Digital Tools
in Romanian Higher Education:
The Influence of the COVID-19 Pandemic
on the Digitalization of Universities

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Abstract

The goal of this research is to find out how much digital tools are used in Romanian institutions on a daily basis. These tools can be used for both administrative and instructional tasks and processes. Furthermore, we investigate whether the COVID-19 pandemic aided or hampered the ongoing digitalization process, which had already begun prior to 2020, and whether any online tools implemented in response to lockdowns and a reduction in face-to-face interactions were kept or abandoned after the restrictions were lifted in the spring of 2022. We conducted interviews with Chief Information Officers (or comparable positions) at the top 5 Romanian universities and surveyed 15 of the most important Romanian universities to determine the changes in teaching and administrative procedures brought about by digital technology.

Keywords: COVID-19 pandemic, digital transformation, higher education, Romania.

1. Introduction

Education is one domain that is seen as both conservative and open to new technologies. The history of educators using new technologies to facilitate learning dates back to at least the 18th century, when enterprising teachers began to use the newly established postal system to offer what would eventually be known as 'distance learning' (Kentnor, 2015). While individual entrepreneurs initially offered courses on a limited number of subjects (shorthand, accounting), universities such as Oxford and Cambridge began offering correspondence education in the 1800s, among other forms of education (Harting and Erthal, 2005).

Education institutions made use of each era's mass medium and employed it in their effort to reach students. Radio was used in different countries for student and adult education (a good example is represented by BBC in the United Kingdom). After the Second World War, television enabled the creation of dedicated programs or even stations that broadcasted educational content (Harting and Erthal, 2005).

Technology was used not only for communicating with students who were not on campus, but it was also used in the day-to-day operations of schools and universities. From the 'magic lanterns' of the nineteenth century to projectors and photocopiers in the twentieth century and tablets, MOOCs, and 24h connectivity now, schools have repurposed and adapted technological methods and artifacts for educational needs.

The possibilities provided by computers and the internet enabled much greater and faster access to information (think virtual libraries, online encyclopedias or curated search results). Such technological advancements also allowed for less emphasis on information retention (the information was only a click away) and more analysis and practical application; technology in classrooms can thus change the way schools and universities think about education.

Universities use technology in both their back-office operations (for example, document management systems or procurement platforms) and their educational activities, with learning management systems or various digital educational platforms being the most visible examples. The COVID-19 pandemic, which forced most universities to abandon face-to-face instruction in favor of digital interactions, shed light on these previously unknown (at least outside of the academic world) digital tools. This increased research interest in better understanding the benefits and drawbacks for universities of relying on digital instruments for a growing share of their activity.

This increased scrutiny revealed some interesting results. Korikov and Levin (2021) found out that Learning Management Systems (LMS) are not as interactive and do not offer the personalized content and education that face-to-face settings allow. They can be supplemented by other digital tools to overcome their shortcomings (Korikov and Levin, 2021). Despite being touted as very easy to use and understand, the educational platforms employed especially during 2020 and 2021, on which schools and universities relied during lockdowns and restrictions, are not a panacea for current educational needs. No platform can satisfy all requirements and personal interests, and ability and skill (of both teachers and students) remain important (Troshina, Dobrova and Kozyreva, 2021).

On the other hand, contrary to popular belief, you do not have to be an IT specialist or teach IT-related subjects to make use of new technologies in your teaching. University professors of different disciplines are just as likely to master and use digital educational technologies (Novikova and Bychkova, 2022).

2. Literature review

The COVID-19 pandemic was a tragedy that provoked hundreds of thousands of deaths and disrupted the daily lives of most of humanity. It was also a peculiar situation in which most countries introduced a small number of interventions (lockdowns, mask-wearing, travel restrictions, financial help) almost simultaneously. Schools of all levels shut down for long periods in vast parts of the world. Data from UNESCO (2023) shows that, on average, countries closed their schools (partially or totally) for almost a year (49 weeks). Large variation exists: in India closures lasted for 93 weeks, Burundi, Belarus, Nauru and Tadjikistan did not introduce any such restrictions (UNESCO, 2023), but most countries shut down schools for in-person learning for long periods of time.

The COVID-19 pandemic has caused unprecedented disruptions in higher education institutions around the world, requiring them to adapt their teaching and administrative practices in response to the crisis. This review of the literature looks at how universities have dealt with these challenges, with a particular emphasis on digital pedagogy, online learning, emergency remote teaching, and the impact on equity and inequality.

2.1. Digital pedagogy and online learning

The rapid shift to online learning was a common response among universities during the COVID-19 pandemic. Because lockdowns and the move to digital learning happened more or less in the same period of time in many countries, researchers had the opportunity to study how differences in the national context, available resources, or culture affected the universities' response. Crawford *et al*. (2020) conducted a study analyzing the digital pedagogy responses of 20 countries, which revealed a wide range of strategies, from synchronous to asynchronous learning and the use of various online platforms. They found that higher education institutions employed diverse approaches, with some countries relying heavily on videoconferencing tools, while others utilized learning management systems (LMS), open educational resources, and social media platforms to facilitate learning.

Dhawan (2020) discussed the perceived role of online learning as a panacea during the crisis, emphasizing its potential to enhance learning outcomes and student engagement. The author highlighted several advantages of online learning, such as flexibility in time and location, the opportunity for personalized learning, and the ability to foster collaboration and communication among students. Dhawan (2020) also notes that this decampment to online education also presents a number of challenges: technical ones (login, app installation, audio-video problems, lack of good internet access), student motivation difficulties (the flexibility of digital education is a blessing but can also be a curse), lower engagement

opportunities, mediocre course content, lack of practice, the disappearance of the boundaries between school and private life.

