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# OVERCOMING BARRIERS TO DIGITAL TRANSFORMATION OF HIGHER EDUCATION

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***Abstract:*** *The modern world can hardly be imagined without digital technologies. They are used in any sphere of human activity, education being one of them. Using digital technologies in higher education is not just an option anymore; it is an imperious necessity conditioned by a number of factors. Digital technologies are widely used by students for developing their personalized learning environment. However, technology adoption and use by instructors is uneven and often quite modest. Of course, there are faculty members actively and effectively using and promoting available digital teaching tools, as well as those just willing (or unwilling) to do it due to various types of barriers. Sometimes it looks contradictory enough, as most instructors are active users of digital technologies in their personal lives, but in classrooms, some of them encounter serious technical, logistical, and pedagogical problems. Understanding the reasons for some reluctancy to incorporate technology, as well as teachers' concerns in this respect, can essentially contribute to the enhancement of learning environment and professionalism. The present study aims to extend what is known about the factors and issues negatively affecting the adoption and use of modern technologies by faculty members, as well as to offer some recommendations for solving problems and reducing the barriers to technology adoption.*

**Keywords:** digital media, instructional technology, higher education, changes, barriers, innovation

**JEL Classification: I23, O30**

***"There is nothing permanent but change."***
*(Heraclitus, Greek philosopher, 535 BC)*

## 1 Introduction

The modern world can hardly be imagined without digital technologies. They are used in any sphere of human activity, education being one of them. Digital pedagogies, blended, hybrid, online learning are not new, but they have never been used as intensively and extensively as it is happening now. Using digital technologies in higher education is not just an option anymore; it is an imperious necessity conditioned by a number of factors. The landscape of higher education is being constantly transformed due to a number of reasons and demands. Change is our greatest friend and sometimes

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our worst enemy. It's inevitable, and its pace is increasing exponentially. The educational environment is constantly changing, as well as beneficiaries' expectations are. These changes are happening at an ever-accelerating pace. In order to survive and, ideally, thrive in this climate, educational institutions, their services, and all stakeholders must be flexible and resilient.

With the rise of the 21st century, lots of educators around the world were thrust into a new teaching environment of the online classroom, often without their absolute readiness, concern and proper preparation. With the rise of the COVID-19 pandemic all of them, not depending on the education level, had to plunge into teaching online. Higher education was not an exception in this respect. "During 2020 higher education systems worldwide embarked on a journey that for many of us felt more like a roller coaster ride than a planned outing" (Brown, 2021). Higher educational establishments had to embrace the concept of online education, acknowledge its benefits and limitations, and act upon it to remain competitive. COVID-19 has increased society's requirements for remote and online delivery of learning. Thus, faculty staff more than ever have become involved in designing and delivering interactive and engaging learning for all students across all disciplines all over the world. Therefore, it has become vital to invest in supporting them to develop corresponding digital skills and enable them to teach with confidence, meeting new educational requirements of the digital transformation.

## 2 Virtues and Challenges of Digital Transformation from Students' Perspective

Today, online education is a reality, whether you like it or not. Its benefits have a positive impact on institutional growth, and its limitations, or barriers, affect (mostly negatively) institutional image, instructor workload, as well as the level of students' satisfaction. In today's fast-changing higher education landscape, universities are facing unprecedented challenges and, at the same time, opportunities, where technology can play the central role in students' learning activity and experiences. Digital technologies are widely used by students for developing their personalized learning environment.

Pearson and Wonkhe's research on students' learning experience, which was published in July 2020 and was based on the opinions of 3,461 students (82% from the UK, 6% from the EU, 12% - international) finds that, despite their struggles with studying during Covid-19, students are open to flexible learning post-pandemic. According to this research, 76% agree that more college and university students will attend virtually vs a traditional education setting within ten years. Moreover, the most popular answer (about 58% of students) to the question 'What can your university do to meet your expectations for next year? (i.e. 2021)' was high quality online teaching (Pearson and Wonkhe, 2020).

