Published in *Quality assurance in education*, vol. 32, no. 3(2024) which should be cited to refer to this work.
DOI : 10.1108/QAE-05-2024-0077

Higher Education pre to post-Covid-19: Student and Faculty Perceptions

Purpose: Higher Education Institutions (HEIs) seek innovative approaches to attract students. Since the Covid-19 pandemic, many HEIs have considered diversification through digitalization. From the initial urgency to implement technology at the start of the pandemic to a gradual acceptance over time, HEIs witnessed a shift in perceptions. This paper explores the evolution of the use of technology in HEI classrooms from pre to post-Covid-19 as seen through the eyes of students and faculty members.

Design/Methodology: Seven surveys were conducted from March 2020 to January 2023 with faculty members and students at one business HEI in Switzerland. This longitudinal study analyzed the perceptions of faculty and students regarding technology in the ever-changing HEI environments. These results have been used to make practical recommendations for future HEI classroom settings.

Findings: The findings reveal that the social aspect must be considered when implementing technology into HEIs. Faculty members and students need appropriate training and adequate resources to engage with the technology in and outside the classroom. Our results suggest that one result of the pandemic was a greater acceptance of blended learning practices in traditional business education.

Originality: The pandemic has left long-lasting effects on teaching and learning. While many HEIs revert to traditional ways, we suggest the need to embrace technology that encourages engagement and authentic teaching and learning. HEIs must listen to their faculty members and students, to create more innovative learning environments.

KEYWORDS: Higher Education Institutions (HEIs), business education, COVID-19, technology, student/faculty perceptions

Introduction

Higher Education Institutions (HEIs) are subject to worldwide competition for student enrollment. The existing technological possibilities (Chauhan, 2021) increase student mobility and put the HEIs under tremendous pressure for change (Rehm & Schulz, 2020). In this competitive setting, HEIs face two main issues: The increasing mobility of students and the availability of digital possibilities to replace face-to-face, bricks-and-mortar education. To be competitive (Nunez-Canal et al., 2022) in a so-called 'new normal,' HEIs must provide quality education within the ongoing digital transformation and accelerated change (Garcia-Morales et al., 2021). Some HEIs tout the importance of educational disruption, sudden breaks, or interruption from the norm (Garcia-Morales et al., 2021) and claim the need to replace old ways of teaching. Garcia-Morales et al. (2021) suggested the term *disruptive educational innovation,* meaning that existing methodologies and modes of knowledge transmission are replaced by offering new alternatives based on sustainability, scope, and scale. HEIs must be more entrepreneurial in their offers and opt for flexibility, short and accelerated programs, new governance structures, and more 'competence-based learning' methods (Nunez-Canal et al., 2022).

Before Covid, HEIs that focused on business studies were criticized for their typically lecture-based teaching, with only minor shifts toward student-centered or problem-based learning (Garcia-Morales et al., 2021). However, passive courses often prevent students from achieving the program's learning outcomes (Pereira et al., 2021). Many HEIs continued to teach as they have done for decades (Zizka & Probst, 2022a), showing great reluctance to change due to their "dominant mindset of tradition, campus-based pedagogy style among students and faculty" (Chauhan, 2021, p. 1598).

During Covid, a temporary shift to distance teaching and learning at all levels took place (Nunez- Canal et al., 2022; Sailer et al., 2021), and it was, for the most part, a disruptive, chaotic, and massive change (Dagiene, 2022), although technology always existed

in HEIs and was implemented at different levels and stages into their programs for years (Lischer et al., 2021). Still, many faculty members had little or no experience with digital tools (Almahases, 2021). As the pandemic continued, the business HEI landscape shifted (Hogan et al., 2021), with some HEIs ready to use (more) digital technology (Sailer et al., 2021) and even some of the most traditional and change-averse HEIs have started considering the link between education and employability, particularly when entrepreneurial skills including emerging technologies and collaboration with others can be promoted (Hogan et al., 2021). For Sailer et al. (2021), teaching and learning with technology have offered new ways to acquire knowledge and skills in HEI that apply better to the needs of the real world.

Digitalization has an overall impact on our private and professional life, but it is per se neither good nor bad; only its use can be judged as such (Weiss, 2022). This study examines technology, focusing on its service role in education and considering this question: Can technology contribute to quality teaching, the overarching aim of all education? Since the start of the Covid-19 pandemic, technology has become the particular focus of HEIs when all teaching was switched to online courses. At that point, high quality was less critical than immediately shifting all face-to-face courses to distance learning, and school leaders, teachers, and students felt great apprehension during this immediate set-up of teaching via distance channels.