These problems brought by online education were also discussed by Rasheed, Kamsin and Abdullah (2020); the authors conducted a systematic review of the challenges faced by universities in implementing online components of blended learning, identifying issues related to technology infrastructure, instructional design, and student engagement. They emphasized the need for robust and reliable internet connectivity, appropriate hardware and software, and adequate technical support to ensure a smooth online learning experience. The importance of engaging and interactive online learning materials was also evident in this study, as well as providing timely feedback, and taking into account the diverse needs of the students.

In a case study of the way in which Peking University coped with the COVID-19 pandemic, taking into account also the long lockdown periods in China, Bao (2020) highlighted the importance of institutional support and faculty training in ensuring the successful adoption of online teaching. The author noted that the university provided resources and training sessions to help faculty members develop their online teaching skills, adapt their instructional strategies, and utilize various online tools effectively. Dedicated technical support teams also proved to be helpful, especially at the start of the online educational period, when, for a lot of students and professors, the tools and methods used were not very familiar.

Marinoni, van't Land and Jensen (2020) conducted a global survey to find out the key factors that influenced the success of the transition to online learning. These included the availability of digital infrastructure, the preparedness of faculty and students for online learning, and the level of support provided by the institution. The authors also observed that the pandemic prompted many higher education institutions to reconsider their approaches to teaching and learning, with a growing emphasis on flexible, learner-centered, and technology-enhanced pedagogies. Administrative and bureaucratic barriers that seemed insurmountable just a few weeks before were torn down in the mad dash to provide students stuck at home with the best education possible under those circumstances.

2.2. Emergency remote teaching

In order to differentiate the 'classical' online learning approach (which existed before the COVID-19 pandemic), the concept of emergency remote teaching emerged as a distinct approach, characterized by the rapid and unplanned transition to online instruction (Bozkurt and Sharma, 2020). This shift was primarily aimed at ensuring the continuity of education in the face of widespread closures and physical distancing measures. Unlike traditional online learning, which is typically designed and developed over an extended period of time, emergency remote teaching involved the rapid adaptation of existing face-to-face courses for online delivery.

Rapanta *et al.* (2020) stressed the importance of refocusing teacher presence and learning activity in the context of emergency remote teaching. They argued that instructors needed to establish a strong online presence, provide clear guidance and expectations, and

offer timely feedback to support student learning. The need to design learning activities that offer students opportunities for active engagement, critical thinking, and collaboration in the online environment was also found to be important.

A sensitive topic was touched upon by Czerniewicz *et al.* (2020). The authors examined the implications of emergency remote teaching on equity and inequality in higher education. Technology can act as a conduit for education delivery, but only if that technology exists and works as intended. Students that do not have computers or tablets, or a reliable internet connection, can be cut out not only from classes, but also from social and academic support networks. The pandemic exacerbated existing disparities, with marginalized students experiencing greater challenges in accessing and benefiting from remote instruction. The blurring of boundaries between home and school can have a detrimental effect (children that are at home and not in the classroom have a higher chance of being asked to help with other tasks, particularly in poorer households). The authors called for universities to adopt inclusive and flexible approaches to teaching and assessment, as well as to provide targeted support for disadvantaged students.

Differentiating between traditional online learning and emergency remote teaching can help with devising appropriate strategies, policies, and support mechanisms for faculty and students (Hodges *et al.*, 2020). In times such as global pandemics or other events that close down schools and universities, short-term solutions to address immediate needs should be readily available. But universities should not overlook planning for long-term improvements in online learning infrastructure and pedagogy.

A UNESCO (2021) report provided a global perspective on the challenges and opportunities associated with emergency remote teaching. The findings are not surprising: educational institutions need to adopt innovative solutions, collaborate with stakeholders, and leverage digital technologies to ensure the continuity of education during events such as pandemics. Additionally, the potential of emergency remote teaching to promote digital transformation in higher education and provide greater flexibility and inclusivity exists and should not be squandered (there is a greater openness towards technology driven change in education than before the pandemic).

2.3. Faculty and student perspectives

Up until now we looked at the way in which institutions and educational systems adapted to the pandemic conditions. But these systems and universities serve and are served by people – teachers, administrators, and students. A number of papers studied this particular topic. Adnan and Anwar (2020) and Owusu-Fordjour, Koomson and Hanson (2020) found that students are concerned with the quality of instruction, technology access, difficulties in adapting to the new educational environment, and the loss of social interaction. Some students reported having trouble concentrating or experiencing feelings of isolation, and a lack of motivation. Additionally, they expressed concerns about the assessment and evaluation processes in the online context, as well as the availability and quality of support services provided by their institutions.

Students with disabilities, particularly sight- or hearing-related found that the shift to online education often exacerbated existing barriers to accessibility and inclusion (Murphy, 2020). Adopting universal design principles in their online courses and offering customized support services could alleviate some of these problems.

Another worrisome development is the increase in reported levels of anxiety, stress, and depression as a result of the crisis (Watermeyer *et al.*, 2021). The authors emphasized the need for institutions to address these concerns through the provision of mental health support services and the development of learning environments that promote well-being and resilience.

In a study focused on the U.S., Trust and Whalen (2020) explored the experiences of K-12 teachers during the transition to remote teaching. Although their study did not specifically focus on higher education, the findings provide valuable insights into the challenges and opportunities faced by educators in adapting their practices during the pandemic. The authors highlighted the importance of collaboration, professional development, and the availability of appropriate technology tools in supporting the success of remote teaching.