According to Anna Jackson, Head of Customer Insights at Pearson (Jackson, 2021), there seems to be a consensus among university leaders of learning and teaching that while the explosion in online and blended learning didn't come about in exactly the same way the sector would have chosen, there's now little sense in reverting back to the way things were before. It is both heartening and daunting in equal measure that there are very few elements of online learning and teaching that the students they surveyed would NOT like to see continue after the pandemic.

Wonkhe and Pearson collaborated again on a survey of students exploring their academic experience in the autumn 2020 term and their hope for the future of learning and teaching. This

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time the survey included 3,389 students (75% from the UK, 10% from the EU, 15% outside the UK and EU) being at different level and from different educational backgrounds. According to a new survey, which was published in February 2021, over 80% of students agreed that they would like to see recorded lectures, availability of all essential learning materials in the virtual learning environment, as well as online access to support services. 79% said they would like to continue online tutorials or check-ins with tutors. Among the benefits of digital transformation, students mentioned that they liked the flexibility of virtual learning, working at their own pace and not having to commute to campus. 72% said they would welcome online tests that allow them to check their learning, and 69% mentioned they would like to see online discussion forums continue. 58% would like to continue with online seminars. However, students were more equivocal regarding virtual placements/internships and virtual labs. Just about 33% would like to do it online. At the same time, when students were asked straight out whether they thought their online academic experience had been of sufficiently good quality (during autumn 2020 term), only 40 per cent said yes (Pearson and Wonkhe, 2021).

Thus, it can be concluded that students are ready for digital transformation of higher education, they are willing to benefit from a number of advantages it can offer, but they are not quite satisfied with its present quality.

## 3 Technology Adoption and Use

Technology adoption and use by instructors is uneven and often quite modest. Of course, there are faculty members who are actively and effectively using and promoting available digital teaching tools, as well as those willing (or unwilling) to do it due to various types of barriers. Sometimes it looks contradictory enough, as most instructors are active users of digital technologies in their personal lives, but in classrooms, some of them encounter serious technical, logistical, and pedagogical problems. Understanding the reasons for teachers' concerns and some reluctancy to incorporate technology can essentially contribute to the enhancement of learning environment and professionalism.

With the passage of each day, society's use of technology impacts every aspect of their lives. Consequently, as the technology has changed and student use of technology has changed, faculty have needed to adjust to new digital demands to satisfy the emerging needs of new student generations. The success of faculty members in adopting technology directly impacts students' success and ultimately institution's on the whole.

Online learning has become available at lots of colleges and universities around the world. Lots of courses are offered through learning management systems (LMS) like Moodle, D2L, Canvas, Blackboard. The technological change has altered the perception of the university campus from a one-dimensional (physical) concept to a multi-dimensional (physical and online) one, which has brought great transformations into all aspects of higher education. The growing population of learners willing to study online has created a favorable market for courses delivered online (totally and/or partially), which has made universities around the world respond to rapid economic and technological changes.

While this trend of increasing online instruction was boosted by negative COVID reasons, now it's seen as a positive direction for 21$^{st}$ century higher education. Even traditional

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campus/resident students, as well as teaching staff, sometimes prefer online courses, as it helps to sort out issues related to schedule or transportation. Besides, it lets a greater number of students take popular courses when physical space limits enrollment. It has become possible to study/work abroad without leaving your home country. When COVID does not determine the necessity of studying/teaching online, these are often the primary reasons for delivering online courses, which gives rise to increased access to higher educational services for those who cannot participate in a campus-based learning experience for various reasons. However, online courses should provide more than just access. Good online courses should offer high quality instruction. That's where issues can arise. Many universities face challenges related to motivation (both students' and professors'), learning designs that are less suitable for distance education, as well as restricted access to technology because of limited resources.

## 4 Diffusion of Innovations

Today, instructional technology is widely available on most campuses and its intensive integration is deemed as vital for the survival of higher education institutions. Thus, they must be ready and prepare their faculty to implement the new technologies within their classes. It is difficult, or even impossible, to imagine successful functioning of any university as a whole or its separate components independently of technology. All the university components, including organization, people, learning and teaching processes, knowledge transfer and information exchange processes are served and supported by technology. Although universities require the use of instructional technology by their professors, many of them use the minimum from the technology that is at their disposal. It means that the innovation-decision process is not effective enough.

