

# Digital University: A Comparative Study in COVID-19 Times - Investigating the Impact of the Pandemic on the Acceptance of e-learning, Distance Learning, and Distance Teaching

*This paper explores a comparative study on the Digitalization in Teaching conducted by the FHWien der WKW (FHW) at the very beginning of the pandemic, with a follow-up one year later, after the complete changeover to distance learning. The study investigated behaviour and preferences of students and teaching staff as linked to their experience with digital tools both initially and after that year. The results were compared to the results of similar studies, focusing on answering the question about the impact of digital education on the acceptance of the digital tools and processes. This paper presents the findings of the FHW study examining the acceptance or rejection of e-learning by students and teaching staff by exploring their needs, questions, and requests. The research uses acceptance theory in its theoretical underpinnings. Its methodology consists of a quantitative survey of students and teaching staff, as well as the review of studies on related topics. The outcome of this study shows that, after a year of being forced to work with digital tools, attitudes among students and teaching staff generally became more accepting and shifts in their needs and requests could be observed.*

**Keywords:** *distance learning, digital tools, post-secondary education, e-learning, acceptance*

## Introduction

The COVID-19 pandemic, the most profound health crisis of the past hundred years, has been with us for about two years. The effects of this crisis have changed the ways in which we live, affecting all aspects of our lives. No other phenomenon in recent years has so fundamentally shaken our societies, nor to spread across the world at such speed (Skillsoft 2020).

The specific research area of this paper is the education sector, which was particularly affected by the imposition of measures enforcing social distancing and resulting in the closure of the majority of higher education institutions (Al-Kumaim et al., 2021, Holzer et al., 2021, Taga et al., 2020, Mohamed et al., 2020). The sudden closure of many educational institutions created challenges for both students and university staff. During this time, many educational institutions surveyed their students and employees on the impact of the sudden changes (Arndt et al. 2020, Pausits et al. 2021). Generally speaking, even those educational institutes that were already familiar with digital educational tools and distance learning were caught off-guard by the pandemic and the measures enacted to control it (Berghoff et al. 2021; Marczuk et al. 2021). While scholars acknowledge that the concept of online learning is not new, they also recognise that the digitalization of higher education accelerated dramatically

1 during the pandemic (Hargitai et al., 2021, Al-Kumaim et al., 2021, Kreulich et  
2 al., 2020).

3 Vienna's University of Applied Sciences for Management and  
4 Communication – FHWien der WKW – is a rather small Austrian university  
5 with approximately 3,000 students spread across 10 Bachelor and 8 Master  
6 programs. The implementation of pandemic mitigation measures triggered a  
7 digitalization push throughout FHW's teaching and learning activities, with the  
8 rapid deployment of digital tools and methods across a wide range of course  
9 types. Such changes have fundamentally changed the way online teaching is  
10 approached by universities, where digital skills are in greater demand than ever  
11 (Farnell et al., 2021, Berghoff et al., 2021, Kreulich et al., 2020). While the  
12 trend towards digitalization in higher education is nothing new – also at the  
13 FHW, which has long embraced digitalization in teaching – the novel  
14 conditions of 2020 and 2021 necessitated a faster and wider implementation  
15 than many had previously expected (Kreulich et al., 2020).

16 “Pre-pandemic” efforts towards digitalization in teaching were constantly  
17 surrounded by concerns about effects on the quality of teaching and about the  
18 acceptance of the tools (Söbke/Reichelt 2016). At the same time, the  
19 introduction of digital/virtual distance learning is recognized as bringing  
20 advantages, such as the promotion of individual learning, independent of time  
21 and space, as well as greater flexibility during studies through video  
22 conferencing, interactive exercises, streaming, and online learning platforms  
23 (Marczuk et al., 2021, Berghoff et al., 2021, Kreulich et al., 2020). Given  
24 recent upheavals and arguments on each side of the equation, this is an  
25 opportune moment to investigate how students and faculty view these  
26 developments, and how they deal with the digitalization and virtualization of  
27 teaching after more than a year of first-hand experience.

28 This article is based on studies conducted by a team of experts in the  
29 digitalization of communication at FHW, who have been investigating digital  
30 trends in higher education since 2019. This research project, funded by the city  
31 of Vienna, focuses on digital communication trends in higher education and  
32 developments in digital communication studies. Since the outbreak of COVID-  
33 19 in Austria during March 2020, the project has expanded its research interest  
34 to include students' and lecturers' experiences during the pandemic.  
35 Accordingly, four surveys have been conducted so far, with two targeted at  
36 each group: students and lecturers. This study includes four waves of data  
37 collection, from Spring 2020 to Spring 2021.

38 This longitudinal data on attitudes and experiences, collected during a  
39 period of substantial regulatory and institutional change, enables exploration of  
40 the acceptability of digital teaching in light of the changes brought about by  
41 social-distancing measures. Thus, the guiding research question addressed here  
42 is:

43  
44 *How did the sudden shift to online education during the COVID-19 pandemic*  
45 *affect students' and educators' acceptance of digitalization in Austrian post-*  
46 *secondary education?*  
47

1 The COVID-19 pandemic can be considered as an exceptional set of  
2 circumstances, which, in many cases, forced the rapid transition to e-learning,  
3 distance learning, and distance teaching. In this light, results of the  
4 aforementioned surveys into students' and lecturers' acceptance of digital  
5 teaching and learning can be understood as short-term consequences (Farnell et  
6 al., 2021). These factors notwithstanding, the longitudinal analysis of this data  
7 by the Competence Team for the Digitalisation of Communication can provide  
8 important lessons for improving the overall online learning experience for all  
9 parties involved in higher education (Marczuk et al., 2021, Walwyn, 2020).