Some students thrived in the new setting. Aguilera-Hermida (2020) looked at the experiences of college students in the United States during the pandemic, with particular emphasis on their perceptions of online education and its impact on their academic performance. While students mentioned various challenges related to technology, time management, and face-to-face interactions, they also appreciated the flexibility offered by remote learning.

Overall, the literature on faculty and student perspectives during the COVID-19 pandemic emphasizes the significance of taking into account the diverse experiences and needs of various stakeholders. Universities must weigh the benefits and drawbacks of remote learning while also striving to create inclusive, supportive, and engaging learning environments that meet the diverse needs of their faculty and students.

The same mix of advantages and challenges was experienced by faculty during the transition to remote learning. One of the main challenges was rapid and forced adoption of new technologies (Hodges *et al.*, 2020). This learning curve was steeper for those who had limited prior experience with online teaching and also put a strain on the technical support apparatus in universities. The pedagogical methods underwent a hasty transformation, to something more suited to remote interactions. These included redesigned course materials, new evaluation methods, and ways to keep students engaged in a new environment, choke full of distractions, and over which teachers had no control (Bozkurt and Sharma, 2020).

Some professors also experienced increased workload, particularly in the first weeks and months of the pandemic. This was caused by the need to redesign course materials, learn new technologies, and provide additional support for students facing challenges with remote learning (Johnson, Veletsianos and Seaman, 2020). Faculty members had to find new ways to establish and maintain connections with their students, provide timely feedback, and offer reassurance (Bozkurt and Sharma, 2020). Furthermore, the connections between faculty members had to be kept alive and proved essential for sharing best

practices, troubleshooting technical problems, and providing emotional support during a challenging time (Kim and Asbury, 2020).

Despite the fact that this crisis was on a much larger scale than most previous ones, government responses varied across countries and contexts. The pandemic's impact on universities and the strategies used to deal with it have varied greatly around the world.

A global survey conducted by Marinoni, van't Land and Jensen (2020) found that the majority of respondents experienced disruptions to their teaching and learning activities due to the pandemic. The extent and nature of these disruptions varied widely across different regions, with institutions in low-income countries facing greater challenges in transitioning to remote learning. While problems encountered were essentially the same all over the world, wide disparities in resources (technological, expertise, funds) led to differences in the adopted solutions.

A study by Pather *et al.* (2020) focused on the experiences of medical and health sciences educators in South Africa, highlighting the challenges they faced in rapidly transitioning to remote learning. Several factors hindered the effective implementation of remote learning, including inadequate digital infrastructure, limited access to technology and internet connectivity, and the lack of prior experience in online teaching among faculty members. The study underscored the need for targeted investments in digital infrastructure and capacity building to support the successful transition to remote learning in resource-constrained settings.

In the Middle Eastern context, Al Lily *et al.* (2020) analyzed the experiences of universities in Saudi Arabia during the pandemic, with a focus on the challenges and opportunities associated with the shift to remote learning. The study identified several factors that influenced the effectiveness of remote learning, including the availability of digital resources, the level of support provided to faculty and students, and the adaptability of institutional policies and practices.

The internal administrative processes of universities also underwent significant changes during the COVID-19 pandemic. The process of digital transformation of higher education institutions did not start but was accelerated by the crisis, as many processes had to be moved online to ensure their continuity. This included admissions, registration, financial aid, and other student services, which transitioned to virtual platforms to accommodate remote access and minimize in-person interactions (Crawford, 2020). This focus on digitalization required investments in technology infrastructure, staff training, and the adaptation of internal processes to digital delivery channels. Student services, including virtual academic advising and tutoring, mental health and wellness resources, and support for students facing technological barriers were also created or transformed. Students with particular situations, such as those with disabilities, international students, and students from disadvantaged backgrounds presented an additional set of problems (Sahu, 2020).

The particular health and safety challenges presented by the pandemic meant that administrative services played a vital role in implementing measures to protect students, faculty, and staff. This involved developing and enforcing policies on social distancing, mask-wearing, and hygiene practices; coordinating COVID-19 vaccination efforts, contact

tracing, and quarantine protocols; and managing the use of campus facilities to minimize the risk of transmission (Aucejo *et al*., 2020). Some universities also provided expertise or equipment valuable for the national health effort, especially those linked with the field of medicine or public health.

Another task that was at least partially fulfilled by the administrative services was launching digital communication channels with students, faculty, and staff to disseminate up-to-date information about changes in policies, procedures, and support services (Aucejo *et al*., 2020). Information technology departments, which are generally part of the administrative backbone of universities were vital in this regard.

The COVID-19 pandemic has had a profound impact on universities worldwide, prompting a variety of responses and adaptations prompted by faculty and student experiences during this difficult period. These include using the crisis as a catalyst for internal change, shifting to digital pedagogy, online learning, and emergency remote teaching.

3. Methodology

The digital transformation of Romanian universities is the subject of our research. Therefore, our first move was to do a literature review to learn more about the digital issues the COVID-19 pandemic has caused for colleges all over the world.

Second, we conducted an evaluation of the changes in teaching and administrative procedures brought about by digital technology by sending an online questionnaire to 30 of the most significant universities[1] in Romania. We got in touch with the CIOs (Heads of IT&C Departments) in each of those universities by email and requested that only one person, the one with the most expertise in the university's digitalization, complete the questionnaire. We had a 50% response rate (15 universities responded). The respondents were mostly the CIO themselves or people working in the IT&C department of the university.

