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Needs must when the devil drives – Migration of an entire university to digital teaching

Abstract

This study describes how the pandemic and its need for digitization catalyzed broadly implemented further education at the University of Witten/Herdecke. The empirical data consist of 117 courses for the training of 320 university members. In addition, 424 students were surveyed on the perception of digital teaching. It became evident that even though technical knowledge was transferred successfully, the didactic implementation left room for improvement. The results of this study stress that a wide range of training opportunities support the use of technology enhanced learning as well as collaboration between faculty experts, IT professionals and educational developers.

Keywords

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1 Introduction

For decades, technology enhanced learning has been on the agenda of higher education institutions worldwide. But there has never been a more universal and urgent need to digitize teaching and learning than during the COVID-19-pandemic. Though technology enhanced learning (TEL) already emerged in the early 80s of the 20th century (SHAPIRO et al., 1995; HARASIM, 2000; FRIKER et al., 2001) most universities – also in Germany – struggle to make a meaningful and comprehensive deployment (PENSEL & HOFHUES, 2017; KERRES, 2020). This can be seen, among other things, in the fact that new names and formulations are constantly being found in order to drive the application forward with a modern touch: e-learning (GURI-ROSENBLIT & GROS, 2011), distance learning (MOORE et al., 2011) or TEL (KIRKWOOD & PRICE, 2013; HABIB & JOHANNESEN, 2020; SHEN & HO, 2020).

Apart from the discussion about adequate terms, the need for integrating and supplementing traditional face-to-face lecturing with a more diverse portfolio of TEL techniques has long been recognized. This is generally termed blended learning (GARRISON & KANUKA, 2004; GARRISON & VAUGHAN, 2008; BUNDESMINISTERIUM DES INNERN et al., 2014) or flipped classroom (TUCKER, 2012) which also refers to paradigm changes and a shift from teaching to learning (FRIKER & EHLERS, 2003).

In 2019 about 80% of German universities stated that digitization has a high priority, but only 20% claimed to have realized a high level themselves (GILCH et al., 2019). There seem to be many barriers in place towards blended and technology enhanced learning: a great expected effort (CHILDS et al., 2005), reluctance to embrace Information and Communication Technology (RIENTIES et al., 2013), insufficient funding (GETTO et al., 2018) and strict privacy and data protection regulations in Germany (GETTO et al., 2018; KERRES, 2020). Furthermore, professional development needs to be embedded into the academics' daily practice not just into one particular context (LAWLESS & PELLEGRINO, 2007; RIENTIES et al., 2011).

Witten/Herdecke University (UW/H) is no exception to many of the problems stated above, as the universities focus has so far been more on hands-on experiences and eye-to-eye encounters (ZUPANIC et al., 2020; SMETANA, 2019; BLANKERS et al., 2018). UW/H has always excelled from others by work in small groups with

personal contact. As a result, TEL formats have long been neglected and viewed as unsuited for the typical teaching and learning formats at UW/H. Although there have been several projects fostering the integration of TEL into daily learning and teaching, as for example virtual classroom courses (EHLERS et al., 2019), there has not been sustainable and profitable deployment of TEL across the university so far.

The situation concerning COVID-19 resulted in contact restriction orders by which universities were not allowed to continue teaching and learning in enclosed spaces (BRD, 2020). In the initial confusion, some professors and students demanded a free semester (PIORKOWSKI, 2020) Others argued that the COVID-19 crisis might act as a catalyst for TEL implementation because of its sudden and widespread need (BRANDT, 2020; KERRES, 2020). UW/H decided to shift from very interactive, small-group oriented face-to-face didactics to TEL and digital teaching formats (UW/H, 2020).

Three main challenges arose: firstly, how to enable students to continue with their studies, secondly, how to find ways in which the unique teaching and learning culture would not be compromised, and thirdly, the sudden rise in demand for further education for lecturers.

The following paper describes the initiative to teach lecturers in distance teaching techniques and how students did perceive the new teaching formats. In addition, it addresses the question how a change process for a whole university can be organized and how a process that has been dragged out for years can find the acceptance of an entire university community in a very short time.

2 Methods

2.1 Setting

UW/H is the first private university in Germany, founded in 1983 as a reform university (BUTZLAFF et al., 2014). In 2020 a total of 631 people were employed and 2647 students were enrolled (INTERNAL REPORT, 2020).

Teaching and learning at the UW/H are guided by a strictly student-centred approach. Lectures are the absolute exception and problem-based learning (PBL), seminars, exercises and projects in companies and organizations are common methods. That is to encourage student-lecturer interaction and to increase students' and lecturers' self-efficacy and personality development.