In terms of higher education, the innovation-decision process is the process through which universities pass from first knowledge of an innovation to forming an attitude toward it, followed by a decision on its adoption or rejection, then, in case of adoption, to implementation and use of the new idea, and, finally, to confirmation of this decision (Rogers, 1995). Thus, there are five main steps in the innovation-decision process:


**Figure 1** Steps in the innovation-decision process.
**Source:** based on Rogers (1995)

*Knowledge* occurs when an organization learns of the innovation's existence and gains some understanding of how it functions. *Persuasion* occurs when a favorable or unfavorable attitude toward the innovation is formed. *Decision* is a critical stage occurring when there is engagement in activities, weighing advantages and disadvantages, which leads either to adoption or rejection of the innovation. *Implementation* happens when an innovation is put into use and organizations and their staff employ the innovation to a varying degree. Finally, *confirmation* takes place when a decision-making unit seeks reinforcement of an innovation-decision that has been made, but which might be reversed if there are any conflicting messages about the innovation. Thus, the theory suggests that potential adopters of an innovation must initially become aware and learn about the innovation, then they have to get persuaded as to the benefits of the innovation, after

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that, decide to adopt and implement it, and, finally, confirm (reaffirm or reject) the decision about its adoption. Those that are predisposed to being innovative will adopt an innovation earlier than those who are less predisposed. In this context, there are innovators (risk takers and pioneers who adopt an innovation very early in the diffusion process) and laggards (are resistant to adopting an innovation until rather late in the diffusion process, if ever). In terms of using and promoting educational technologies, the former are engines of digital transformation, whereas the latter are its brakes, who necessitate special attention from administrators and instructional technologists to reduce the negative effect of this obstacle.

The process of adopting new technologies has been an ongoing area of study for a number of decades throughout the world. Rogers (1995, p.21) defined adoption as "a decision to make full use of an innovation as the best course of action available". As it is stated above, rejection can also happen, which is "a decision not to adopt an innovation". Getting a new idea adopted, even when it has obvious advantages, is often very difficult. Many innovations require a lengthy period, often of many years, from the time they become available to the time they are widely adopted. The Covid-19 pandemic did not offer any time at all, as universities had to adapt to relatively new online conditions of teaching/studying extremely fast. Nowadays, the modern higher education environment also does not dispose of so much time to adopt various educational technologies. Therefore, a common problem for universities is speeding up the rate of diffusion of innovations, which is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995, p.5).

Rapidly changing educational technology combined with various degrees of financial support (which can be stronger or less strong, depending on the country, the region of the country, the type of institution, etc.) often cause some resistance from the faculty to adopting new instructional technologies. The four major factors that interact to influence the innovation diffusion are the following: features of the innovation itself, the way information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced. These factors interact in various ways and subsequently facilitate or impede the adoption and usage of a specific product or practice.

Many instructional technologists deal with lack of utilization of technology by faculty members. There is a number of factors which can be blamed in this respect ranging from faculty resistance to change and unwillingness to adopt innovations to bureaucracy, inadequate funding, or limits imposed by institutions. Instructional technology is inherently based on innovation, so through better understanding the factors that influence adoption of innovation, it will be easier to explain and potentially predict the scale and the speed of diffusion of innovative products and methods.

New generations entering universities have significant, very often advanced, skills associated with the use of the latest information technology, they are ready and willing to use it, as they find instructional technology beneficial to their learning. Higher education institutions all over the world spend lots of effort and money on instructional technology purchase and application. However, it is not unusual that administrators, instructional technologists, students complain that faculty are adopting them in a very limited way, or even not adopting at all. Thus, it is widely recognized by every part related to the field of higher education that there are barriers preventing instructors to effectively integrate the instructional technology.

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## 5 Barriers to Digital Transformation

As it has been stated above, educational technologies absorb a significant amount of the university effort and budget, but not all faculty are using them to their full potential (or at all). That is why it is crucial to identify the barriers for creating and delivering online courses, or just some of their elements, in order to integrate new strategies that will provide the instructors with the appropriate teaching tools to make successful courses.