10 This paper is structured in the following format: After this introduction the  
11 next section presents a short literature review and the theoretical framework of  
12 the research question. Section 3 focuses on the methodology and is followed by  
13 the results section, in which the empirical findings are explained, and the last  
14 section concludes the study.

### 17 **Literature Review**

18  
19 The changes caused by the COVID-19 pandemic made it necessary for  
20 universities to regard digitalization as a strategically relevant topic, with many  
21 forced to implement a rapid transition to virtual teaching and learning in early  
22 2020. During this adaptation to e-learning, and despite the extra workload  
23 implied, universities also seemed to increasingly launch surveys related to the  
24 digitalization process (Arndt et al. 2020). In the final report of the research  
25 project BRIDGING, Arndt et al. (2020) question the extent to which  
26 digitalization influences traditional transfer strategies for the development and  
27 dissemination of concepts and content in higher education. Accordingly, the  
28 research team conducted a supplementary qualitative study of internal surveys  
29 of teachers and students at German universities carried out during the summer  
30 semester of 2020. Likewise, the report "Distance Learning at Austrian  
31 Universities and Colleges in the Summer Semester 2020 and Winter Semester  
32 2020/21" (Pausits et al. 2021) attempts to bundle and systematize the research  
33 work of Austrian universities into "distance education" during 2020. The  
34 following main results of these two studies have substantially informed the  
35 current research:

36 The content analysis by Arndt et al. (2020) of surveys related to  
37 digitalization within universities identified 13 areas of relevance: (a)  
38 workload, (b) life situation, (c) progress through studies, (d) examinations and  
39 forms of assessment, (e) learning progress and organization, (f) communication  
40 and interaction, (g) previous experience, (h) media-technical and didactical  
41 competences, (i) technical equipment, (j) technical infrastructure and tools, (k)  
42 virtual teaching and learning scenarios, (l) support and support needs, and,  
43 finally, (m) evaluation of the change process. The FHW surveys on which this  
44 paper is based focused particularly on areas (a), (b), (c), (h), (e), (h), (i), (j), (k),  
45 and (l). For the purposes of this paper, however, areas (a), (b), (h), (j), and (k)  
46 are of particular relevance and a short summary of Arndt et al.'s results in these

1 areas is presented below to facilitate comprehension of the similarities and  
2 differences between the FHW study and other related studies:

3 Ad (a) workload: Arndt et al.'s research stated that the workload was  
4 considered by the majority of both students and instructors to be (significantly)  
5 higher compared to face-to-face semesters – as a rule, more so by teachers than  
6 students.

7 Ad (b) life situation: Particularly the lack of workplaces for concentrated  
8 work and learning, financial burdens, and psychological stress can make  
9 learning and teaching more difficult. These may also be reasons for the often-  
10 expressed desire for physical presence in the sense of reopening learning  
11 spaces.

12 Ad (h) media-technical and didactical competences: Both teachers and  
13 students reported an increase in competence and saw this as creating  
14 opportunities for virtual teaching in coming semesters. In addition to the  
15 competence from a technical perspective, also the improvement of didactical  
16 competencies comes here into focus.

17 Ad (j) technical infrastructure and tools: The majority of teachers use  
18 learning management systems and video conferencing systems, primarily  
19 Zoom, on account of its high performance. Differentiation between knowledge  
20 and ability proves to be critical with respect to infrastructure and tools.

21 Ad (k) virtual teaching and learning scenarios: As students consider  
22 exchanges with teachers as important, they desire more than just self-learning  
23 materials. Combinations of asynchronous and synchronous teaching and  
24 learning scenarios meet the different needs and desires of both instructors and  
25 students. The designing of virtual teaching and learning scenarios, and  
26 particularly maintaining communication and interaction, generated a high  
27 workload for lecturers and various support staff actors at the universities both  
28 before and during the 2020 summer semester. Meanwhile, however, they  
29 adapted their offers to meet the needs of students and teachers.

30 Pausits et al. (2021) came to the conclusion that successful conversion to  
31 distance learning required of lecturers the following competencies:

- 32
- 33 (a) skilled handling of Internet-supported teaching technologies, such as  
34 the operation of video conferencing systems and learning management  
35 systems (media informatics),
  - 36 (b) knowledge of possibilities for the methodological-didactic design of  
37 courses in distance learning (media didactics),
  - 38 (c) knowledge about the design of digital learning resources, such as  
39 learning videos (media design), and
  - 40 (d) independent management of their full scope of professional activities,  
41 including exchanges with colleagues for research activities, from their  
42 homes with the help of Internet technology.
- 43

44 Regarding the results for universities students, Pausits et al. (2021)  
45 concluded that the initial surveys paint a positive picture of universities' rapid  
46 responses in crisis mode, but at the same time list some key challenges that

1 have become ever more prominent as the pandemic has progressed. These are  
2 related to:

- 3
- 4 (a) a lack of physical learning spaces,
  - 5 (b) a lack of social contact with colleagues (Gabriel/Pecher, 2020;  
6 Lehner/Sohm, 2021; Schwab et al., 2020; Pausits et al., 2021;  
7 Meyer/Mara, 2020; Weinberger, 2020),
  - 8 (c) less enjoyment of studies conducted through individual learning  
9 (Schwab et al., 2020),
  - 10 (d) limited possibilities for group work (Gabriel/Pecher, 2020;  
11 Lehner/Sohm, 2021, Schwab et al., 2020),
  - 12 (e) increased difficulties in communication with individual teachers  
13 (Schwab et al., 2020; Pausits et al., 2021; Ledermüller et al., 2020),
  - 14 (f) high workloads in distance learning resulting from an underestimation  
15 of the workload by instructors (Schwab et al., 2020; Weinberger, 2020;  
16 Ledermüller et al., 2020).