Further, during the pandemic, the interaction between HEI stakeholders was perceived as a loss, particularly the student-student interaction. Previous research confirmed that their relationships and interactions have suffered because technology interferes with natural human communication (Bylieva, 2021; Dittler, 2017). For the faculty, the missing engagement brought about frustration as they missed student contact. Though, before the pandemic the enthusiasm for online teaching methods was relatively high and was seen as a motor to promote student engagement. In fact, researchers cited that the “potential of digital technologies to enhance student learning had already been well established before the

outbreak" (Lischer et al., 2021, p. 2). HEI stakeholders felt that hybrid education could offer more opportunities for instructors to engage their students with the course content by incorporating online learning communities, synchronous and asynchronous discussions, and various online collaboration methods, and the developments of tools helped to cater to various teaching situations – in face-to-face courses and asynchronous or synchronous online courses to consider different learning styles (Linder, 2017).

Integrating technology carefully into the classroom can improve teaching and learning quality, encouraging student engagement, motivation, and learning (Linder, 2017). Thus, we assert that social integration is the key to effective teaching and learning, but we need a holistic approach when using technology. The loss of physical contact must and can today be compensated by interactive media to create a sense of collaboration and adherence to peer groups.

While many papers have looked at HEIs and the use of technology during Covid, our paper is original for two reasons:

a. Our study is longitudinal. Unlike 'one-shot' perspectives, our study reports the results of seven surveys conducted throughout the pandemic thus allowing us to gauge participants' perceptions over time and follow the evolution of participant perspectives.

b. Unlike studies that look at students or faculty at one time, we have analyzed the responses of both throughout this exceptional time.

This study begins with an overview of the evolution of technology in HEIs. Through surveys conducted with faculty members and students, we can trace where they were and, more importantly, where they are now regarding technology for education. We conclude with recommendations on effectively implementing technology into HEI business programs in the future.

Literature review

Technology in HEIs

Throughout the centuries, higher education has evolved and has been likened to that of the industrial revolution. Miranda et al. (2021) summarized the phases of education through the introduction of 'technology' from 1.0 (the first technology in the classroom) to 4.0, or the current status of higher education. According to their study, in Education 1.0, technology included the printing press, pens, and pencils. These tools enabled students to take personal notes of information given orally or on an erasable blackboard. With Education 2.0, open-source materials were available in libraries, and HEI students began using calculators and early computers. By Education 3.0, computers became prevalent, and many educational processes, such as recording student success or failure, were automated, and multimedia and online tools were introduced into HEI classrooms. With Education 4.0, HEIs have been privy to innovative pedagogical procedures and best practices based on competencies, learning methods, information and communication technologies (ICT), and infrastructure (Miranda et al., 2021). Other researchers have concurred by adding the context of a complex global environment where technology merges with HEI (Nunez-Canal et al., 2022), while others insist on the social context remembering that our world is increasingly a media lifeworld that changes the social rules (Dittler, 2017, p. 45).

Some researchers have extended Education 4.0 to an educational system where online learning potentially replaces the traditional classroom through greater use of the Internet, audio-video options, and entire classes being taught during videoconferences (Langgar et al., 2023). While this may have seemed unrealistic prior to the Covid-19 pandemic, it was precisely the situation HEIs worldwide suddenly faced. Now that HEIs have been able to move back on campus, the question how technology can be used and its place in HEIs needs to be addressed.

Technology aside, Education 4.0 should prepare our students for the economic and social challenges and teach them a range of skills needed to ensure a smooth transition into a

career in the 21st century (Nunez-Canal et al., 2022; Probst & Zizka, 2022; Sailer et al., 2021) and, eventually, span several careers (Hogan et al., 2021). These 21st-century skills include basic technology competencies but also the use of technology for protection, engagement in critical thinking, solve problems, collaborate, or lifelong learning (Sailer et al., 2021; Zizka & Probst, 2022a).

Nonetheless, researchers have recently focused more on competencies over skills or knowledge. For Miranda et al. (2021), competency-based education has had a significant impact as it enables students to face situations, challenges, or problems they will experience in real life. Nunez-Canal et al. (2022) assert that digital competence has gone from a mere tool to an essential pedagogical element and is needed to create an authentic teaching and learning environment (Sailer et al., 2021). Well prepared, it can help students engage by offering a competence-oriented learning and teaching setting with more hands-on, real-world experiences (Probst & Zizka, 2022). Thus, the goal of HEIs in Education 4.0 is to improve teaching and learning processes that encourage authentic lifelong learning, producing highly competitive professionals with a new set of skills for the workplace to help them deal with current and future societal challenges for the digital economy (Miranda et al., 2021; Nunez-Canal et al., 2022; Sailer et al., 2021). To gain a better insight into the future, we analyzed the past and recorded the perceptions of faculty and students.

Early fears concerning the use of technology in education

With most HEI students back on campus, the early fears of March 2020, when HEIs were forced online, disappeared. Nonetheless, some apprehensions remain, and new ones have emerged. This section examines the concerns about the current HEI environment from an institutional, faculty member, and student perspective.