### *5.1 Internal vs external barriers*

Barriers that the faculty have to overcome in order to adopt new instructional technology methods fall into two broad categories: internal and external (Rogers, 2000). The former includes teachers' attitudes or perceptions about technology, lack of time for mastering, implementing or improving digital skills, in addition to their actual competency level of mastering and applying instructional technologies in the process of instruction. The latter might include availability and accessibility of necessary technology, the presence of technical personnel, the existence (or non-existence) of special programs for staff digital development and skill building, as well as lack of funding. External barriers are associated with unavailable resources, such as the lack of equipment, or lack of training. Internal barriers affect professors' attitude to adopting new instructional technologies and might include beliefs, established practices, conservatism, etc.

External sources of barriers can be categorized under three general headings: availability, institutional and technical support, and stakeholder development (Rogers, 2000). The availability and accessibility category of barriers includes limited access to useful, relevant, and appropriate hardware and software. The second general category of external barriers is related to institutional and technical support in the form of user services or media specialists who assist staff in using and maintaining different technologies. Employing a limited number of technical support staff severely hinders technology adoption. Another problem might be connected with the fact that technical support personnel may lack proper technical support expertise, i.e. they do not have necessary technical skills to meet the needs of the faculty. Lack of institutional support may include lack of administration encouragement to try new technologies, not providing required funding, which can become a major barrier to the adoption of new technologies in a university. The third general category of external barriers is related to stakeholder development, where the term 'stakeholder' includes faculty, staff, and students. This category of barriers includes lack of time/funds to develop a new course incorporating educational technology, as well as to acquire new skills. These issues become barriers at both individual and institutional levels. It is necessary to invest a considerable amount of personal time to build new skills or create new teaching materials. It is especially problematic for teachers who are just starting to use new educational technologies. Besides, there might adjoin the fear factor, which stops many teachers from even trying new things.

Lack of time from external or institutional perspective can be connected with the limits regarding release time for a course or professional development. If the necessary release time is not just available, and if personal time is too fragmented or limited, professors cannot learn new skills and develop new materials. Funding issues make the situation even more problematic.

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### *5.2 Five categories of barriers*

Another classification of barriers was suggested by Reid (2014), who identified five categories of barriers related to technology, process, administration, environment and faculty.

