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Digital Natives in the Non-Digital University: A Case Study of Polish Higher Educational Institutions from an Educational and Historical Perspective

(pp. 319–336)

Abstract

According to the theory of technological determinism, the development and popularisation of communication techniques has led to the emergence of two groups of participants in internet discourse: (1) those who have been 'immersed' in the Internet since childhood – digital natives – and (2) those who remember functioning in the offline world – digital immigrants. The main goal of this article is to present the interpenetration of the needs and demands of digital education and the implementation of these demands in the academic environment. The first part of the article presents the main theories related to the topic and attempts to periodise the phenomenon of education at universities undergoing virtualisation. The second part presents research conducted with the use of the CATI method on a sample of 433 students and 133 university teachers concerning the IT revolution at universities related to the SARS-COV2 pandemic and the need to move classes from lecture halls to virtual spaces. The last part of the article answers the hypotheses posed: (1) the initial dysfunctions of the education process in universities were due to the institutions' unpreparedness for the remote environment

and (2) in the opinion of the respondents, the remote education process is not as effective as education in a lecture hall. The conclusions of the study indicate that it is necessary to systematically fund research on remote teaching methodology and tools for effective distance learning. In addition to research, it is also advisable to conduct training and continuously implement new practical solutions in the workplace so that the new media serve teachers and students. In order for distance education to be effective, it is necessary to redefine the use of new media, move away from control towards collaboration and allow students to take ownership of the learning process.

Keywords: educational technology, SARS-COV2, digital citizenship, digital immigrants, online learning

1. Introduction

Progressive digitalisation is making technological solutions an indispensable part of more and more spheres of human life. A prime example of the positive use of technology in the service of human development is the use of ICT methods in the learning process. It is interesting to note that media had already been used in the learning process: in 1728, a stenography teacher, Caleb Phillips, placed an advertisement in the Boston Gazette for a correspondence course that read, 'any one throughout the country desirous of learning this art may, by receiving a few sent lessons a week, be as perfectly taught as the inhabitants of Boston'. As sources indicate, the initiative was received with enthusiasm (Thompson, 2018). According to these sources, the first university to enable remote learning was the University of London, which in 1858 made it possible to earn a university degree by correspondence (Encyclopaedia Britannica, 2013). Nowadays, e-learning is commonly understood to refer to knowledge transmission through multimedia platforms and is defined by the OECD as

the use of information and communication technologies in diverse processes of education to support and enhance learning

in institutions of higher education and includes the usage of information and communication technology as a complement to traditional classrooms, online learning or mixing the two modes. (Njoku, 2015)

Prior to 2020, when the SARS-COV2 pandemic and its social implications led to a revolution in learning processes at all levels of education, researchers such as Dublin (2003) and Arkorful (as cited in Prensky, 2001) presented three basic models of e-learning: e-learning, m-learning and blended learning. The first type covered a wide spectrum of means, from postal education through educational radio and television to multimedia courses. m-learning is defined in the literature as mobile learning using portable, wireless equipment such as laptops, PDAs or smartphones. In order to meet the requirements of m-learning, the devices should have permanent, wireless access to the Internet. The exclusionary barrier is an unstable connection. Blended learning, mostly used in the academic environment until 2020, involved the combination of distance and in-person learning methods. In this type, the curriculum was most often taught remotely, while exams took place in-person. The SARS-COV2 pandemic forced a revolution in higher education, as providers had to very quickly implement distance learning methods as the primary form of transmission, as well as remote evaluation of knowledge, skills and competences. It has also revolutionised the organisation of the work of higher education institutions by transferring most organisational activities from a real space to a virtual space. From the perspective of the last 24 months, it is important to preliminarily periodise the phenomenon of universities' adaptation, the process of the academic community 'learning' remote forms of education and the adaptation of universities' and national education systems' internal regulations to the norms and forms of functioning in an epidemic. This periodisation is presented in Table 1.