Thirdly, in order to clarify the survey results and get additional information about the changes the COVID-19 epidemic caused in universities, we conducted interviews with the Chief Information Officers (or individuals in equivalent positions) at the top five Romanian universities.

4. Survey

In 2022, we distributed (online) a questionnaire to approximately 30 (only 15 responded[2]) of Romania's most important universities in order to assess the changes in teaching and administrative procedures brought about by digital technology.

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1 The list can be accessed here https://www.edu.ro/sites/default/files/_fi%C8%99iere/Invatamant-Superior/metaranking/Raport_Metaranking_National_2022.pdf

2 University of Bucharest, University Valahia of Târgoviște, University 'Lucian Blaga' of Sibiu, University of Craiova, University of Arts George Enescu of Iași, Babeș-Bolyai University Cluj-Napoca, University

According to the survey results, the majority of Romanian universities (66.67%) have chosen bespoke solutions developed by their respective IT departments. This allows for customized solutions that address specific needs and admission criteria. Universities can improve their ability to maintain the confidentiality and security of confidential student information by developing in-house platforms. Furthermore, because they are not required to pay recurring licensing fees, they may realize significant cost savings when compared to commercial alternatives.

Because of the global COVID-19 pandemic, Romanian universities have been forced to shift their admissions processes away from traditional in-person formats and toward digital alternatives.

The adoption of an efficient and dependable admission platform for both faculty and future students was a critical factor in the transition's success. These tools significantly reduce the amount of manual work required for admission management, improving both efficiency and accuracy. With the COVID-19 pandemic hastening the pace of change in higher education, these adaptable platforms enable institutions to meet changing demands.
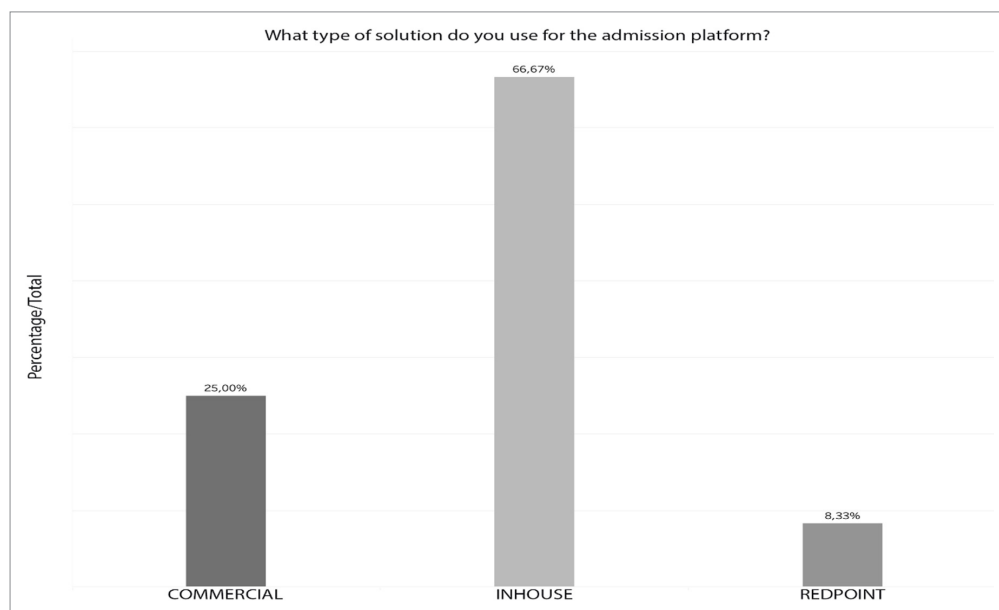

Figure 1: Type of admission platform used
Source: The authors

Commercial platforms are becoming increasingly popular for managing admissions due to their ability to provide a wide range of features and integrations. This is especially beneficial for Romanian universities seeking an efficient implementation process, ongoing support, and regular updates. While these platforms provide significant benefits, institutions must also bear the costs of licenses and ongoing support. Because of its practicality in providing a comprehensive suite of tools, Redpoint Solutions has been adopted by a smaller percentage of universities as their preferred admission platform. As the global education sector undergoes digital transformation, universities in Romania are embracing technological solutions that provide advanced features such as document management and applicant tracking.

With the COVID-19 pandemic still fresh in everyone's minds, this change is expected to have long-term implications for how students are admitted to universities across the country. According to our survey of Romanian universities, 75% are now using their admission portals for both enrollment and confirmation processes.

For both universities and prospective students, this integrated approach streamlines the entire admissions process. In the face of COVID-19, universities are looking for innovative ways to consolidate student data and optimize their admission and enrollment processes.
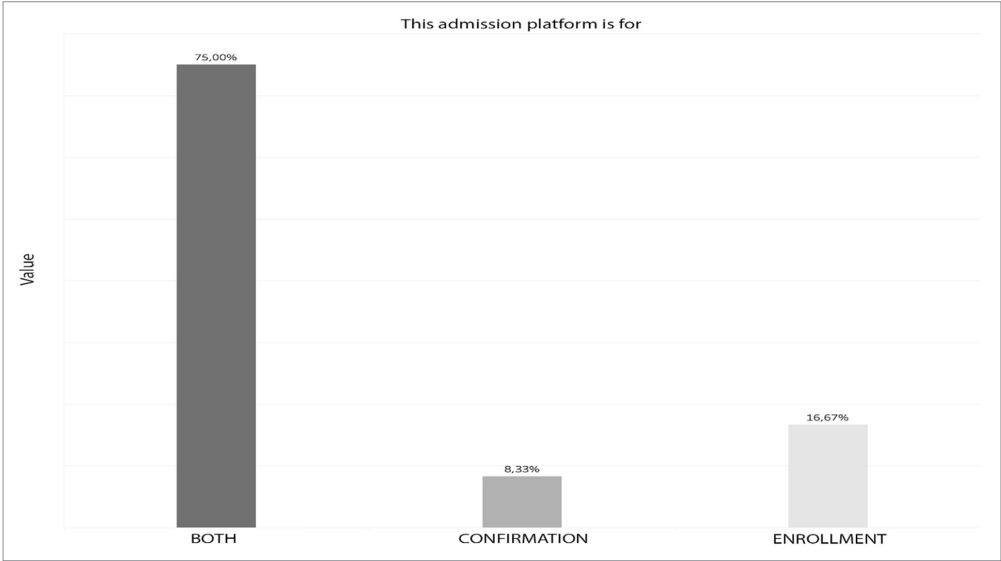