Institutional level

One of the most significant concerns for HEIs when considering more technology is the existing infrastructure on campus to accommodate student learning needs, both virtual and

physical (Miranda et al., 2021). Many HEIs need more resources, facilities, and equipment (Langgar et al., 2023); the appropriate infrastructure, technology platforms, and servers to support the technology (Garcia-Morales et al., 2021) using connected tools and resources to provide conducive online learning environments (Langgar et al., 2023; Sailer et al., 2021). However, it is more than just a question of equipping classrooms. All facilities, services, and systems for the whole institution must be reconsidered for sustainability, usability, accessibility (Miranda et al., 2021) and security to harness digitalization in HEIs (Sailer et al., 2021).

However, rapid technological advancements in HEIs are challenging and must be considered strategically and carefully (Miranda et al., 2021). School leaders should consider how ready their HEI is for more technology and focus on pedagogy first (Nunez-Canal et al., 2022). As seen in the literature, using technology does not constitute learning. HEIs need 'digital teaching concepts that combine pedagogical concepts with technological possibilities' (Zizka & Probst, 2022b, p. 10).

Faculty members

Some faculty members have remained concerned about moving forward with technology and continue to feel the effects of isolation, technology gaps (Langgar et al., 2023), and stress (Garcia-Morales et al., 2021). They need a set of skills and attitudes concerning digital technology that mirrors the level of their students, which goes beyond basic skills (Sailer et al., 2021). HEIs should offer training in digital literacy focusing on digital content creation, data security, and problem-solving (Nunez-Canal et al., 2022), showing them how digital technology can enhance the teaching and learning experience (Sailer et al., 2021) and what impacts new tools may have on their student learning (Zizka & Probst, 2022b). The lack of knowledge coupled with the feeling of being out of their comfort zone results in a negative attitude (Grammens et al., 2022; Nunez-Canal et al., 2022). Thus,

showing teachers the importance of integrating ICT for pedagogical purposes and not as an instrumental or superficial 'extra' is crucial (Nunez-Canal et al., 2022).

Post-pandemic, some HEI faculty members have reported interest in continuing to teach online and are open to incorporating more technological practices and tools into their courses (Zizka & Probst, 2022b). However, "what works well in one course may not work in another, even for the same faculty member, subject matter, or program" (Zizka & Probst, 2022b, p. 22). Faculty members to time to plan and design course interactions to include flexibility, personalization, (new) forms of assessment, use of small groups, interactions, and a mix of pedagogies, technologies, and media (Langgar et al., 2023; Sailer et al., 2021). In short, enthusiasm, approachability, and friendliness toward technology (Nunez-Canal et al., 2022) are crucial to ensure its effectiveness in Education 5.0 classrooms.

Students

Similar to the faculty members, many students complain about technological problems and the digital divide (i.e., the disadvantages of some students compared to others when it comes to technology) (Garcia-Morales et al., 2021). Some students still feel isolated, stressed (Garcia-Morales et al., 2021), demotivated, tired, frustrated, and miss social contact (Probst & Zizka, 2022; Zizka & Probst, 2022a; Zizka & Probst, 2022b). These negative emotions can lead to a lack of interest in digital learning and negative attitudes toward technology and hinder innovation (Sailer et al., 2021).

Thus, to mitigate any negativity, students must be digitally literate, self-efficient, and motivated (Langgar et al., 2023) and have a positive attitude toward technology, or they will not engage (Sailer et al., 2021). To be effective and ensure student learning, faculty members should choose technology that can be used to stimulate and increase student engagement (Sailer et al., 2021) depending on their comfort with their online learning environment (Probst & Zizka, 2022) and their cognitive engagement in learning. Versatile use of technology for storing (i.e., retrieving and utilizing stored information), activating (i.e., using overt actions or

physical manipulations of learning materials to activate prior knowledge), linking (i.e., associating new information with activated prior knowledge), or inferring (i.e., engaging in constructive learning activities to generate new knowledge) is essential for their learning (Sailer et al., 2021). The depth of use may make the difference between engagement or disengagement in the Education 5.0 classroom.

Growing comprehension of technology in education

Since the Covid-19 pandemic, HEIs have faced a steep learning curve in the Education 4.0 environment. They have experimented with new learning methods that mix technology and best practices to ensure effective learning (Miranda et al., 2021; Sailer et al., 2021) and with new learning modalities, delivering the teaching and learning process face-to-face, online, or hybrid (Langgar et al., 2023; Miranda et al., 2021; Sailer et al., 2021). HEIs have embraced ICTs as a collection of technological resources that facilitate access, distribution, and collection of information to encourage collaboration between stakeholders at any time (Miranda et al., 2021). These ICTs have offered flexible access to content and instruction (Langgar et al., 2023) and interactive learning to co-construct knowledge (Probst & Zizka, 2022; Sailer et al., 2021). Many HEIs have sought technology-based solutions through artificial intelligence, machine learning, data analytics, and automation (Hogan et al., 2021; Miranda et al., 2021). During and since the pandemic, tools and platforms for teaching and learning have abounded and taken on increased importance as means to personalize the learning experience and make it more efficient, accessible, and flexible (Garcia-Morales et al., 2021; Miranda et al., 2021). These innovative practices have derived from HEIs willing to support and encourage educators to lead initiatives to develop new practices and methodologies through technology. However, HEIs must ensure that innovation through technology aligns with the needs and requirements of the HEI and respond to specific social contexts (Miranda et al., 2021).