Table 1. Periodisation of the phenomenon of academies adapting to remote learning

Period name	Organisational features	Main tools of knowledge transfer
Initial period (January 2020–September 2022)	Chaos	e-mail, universities' internal online communication systems, outdated e-learning platforms
Transition period (September 2020–July 2021)	Uncertainty	instant messaging, video communication platforms
Mature period (July 2021–present)	Stabilisation	Dedicated communication platforms personalised for a specific academic community (MS Teams, Google Classroom, etc.)

Establishing and discussing this periodisation places the issue in a historical perspective, allowing for it to be retained in the humanities research community. The first proposed period covers January 2020 to September 2020, when universities in many countries had limited or suspended functioning. During this period, ad hoc measures such as broadcast lectures via social media (Facebook Live or YouTube) were implemented and video communications tools such as Skype, Zoom, emails, discussion groups, or forums for teacher–student communication began to be used. In some cases, attempts were also made to adapt the remote education platforms owned by universities (e.g. Moodle) to the requirements of the modern teaching process.

In the second stage, lasting from September 2020 to July 2021, universities implemented modern e-learning platforms or created their own communication and education systems. The implementation process was complemented by training for academic staff on the software's capabilities. At this stage, only the basic functions of these platforms were used.

In the last stage, the academic community became confident in using the software proposed by the university authorities, and the process of ICT-mediated knowledge transmission became a natural part of functioning during the pandemic. Most reported problems were minor, random failures unrelated to competence with the software used in the learning process. It should be mentioned that the above periodisation

is a description of the situation observed in the Polish higher education system and is only applicable in this context. Due to the great diversity in the implementation of ICT solutions in higher education, the models of technology adaptation differ depending on the country and the higher education system.

The SARS-COV2 pandemic also in a way verified Marc Prensky's (2001) typology, which divides the network society into digital natives and digital immigrants. Prensky defined digital natives as people born in the digital age, i.e. after 1980. These are people for whom new media are the natural environment of social and media activity. Additionally, these people have little memory of the predigital era. They use digital means of communication naturally. Their native language is the language of the Internet, computerisation and digitisation. Digital language is considered a supranational language used by digital natives from all over the world, using a standardised nomenclature. According to Prensky, digital natives use several multimedia devices or one multifunctional device at the same time. With one device, they can access the Internet, send messages, listen to music and watch films at the same time. Their way of learning is characterised by the fact that if they cannot find or understand something, they do not look for it in printed books, but search for the necessary information on the Internet. Digital natives are described as 'always on' (Prensky, 2001). They form a new community of people developing in the multimedia world. Their communication process is linked to access to new media, thanks to which they can contact any number of people at the same time. According to Howard Rheingold (2007), the communication of digital natives is conducted in such a way as to 'share common emotions, make plans, spread gossip, have disputes, fall in love, find and lose friends, ... flirt, and have insignificant conversations'.

The opposite of the digital natives are the digital immigrants, who, according to Prensky (2009), constitute a generation of people of predigital age, i.e. those born before 1980, for whom the new media are not a natural environment of communication and social activity. These people use the Internet, but not in the same advanced way as digital natives. Digital immigrants speak an outdated language that is not adapted to

the rules of the modern education system. They use phones mainly to make and receive calls. They work with printed text because they can 'edit' it freely with a pen. In the digital world, they often lack courage and are unable to adapt to new technological achievements. New technologies make them distrustful.

Interestingly, it is stereotypically assumed that university is a meeting place of digital natives (students) and digital immigrants (teachers), representing two different styles of functioning. However, the division between digital immigrants and digital natives is being blurred. Digital immigrants have been forced, at least to some degree, to enter the world of digital natives. Due to the specifics of the Polish system of higher education, including the ages of employees of higher education institutions in Poland, the proposed division into digital immigrants and digital natives in this particular case is justified. Marc Prensky (2009) also notes that the division between digital natives and digital immigrants is increasingly becoming inadequate, and he proposes using the concept of digital wisdom instead. Digital wisdom is recognising that media and the Internet play a significant role in education, noting that their competent use brings new quality to education, allows for changes in teaching methodologies and facilitates and streamlines administrative processes. Digital wisdom is not ascribed only to digital natives; on the contrary, many digital immigrants at universities demonstrate digital wisdom by using modern technologies in the service of learning and teaching. Equally importantly, as Prensky argues, digital tools will not replace humans, who will still be needed to analyse, synthesise, compare and evaluate the facts provided.