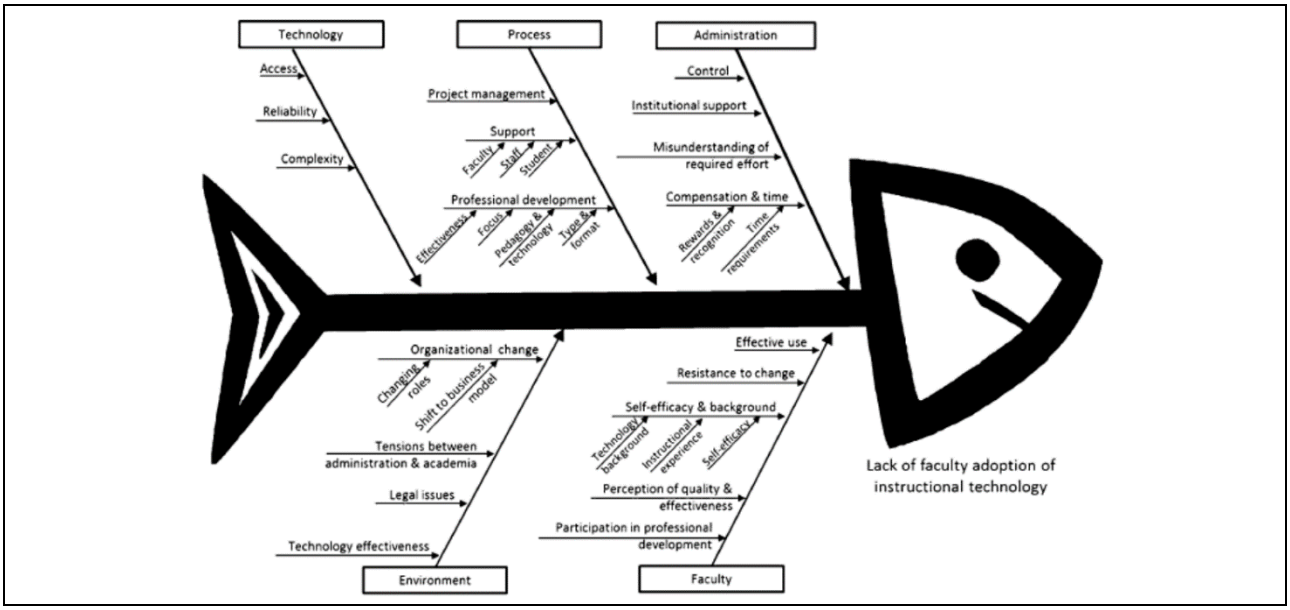


**Figure 2 Fishbone diagram of barriers to adoption of instructional technologies**
**Source:** Reid, 2014, p.385

- **Access to technology**

The most obvious barrier in terms of technology is when it is simply unavailable. Another major technology problem found in lots of universities, especially in developing countries, is that most teaching staff are dissatisfied with the current investment in technology and distribution of available resources among departments. This issue becomes even worse because of the extra tasks required from instructors who plan to use instructional technologies. In some institutes for each class session instructors are individually responsible for obtaining, setting up, and then returning, projectors, laptops, or other equipment they need, to use instructional technology in the classroom. Theoretically, technology is available to instructors, but practically, there is a great degree of frustration and feeling it is not worth the extra work and considerable additional effort.

Besides, technology might be not available consistently. Sometimes, it cannot be used in the classroom because of poor internet coverage or lack of necessary hardware among students. Or the available equipment is just unreliable, old fashioned, not compatible with other items. Whatever technical issue arises, faculty members become reluctant to use educational technologies, if it makes the process of instruction more complicated.

Another technology-related reason is that there is so much educational technology available nowadays, and the progress in this field is so intensive, that it is really challenging both for teachers and students to keep up pace with rapidly developing software tools and devices. The variety of instructional technologies and tools, as well as their potential and limits, can cause confusion, which, in its turn, causes many faculty members to refuse from using them as they assume (often incorrectly) that learning how to use the technology will take a lot of time and effort.

- **Process**

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Adopting new instructional technologies on the institutional level does not happen in a flash. A number of processes are involved ranging from identifying and implementing a new technology to providing help through professional development and support. It can be an expensive failure if there is lack of a clear vision, well-organized leadership, incentive, and extensive faculty participation.

Faculty members can be reluctant to adopt new technologies for a number of reasons: they are comfortable with the way things are and do not welcome changes, some of them are simply uncooperative, there is some deficit of information and communication, they do not have the necessary skills to do it, there is lack of institutional support (administrative, technical, instructional).

Students may also face barriers when trying to use technology, which can result in additional problems for faculty. If this is the case, both parties, being frustrated, need technical support. It is hardly ever provided 24/7, whereas it is often necessary beyond the standard working hours, in the evenings, or at weekends, when both students and faculty members are working individually (students doing homework assignments, professors preparing content, tasks, evaluation activities for the courses). If the institute does not provide this support, or provides it in a rather limited way, then the faculty members face students' worries and frustration and, consequently, need even more support and assistance. If students or teaching staff cannot get what they need in a timely manner, the most probable result will be refusal from using technology by major stakeholders of the education process.

One more major group of obstacles to adopting and using new technologies by faculty is related to the lack of necessary skills and knowledge. Basically, university teaching staff members believe that their institution is mostly responsible for instructional technology training. Universities most often provide professional development opportunities, but it might be not enough. The related courses are usually short-term, whereas they are unlikely to lead to significant professional growth or change. In this case, self-education could be helpful, or looking for instruction outside university, but not all staff are interested in it or can afford it. Another problem is that many professional development courses focus on how to use the technology in very general lines, without delving into the variety of methodological details related to its effective pedagogical use. Technology itself might be relatively easy to understand, but learning how to apply it in the most effective way to enhance both teaching and learning, might be difficult. As a result, these short-term courses do not really help professors incorporate the technology into teaching in the best way.