According to the research, many HEIs are optimistic about the future of teaching and learning post-pandemic. They are ready to try new ways of teaching and enhance digital capacity in their classes (Garcia-Morales et al., 2021), yet only well-designed and effectively delivered online courses can survive and bridge the gap between formal, traditional learning environments to active online learning communities (Langgar et al., 2023). HEIs should only accept hybrid futures if they can ensure high-quality learning on-site and online (Garcia-Morales et al., 2021). As noted in previous studies, no technology model has outperformed others to date (Sailer et al., 2021) and will not do so in Education 5.0.

As HEIs comprehend how technology can be used to further innovation in teaching and learning in Education 4.0, previous studies have raised pertinent questions in preparation for Education 5.0. For example, do students perform better in innovative blended settings than traditional ones? One study suggests that learners perform at least as well as classroom-based courses in achieving learning outcomes (Langgar et al., 2023). While Sailer et al. (2021) touted the importance of student learning outcomes when teaching and learning with digital technology, Zizka and Probst (2022a) found that neither technology nor the general course quality influenced the students' learning experience. Thus, there is dissension in the literature regarding student performance. Another question that remains unanswered was put forward by Nunez-Canal et al. (2022): Can HEIs offer individual learning experiences to all students that meet their needs and prepares them for all careers? These questions shall remain a focus when moving into Education 5.0 and preparing our graduates for the real world.

In this study, we focus on two of the pertinent questions:

1. Have student and faculty perceptions regarding technology in the HEI classroom changed during the COVID-19 pandemic?
2. How can HEI's adapt their use of technology in HEI classrooms for 'better' teaching and learning post COVID-19?

Methodology

Research procedure

From the onset of the Covid-19 pandemic, the lecturers and students of one HEI in Switzerland were followed to gauge their perceptions of teaching and learning over the 2 ½ years. In the aim of evaluating the situation of teaching and learning at different moments during and after the pandemic we used a longitudinal panel study. A convenience sampling was used, since all members of the bachelor study program of business administration (students as well as faculty members) were included and invited to participate. Between April 2020 and January 2023, one survey was conducted every semester, only in the spring semester 2020, due to the extreme circumstances of the pandemic, two surveys were conducted in April and June, resulting in 7 surveys.

In total, 2046 answers were collected from 1,654 students and 392 members of faculty (n = 2046) provided answers throughout this period. The population varied over time with some students replying several times and others graduating or starting their studies during our observation time. Faculty members too changed slightly throughout this period, as some were teaching only in the spring or fall semester, others leaving or arriving at the school. With an overall participation rate of 44.3%, this choice is representative of our schools' population according to Jacob et al. (2019), who explains that analysed subgroups should amount to minimum 20 to 25% of the whole population. This rate decreased with each survey, starting in April 2020 with a rate of 56.6% and ending in January 2023 with 22.5%.

Research instruments

We used the online-tool LimeSurvey, which allows strong data protection as answers cannot be linked to mail addresses or names of the respondents. This tool is used at this specific school for all course evaluation and students and faculty members are familiar with this procedure of purely online surveys, receiving a personalized invitation via mail. The data analysis has been carried out with excel, a tool offering a wide range of functions for statistical analysis and data visualization and being compatible with LimeSurvey. All

participants were informed about the scientific use of their answers according to scientific standards. The choice of questions has been readapted in each survey and consists of a mixture of closed and open questions, that have been treated either as quantitative or qualitative data; the latter have been categorized into first and second-order categories, according to the description by Gioia (2020). Our first order category was positive, negative, and neutral for the comments and the second order categories were then more specific, e.g. interactive use of technology, note-taking, etc. We used the comments of the last survey that offered an overview of this period and that explicitly express needs and wishes of some of the members of this HEI, which will help to see the human background behind the anonymous data.

Results

Throughout the surveys, students and faculty were asked about their global satisfaction with the online courses with the one-choice question: *"My impressions of distance learning during this spring semester are ..."* with answer possibilities of six categories from *extremely satisfying* to *extremely dissatisfying*. We can see in Table 1 that we have a tendency toward *satisfying* and *very satisfying* for the students over time. In contrast, the faculty's appraisal of online teaching decreased in the same time frame.

Insert Table 1 here.