2. Materials and methods

The main aim of the study was to confirm or disprove two hypotheses: (1) the initial dysfunctions of the education process in universities were due to their unpreparedness to adapt to the remote environment and (2) in the opinion of the respondents, the remote education process is not as effective as in-person education.

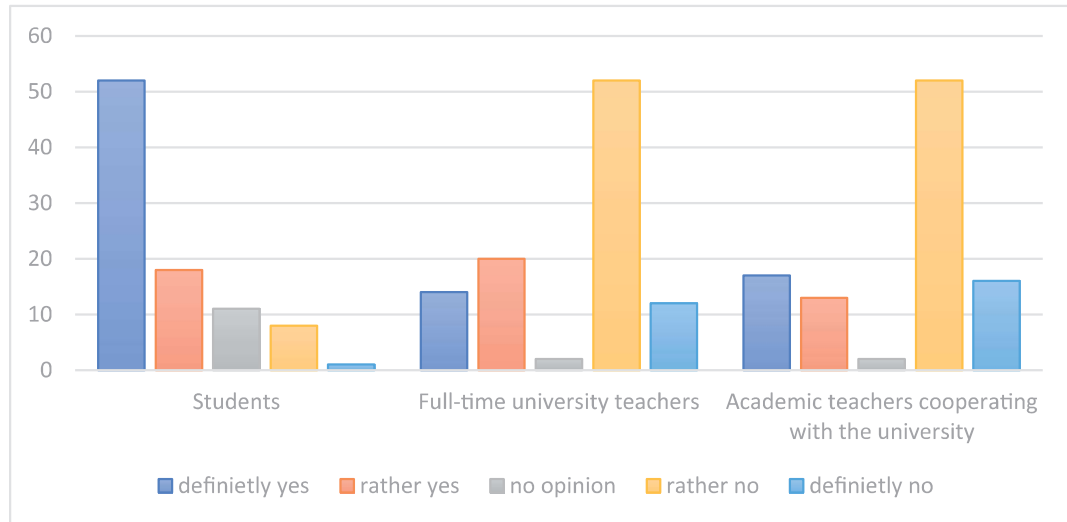
In order to confirm the assumed theoretical concepts, quantitative research was conducted in September and October 2021. The research was conducted using the CATI method, i.e. a telephone interview with the respondent following a special computer script. The script allows for some automation of the questionnaire, e.g. by filtering the questions asked or by randomising the order in which certain questions will be asked. The study used a laboratory dedicated to this type of research at the authors' home university. Due to the research problem, purposive sampling was chosen and 433 students and 133 university teachers were surveyed. Both teachers permanently employed at universities and those for whom university is not their primary place of work were taken into account. Due to the causal nature of the survey and the limited funds, it was decided to survey only respondents residing, working or studying in Poland. It is the intention of the researchers that the research will primarily contribute to larger studies set in the CEE region. In determining the research questions, an attempt was made to explore the respondents' opinions regarding their own skills at the beginning of the pandemic and at the time of the survey. An attempt was also made to establish the preferred form of ICT communication in the learning process, to analyse the effectiveness of remote education in relation to traditional education and to collect the respondents' recommendations for improving higher education.

3. Results

With the first question, the authors tried to diagnose the initial state at the beginning of the pandemic, i.e. in March 2020; the question was retrospective in nature. The respondents were divided into the following groups: students, full-time academic lecturers and associate lecturers. The respondents were asked, 'Do you think you were competent to use e-learning platforms at the beginning of the pandemic?' The analysis of the answers brought interesting conclusions: 70% of the students' cumulative answers (definitely yes and rather yes) were positive, while only 9% were negative (rather no and definitely no). In the case of the academic teachers,