17

18 The reviews by Arndt et al. and Pausits et al. expose a raft of important  
19 considerations that helped to inform the current study, as well as revealing  
20 common experiences at other universities, against which the FHW data can be  
21 benchmarked. First, two key aspects of the research question are defined in  
22 detail in the sections below: 1) distance learning and distance teaching, which  
23 are of equal significant here, as the main survey addresses the challenges and  
24 needs of both students and teachers; and 2) the concept of acceptance, which  
25 we operationalize by drawing on the theoretical foundations of acceptance  
26 research. A further important aspect is the context of the study, which was  
27 conducted with students and lecturers of the FHW, who experienced the  
28 pandemic-related changes in a common context. An explanation of this context  
29 is integrated in the following sections to increase the validity of the  
30 comparative analysis by setting the data within a realistic framework, while  
31 demographic data on the study participants are presented in the methodology  
32 section.

### 33

### 34 **Distance Learning and Distance Teaching**

### 35

36 Distance Education is nothing new: already in the 19th century distance  
37 learning courses were offered to soldiers (Kentnor 2015), while institutions  
38 made course content available to students for the purpose of self-study. Some  
39 of the most defining characteristics are the physical separation of teacher and  
40 learner, learning in the context of (yet not within) an educational institution,  
41 and the use of communication media such as radio, television, mail, internet,  
42 etc. in teaching (Fidalgo et al. 2020).

43 In Germany, the term “distance education” is defined in the 1977 Distance  
44 Education Protection Act as the transmission of knowledge and skills on a  
45 contractual basis, in which the teacher and the student are exclusively or

1 predominantly physically separated, and the teacher or their representative  
2 monitors the learning success of the students (FernUSG § 1 Abs., 1976).

3 With the advent of the Internet as a knowledge exchange platform  
4 providing possibilities for online data transfer, a previously unimaginable  
5 variety of distance education methods and tools has emerged. “Distance  
6 education was based on the premise that education was possible without the  
7 face-to-face interaction between the student and teacher. [...] Today, with the  
8 advancements in communications technology and the connectivity of  
9 computers and the Internet, distance education is commonplace.” (Kentnor  
10 2015)

11 Recent developments in communications technologies have increased  
12 usage of the term “distance learning”, placing it in close relation to e-learning,  
13 virtual learning, or online learning. The FHW uses the potentials of e-learning  
14 to better address individual needs and to achieve a wider reach of teaching  
15 content. Digital infrastructures enable, among other things, asynchronous  
16 teaching, educational games, the creation of discussion forums, and  
17 synchronous virtual contact between students and teachers. Digital teaching  
18 methods thus offer extraordinary flexibility in designing learning processes and  
19 should therefore provide for improved learning motivation among students  
20 (Reiss/Steffens 2010).

21 Before the year 2020, the FHW was not interested in radically replacing  
22 traditional learning content with virtual content, but rather in enhancing it by  
23 blending real and virtual learning offerings. The terms “augmented learning”  
24 and “blended learning” accurately express FHW's original intention, yet this  
25 intention changed significantly when pandemic mitigation measures forced a  
26 complete change to distance learning in a very short time period. The FHW  
27 used this as an opportunity to learn more about the possibilities for digital  
28 design in teaching as well as to better understand the acceptance of distance  
29 learning by students and teachers, given the circumstances.

30 Despite being two sides of the same coin, this article distinguishes between  
31 distance learning and distance teaching in order to precisely address the  
32 challenges that are experienced differently by students and teachers in distance  
33 education.

### 34 35 **Acceptance Definitions**

36  
37 In discussing the acceptance of digital teaching, we apply the term as  
38 defined by Simon (2001) with respect to the acceptance of innovations:  
39 Acceptance stands in opposition to the term rejection and denotes the positive  
40 acceptance decision of an innovation by the users. The central elements of  
41 acceptance research are (a) the acceptance concept (What does acceptance of  
42 an innovation mean?), (b) the users (who has to accept an innovation and  
43 how?) as well as (c) the innovation (what is to be accepted?). (Simon 2001)

44 Attitudinal acceptance (Müller/Müller 1986) comprises both affective  
45 (emotional) and cognitive (rational) components. The affective component  
46 considers motivational-emotional states associated with the innovation. The

1 cognitive component weighs the costs and benefits of an innovation, taking  
2 into account personal context. Attitudinal acceptance by users is not directly  
3 observable. Behavioral acceptance (Müller/Müller 1986) extends the  
4 acceptance concept by an activity aspect. Behavioral acceptance is spoken of  
5 when innovations are accepted in the form of an observable behavior, such as  
6 use (Simon 2001).