The final survey was conducted when courses were back on campus, so the question has slightly changed into the following: *"Now that the courses are back on site: Are you satisfied with the current use of technology in teaching?"* with the same choice of answers. One hundred sixty-five answers (n= 165) have been provided by faculty (61 answers) and students (104 answers). The majority answered yes (faculty = 72.1%, students = 60.6%), while 28.5% answered a little (faculty = 26.2%, students = 29.8%) and 6.7% not (faculty = 1.5%; students = 9.6%). So, in the end, faculty members are more positive than students. Although the students who answered this final survey did not experience the pandemic at this

HEI, they may have imagined the courses differently. The comments show their concrete desires: Flexibility, especially for those students who study half time; use of existing Technology adapted to their business career; online exams; the possibility of quick note taking on tablets and being treated as equals without any control mentality. There is an urgent need to keep up with the times, which is shown in these student's quotes:

> "*We should be able to learn with technology in order to be able to implement it in the company*." (student 1)
>
> "*I have the impression that we are not trusted because we could use our computer to do something else*." (student 2)
>
> "*Apart from a PowerPoint presentation and a cloud to store the digitized course material, the technology does not add much to the teaching*." (student 3)
>
> "*No courses are offered at a distance; the school is lagging behind for those studying half-time*." (student 4)

The learning experience with the general use of technology was requested in a survey in May 2022 (n = 218) with the following question: "*Do you think your learning experience (the learning experience of your students) has been enhanced by the use of technology?",,* collecting 165 answers from students and 53 from faculty members. 34% of faculty members think their student's learning experience improved *a lot,* and 34% think it improved *a bit*. For students, 31% considered the improvement *important* and 48.5% saw *little improvement*. In the same survey, we asked if the digital tools used in the courses are favorable to the learning, and 56.6% of the faculty members said *yes*, 41.5 said *a bit*, whereas 62.4% of the students *completely agreed* with this statement.

The statistics show the overall satisfaction with learning experiences helped by Technology, and this is clearly visible in the student's comments:

> "*Technology is an integral part of our life. No one can do without it in modern society*." (student 5)

Students especially prefer note-taking on electronic devices, which enables better organization, but they are also aware that these tools are a risk for distraction or dependency.

"*I'm afraid we are dependent on our computers. But it is clear that it is useful to have everything on Moodle or Teams*." (student 6)

The faculty's experiences are more negative, in the survey addressed to faculty members in 2023 (n = 59), only 21% confirmed that their teaching experience improved *a lot* through the use of technology, and 42% said it was *a bit improved*. Their comments show their major apprehensions:

"*It is risky to rely too much on technology because of its unreliability*." (faculty 2)

"*At this point (after the pandemic), I'm wondering whether it makes sense because I'm losing more time."* (faculty 3)

Others are confident about the student engagement that can be enhanced with technology:

"*Teaching becomes more interactive, I reach more students, and their engagement with my course improves significantly*." (faculty 4)

Concerning the future needs in society, in 2023, participants responded to an open question aiming at competencies linked to the use of technology during courses that are especially useful for their future careers: "*What skills related to the use of technology in the classroom are particularly useful in today's professional world?*" The 85 answers from students and 40 from the faculty were classified into two categories: General skills and computer programs or applications. The general use of digital tools used in the professional world and digital literacy are considered as important skills for the future. Note-taking or collaborative tools, as well as tools for videoconferences or online communication, were also repeatedly mentioned. When it comes to the tools itself, typical office programs, presentation tools or video conferencing applications were the most frequently referred to.

Discussion

The research results indicate the challenges of teaching in HEIs. Torn between the needs of faculty and students, the professional needs for the future, and the personal learning and teaching style of all members of HEIs, a compromise needs to be found, or in other words, the *disruption* needs to be embraced. Now is the time to integrate what was learned during the pandemic, what should be kept and what should be left behind. Innovations are directed toward the future, but we need awareness of historical processes to avoid making the same mistakes over and over again.

Two necessities are clear – human needs and digital progress. After the significant expenditure in technology during the pandemic, we have to invest in humans, although education policy often prefers "to invest in technology, not always in people" (Zierer, 2020, p. 79). We demonstrated that the faculty and students both ensure the need for technology, but the social part must not be forgotten as learning is a social activity (Weiss, 2022).

Thus, all learning settings that use technology must integrate our profoundly human needs since learning is not only about acquiring knowledge and skills but also about developing attitudes and values (Zierer, 2020, p. 41) and feeling confident in the teaching and learning environment. Faculty and students must be trained in using these online communication channels and realize the importance of specific work attitudes. Course methods that focus on active engagement either online or in face-to-face settings need to be pushed forward to "provoke interaction" (Grammens et al., 2022, p. 7). Interactive and collaborative teaching and learning means that students are engaged in debates, are stimulated with good questions to answer individually, in pairs or in groups and receive good and immediate feedback. Many digital tools, such as live online polls, quizzes, pads, poster boards or mind mapping tools can contribute and will provoke answers from more students then when asked orally as you possibly cannot repeat a question more than 2 or 3 times in a course, but when asked online, you can collect answers from all (or nearly all) students in your class. The following mind map, created and published on Mindmeister, shows the possibilities of

interacting with students and has been used successfully in different teacher training sessions. When choosing the page, the reader can open up any of the knots shown in Figure 1 and have access how to create the activities and which tool (online or traditional) to use.

Insert Figure 1 here

Any of these activities will promote student's active involvement, needed in our future education concept for human togetherness enhanced by teaching strategies combining presence learning with pedagogical tools.