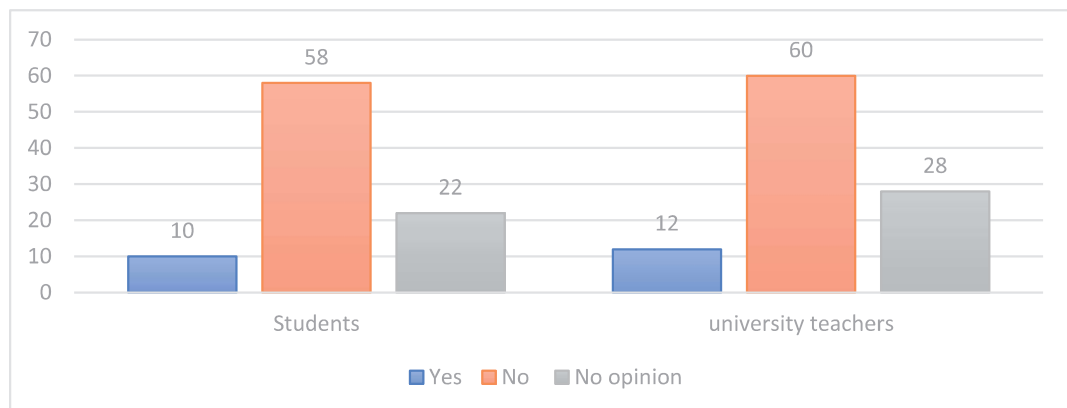
the majority of both groups answered negatively (rather no and definitely no): 64% of full-time employees and 66% of people working part-time. A detailed distribution of the answers is presented in Figure 1.

Figure 1. Distribution of answers regarding self-diagnosed digital competence at the beginning of the pandemic (%)



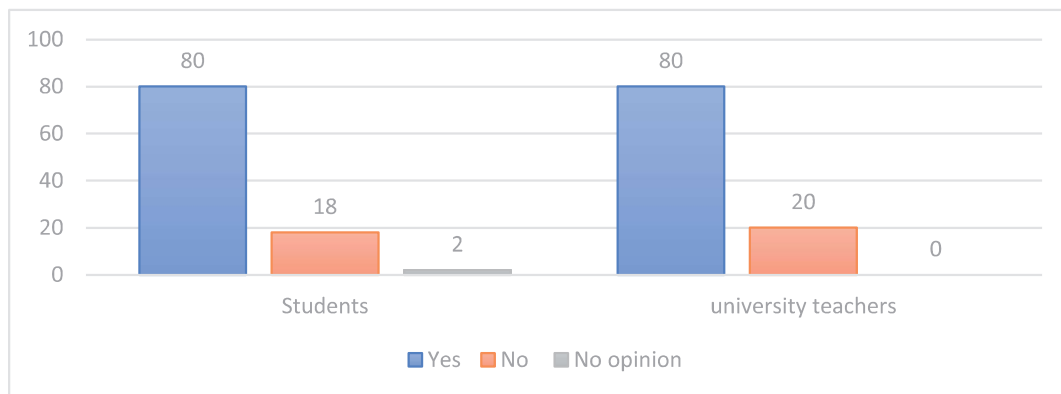
With the second question, the respondents were asked whether the university was prepared for remote teaching, in their opinion. Both the students and the cumulative answers of the academic staff overwhelmingly indicated that the universities were not prepared for remote teaching at the first stage of remote teaching, which confirms the functional-adaptive model of the university presented in the introduction.

Figure 2. Distribution of answers to the question: ‘Was your university well prepared for remote learning in the first period of the process?’ (%)



The validity of the model was further confirmed by the answers concerning the preparation of universities in the 2020–2021 academic year. The vast majority of respondents, both students and academic teachers, indicated that universities were prepared technologically and with training to conduct classes remotely, as presented in Figure 3.

Figure 3. Responses to the question: ‘Was your university well prepared for remote learning in the 2020–2021 academic year?’ (%)



Three diagnostic questions were also asked in order to more completely analyse the phenomenon. In the first of the additional questions, the respondents were asked which form of knowledge acquisition they found more effective. More than half of the respondents (59% of students and 77% of teachers) indicated traditional classes as the more effective form. Interestingly, 19% of the students marked the answer ‘I don’t have an opinion.’ A detailed distribution of the answers is presented in Table 2.