Figure 2: Usage of admission platform
Source: The authors

One key solution for achieving this goal is to use a unified platform that streamlines tasks like application processing, eligibility evaluation, document submission, and course registration. Universities can reduce communication challenges and errors or delays by integrating these various functions into a single system. Focusing on improving the enrollment process and tailoring it to the specific needs of universities may necessitate additional

coordination between departments or platforms; however, this approach can yield significant benefits. Some Romanian universities save time by using admission platforms only for confirmation.

Universities in Romania can ensure an efficient process for students to secure their place at the institution after being accepted by using digital admissions solutions. Most universities have implemented comprehensive platforms that manage both enrollment and confirmation processes in response to the COVID-19 pandemic. Some universities, however, have chosen to focus on either enrollment or confirmation tasks. As institutions refine and adapt their admission processes, these digital platforms will continue to play a critical role in shaping the future of higher education in Romania beyond the current pandemic.

When asked which LMS (Learning Management System) they prefer, more than one-third (38.46%) of respondents said Moodle is their university's e-learning platform, indicating that this open-source LMS is well-regarded among Romanian institutions. Moodle excels in providing robust support for various learning activities due to its comprehensive suite of tools and features required to create and manage online courses. Its remarkable customizability, flexibility, and affordability paved the way for the development of an adaptable e-learning solution that meets the unique needs of each institution. Romanian universities have been forced to find new digital tools to improve student engagement and academic performance as the educational landscape has shifted toward remote learning.
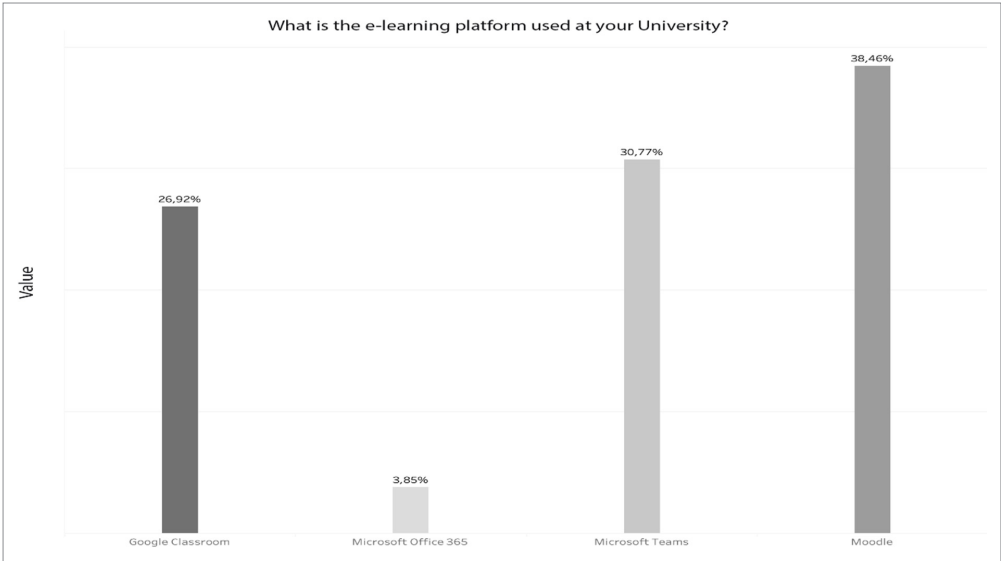

Figure 3: E-learning platforms
Source: The authors

Microsoft Teams, which provides a comprehensive suite of communication and collaboration features, is also a popular (30.77%) choice among these institutions. Schools

with existing subscriptions can integrate Teams at no additional cost because it is already included in the Office 365 package. Google Classroom is a popular e-learning platform in Romanian universities, according to our research, with approximately 26.92% of institutions using this free web-based solution to create and distribute assignments, grade work, and communicate with students. Because of its easy integration with other Google applications such as Drive, Docs, and Meet, the platform is accessible and user-friendly for educators looking for an online learning environment.

In the midst of the COVID-19 pandemic, universities in Romania were utilizing e-learning platforms to provide continuous education. Learning management systems (LMS) such as Moodle, Microsoft Teams, and Google Classroom have emerged as top contenders to ensure academic continuity with students and teachers confined to their homes. Microsoft Office 365 is one of the most popular productivity tools among educators worldwide, with applications such as Word, Excel, and PowerPoint allowing for the creation and sharing of educational materials.

The integration of e-learning platforms in higher education has been a prevalent trend in recent years, but its importance has been heightened by the pandemic. Even after COVID-19, universities in Romania have successfully implemented various streaming solutions to support online classes and events.