7 Acceptance research also investigates the reasons for the acceptance of  
8 technological innovations with the aim of identifying and counteracting,  
9 undesirable developments as early as possible (Schlohmann 2012). The  
10 research interest of this article, the digitalized teaching program of the FHW, is  
11 considered as the innovative "product" and is examined according to its  
12 acceptance by students and teachers. Because the digitalized educational  
13 program relies on technological implementation and technical skills, the  
14 Technology Acceptance Model (TAM) is adopted as the reference model for  
15 our analysis.

16 The TAM aims to describe the motivational processes involved in using  
17 technological systems. It postulates that the characteristics of the system  
18 determine the degree of use by individuals and presents the relevant  
19 determinants of acceptance. The TAM assumes that the user's attitude toward  
20 the system is an important determinant of the decision to actually use it  
21 (Schlohmann 2012). According to Davis et al. (1989), the developer of the  
22 model, perceived usefulness and perceived ease of use are the key determinants  
23 of attitude toward technological systems. In addition, perceived ease of use  
24 influences perceived usefulness (Schlohmann 2012).

25 The TAM offers tools to observe users' satisfaction with their experience  
26 with new technologies. In a study about the contribution of technology  
27 acceptance to learner satisfaction in distance education, Ilgaz/Askar (2013)  
28 showed that students who perceived online learning systems as easy to use and  
29 useful for their learning were more satisfied with distance education, as were  
30 students who were able to develop a sense of community. Perceived usefulness  
31 was found to explain 45% of the variance in satisfaction and to have the  
32 highest predictive power. The researchers further determined that students in  
33 undergraduate degrees are more positive about distance education than students  
34 in higher degrees (Ilgaz/Askar 2013).

## 35 36 37 **Methodology** 38

39 This paper examines the acceptance of e-learning by students and teaching  
40 staff by exploring their needs, questions, and requests. The research uses  
41 acceptance theory as its theoretical underpinnings to analyze quantitative  
42 surveys of students and teaching staff in light of review studies on related  
43 topics (Arndt et al. 2020 & Pausits et al. 2021). The outcome of this study  
44 shows that full-time and part-time students have different needs and acceptance  
45 levels regarding distance learning and digital tools. Shifts in these needs and  
46 requests are observed after one year of being forced to work with digital tools,

1 with both students' and teaching staff's attitudes generally becoming more  
2 accepting.

3 Data collection consisted of four surveys conducted at the FHW. Students  
4 were first surveyed from April 8<sup>th</sup> to April 22<sup>nd</sup>, 2020, with a follow-up survey  
5 conducted from March 2<sup>nd</sup> to March 20<sup>th</sup>, 2021. The latter student survey in  
6 2021 achieved a response rate of 66.3%, attracting 561 participants comprising  
7 69.1% female and 30.9% male respondents. Similarly, the initial survey of  
8 lecturers ran from April 20<sup>th</sup> to April 22<sup>nd</sup>, 2020, and the follow-up from June  
9 3<sup>rd</sup> to June 17<sup>th</sup>, 2021. The latter survey of lecturers in 2021 yielded a  
10 completion rate of 70.35%, with the 159 respondents showing a gender  
11 distribution of 56.6% male and 43.3% female.

12 The surveys were distributed amongst all students and lecturers of the  
13 FHW, which offers ten different Bachelor programs and eight different Master  
14 programs. Even though students from all study programs were invited, in 2021  
15 most student respondents were enrolled in the following programs: BA in  
16 Management & Entrepreneurship, the BA in Finance, Accounting & Taxation,  
17 and the BA in Tourism & Hospitality Management. Meanwhile, respondents to  
18 the 2021 lecturer survey consisted mainly of lecturers from the BA in  
19 Management & Entrepreneurship, the BA in Corporate Communication, the  
20 BA in Human Resources Management, the BA in Marketing & Sales, and the  
21 BA in Journalism and Media Management participated. Lecturers at the FHW  
22 University of Applied Sciences are qualified in different fields of Management  
23 and Communication and work either as full-time employees or as external  
24 lecturers. The 2021 lecturer survey consisted of 81.6% 'external lecturers' and  
25 18.4% 'full-time employees' of the university.

## 26 27 28 **Results**

29  
30 This section presents a selection of results from the FHW surveys that are  
31 pertinent to the research question. These are structured according to the  
32 relevant categories from Arndt et al. (2020)'s 13 areas of relevance related to  
33 digitalization within universities: (a) workload, (b) life situation, (h) media-  
34 technical and didactical competences, (j) technical infrastructure and tools, and  
35 (k) virtual teaching and learning scenarios.

### 36 37 **Workload**

38  
39 As shown in figure 1, below, students of the FHW der WKW University of  
40 Applied Sciences for Management and Communication were asked whether  
41 they think most teachers correctly estimate the workload for independent  
42 assignments. A comparison between the years 2020 and 2021 shows that  
43 student evaluations have become more positive over time. In 2020, a lower  
44 percentage of students expressed 'full agreement' or 'rather agreement' that  
45 lecturers correctly estimate student workloads, with a greater percentage  
46 opining 'less agreement' or 'no agreement at all'. Thus, an overall