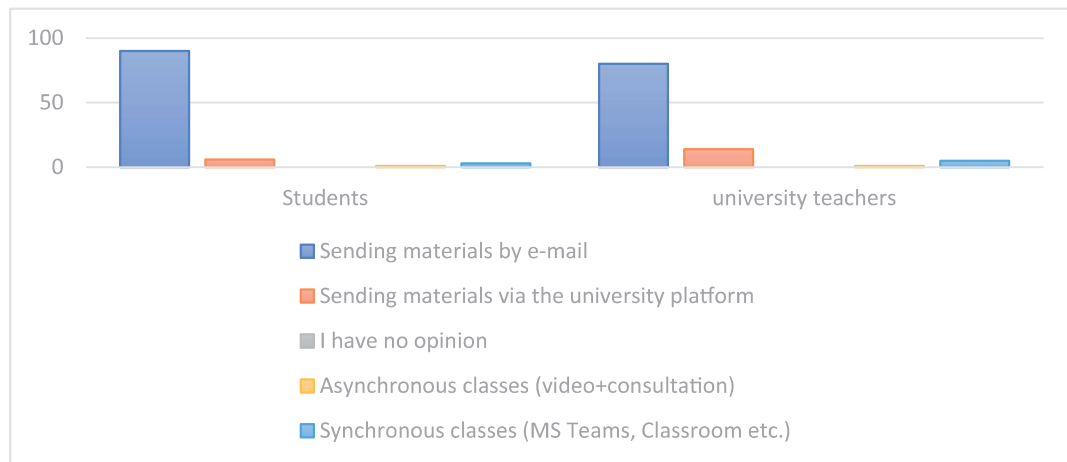
Table 2. Summary of answers concerning the preferred form of acquiring knowledge

	Traditional classes	Online classes	I have no opinion
Students	59	22	19
University teachers	77	22	1

In the second diagnostic question, the respondents were asked what they thought was the least effective form of distance learning. Most negative answers were given to the old type of asynchronous forms, i.e. sending

materials by email or via the university platform. Synchronous forms and a new type of asynchronous classes, combining the element of self-study and consultations, were considered more effective by the respondents (Figure 4).

Figure 4. Responses to the question: ‘Which form of contact was least effective for you?’ (% , multiple-choice question)



The last diagnostic question was ‘Which form of education required more effort from you?’ In the group of students, the answers showed no significant differences. A definite difference can be observed in the declarations of academic teachers, the vast majority of whom indicated remote education as the more absorbing form. The answers are summarised in Table 3.

Table 3. Aggregate answers to the question regarding the more absorbing form of education

	Traditional classes	Online classes	I have no opinion
Students	39	45	16
University teachers	20	77	3

4. Discussion

The analysis of the academic teachers' and students' self-diagnosed digital competence confirms the division into digital natives and digital immigrants in Polish higher education. The vast majority of students believed that they had sufficient skills to use e-learning platforms. In contrast, the teachers believed that they lacked such skills. As Głomb and Kniaź (2019) point out, as many as 9 million Poles over the age of 50 are digitally illiterate; as one reason for this, the authors indicate traditional schooling in which school and university teachers show a deficit of digital awareness. When creating the SAMR model, Puentedura (2010) described the first level of the model – substitution – as the apparent use of new media in education, since there is then neither a functional change in the use of IT nor a change in the teaching methodology. A study to analyse digital literacy within higher education institutions was carried out during the pandemic by Santiago Tejedor, Laura Cervi, Ana Pérez-Escoda and Fernanda Tusa Jumbo (2020); they noted that over 70% of students in Spain felt that teachers' digital skills were inadequate, while the opposite was true in Italy and Ecuador, where over 70% of students felt that teachers' digital skills were adequate (Tejedor et al., 2020). Over 70% of the surveyed students from Ecuador, Italy and Spain – like those from Poland – declared that their own level of digital skills was high. However, as David Jiménez-Hernández et al. (2020) note, today's generation of digital natives, while excelling at using digital tools for entertainment and social purposes, have difficulty using the Internet for learning and self-education.