According to our survey, Google Meet was the most popular platform among academic respondents in Romania. Google Meet's popularity in video conferencing is primarily due to its simple interface, which integrates well with other Google services.
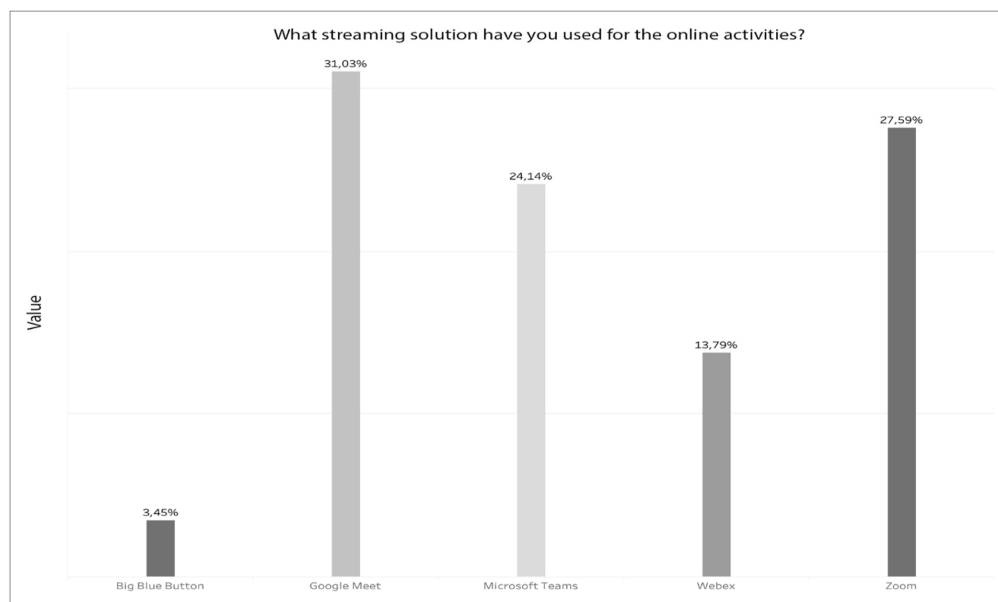

Figure 4: Streaming solutions
Source: The authors

Furthermore, Google Meet has strong security features that ensure secure communication. Educational institutions seeking a free solution can use the platform's basic features at no additional cost. Zoom, in contrast to Google Meet, has gained traction for online activities in sectors such as education due to its high-quality sound and visuals, as well as an extensive list of tools. Because of COVID-19 restrictions, virtual classrooms are quickly becoming commonplace in Romanian universities. Various video conferencing software, such as Zoom and Microsoft Teams, play critical roles in effectively facilitating online teaching activities. However, budget constraints prevent some institutions from fully utilizing paid versions of these services.

While Webex provides basic functionality for free, for more advanced tools, and larger meeting capacities, it requires a paid subscription. Despite the fact that Big Blue Button has a number of educational features, it appears to be one of the less popular streaming solutions among Romanian universities. This is most likely due to its more difficult set-up and maintenance in comparison to other platforms currently available. Google Meet, Zoom, and Microsoft Teams, for example, have seen increased adoption due to their ease of use and integration with existing systems. Even if face-to-face learning becomes more popular again, it appears that these alternatives will continue to be an important part of higher education in Romania.

As universities around the world face unprecedented challenges from the COVID-19 pandemic, the importance of digitalization in higher education cannot be overstated. According to our findings, roughly one-third of Romanian universities have set aside funds for digital transformation initiatives. These budgets are critical for enabling the implementation and optimization of innovative technologies and infrastructure, both of which have proven critical in the current crisis. Funding can be directed toward a variety of critical aspects of digital transformation, such as software licensing, IT staffing, and educator training opportunities. In the midst of a pandemic, institutions that allocate a digitalization budget demonstrate their commitment to modernizing their educational offerings and adapting to the ever-changing needs of students and staff.

However, it appears that a small number of Romanian universities do not allocate specific resources for digitalization. As a result, these institutions may face challenges in implementing large-scale digital transformation initiatives, which may jeopardize both the quality of online instruction and their competitiveness in an increasingly digital-oriented higher education sector. A notable finding in our study was the lack of clarity surrounding digitalization budgets at Romanian universities, with nearly one-third of respondents expressing uncertainty. This ambiguity could be due to a lack of communication between higher-ups and faculty or staff, or it could indicate that digital transformation initiatives are not yet well-established in these institutions.