Exaggerated conservatism can represent another barrier, which is difficult to overcome. New technologies require faculty members to abandon many traditional practices and relationships and find new ways to deliver qualitative classes, and this is often really difficult.

Thus, lack of necessary pedagogical background on the one hand, and limited access to detailed instruction on the other hand, give rise to essential barriers to digital transformation of higher education.

- **Administration**

University administration is also pertinent, directly or indirectly, to the appearance of barriers to digital transformation. In many higher education institutes, technology decisions are made without faculty input or administrative consideration of faculty adoption issues. Sometimes,

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decisions related to new technologies are made without a well-considered overall plan for their instructional use. Technology use (such as learning management systems, interactive boards, modern equipment, etc.) are usually controlled by structures beyond academic departments. So, the distance between the initiators of using new technologies and their actual users (faculty members and students) is considerable, which makes the process of adoption new technologies even more complicated.

One more factor which slows down the process of digitalization of higher education is administrative control, which many faculty members see as negatively influencing their teaching and learning processes. They are afraid that controls will lead to more controls, which is always stressing.

Another group of administrative barriers derives from the fact that, at many institutions, teaching has long been considered less important than research and scholarship, which require lots of time and effort. So, faculty members just do not have enough time and energy to get acquainted with new technologies, not speaking about trying to use them. In addition to it, there are some other things that are currently lacking in a number of universities because of some administrative issues, for example decent physical resources, including offices and classrooms, additional equipment, enough funding, incentives, lower teaching loads and higher release times.

To sum up, increasing instructional technology use is translated into more faculty time at every stage of the process, which is not simply a matter of learning the technology. Instructors receive few, if any, incentives for adopting new technologies. Leadership may not understand the complexities of the technologies, or the time needed to master them. Further, administration may be controlling access without considering faculty needs.

- **Environment**

Instructional technologies are not adopted in a vacuum. Higher education institutes are constantly running lots of processes, implementing multiple strategies, going through various changes at the same time. Different institutes have different cultures that guide the processes related to technology adoption, implementation and use in these changing environments. Institutional environmental considerations are conditioned by various changes (from local, organizational to more global, happening on the government or country level), the nature of relationship between administration and academia (which can have a more conservative or liberal vector, stick more to traditions or innovations, be more authoritarian or democratic), legal issues, the level of institutional autonomy, the effectiveness of instructional technology, etc. There are many issues regarding academic freedom and responsibility. In terms of legal issues, there are barriers connected with the rights to online materials. Universities might treat online materials as inventions rather than intellectual property. Moreover, placing materials into an online environment can cause piracy and copyright infringement. Taking into account the complexity of copyright laws and regulations, and lack of necessary knowledge and insight in this area, faculty members may not feel they understand all the related issues well enough and therefore resist creating and adding online materials on university learning management system. Faculty who are concerned about these issues might be hesitant and, as a result, reluctant to place any materials in any environment which is beyond their control. All these environment-related issues cause a supply-and-demand conflict. On the one hand, many students, government agencies, businesses

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demand the inclusion of more instructional technologies in academic courses, which keeps pace with the modern life realia. On the other hand, higher education institutions and their staff cannot meet these requirements completely because of existing barriers of various nature.

- **Faculty**

The faculty-related barriers are more fundamental and personal. That is why they are more difficult to overcome. These barriers are very specific. Every faculty member, facing the need to adopt and use new technologies, may experience varying degrees of resistance to change. Self-efficacy and background, the knowledge and skills in this field may also differ considerably. There can be various perceptions regarding instructional technology effectiveness, more or less active participation in respective professional development courses, and so on and so forth. Since these barriers are internal to individuals, they cannot be controlled externally, which makes them especially difficult to deal with.

Having a closer look at the above-mentioned barriers, it can be noticed how interconnected and interrelated they are. This picture is created because of overlapping issues and needs, causing these barriers to happen. 'More digital' institutional needs are connected with respective students' needs, personnel needs are tied to staff development needs, which, in their turn, depend on the available time and funds, both personal and institutional.