The circumstances of obligatory social distancing have led to an urgent necessity to develop training courses tailored to the needs of the university within a few days. For this purpose, a group of experts in the field of TEL has combined the experience, methods and technological solutions already available at UW/H. Various training contents were designed to ensure that the digital courses will meet the requirements of the UW/H teaching. The conception took place in exchange with UW/H internal experts for the single contents and amounted to approximately two weeks. Almost all seminar forms (incl. PBL) could be conducted online. Only the hands-on courses (e. g., examination or dissection courses) had to be temporarily suspended. For administration employees additional training courses on virtual classrooms were offered on a department-specific basis to ensure target group orientation. In the present study, the focus is on lecturers and conclusions for digital teaching.

2.2 Initiative

Four weeks before the start of the summer term 2020 training courses in areas of digital teaching (s. table 1) were offered to train interested lecturers of the UW/H. In addition, about 30 student e-tutors, supported in the use of TEL formats beyond the training courses offered. This support ranged from assistance with the preparation of digital meeting rooms to technical support by attending and moderating classes.

Table 1: Overview of training courses

Theme	Number of trainers who offered the course	Training content
Virtual Classrooms	4	Technical operation, creation and control of virtual classrooms
Moodle	2	Create courses, provide materials, self-tests and exams, interaction in wikis and forums
Feedback tools in virtual classrooms	2	Technical implementation of various digital feedback systems
Youtube Playlists, Lecture Recordings	2	Create and distribute playlists, record own lectures (e. g., Connect, Lecturnity, Screencasts, Video)
Problem-Based Learning in a virtual classroom	5	Technical operation of Zoom in the special case of PBL, share the own screen, use of the whiteboard function, generate and control breakout rooms
Case-based learning (Casus)	1	Use existing cases (PBL, pediatrics), create own cases, let students create cases

Eight trainers were deployed to satisfy the need for training in TEL. The registration for the courses was realized through a Google Table, which was sent via email to the university members. The training courses were scheduled to last 60–90 minutes and took place in Zoom meeting rooms. The number of participants per training was limited to a maximum of six to ensure interactive training with room for specific questions and problems.

2.3 Evaluation

An online evaluation of the training courses was established to adapt contents to the needs of UW/H lecturers immediately. The link to the evaluation survey was sent to the participating lecturers by email directly after each course and took about five minutes. This enabled an iterative adaptation process over the entire training period.

Descriptive statistics are considered for further evaluation, e. g., the acceptance based on participation. Furthermore, to investigate how the digital format is received by students in the summer term 2020 all medical students at UW/H (N = 588) were asked to participate in a survey about the implementation of digital teaching. The participating students were asked to answer questions (s. table 2) on a 6-point Likert-scale. In addition, the students had the option to give qualitative feedback in a text field.

Table 2: Questions asked in the survey to the medical students (translated into English).

#	Question	Scale
1	How was the technical implementation?	1 = unsatisfied
2	How was the didactic implementation?	2 = mainly unsatisfied
3	How was your subjective learning success this semester compared to the previous semester?	3 = occasionally unsatisfied 4 = occasionally satisfied 5 = mainly satisfied
4	How would you rate the group cohesion this semester compared to the previous semester?	6 = satisfied

3 Results

The results presented below have been summarized in three sections. First, it is presented how many training courses and participations took place. Second, it is shown how many courses were offered per theme. Third, the results of the short survey of the students are presented.

3.1 Number of training courses and participation

During four weeks, a total number of 117 training courses with 635 participations from 320 university members took place (s. table 3). The numbers of male and female participants were relatively balanced (145m – 175f). That corresponds to about half of all staff at UW/H. The amount of training courses as well as the participations peaked during weeks two and three. For each training an average of 5.2 ($\sigma \pm$ 0.5) participants were registered.

Table 3: Overview of training sessions per week and number of participations (mean + standard deviation)

Week	Number of training sessions	Number of participations	Participations per training session
Week 1	18	81	4.5 ($\sigma \pm 1.3$)
Week 2	41	238	5.8 ($\sigma \pm 0.6$)
Week 3	44	247	5.6 ($\sigma \pm 1.4$)
Week 4	14	69	4.9 ($\sigma \pm 1.9$)
Total	**117**	**635**	**5.2 ($\sigma \pm 0.5$)**

3.2 Training courses by themes

Over the entire training period, most training courses were on the theme of *virtual classrooms* (s. table 4). This training course was most in demand and served primarily to generate a basic understanding of how to implement an online course and the software in general. Zoom was the only virtual classroom software taught at the end since it proofed to be most reliable. The theme of virtual classrooms was supplemented with training courses on the subject of *feedback in virtual rooms* and training courses on the subject of *PBL*. During the training courses on PBL, lecturers learned how to adopt the eight PBL specific steps (WIJNIA et al., 2019) into a digital format. One of these specifics was the usage of *break-out sessions* in Zoom. Also, one training course for *case-based learning (CASUS)* was offered. Participating lecturers learned how to create virtual patients and use them in an asynchronous learning setting. As this is a special technology already used at UW/H, only a small group of lecturers needed training in CASUS.