In the present study, a transition became apparent from the initial period, in which both universities and instructors were unprepared for remote teaching, to the mature period, characterised by organisation and adaptation to remote teaching, specialised digital tools enabling more or less effective remote learning and legal and administrative solutions enabling effective communication and management of the organisation under changing conditions. According to Drucker (1994), change in an organisation is 'always that which creates an opportunity for everything new and different' (p. 3). In this case, the global pandemic was an external

enabler of change in an organisation such as a university. The pandemic contributed to both organisational changes – evident in the transition from face-to-face to distance learning – technical changes and administrative and legal changes, which in turn led to social and psychological changes. These changes were adaptive and revolutionary. In both education and science there was a lack of procedures of action which would allow for a smooth introduction of changes. The lack of conceptual, legal and technical preparation of managers and staff resulted in a number of chaotic changes, while the lack of adequate communication and preparation of staff reduced the quality of services provided. Referring to Drucker, it can be stated that remote learning provided an opportunity to create digital tools which will serve academic teachers and students in their work and communication after the pandemic, but there were no changes in the methodology of remote learning.

The vast majority of respondents preferred traditional classes, where they could interact freely. Most researchers (Hong Jon-Chao et al., 2021) agree that remote education enables students from different areas to participate in learning and time constraints to be overcome. At the same time, it is worth noting that it is debatable whether the same learning outcomes can be achieved in both types of learning. This is mainly due to psychological mechanisms concerning the ability to maintain attention for a length of time and the motivation to actively participate in courses. It also becomes important to investigate students' behavioural engagement in the courses, which is easier to obtain in face-to-face education. In the present study, it was found that remote classes were more engaging for lecturers than for students. In part, this may be due to the low behavioural engagement of students during remote learning. However, the students' responses indicate that they find both remote and face-to-face teaching equally engaging. The exceptionally high preoccupation of academic teachers with remote teaching may therefore also be explained by the need to adapt their teaching to the conditions of gifted learning, preparing appropriate materials and communicating with students. At the same time, according to Sakkir et al., the majority of students consider remote teaching less effective because of interrupted Internet access (noting the

cost of such education for students) and the lack of distance learning methods, motivation to perform tasks and mutual understanding (Sakkir et al., 2021). According to Bao (2020), the effectiveness of remote education can be verified by analysing students' logging into courses and the lesson quizzes in which students participate, pointing out that completing as many tests as possible will lead to higher grades in the subjects. However, it is worth considering the purpose of education – whether it is only the acquisition of knowledge, which can be checked by tests, or soft competences and the ability to analyse, think creatively and critically, make judgements and take correct decisions (as stated by Bakhshi et al. [2017]).

Research conducted in Poland (Zahorska, 2020) suggests that while at the beginning of the pandemic the problem with remote teaching was a lack of tools (students and teachers) and a lack of knowledge about how to use them, at a later stage the problems were a lack of contact with students during classes and activation and mobilisation among the students. Similar problems were observed at universities, and it may be concluded that they result from methodological and skill deficiencies of teachers. As stated by Tejedor et al. (2020), universities should create precise digital literacy strategies, thanks to which students as well as academic teachers will be digitally competent. As the research conducted by Klichowski et al. (2015) shows, the gaps in digital competence of teachers in Poland are due to the weaknesses of teacher education. Klichowski et al. (2015) point out that a 'pedagogical knowledge' or 'content knowledge' approach is promoted in Poland, which means that we teach teachers either as experts in subject matter without a thorough methodological and pedagogical foundation, or as pedagogues without thorough knowledge of the subject. Klichowski et al. (2015) juxtapose this pessimistic analysis with the TPACK model promoted in highly developed countries, which assumes that future teachers should have knowledge and competences from three different areas: pedagogical (knowledge of pupil support and theories of upbringing and education), subject-related (knowledge of the material and teaching methodology) and technological (knowledge and skills concerning the use of IT in education). For future teachers to be able to educate their students according to the TPACK model, they need to be

educated in this way. The main obstacles to the introduction of the TPACK model in Polish universities are (1) a lack of adequate equipment in classrooms, (2) a lack of competence among university teachers, (3) a lack of motivation to change the education system, (4) a lack of methodological solutions and (5) bureaucracy and increased emphasis on teaching time rather than teaching quality.

