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Continuing Digital Higher Education Teaching in the post COVID-19 Era: A Qualitative Survey on Success Factors

Nicole Draxler-Weber, Fynn-Hendrik Paul, Uwe Hoppe
Department Organization & Information Systems, Osnabrück University, Germany.

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Abstract

The COVID-19 pandemic has forced higher education institutions (HEIs) worldwide to a rapid transition to digital higher education teaching (DHET), which can now be considered implemented. Digital technologies have already found their way into teaching and are the new normal. The future of DHET envisages a mix of digital and face-to-face teaching. In this contribution, a qualitative survey is analyzed to identify the success factors necessary for continuing DHET in the long term. Eleven success factors were defined and grouped into the categories of technology, human, and organization. The results show that the successful continuation of DHET requires an even stronger focus on significant success factors as part of the socio-technical approach.

Keywords: *Digital Teaching; Success Factors; Higher Education Institutions; Post COVID-19 Pandemic; Digital Transformation; Qualitative Study.*

1. Introduction

Digital technologies are capable of transforming the environment in which organizations operate (Osmundsen et al., 2018). This induced digital transformation is gaining attention in all areas of business and life. In higher education institutions (HEIs), digital transformation impacts the learning and teaching environment with digitally enhanced teaching methods. It enables autonomous, flexible, and more collaborative teaching concepts (Benavides et al., 2020). Before the COVID-19 pandemic, discussions on digitization in teaching were ongoing, but full-scale digital higher education teaching (DHET) had never been fully adopted (Tesar & Sieber, 2010). Throughout the pandemic, traditional face-to-face teaching gave way to online education. Lasting changes in HEIs are excepted, making a return to previous practices increasingly unlikely. DHET appears the new normal (Rapanta et al., 2021) because technologies are an integral part of the educational environment (Norberg et al., 2011). Therefore, DHET represents a large area of research. One research focus is success factors (SFs) that represent "those few

things that must go well to ensure success for a manager or an organization" (Boyton & Zmud, 1984). So far, research into the SFs for DHET has focused primarily on its implementation. SFs for implementing DHET before and during the COVID-19 pandemic have been widely examined in the literature (Alqahtani & Rajkhan, 2020; Cheawjindakarn et al., 2012). However, there is a lack of knowledge about SFs from the perspective of teachers if DHET has already been introduced and is to be continued. Although HEIs around the world are returning to on-campus teaching, future concepts envisage a combination of face-to-face and online teaching (Imran et al., 2023). The knowledge gained during the pandemic should therefore be preserved and applied in the future. This article contributes to it by answering the following research question: *What are the SFs for continuing DHET in the post-COVID-19 era?* The aim is to accumulate the teachers' knowledge and experiences from interviews on how to successfully continue DHET free from pandemic restrictions. In this way, fields of action are revealed, and it is made transparent what needs to be promoted by HEIs to ensure that teachers are still willing to conduct DHET.

2. Research Method

In the investigation of SFs, consulting teachers is primarily appropriate because they play a crucial role in shaping the future of DHET. Intending to provide detailed and in-depth insights, a qualitative study design was followed. In the data collection phase, teachers from a single German HEI with experiences in DHET were asked to participate in an interview. The sample shown in Table 1 comprises 21 respondents, 8 of whom already had experience with DHET before and 13 of whom during the pandemic. The interviews were led during the COVID-19 pandemic, so they were conducted by telephone or video conferences. A semi-structured interview guide with key questions was used. First, information about the interviewees was collected, followed by two questions on SFs for the continued use of DHET: *(1) Will you voluntarily continue to use and actively promote DHET once the COVID-19 pandemic has ended? (2) What conditions and requirements have to be met for DHET to be further used?* These question types encourage to provide open and detailed responses.

A qualitative content analysis was applied to the open questions. The text excerpts extracted from the transcripts underwent organization and paraphrasing. In total, 50 statements were analyzed. Within these statements, analogous or identical basic sentences were collated and categorized into SFs, following an inductive approach. SFs were formulated iteratively until the entire content was captured in this way (Mayring, 2014). The SFs were then inductively assigned to superordinate categories. The categorization of the SFs and categories were elaborated and discussed among all authors of the contribution. A partial inter-coder agreement test was carried out.

Table 1. Sample Description. Source: Own survey.

Characteristics (N)	Gender	Age	Job activities	Department
	Male (13)	20-30 (6)	Teaching (4)	Linguistics and literature (2)
	Female (8)	31-40 (5)	+ Research (16)	Cultural and social sciences (6)
	Not stated (0)	41-50 (3)	+ Board work (1)	Mathematics and informatics (1)
		51-60 (2)		Legal studies (1)
		> 61 (1)		Education and cultural studies (2)
		Not stated (4)		Business economics (4)
				Human sciences (4)
				External (1)
				Not stated (0)