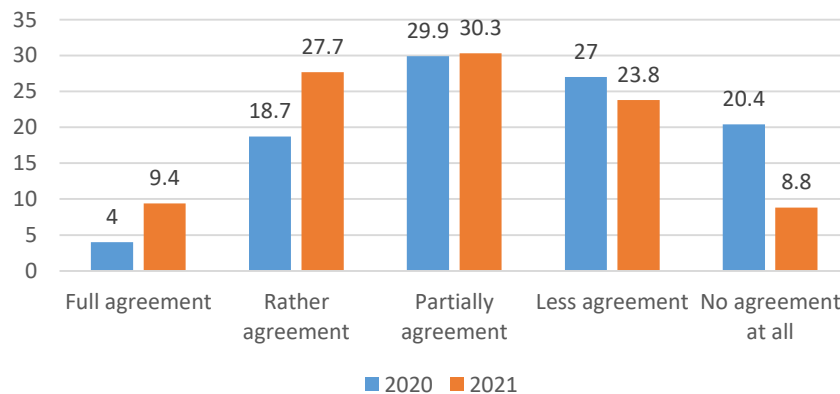


1 improvement over time could be noted, even though almost one third of  
 2 students still disagree (less agreement or no agreement at all) that lecturers  
 3 estimate workloads correctly in 2021.

4

5 *Figure 1.* Student Evaluations of Teachers' Correct Estimation of  
 6 Workload/Comparison 2020 and 2021

Most teachers correctly estimate the  
 workload for independent assignments  
 (students' estimation).



7

8

Source: Author.

9

## 10 Life Situation

11

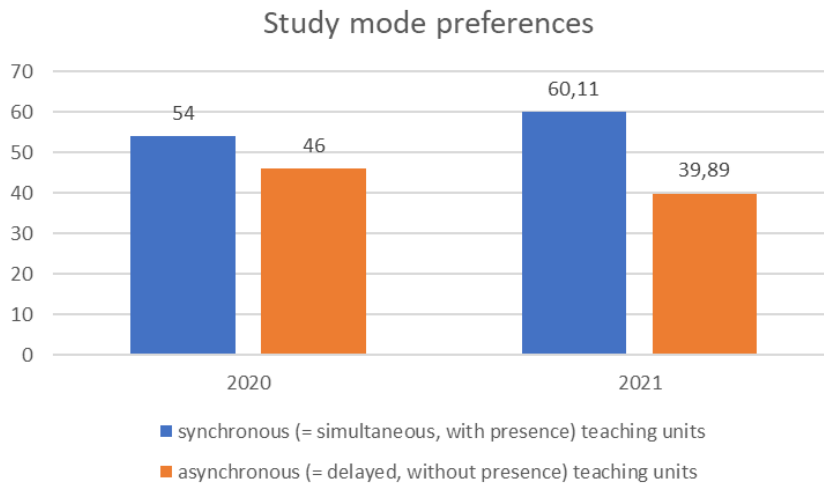
12 Both students and lecturers were asked about their **study mode**  
 13 **preferences**, where the synchronous study mode refers to simultaneous  
 14 Distance Learning, while the asynchronous study mode involved delayed  
 15 Distance Learning and without presence. This information seems relevant not  
 16 only to how students prefer to organize their studies, but more broadly to  
 17 organizing their study-work balance/study-life balance.

18

19 The data is presented in Figures 2 and 3, below, where Figure 2 shows a  
 20 longitudinal comparison of study mode preferences by students between 2020  
 21 and 2021, and Figure 3 shows a cross-sectional comparison of study mode  
 22 preferences between students and lecturers in the year 2021.

23

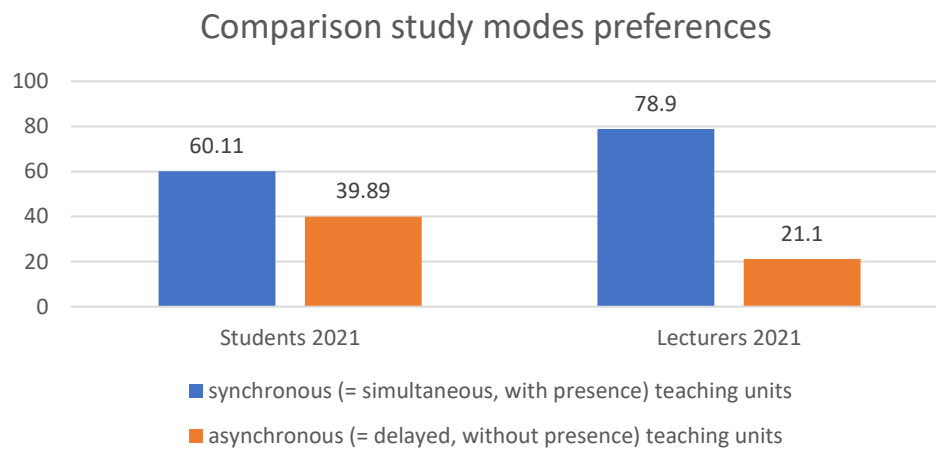
*Figure 2.* Comparison of Students' Study Mode Preferences Between 2020 and  
 2021



1  
2 Source: Author.

3  
4 Interestingly, Figure 2 shows that students have a stronger tendency  
5 towards the synchronous study mode in 2021 compared to 2020. After one year  
6 of distance education, students increasingly prefer to be simultaneously online  
7 when engaged in Distance Learning.

8  
9 *Figure 3.* Comparison of Study Mode Preferences Between Students and  
10 Lecturers



11  
12 Source: Author.