Regardless of the underlying cause, this discovery highlights the importance of better coordination and transparency in digitalization efforts, especially given the urgency imposed by pandemic-era remote learning. The digital age has changed the way universities operate, and having a dedicated budget for digitalization is critical to their success. While approximately one-third of Romanian universities have implemented such budgets, many
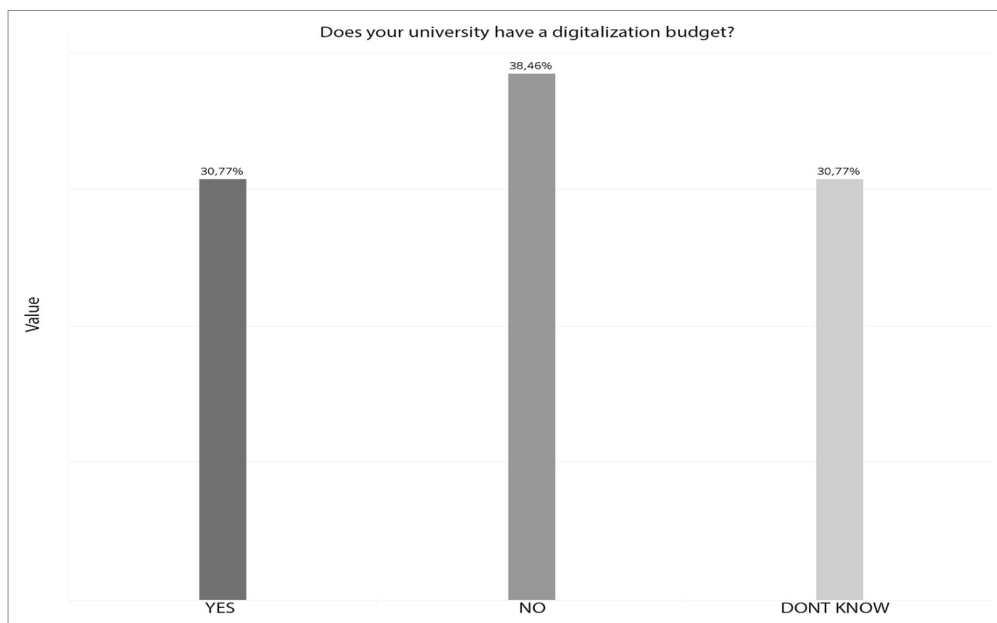
Figure 5: Allocation of budgets for digitalization
Source: The authors

institutions continue to lack adequate funding to facilitate effective digital transformation. Given the changing landscape of higher education, universities in Romania must prioritize this aspect and devote the necessary resources to it.

With COVID-19 exacerbating digital demands by requiring remote learning options and virtual services, equipping faculty and staff with appropriate skill sets and knowledge has become critical. With technology playing an increasingly important role in higher education settings, it is not surprising that institutions across Romania have begun to invest more heavily in training programs designed to assist individuals in adapting accordingly.

According to our research, roughly half (46.15%) of all university respondents declared having participated in such initiatives aimed at providing faculty and staffers alike with important knowledge relating to e-learning platforms, online assessment strategies, remote teaching techniques, as well as the society's changing demands for learning modality – attesting once again why institutional support remains essential when it comes to ensuring individual success.

According to our data, over the last three years, a significant number of Romanian universities have not provided any digital training for their faculty and staff. This lack of upskilling presents a potential impediment to employee capability as they attempt to navigate current COVID-19-induced digital transformations. Personnel at these institutions may need to rely on prior knowledge or seek new technology-related competencies from outside sources. The lack of initiatives aimed at honing these skills may have a long-term impact on the quality of online education and jeopardize these institutions' overall competitiveness.
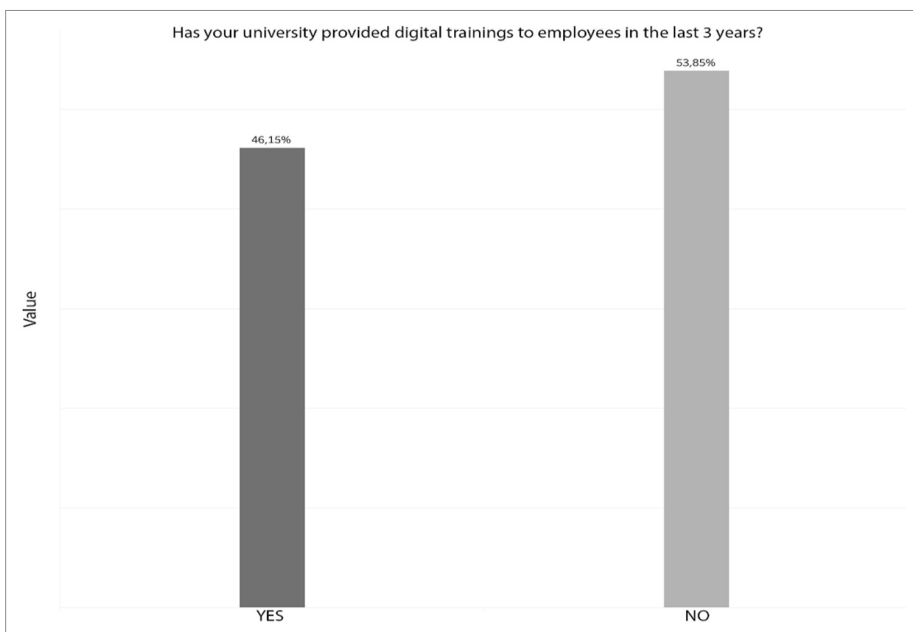
Figure 6: The provision of digital trainings to university staff
Source: The authors

With the COVID-19 pandemic, Romanian universities have been forced to adapt their operations and embrace digital transformation. This adaptation has highlighted the importance of providing digital training for faculty and staff as they navigate remote learning and online operations. Despite the fact that nearly half of Romanian universities have implemented digital training initiatives in the last three years, a troubling number of institutions have not. Moving forward, it is critical for these universities to prioritize employee education and investment in human resource development if they are to thrive in an increasingly digitized world.

In response to the COVID-19 pandemic, Romanian universities have rapidly accelerated their digital transformation efforts. This study provides an in-depth examination of the various approaches that these institutions have taken towards adoption, implementation, and investment in digital technologies. Our findings suggest a diverse landscape among universities, with differing levels of emphasis placed on particular solutions.