For the training offer on *Moodle*, a distinction was made between beginner and advanced level trainings. This change was implemented from the end of week one due to strongly diverging knowledge levels of the lecturers.

Many participating lecturers in the virtual classroom training courses also took one of the training courses on *YouTube Playlists and Lecture Recordings* to make the virtual meetings available to students later on or even to enable asynchronous teaching, which was the main focus. The latter was interesting because it enables the lecturers to plan content better.

During every training session, participating lecturers were encouraged to apply what they had learned at short notice and to contact the trainer if they had any questions. In some cases appointments were made to clarify open questions or provide further details. The FAQs and specific questions were collected, answered and made available on Moodle.

Table 4: Overview of training sessions by theme and number of sessions

Theme		Number of training sessions	
Virtual classrooms		42	
Moodle	Beginners	14	total: 26
	Advanced	12	
Youtube Playlists and Lecture Recordings		17	
PBL in a virtual classroom		16	
Feedback in virtual class-rooms		9	
Group-specific trainings		6	
Case-based learning (CASUS)		1	

3.3 Students perception of digital teaching

A total of 424 medical students (response rate 72.1%) took part in the survey regarding their perception of digital teaching (s. figure 1). Of the students participating, 86.8% were satisfied with the technical implementation and less than 1% were very dissatisfied. In contrast, only 67% of the respondents were satisfied with the didactic implementation, of which as many as 13% were dissatisfied. Compared to the previous semester, learning success and group cohesion were rated positively by about half of the students. Among the respondents, 57.6% rated the learning success positively, but only 7.2% were very satisfied and just as many were very dissatisfied. In terms of group cohesion, only 55.6% were satisfied, but 12.8% were very satisfied.
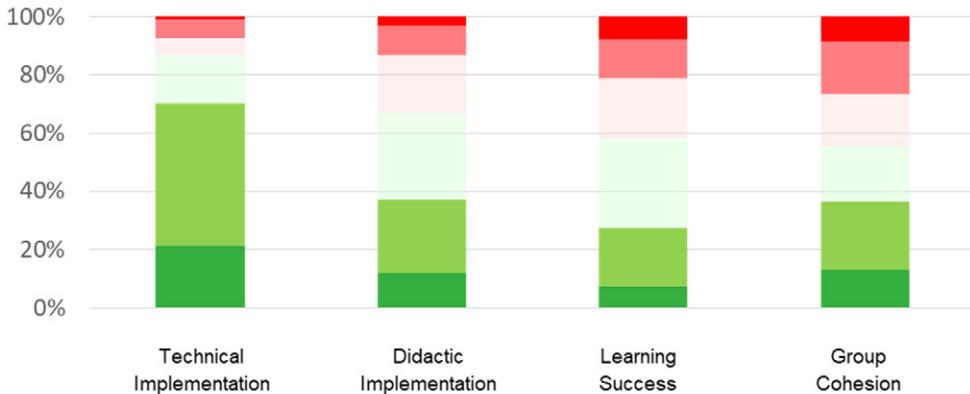
Figure 1: Results of the survey 'How satisfied are you…?' in a stacked column chart (● (very) satisfied; ● (very) unsatisfied)

Especially the free text comments of the students indicated a great appreciation about the fast implementation and continuation of the study programme, but also the need for an improved online didactic.

'Definitely the best has been achieved in the current situation. I am very grateful for the implementation, which was very successful after all.'

'Many lecturers seem to have no interest in this format [...] without transferring knowledge.'

Although many students, including freshmen in particular, were enthusiastic about the efforts made, a desire for greater encouragement of interaction and stronger community building was expressed.

'I'm still delighted that we had a good start to the first semester as freshmen [...] friends told me how things went at universities elsewhere.'

Students missed courses that could not be fully replaced in digital format, such as examination and dissection courses. However, it is also noteworthy that some students commented that they did not feel disadvantaged in any way.

4   Discussion

This study presents the results of a dynamic project in which lecturers were trained to migrate an entire university to TEL in the shortest possible time. The digital format was well received not only by the lecturers, but also by the students.

It is of great importance to avoid 'first-order obstacles'. First, a robust and technically reliable infrastructure is considered a crucial factor for the introduction of TEL (GARRISON & KANUKA, 2004; ADEKOLA et al., 2017). Second, time to develop skills and confidence in order to keep user motivation high is indispensable (ARMSTRONG, 2019). Therefore, mapping training courses via Adobe Connect was not an option after server problems, in order not to jeopardize the project. Anyway, it is best if the software can be hosted on a universities' own server and a comprehensive security concept exists.