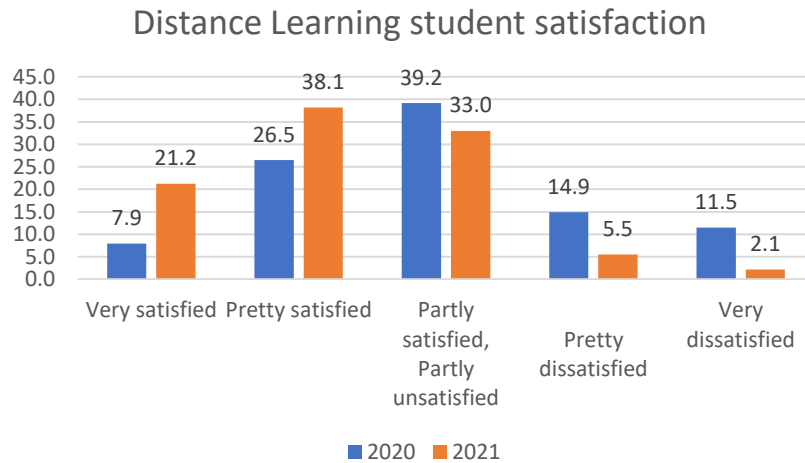
13  
14 The increasing preference of students for synchronous instruction is also  
15 reflected among lecturers. Figure 3 shows that approximately 80% of lecturers  
16 prefer a synchronous study mode in 2021, exceeding the approximately 60% of  
17 students who prefer the synchronous study mode. It is clear that both target  
18 groups prefer synchronous study modes to asynchronous study modes, and that  
19 this tendency has increased over the course of the study period.

20 The FHW surveys further asked students about their **level of satisfaction**  
21 **with Distance Learning**, both in 2020 and again in 2021. The data presented

1 in Figure 4, below, show a comparison of student evaluations across these  
2 years.

3

4 *Figure 4. Student Satisfaction with Distance Learning in 2020 and 2021*



5

6 *Source: Author.*

7

8 Interestingly, after one year of the COVID-19 pandemic, students  
9 expressed higher levels of contentment (“very satisfied” or “pretty satisfied”)  
10 with Distance Learning, while the percentage who are “partly satisfied, partly  
11 unsatisfied”, “pretty dissatisfied”, or “very dissatisfied” decreased in  
12 comparison to 2020. This shows that students are generally more satisfied with  
13 Distance Learning now than they were when commencing this experience.

14

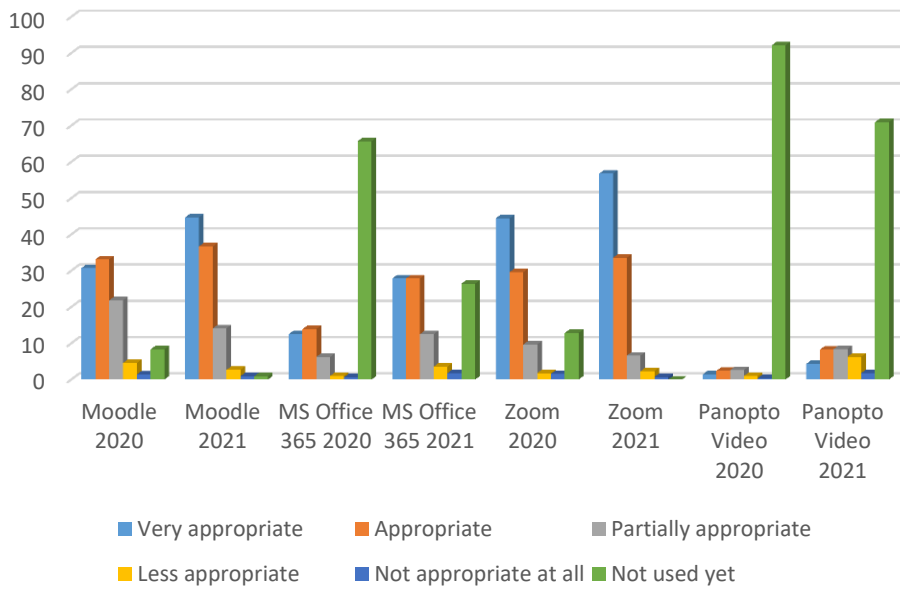
#### 15 **Media-Technical and Didactical Competences, Technical Infrastructure** 16 **and Tools, and Virtual Teaching and Learning**

17

18 As shown in Figure 5, students were also asked about the appropriate  
19 deployment of technical infrastructure and tools used for Distance Teaching.  
20 For the purposes of Distance Teaching at the FHW, the four tools Moodle,  
21 Microsoft Office 365, Zoom, and Panopto were employed. In Figure 5, student  
22 evaluations are compared between 2020 and 2021.