However, most institutions have integrated comprehensive platforms for managing both admission and confirmation processes, as well as popular e-learning tools such as Moodle, Microsoft Teams, and Google Classroom. The use of online platforms for educational and communication purposes has increased significantly in Romanian universities, as evidenced by survey data showing that all participating institutions have implemented e-learning systems. However, certain challenges remain, such as the need for more consistent digital training programs and budget allocations across universities. These areas have the potential to improve not only existing digital learning practices but also to pave the way

for responsible digital transformation in higher education. Romanian universities must prioritize the allocation of resources toward digitalization budgets, workforce training initiatives to improve digital literacy, and investing in effective digital tools and platforms tailored to their specific needs in order to remain viable and relevant in a post-pandemic world. They can ensure that they continue to offer competitive academic programs with high quality standards by doing so.

5. Interviews

As part of our study we also conducted interviews with Chief Information Officers (or comparable positions) at the top five[3] universities to assess the impact of the COVID-19 pandemic on the digitalization of Romanian universities.

When COVID-19 caused lockdowns across the country, university officials scrambled to find ways to keep classes running without putting staff or students in danger. Learning appeared to be simple in the past because teachers taught in a classroom while students actively absorbed information. Institutions were forced to seek alternative solutions when social distancing policies were implemented. Using e-learning tools like Moodle and Microsoft Teams effectively was a popular alternative solution.

These asynchronous learning tools have grown to be extremely valuable resources for institutions all over the world, providing ways to facilitate seamless teaching experiences now and in the future. During the pandemic, Romanian universities used Moodle, an online learning management system. Training sessions were provided for administrators, teachers, and students alike in order to assist those who were unfamiliar with this software. Moodle's usage has skyrocketed as a result of these initiatives, with some universities reporting up to 14K active users per day, compared to the pitiful 50-100 users prior to the outbreak. Online platforms such as admissions portals, digital class scheduling, and card payments were also integrated to better meet the needs of students.

Administrative procedures were reduced thanks to electronic course material registries and e-contract management systems, which increased productivity and efficiency. Despite the challenges posed by the pandemic, universities have recognized the benefits of implementing digital solutions such as advanced research management software and hybrid learning. Institutions recognize the importance of improving administrative operations, but many elderly professors may be resistant to change. Furthermore, as institutions seek to reduce paper use and improve communication, electronic archives and project management systems are becoming more popular. The majority of industries have undergone a digital transition in recent years, and higher education is no exception. However, to accelerate this process within colleges, a catastrophic global pandemic was required.

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3 University of Bucharest, West University of Timişoara, Academy of Economic Studies of Bucharest, Technical University Cluj-Napoca, Babeş-Bolyai University Cluj-Napoca.

6. Conclusion

In response to COVID-19 limits on in-person gatherings, academic institutions in Romania quickly shifted to virtual learning settings, keeping their doors open while putting safety first.

Prior to the pandemic, universities had little experience with digital tools and services. Administrative procedures were still heavily reliant on paper documentation, and e-learning systems such as Moodle were underutilized. When COVID-19 struck, universities had to quickly adapt to online learning, virtual processes, and increased use of digital communication channels. Because of these difficulties and the benefits it has for long-term educational outcomes, many universities in Romania have continued to use digital technology after the pandemic. As a result, e-learning tools such as Moodle and Microsoft Teams are becoming increasingly important in higher education settings. Because of the increased use of technology in university settings, hybrid learning models – which combine online and traditional in-person classes – have grown in popularity.

Administrative procedures such as online admissions and digital class scheduling have become more efficient as a result of the use of digital tools. Universities are also considering implementing project management software and electronic archives to streamline their operations. However, students' privacy concerns about exam proctoring solutions must be addressed, as must older professors' resistance to change as a challenge. Institutions are still debating how to strike a balance between security and individual privacy. The long-term effects of the digital revolution on universities have become painfully obvious in the years since the pandemic.

Despite the problems that remain, the transition to digitalization and e-learning has created a solid foundation for the future of higher education. Universities must continue to improve their digital initiatives while also maintaining more traditional teaching methods. The COVID-19 outbreak compelled higher education to evolve digitally, resulting in the widespread adoption of cutting-edge e-learning platforms and easing the process of administrative work digitization.

Immersive technologies enable students to learn by doing, allowing them to explore difficult concepts and develop useful skills in realistic settings. As universities recognize the value of both online and traditional education, hybrid learning models will become more popular.

These methods makes themselves more accessible to students who may require scheduling flexibility. It has been demonstrated that providing academic credentials online is a practical and secure way to do so. The implementation of streamlined security measures that prioritize authenticity over fraudulence would make credential verification a breeze. Data analytics is being used by institutions as one of their primary decision-making tools in order to efficiently monitor performance and develop strategies based on observable trends.

The development of collaborative digital environments that facilitate project-based learning is another step toward enhancing students' ability to work creatively and collaboratively on complex challenges. Given how the workforce is changing as a result of the

digital revolution, Romanian institutions may need to place a greater emphasis on life-long learning. People can maintain their job market competitiveness by participating in professional development programs, micro-credentials, and short courses. To succeed in the changing higher education environment, these schools must emphasize individualized learning opportunities that make use of cutting-edge technologies and encourage collaboration.

The COVID-19 pandemic has had a significant impact on Romanian university digitalization. Many universities had little experience with digital tools and services prior to the pandemic, but because of lockdowns and fewer in-person interactions, they were forced to quickly adapt to online learning and virtual workflows. Despite these obstacles, many universities have continued to use digital technology in the aftermath of the pandemic because they see the long-term benefits for educational outcomes. To fully integrate digital tools into educational and administrative operations, more work remains to be done. Overall, this study emphasizes the significance of ongoing initiatives to improve infrastructure and digital literacy in Romanian higher education institutions, as well as the steps that must be taken to ensure the continuation of these initiatives.

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