Since one of the digital experts is also the UW/H Vice president, a very short-term implementation of the initiative was possible with short decision-making processes. Otherwise it is advisable to set up a department responsible for TEL in order to be able to act spontaneously if necessary and to ensure quality standards, as recommended by SOSTMANN et al. (2011).

People involved must support the digital format to successfully implement TEL. Results show that a large number of lecturers used the short-term offer to prepare for working under pandemic conditions. Consideration of participants' expectations is one of the key factors to generate engagement (FRAND, 2000; ADEKOLA et al., 2017). A high degree of flexibility from the trainers was demanded because an ongoing adaptation of the training content was necessary to deal with changes in the software and lecturers' wishes. The trainers could continually expand their knowledge, pass it directly on to the lecturers and empathize with them. At the point where other universities had demanded a vacant semester in an open letter (#nichtsemester), the UW/H developed a concept for a digital semester as quickly as possible in collaboration of all involved.

Student e-tutors supported the project in addition to the trainers. This tandem approach was not only owed to the forced and time-critical changeover to digital teaching and learning formats in 2020 (ABLER et al., 2020), but it is based on the Witten

didactic concept. These same e-tutors could enrich the content of the training courses in the long term.

Technological and didactic support is indispensable for the sustainable integration of TEL (GARRISON & KANUKA, 2004; PORTER et al., 2014). Especially in the context of the limited preparation time, this was the key factor for the introduction at UW/H. Subjectively, the efforts made seem to have led to the fact that the hurdles and challenges with regard to TEL appeared to be lower in the short term. Although the training courses mainly dealt with the technical implementation and served as a kind of instruction manual, the didactic procedure was implicitly taught and practiced in the context of online events. This included information on how to handle group discussions and lectures in the virtual room (e. g., default setting: microphone muted, use of status icons for voting). In this context, it became apparent that one of the greatest challenges was to familiarize lecturers with the administrative workload of such an event (e. g., creating an account). It was particularly important to formulate how the organization of TEL can succeed.

In the training courses offered, the idea of interdisciplinarity was put into practice quite clearly and for weeks on end, resulting in a very lively exchange about the respective circumstances and difficulties, which demonstrated the advantages of interdisciplinarity work (ABLER et al., 2020). At the same time, this very dynamic composition created an enormous challenge. In the course of the adjustments, e. g., the Moodle course was divided into beginners and advanced to gain a higher benefit – this was well received according to the trainers (verbal feedback from the lecturers). In a subsequent implementation, other training offers should be adapted to achieve better target group orientation.

In order to meet the students' desire for better online didactics and to provide a wide array of frequent further education opportunities (JOKIAHO & MAY, 2017), the programme of workshops on online didactics was expanded to a total of twelve topics (UW/H, 2021). The newly designed workshops – e. g., video didactics – are very well received by the lecturers. Moreover, to meet the requirements of digital learning, an asynchronous training offer was introduced.

It became particularly clear that an increased effort was necessary to maintain a sense of community. To strengthen the group cohesion a wide range of online events has been developed, e. g., social events for all students (e. g., Get Together via Zoom,

Beer night via Gather Town) and video greetings for freshmen. The entire university community was kept up to date on current events (e. g., "This university is still in action", "Digital ground-breaking ceremony") and digital live events provided opportunities for direct exchange, e. g., at a Christmas party where all guests also received a package with small items to strengthen a sense of community.

The experiences from the summer term 2020 are being incorporated into a guideline on "digital teaching after COVID-19". The present project should be understood as an emergency package that was appropriate to the situation in order to sufficiently set up the UW/H for digital teaching in times of the pandemic. Providing direction in times of uncertainty and perceived powerlessness in order to strategically position the UW/H was the goal. In summary, a university is an educational and living space – which is shaped by the community – for the entire university community and it must offer more than just information.

In conclusion, this project shows that the choice of the constructivist learning approach for this format has been confirmed as effective. Implementation barriers were kept low by orienting the content of the training courses towards the participants needs. There will be no technology supported learning for each module at UW/H in order to avoid a wear-out effect (WANG, 2015). The challenge is to use digital tools only if they offer added value. A culture that encourages critical reflection on the design and use of TEL is the goal (MCCONNELL, 2018). This critical reflection can simultaneously act as a driver of change towards technology-based learning because it proves that a quick change is possible when the pressure is still high enough. Or: Needs must when the devil drives.

On a glance: critical factors to introduce TEL

- robust and technically reliable infrastructure
- appropriate structural embedding of the training program
- ongoing adaptation of the training program for target group orientation and software changes
- combination of technological and didactic support
- inclusion of student e-tutors complementary to trainers
- promotion of exchange and discussion
- PBL approach

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