23

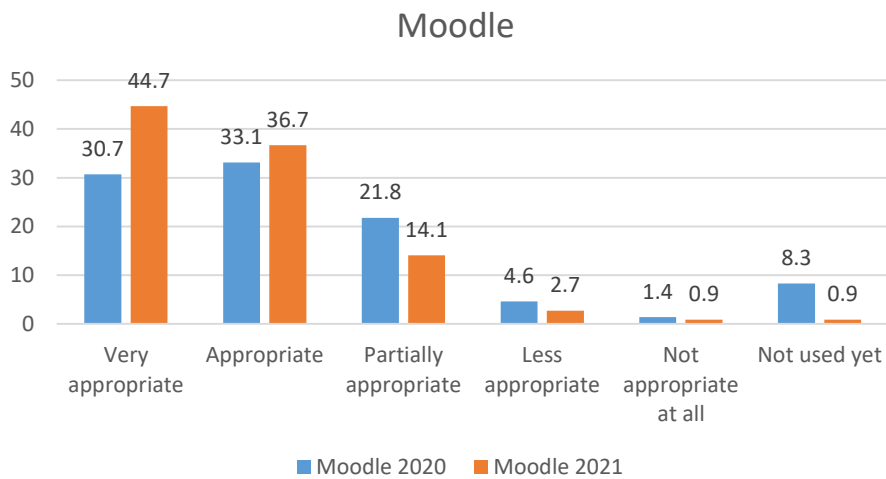
1 *Figure 5. Tools for Distance Learning (2020 and 2021)*



2  
3 Source: Author.

4  
5 As shown in Figure 6, students found Moodle to be even more appropriate  
6 for their studies in 2021 than in 2020. The graph also reveals that the  
7 proportion of students in the ‘not used yet’ category declined over the course of  
8 the year.

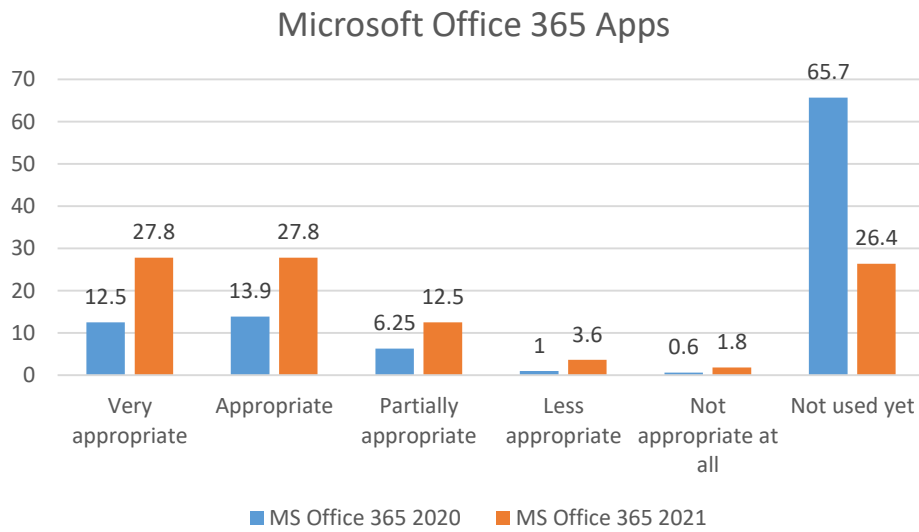
9  
10 *Figure 6. Moodle for Distance Learning (2020 and 2021)*



11  
12 Source: Author.

13  
14 Figure 7 shows that more students consider the online tool Microsoft  
15 Office 365 as ‘appropriate’ to ‘very appropriate’ in 2021 than in 2020. As with  
16 Moodle, the percentage of students who claimed not to have used the tool also  
17 declined from 2020 to 2021.

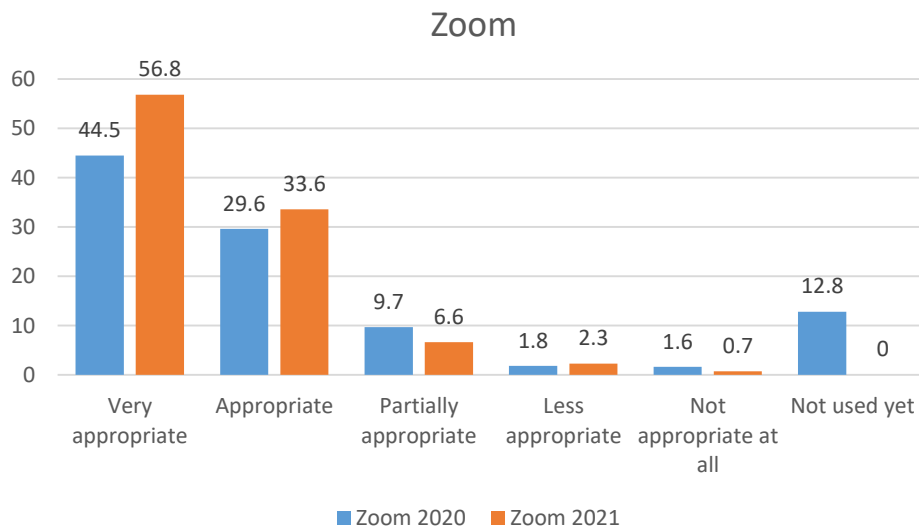
1 *Figure 7. Microsoft Office 365 Apps for Distance Learning (2020 and 2021)*



2  
3 *Source: Author.*

4  
5 Contentment with the online tool Zoom also increased between 2020 and  
6 2021, as shown in Figure 8. In 2021, students are more likely to find Zoom  
7 ‘very appropriate’ to ‘appropriate’, as the proportion of students declaring that  
8 they had ‘not used (Zoom) yet’ dropped to near zero in 2021.