3. Findings

This qualitative study focuses on identifying SFs for continuing DHET after the pandemic. Before presenting these findings, an overview of the teachers' intentions regarding DHET is given. The majority of the respondents are positively disposed towards continuing DHET. 19 out of 21 respondents specify to continue DHET even after the pandemic is over. One respondent excludes this option completely and intends to return to traditional face-to-face teaching, while another person is still undecided. Among the proponents of DHET, 10 teachers add they can only imagine DHET in a mix with face-to-face teaching: "*I am absolutely convinced that this is the future of teaching in higher education, with blended learning formats, with face-to-face and online teaching*" (Interviewee 3) and 4 respondents emphasize the continued use of DHET as an enhancement of traditional teaching with digital elements: "*I am switching to digitally supported face-to-face teaching*" (Interviewee 6). The majority acceptance of DHET among the interviewees reinforces the consideration of SFs for continued use. 11 SFs for continuing DHET were identified, which could be assigned to 3 categories: Technology-related SFs refer to all hard factors associated with technical requirements. Human-related SFs focus on softer aspects that go hand in hand with the attitudes of teachers. The organization-related SFs refer to strategic, structural, and procedural factors of the HEIs driven and managed by the HEI management. The results are shown in Table 2 and described in the following using quotes from the interviews.

Reliable Internet connection. The interviewed teachers consider the Internet connection as a prerequisite for data transfer. This is not possible if the quality of the Internet connection varies from area to area. For example, one teacher observed that students from rural areas have much greater Internet connection problems than students living in urban areas. Another interviewee states that DHET should offer equal opportunities for all students: "*It is not in the spirit of a course that those who have better connections are preferred and others who do not have them only have access to a third or half of the lecture*" (Interviewee 2). Thus, the reliability of the Internet connection is an identified SF.

Table 2. Success Factors. Source: Own survey.

Category	Success Factors	N
Technology-related	Reliable internet connection	4
	Available hardware	7
	User-centered application software	3
	Scalable application software	3
	Wide range of application software	3
Human-related	Digital mindset	3
	Efficient exploitation of teaching material	2
Organization-related	Digital-ready HEI policies	7
	Provided support services	11
	Allocated resources	4
	Encouraged collaboration	3

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Available hardware. Alongside the Internet connection, hardware that meets the requirements of teachers and students is also needed. One interviewee summarizes: *"But overall, the digital equipment of the students is simply the decisive factor"* (Interviewee 4). That includes laptops, tablets, webcams, and more. In addition, the hardware on the campus is also important. Either missing equipment has to be procured or existing technology has to be extended and maintained regularly: *"I mean, we still have overhead projectors, but you can't use them for digital teaching or recordings. We simply don't have the equipment in the auditoriums for the future"* (Interviewee 20).

User-centered application software. During the pandemic, HE teachers acquired experiences regarding diverse application software for DHET, like learning management systems (LMS) or video conferencing systems. Some limitations and complexities of the software tools have become apparent, so teachers are looking for an adaptation and continuous development of the functionalities. One interviewee clarifies that acceptance of digital tools is essential, which can be promoted by ensuring that the tools are "*definitely intuitive*" (Interviewee 11). Existing application software must be regularly tested for the functional scope and its development potential. One respondent would like to be involved in the development of new functions: "*I would of course be delighted if [the developers] [...] continue to think about [the functions] and*

develop it further together with us" (Interviewee 7). All in all, the focus should be on the needs of the users and their requirements should be regularly queried to achieve a user-centered application software that is needed.

Scalable application software. The capacities of the servers and the used application software were perceived as inadequate by the teachers. The interviewees are concerned that the "*[server] capacities should not be further reduced*" (Interviewee 7). With large numbers of participants, for example, a video conferencing system provided by the HEI collapsed: "*I have a third semester lecture with 350 people, I can't do it live with them*" (Interviewee 5). Scalable application software that can be reliably used for all lecture sizes has proven to be a SF.

Wide range of application software. Alternatively, more selectable software options are suggested. The openness of HEIs to offer a wide range of software is a possible factor in achieving success in DHET. Every teacher has different needs, which can vary from lecture to lecture. This is difficult to cover with one application software. For example, in one interview the teacher asks for an alternative LMS. Having more tools to choose from would allow teachers to meet their DHET needs.

Digital mindset. Teaching in a new digital environment requires awareness by both teachers and students side. One interviewee sums it up as "*together we will learn to trust each other digitally*" (Interviewee 17). The lack of use of a webcam on the student's side can be seen as an example of mistrust, as another interviewee indicates. With a digital mindset, these barriers can be overcome and the use of DHET successfully continued.

Efficient exploitation of teaching material. To continuously use DHET, the efficient working of teachers is a SF. On the one hand, the initial development of DHET materials is often more time-consuming than that of traditional formats. On the other hand, DHET materials offer the possibility of reusing them. A respondent recommends "*build up a database or something [...] from which you can then draw so that you don't have to develop everything from scratch every semester*" (Interviewee 18). Another interviewee emphasized that the reuse of materials should be legitimate and a "*self-commitment [of the teachers] to update the teaching content*" (Interviewee 15).