## 6 Improving the Effectiveness of Digital Transformation

Having examined an extensive set of barriers to technology adoption by higher educational establishments, and having studied the suggestions in the related sources, a number of recommendations can be made on removing or reducing their negative effect, and, consequently, improving the effectiveness of higher education digitalization. This list cannot be exhaustive, taking into account a great number of all the related components and issues. However, some broad recommendations can be listed to assist in the process of digital transformation and electronically enhanced curriculum development. Thus, in this connection, it can be helpful to do the following:

- determine the goals of teaching and learning first, taking into account the mission of the educational institution, learners' needs, as well as some considerations regarding the institution's future;
- determine what technologies can support and promote educational goals;
- assess the level of technology adoption of the stakeholders, especially the faculty and staff, which will guide the selection of technical support and choice of equipment;
- design phases and strategies of university faculty and staff's professional development;
- assess and change (if necessary) the attitudes of stakeholders regarding educational technology, as both individual and institutional attitudes and perceptions are critical when confronting barriers;
- consider all categories of barriers to technology adoption and use simultaneously, as, for instance, it is useless to purchase high-tech equipment without providing qualified technical support and staff development opportunities;
- hire well-prepared instructional technologists and technicians, who have appropriate skills in maintaining and servicing such high-end equipment and can assist teaching staff with

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using this equipment and provide necessary training and support; and to make them available and accessible to teachers;

- take into account considerations of time and funding issues (to develop new course materials, learn new skills);
- allocate funds in an appropriate way, taking into account a broad picture of the current situation, but not just some specific details (e.g. purchasing new up-market technology without investing in staff training can be waste of money, which can contribute to negative attitude toward technology, and, ultimately, become a major barrier to technology adoption);
- promote the benefits of digital transformation among both faculty members and students, provide and support related learning/teaching experiences and develop proper digital skills;
- offer responsive support for technical and user-related issues;
- demonstrate use of all platforms, systems and software, which are used in a particular institutional environment, at the beginning of the academic year and at regular intervals throughout it;
- offer regular check-in sessions to help students see how they are progressing academically and personally and identify additional support needs;
- improve communication among all the related stakeholders by setting out clear channels and by responding promptly;
- facilitate access to digital learning/teaching (as to the availability of necessary equipment and software);
- improve the interactive aspects of technology-based learning/teaching (encourage more socialization, collaboration, cooperative learning, use online quizzes, didactic games, polls, online collaboration boards);
- signpost useful tools and strategies within learning episodes;
- in terms of teaching, use variety of different mediums and software to create content and organize engaging activities and discussions, which makes learning experiences more memorable and motivating;
- have more technology-based informal quizzes and formative assessment opportunities to consolidate learning and help students manage their progress;
- ensure a timely and sufficiently detailed feedback to aid progress;
- increase the number of copies of digital resources and purchase more licenses to key/in-demand resources;
- minimize confusion and improve navigation through reducing the number of platforms and software being used;
- to ensure consistent structure of courses and modules within them;
- in terms of staff and students' wellbeing, offer comprehensive mental health care solutions for those who struggle to learn/teach using digital technologies;
- provide guidance on how to manage online workload;
- develop a sector-wide evidence base that demonstrates the value of digital technology in higher education;

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- raise awareness of the strategic importance of embedding digital technologies within the curriculum;
- prioritize building digital capabilities;
- make a long-term commitment to tackle digital inclusivity.

## 7 Conclusion

The overall purpose of this study was to identify the barriers that higher education institutions have in implementing online instructional technology. The review of the literature and data related to the focus of the study provides a framework for further research in methods for minimizing the impact of each barrier. The framework of categories of barriers presented here might provide institutions and relevant stakeholders with a starting point to approach adoption and use of instructional technology with a plan to mitigate and minimize as many barriers as possible, giving it a better chance of success. Although it would be helpful to know which barriers were more important than others, there is no definitive, ranked list. There are barriers at national, institutional and personal levels – they all contribute to slow uptake of digital transformation of higher education. Taking into account their complex nature, a complex approach is needed to overcome these barriers, or, at least, reduce their negative effect, and create the belief in digital transformation that is needed for a successful instruction meeting modern society requirements, as well as for continued growth.

***"Technology will never replace great teachers,***
***but technology in the hands of a great teacher can be transformational."***
*(George Couros)*

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