In the context of distance learning and controlling the quality of teaching in both traditional and remote systems, it is worth analysing the way in which academic staff conducted classes and interacted with students. In the present research, students evaluated the effectiveness of different forms of teaching, and they considered synchronous classes conducted using tools such as MS Teams, Classroom, etc. and asynchronous classes in which the academic teachers provided video and then conducted consultations to be the most effective. The least effective form was found to be sending course materials via email or the university platform. Two issues stand out: firstly, students found it more effective to learn when the teacher guides them through the learning process, and secondly, they lack the ability to learn on their own from the material. Also, in a study conducted by Tejedor et al. (2020), students preferred digital sources of learning – video and audio-visual materials – giving worse marks to source materials, i.e. books and scientific articles. In the study, the respondents pointed out that they were overloaded with homework and that the classes were boring and did not provide adequate stimulation.

Analysing the forms of teaching used by academic teachers, it can be observed that new media are used at the level of substitution, as distinguished by Puentedura (2010). This means that the lectures during the pandemic were still formally lectures, and thus monologues from the teacher, regardless of the psychophysical conditions of students, due to the fact that the concentration and ability to follow the lecturer's train of thought is much lower than with direct contact. The aforementioned desire to control the quality of teachers' work (measured by the duration of the lessons) discourages the use of other methods of conducting lectures, e.g. podcasting and consultations, as such material can only be discussed during consultations. On the other hand, lessons with exercises are

more effective when the teacher gives the students feedback on their work – in which they point out the good aspects, errors and how to improve it – and proposes group work and creative problem-solving. In the search for optimal remote teaching methods, one should remember about digital programmes with which one can create visually attractive aids, presentations, games and tasks that would require students not only to acquire knowledge, but also to form skills. The use of methods to activate students in remote education requires a lot of work on the part of the teacher when preparing for classes and transposing content adapted methodically to traditional teaching in order to achieve effective remote teaching.

5. Conclusions

Hypothesis 1 stated that the initial dysfunctions of the educational process in universities were due to the universities' unpreparedness to adapt to the remote environment. From the respondents' answers, it can be concluded that the lack of initial legal and administrative solutions resulted in communication and educational chaos, which was exacerbated by the lack of appropriate digital tools adapted for use in higher education institutions. In spite of this, in the mature period of university adaptation, university teachers who had not adjusted can still be observed. This is partly due to a lack of effective staff training, a lack of subject-specific tools, a lack of staff competence and the use of new media at the level of substitution rather than redefinition.

A postulate resulting from the partial verification of this hypothesis is that universities need to create a programme of IT implementation in higher education institutions and to design tools adequate for remote or hybrid work and adjusted to the given field of study. At the same time, it seems necessary to implement training in which academic staff would use digital tools not only at a basic level, but also to create educational resources and design programmes conducive to effective education.

Hypothesis 2 stated that the process of remote education in the opinion of respondents is not as effective as traditional classes. This hypothesis

was confirmed. Although remote classes for both groups of respondents were more absorbing than traditional classes, they were not equally effective. Most of the respondents preferred direct contact with the lecturer. The ineffectiveness of remote classes may be a result of the lack of changes in the methodology of remote learning and the lack of self-learning skills among students, through which they would take responsibility for their own learning.

From this hypothesis, two postulates can be made. Firstly, universities should analyse the psycho-physical capabilities of students and, with reference to cognitive theories (constructivism) and humanistic theories (motivation theory), should define new forms and methods to be implemented in remote learning. It follows directly from this that a methodology for remote working must be created. Secondly, teachers involved in education from the lowest level should introduce students to self-education and taking responsibility for their own learning. This will be possible when they fully implement the postulates of the constructivists and move away from the paradigm in which the teacher is the only source of knowledge and its interpretation. Granting students autonomy and their due place in the learning process will translate into students' ability to independently acquire knowledge and skills, making the teacher a source of support and guidance.

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