A main implication of our surveys is that the satisfaction of online courses grew with the faculty and students' experience. At the beginning of the pandemic, experience was limited, but there was a great deal of goodwill towards the initial difficulties of online teaching. Over time, however, satisfaction grew more on the part of the students than on the part of the lecturers, who missed the personal presence and feedback in the course more than students. Integrating technology coursework in an interactive way can solve the frustration of lecturers sitting in front of passive listeners.

Another result of our study is that blended learning, the combination of face-to-face courses with online courses, has to be implemented in a reflective and planned manner. The emergency online courses created in the early stages of the Covid-19 pandemic are not authentic examples of online or blended learning. Rather, in the first few months of the pandemic, traditional courses were dismissed via video conference tools without any link to online pedagogy. Now, three years later, the opportunities to use technology in a pedagogically sound manner have improved. HEIs can use their experience and sort out the tools that worked and those that did not.

Nonetheless, we may need to convince some faculty members, who are (still) sceptical about the use of technology and show them its potential in teaching. Effective teacher training needs to place faculty members in the role of students so that they can experience learning from their student's perspective and can realize the advantages of technology since it is the

“perceived usefulness (that) is a strong indicator of faculty acceptance of online education” (Weilage et al., 2022, p. 114).

Further, many faculty fear that technology can cause distractions in the learning environment as they perceive the absence of student activity much stronger in online environments than in the classroom (Weilage et al., 2022). Students are fully aware of this, but do not want more supervision and control. Hence, student autonomy must be considered when dealing with distractions in HEI classrooms, which is an everyday challenge.

Consequently, self-regulation is needed, which is a multidimensional phenomenon defined as “a core aspect of human functioning that helps facilitate the successful pursuit of personal goals” (Bylieva, 2021, p. 2) so that students actively manage their learning process, which is, however, challenging to attain in a purely electronic educational medium (Bylieva, 2021). The regular use of digital tools and blended learning and the implementation of classroom rules could be part of the solution uniting the advantages of active face-to-face learning and distance education.

To respond to our research questions: For the question: Have student and faculty perceptions regarding technology in the HEI classroom changed during the COVID-19 pandemic? The response is affirmative. When examining the satisfaction level of students and faculty members, we note that students were initially critical of online courses but, as the semesters evolved, became much more content with the offer. This could be explained by their growing comfortability as each semester passed. On the contrary, for the faculty, early enthusiasm and satisfaction were observed. This indicated the major shift they had to make in a short time due to the pandemic. First, they felt pleased with their efforts. However, as the semesters continued, faculty members appeared less satisfied with online courses even though they were more comfortable with the set-up and the tools.

Regarding RQ2: How can HEIs adapt their use of technology in HEI classrooms for 'better' teaching and learning post-COVID-19? We have used the results to identify critical

areas to address when moving forward: Reflection on what tools should be implemented in the HEI classroom and which ones engage best students in their learning. We also need more detailed recommendations about the tools that promote 'better' learning environments and provide occasions for autonomous work to be able to carve a unique learning path for each student. Our mind map could be used as a suggestion how to provide for activities and can be used to generate ideas how to interact, but we have to admit that the choice of shown tools needs to be revised and regularly updated, given the economic character behind the institutions offering the digital tools.

Managerial Implications

In Figure 2 we share some general recommendations that emerged from the literature and our results on how to introduce clear strategies for improving teaching and learning post-Covid 19 that integrate the needs of all stakeholders. If the concerns of students and lecturers are taken into account, significant changes need to happen on the institutional and scientific level.

Insert Figure 2 here

In the left-hand column, the key stakeholders (Research, HEIs, Faculty, Students) are shown with the demands and expectations coming from other stakeholders as society and the professional world that are important for researchers and HEIs, while family, friends, and careers are central for faculty and students. What is needed for each group falls under the middle category: inclusion of theory and practice for science, agility and responsibility for the educational institutions, empathy and digital skills for faculty, and communication and personal skills for students. Finally, in the right-hand column, we offer specific actions to implement our recommendations.

To implement these recommendations, HEIs need to encourage purposeful leadership, defined as intense collaboration between the heads of departments and teachers (Mbangula, 2022) and a strategic change management, needed for successful digitalization: "Intensive

persuasion, demonstrable success and careful change management at all levels" (Rehm and Schulz, 2020, p. 382) is necessary within the participatory setting of HEIs. Deficits in the use of digital tools emerged in our research when we asked our faculty members about their needs to better integrate technology into their teaching. The responses were as follows: "*Most colleagues seem to use Moodle as a repository, which is great and sustainable in principle. But it has nothing to do with digital skills or E-LEARNING." // "More technology could be used, especially as the skills are (still) at hand and students are very open to technology*" (comments of faculty members). The faculty members of our school also claimed that they wanted to see the future strategies of the school. According to our faculty members, teacher training is needed: "*a little more in-depth training on how to use the tools at disposal would be nice*", although their primary problem is connecting the hardware.