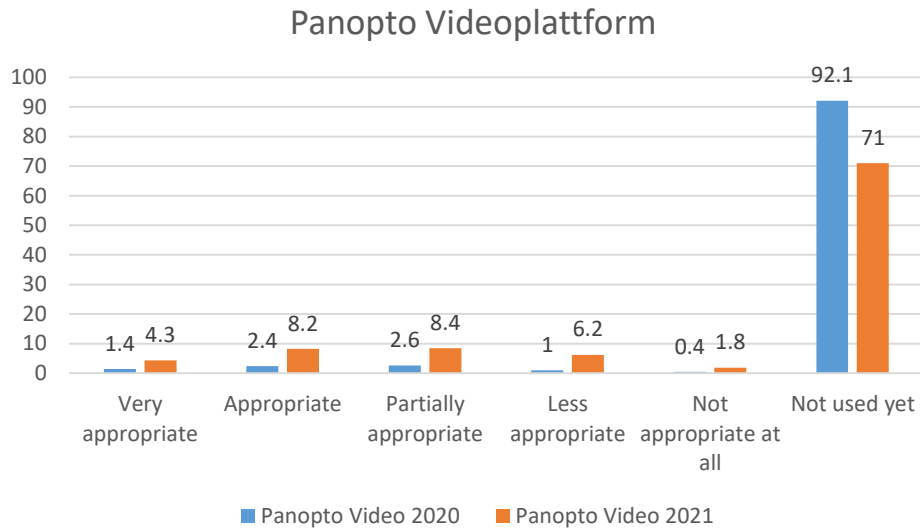
9  
10 *Figure 8. Zoom for Distance Learning (2020 and 2021)*



11  
12 *Source: Author.*

13  
14 As Figure 9 demonstrates, even though students find the online video  
15 platform Panopto slightly more appropriate in 2021 than 2020, most  
16 participants had still not used the video platform.

17

1 *Figure 9. Panopto for Distance Learning (2020 and 2021)*

2  
3 *Source: Author.*

## 6 **Discussion and Conclusions**

8 The results of the FHW student and lecturer surveys offer valuable insights  
9 regarding questions about the acceptance of digital education by students and  
10 educators. Since the surveys were conducted at the beginning and at the end of  
11 the first year of COVID-19 restrictions in Austria, they enable identification of  
12 shifts in attitudes towards digital education.

13 Compared to the related studies cited in the literature review section of this  
14 paper, the FHW results correlate well with their results. Hence, while student  
15 satisfaction correlates with their perceived usefulness towards digital education  
16 in the Ilgaz/Askar (2013) study and therefore has the tendency to increase as  
17 more students get used to digital education, the FHW results shows that one  
18 year into the pandemic 59.3% of students are “very satisfied” or “pretty  
19 satisfied” with distance learning, compared with only 34.4% the year before.  
20 On the other side of the equation, the percentage of ‘pretty unsatisfied’ to ‘very  
21 dissatisfied’ students declined from 2020 (26.4%) to 2021 (7.6%), which also  
22 indicates the positive overall trend.

23 Related to the workload, which according to Arndt et al.’s (2020)  
24 BRIDGING study became higher compared to face-to-face-semester, the  
25 following results were observed in the FHW surveys. Student (full or rather)  
26 agreement with the proposition that lecturers correctly estimate workloads rose  
27 from 22.7% in 2020 to 37.1% in 2021, while disagreement (less or no  
28 agreement) with this statement fell from 47.4% in 2020 to 32.6% in 2021.  
29 Although the FHW surveys do not facilitate a direct comparison of students’  
30 workload perceptions between traditional teaching model and distance learning  
31 models, the improvement in student evaluations of the accuracy of lecturers’  
32 workload estimations from 2020 to 2021 nevertheless indicates issues of

1 increased workloads when switching to distance learning. Although this issue  
 2 seems to have somewhat mitigated over time, the approximately one third of  
 3 students who continue to express issues with workloads in 2021 suggests value  
 4 in further research on this point.

5 Another area of relevance for digitalization within universities identified  
 6 by Arndt et al. (2020) was that of life situation. Related to this element, the  
 7 FHW survey results show that students and lecturers have certain preferences  
 8 when it comes to study modes. Even though it could be assumed that students  
 9 and lecturers actually prefer an asynchronous study mode, meaning that  
 10 teaching and learning happen independently of time and place, results from one  
 11 year after the outbreak of the pandemic surprise with a different outcome.  
 12 While 54% of students preferred a synchronous teaching mode in 2020, a slight  
 13 increase to 60.11% was noted in 2021. Interestingly, the comparison of  
 14 students' and lecturers' study mode preferences in 2021 shows that lecturers  
 15 prefer synchronous study modes even more strongly, with 78.9% favoring this  
 16 option and only 21.1% preferring asynchronous teaching. This development  
 17 shows that after one year of the pandemic, both parties prefer synchronous  
 18 study modes involving more interactive and engaging teaching. This effect also  
 19 supports the findings from the FHW surveys regarding lecturer's preferences  
 20 for Zoom, which is a helpful tool for synchronous classes. Therefore, in  
 21 contrast to the BRIDGING studies, the preference for Zoom can not only be  
 22 attributed to its good performance, but also because this tool satisfies lecturers'  
 23 and students' needs.

24 The FHW surveys provide hints that with the passage of time in which  
 25 universities are forced to adapt to distance learning, their technical competence  
 26 increases. Hence, "perceived ease of use" - a determinant of acceptance  
 27 according to TAM - enhances as well. Overall, there is a clear positive  
 28 development in levels of satisfaction with distance learning at the FHW.

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