Provided support services. For the continued use of DHET, teachers are requesting more support for both technical and didactical issues. This support can be offered through consulting or training for teachers who feel underqualified. One respondent even suggests a seminar format supplemented with individual tutorials if required. This way, individual competence gaps can be better addressed. Further support can be provided by instructions and manuals: "*there must be valid templates or blueprints or some kind of a procedural model for the best way to set up a lecture*" (Interviewee 15). These can also relate to the correct use of application software and "*should also be given to students*" (Interviewee 11).

Digital-ready HEI policies. Teachers call on HEI management to emphasize the importance of continuing DHET and to set the appropriate framework conditions for it. One interviewee criticizes that teaching at HEIs often takes second place to research. Good teaching has to be prioritized again, for which a "*university-related change in attitude*" (Interviewee 20) is necessary. Teachers would also like to choose which lectures they offer face-to-face, digitally, or a mix of both. This requires guidelines that define the framework conditions for DHET. Upgrading HEI policies to digital-ready HEI policies is a SF for the use of DHET in the future.

Allocated resources. The HEI handles the provision of resources for DHET. However, the teachers "*fear that the funds will be canceled*" (Interviewee 20). The interviewees see the long-term use of DHET as promising if the efforts are also recognized at the HEI management level. Teachers themselves can be granted more time and resources for preparing DHET. At the time of the interviews, DHET effort is not considered in the teaching loads "*[…] and as long as that's not the case, not many will do it*" (Interviewee 13). Apart from that, staffing resources can be made available that support teachers, such as student assistants. Regardless of the type, resources are a SF for the continued use of DHET in the future.

Encouraged collaboration. *"I think best practices need to be shared more"* (Interviewee 16) shows that collaboration between teachers has to be encouraged. Thus, a HEI can create various opportunities. Suggestions, such as work groups for the exchange of experiences as well as materials, emerge from the interviews. The willingness of teachers is given: "*I simply passed on a presentation because the introduction is similar in another seminar*" (Interviewee 18). Such opportunities can be further exploited if the HEI continues to encourage collaboration.

4. Concluding Discussion

After the disruption caused by the COVID-19 pandemic, DHET has become essential but its continuation is very individual. Most teachers would like to incorporate digital elements in combination with face-to-face elements, which is seen as the DHET form of the future (Imran et al., 2023). In this contribution, SFs for the continuation of DHET were identified in three categories, highlighting the tension between technological, human, and organizational factors. The interaction between the components has been already described by the Man-Technology-Organization analysis (Strohm et al., 1997). Consequently, the success of DHET as the new normal does not depend on technology alone. The resulting DHET success model places equal emphasis on social and technical aspects. The most frequently mentioned category was organization. Teachers believe HEIs should create the conditions by supporting teachers in their work to continue DHET and by setting policies that provide both the framework for DHET and sufficient room for teachers to maneuver. Technology is the second most mentioned category. Within, the different needs of the teachers become clear. Whilst identical conditions were mentioned for hardware availability and internet connection, the expectations for application

software are different. While some respondents are in favor of their institution's software solutions but call for further development of their functionality, others find them so inadequate that would like to see a wider range of tools, including external ones. In this respect, new digital technologies have serious potential to enrich teaching and make it more attractive for teachers and learners. For example, the integration of artificial intelligence could enable intelligent tutor systems, personalize learning objectives and content, and automate grading (Zawacki-Richter et al., 2019). The scalability of the application software capacities is also discussed, with one lecturer mentioning the possibility of switching to external tools. Identified technology-related SFs for continued use of DHET coincide with dimensions of the Information System Success Model (Delone & McLean, 2003). A reliable Internet connection, available hardware, and application software that meets the requirements of all lecture types and sizes affect the system and information quality. As has been emphasized, the ease of use through intuitive handling of software functionalities must be given high priority to acquire user satisfaction, resulting in accepting and continuing DHET methods. The fewest mentions are in the human category. Here, a distorted self-perception by the teachers may have biased the results. It is noteworthy that previous contributions have identified a significantly higher number of SFs for implementing DHET. For example, another research also addresses SFs that explicitly deal with social interaction and students' attitudes, such as self-efficacy, cooperation, and commitment (Magd et al., 2022). This clarifies that the SFs presented in this contribution do not represent the totality of all requirements for DHET in general, but focus on continuity. This also reflects the experience gained, which is significantly higher in the post COVID-19 era. At the same time, a smaller selection of factors is the aim of the SF concept: HEIs must concentrate on these few aspects to be successful. As the main success areas are addressed and not all barriers that might be encountered, a holistic overcoming of barriers is not to be expected. Further research should investigate the interactions between these success factors, as these conclusions could not be drawn from the data presented here. The contribution is not without limitations. Conducted at a German HEI, it may yield different results if expanded globally. While the use of qualitative data provides very good insights into the respondents' assessments, it carries the risk of interpretation. Involving a larger teacher sample could enhance objectivity. An attempt, under Mayring (2014) has been made to minimize subjectivity through independent coding by the authors and an iterative check of the categorization. In addition, the interviews were conducted during the pandemic, whereby it can not be excluded that the teachers' perceptions are influenced by pandemic restrictions. Nonetheless, the findings can help HEIs create an awareness of the SFs for their continuation of DHET. The SFs can be used to categorize the status quo to derive further measures to achieve DHET success.

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