Thus, when moving forward in this post-COVID-19 educational environment, HEIs must take time to consider how they can best implement technology into their courses and programs. While we have witnessed growing comfortability with technology for both faculty members and students, offering more opportunities for training on specific technological tools would be beneficial. HEI stakeholders should find ways to recreate social connections that were lost or digitalized during the pandemic. HEI campuses must become attractive again for social interactions, even for digital teaching. Choice (modality, timing, location, etc.) is the resounding preference for HEI students and faculty members.

Conclusion

Business education has changed with and since COVID-19. HEIs were initially faced with seemingly insurmountable challenges, followed by creative opportunities. It was the worst with all our apprehensions and the best with all we learned. It showed us many opportunities and also the limits of technology in learning. Without shifts in policy and strategy, more challenges may come in the future (Hogan et al., 2021). Consequently, all stakeholders (governance, administration, teachers, and students) must be part of the

discussion when implementing further digital technology in HEIs (Sailer et al., 2021; Zizka & Probst, 2022a). According to the literature, HEIs that do not diversify or cannot adapt to the changes in the HEI landscape including the integration of technology will disappear; therefore, it is time to act (Hogan et al., 2021).

HEIs must continue testing and evaluating new ways of using technology to create more effective teaching and learning and be responsive to the needs and demands of students (Langgar et al., 2023) by offering adequate technical support for the students and faculty members (Sailer et al., 2021) to ascertain their digital readiness (Zizka & Probst, 2022b). Moreover, although it is technically possible to replace teachers with technology, humanly cold learning only via technology is not attractive. Today, we can have commercial aircraft take off and land safely without any pilots, but hardly any passenger would feel comfortable in an aircraft without humans (Weiss, 2022, p. 31). It is the same for education. The presence of professionals and faculty creates an emotional value that pure technology cannot replace.

Limitations and Future Studies

Our study had several limitations. The surveys were done from March 2020 through January 2023. Most of the questions remained the same; however, questions evolved to align with the ever-changing sanitary situation and its effects on this specific business school. Secondly, while we conducted all seven surveys within the same school, some students left or began the program during the time. Thus, we were unable to state that the same students or faculty responded each time. Finally, although a future study could follow one group from their first semester through their graduation, the Covid-19 pandemic is no longer an issue. The momentum of these 2 ½ years has since dissipated. The catalyst for consequential change in HEIs has been replaced with a societal shift toward returning to ‘normal’. Future research is urgently needed to evaluate which activities and which digital tools contribute best to more learning engagement and better learning outcomes.

References

Almahasees, Z. and Qassem, M. (2021). "Faculty perception of teaching translation courses online during Covid-19", *PSU Research Review*. Vol. 6 No. 3, pp. 205-219. https://doi.org/10.1108/prr-12-2020-0044

Bylieva, D., Hong, J. C., Lobatyuk, V., and Nam, T. (2021), "Self-regulation in E-learning environment", *Education Sciences,* Vol. 11 No. 12, pp. 785-796. https://doi.org/10.3390/educsci11120785

Chauhan, S., Goyal, S., Bhardwaj, A. K., and Sergi, B. S. (2021), "Examining continuance intention in business schools with digital classroom methods during COVID-19: A comparative study of India and Italy", *Behaviour & Information Technology,* Vol. 41 No. 8, pp. 1596-1619. https://doi.org/10.1080/0144929x.2021.1892191

Dagiene, V., Jasute, E., Navickiene, V., Butkiene, R., and Gudoniene, D. (2022), "Opportunities, quality factors, and required changes during the pandemic based on higher education leaders' perspective", *Sustainability,* Vol. 14 No. 3, pp. 1933-1943. https://doi.org/10.3390/su14031933

Dittler, U. (2017), Die 4. Welle des E-Learning: Mobile, smarte und soziale Medien erobern den Alltag und verändern die Lernwelt In: *E-Learning 4.0: Mobile Learning, Lernen mit Smart Devices und Lernen in sozialen Netzwerken*, Berlin, Boston: De Gruyter Oldenbourg, 2017, pp. 43-67. https://doi.org/10.1515/9783110468946-003

Garcia-Morales, V. J., Garrido-Moreno, A., and Martin-Rojas, R. (2021), "The transformation of higher education after the Covid disruption: Emerging challenges in an online learning scenario", *Frontiers in Psychology,* Vol. 12, pp. 1-6. https://doi.org/10.3389/fpsyg.2021.616509

Gioia, D. (2020), "A Systematic Methodology for Doing Qualitative Research", *The Journal of Applied Behavioral Science*, Vol. 57 No. 1, pp. 20–29. https://doi.org/10.1177/0021886320982715

Grammens, M., Voet, M., Vanderlinde, R., Declercq, L., and De Wever, B. (2022), "A systematic review of teacher roles and competences for teaching synchronously online through videoconferencing technology", *Evducational Research Review,* Vol. 37, 100461. https://doi.org/10.1016/j.edurev.2022.100461

Hogan, O., Charles, M. B., and Kortt, M. A. (2021), "Business education in Australia: Covid-19 and beyond", *Journal of Higher Education Policy and Management*, Vol. 43 No. 6, pp. 559- 575. https://doi.org/10.1080/1360080X.2021.1926616

Jacob, R., Heinz, A. and Décieux, J. P. P. (2019), *Umfrage - Einführung in die Methoden der Umfrageforschung.* Oldenbourg: De Gruyter.

Langgar, D., Bani, M., and Ly, P. (2023), "The study of learning motivation analysis during COVID-19 online learning and post COVID-19 offline learning", *International Journal of Social Service and Research,* Vol. 3 No. 3, pp. 656-662. https://doi.org/10.46799/ijssr.v3i3.311

Linder, K. E. (2017), "Fundamentals of hybrid teaching and learning", *New Directions for Teaching and Learning,* Vol. 2017 No. 149, pp. 11–18. https://doi.org/10.1002/tl.20222

Lischer, S., Safi, N., and Dickson, C. (2021), "Remote learning and students' mental health during the Covid-19 pandemic: A mixed-method enquiry", *PROSPECTS*. https://doi.org/10.1007/s11125-020-09530-w

Mbangula, D. D. K., and Albert, D. I. (2022), "Effectiveness of Principals' Roles on School Performance: Perspective of School Principal-Ship, *Research Journal of Education*, Vol. 81, pp. 1–10. https://doi.org/10.32861/rje.81.1.10

Miranda, J., Navarrete, C., Noguez, J., Molina-Espinosa, J.-M., Ramirez-Montoya, M.-S., Navarro-Tuch, S. A., Bustamante-Bello, M.-R., Rosas-Fernandez, J.-B., and Molina, A. (2021), "The core components of education 4.0 in higher education: Three case studies in engineering education", *Computers and Electrical Engineering,* Vol. 93, pp. 1- 13. https://doi.org/10.1016/j.compleleceng.2021.107278

Nunez-Canal, M., de las Mercedes de Obesso, M., and Perez-Rivero, C. A. (2022), "New challenges in higher education: A study of the digital competence of educators in Covid times", *Technological Forecasting & Social Change*, Vol. 174, pp. 1-13. https://doi.org/10.1016/j.techfore.2021.121270

Pereira, M. A. C., Ignácio, L. M. N. D. C. and Rodrigues Reis, C. E. (2021), "Virtualizing project-based learning: An abrupt adaptation of active learning in the first days of the COVID-19 pandemic, with promising outcomes", *Sustainability,* Vol. 14 No. 1, pp. 363-373. https://doi.org/10.3390/su14010363

Probst, G., and Zizka, L. (2022), "Bridging the gap: From instruction to co-construction in business education", In R. J. Baldegger, A. El Tarabishy, D. B. Audretsch, D. Kariv, K. Passerini, & W.-L. Tan (Eds). *The Future of Business Schools: Purpose Action, and Impact*. Cheltemham, UK: Elgar Publishing.

Rehm, S., and Schulz, H. (2020), "Digitalisierung durchdenken und gestalten: Ein Plädoyer für strategisches Handeln". In: Bauer, R., Hafer, J., Hofhues, S., Schiefner-Rohs, M., Thillosen, A., Volk, B. & Wannemacher, K. (2020). *Vom E-Learning zur Digitalisierung: Mythen, Realitäten, Perspektiven (Medien in der Wissenschaft)* (1. Aufl.). Waxmann.

Sailer, M., Schultz-Pernice, F., and Fischer, F. (2021), "Contextual facilitators for learning activities involving technology in higher education: The CЬ- model", *Computers in Human Behavior,* Vol. 121, pp. 1-13. https://doi.org/ 10.1016/j.chb.2021.106794

Weilage, C., and Stumpfegger, E. (2022), "Technology acceptance by university lecturers: A reflection on the future of online and hybrid teaching". *On the Horizon: The International Journal of Learning Futures,* Vol. 30 No 2, pp. 112–121. https://doi.org/10.1108/oth-09-2021-0110

Weiss, Y. (2022). *Weltbeste Bildung: Wie wir unsere digitale Zukunft sichern*. Campus Verlag.

Zierer, K. (2020), *Lernen 4.0 - Pädagogik vor Technik: Möglichkeiten und Grenzen einer Digitalisierung im Bildungsbereich*. wbv Media GmbH & Company KG.

Zizka, L., and Probst, G. (2022a), "Learning during (or despite) COVID-19: Business students' perceptions of online learning", *Quality Assurance in Education, Vol. 31* No. 1, pp. 60-73. https://doi.org/10.1108/QAE-12-2021-0188

Zizka, L., and Probst, G. (2022b), "Teaching during COVD-19: Faculty members' perceptions during and after an "exceptional" semester", *Journal of International Education in Business,* pp. 1-19. https://doi.org/10.1108/JIEB-12-2020-0099