Acta Universitatis Sapientiae, Philologica, **13**, 2 (2021) 55–70

DOI: 10.2478/ausp-2021-0013

Changes and Perspectives in Teacher Training Methodology

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Abstract. School closures induced by the COVID-19 crisis have led to the rethinking and reshaping of teacher training considering the norms of online and blended learning, and the pressure to embrace the possibilities offered by information and communications technology. We propose to examine the new perspectives and necessary changes related to three domains in which our institution – the Teacher Training Institute of Sapientia Hungarian University of Transylvania, Faculty of Technical and Human Sciences – offers training: foreign languages, social sciences, and engineering. Different areas of education have been affected in different ways by the pandemic. In language teaching, familiarity with pre-existing platforms and programs helped the transition to online education. In the field of social sciences, the transfer of theoretical information did not cause any particular problems, but the development of interpersonal relationships, interactivity, and communication became more difficult. In the domain of engineering, practical education has become nearly impossible, as in order to develop certain practical skills students need access to laboratories equipped with special tools, devices, and instruments. In our study, we will focus on ways of updating and developing our methodology courses based on new paradigms and good practices presented in the specialized literature, also reflecting on feedback received from our teacher trainees related to their difficulties and needs revealed by the shift to online teaching.

Keywords: methodology courses, teacher training, languages, social sciences, engineering

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Introduction

The fourth industrial revolution, taking place in the present day, is about linking different machines and sensors into one single information network. This is already an augmented reality, the era of artificial intelligence and the development of 3 or even 4D printing, the world of the Internet of Things (IoT) (Ashton 2009).

The changes generated by the industrial revolution did not leave the school system unaffected. Basically, they affected the content of education mainly with the expansion of the curriculum, while the tools and methods changed relatively slowly. However, digitalization, the emergence and spread of computers generated significant changes. At the beginning, the number and quality of tools available was not adequate, the methodological training of teachers was scarce, and there was very little good-quality digital content. Later on, schools became better equipped, and Internet access indicators improved, but content development and teacher training did not keep pace with the changes.

ICT had an impact not only on the teaching process – transforming and expanding the traditional teaching and learning environment – but also on students (Ciascai 2018). Members of generation Z appeared in schools, those who were already born into the age of information, and for them networking is more natural than anything else in the world. In this world, almost any information can be accessed anytime, anywhere, the reason why teachers lost their "central source of information" status (Buda 2017), their former role of "sage on the stage" (McNair 2001). Today's students have a hard time accepting the need to learn data, definitions, and formulas that can be accessed in seconds with the help of the World Wide Web.

The COVID-19 pandemic highlighted the need for teachers who are proficient in digital technologies and can use them confidently in order to continue effective educational activities and maintain student activity and motivation. The new type of learning environment, the new technology requires new methods and approaches from teachers. Teacher training institutes have a key role in this process as teacher training is a self-reproducing segment of education (Péntek 2005).

Therefore, it is important to determine what new perspectives and changes are necessary related to three domains in which our institution – the Teacher Training Institute of Sapientia Hungarian University of Transylvania, Faculty of Technical and Human Sciences – offers teacher training: foreign languages, social sciences, and engineering. The accredited Institute operates in three locations (Cluj-Napoca, Miercurea Ciuc, and Târgu-Mureş), and the unity of its operation is ensured by the methodology of the institute, the admission and examination methods, and the pedagogical practice implemented in the same system.

In this study, we examine how the different areas of education have been affected by the pandemic. Based on our experience, we assume that in language

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teaching familiarity with pre-existing language teaching platforms and programs helped the transition to online education. In the field of social sciences, the transfer of theoretical information did not cause any particular problems, but the development of interpersonal relationships, interactivity, and communication became more difficult. In the domain of engineering, practical education has become nearly impossible, as in order to develop certain practical skills students need access to laboratories equipped with special tools, devices, and instruments.

1. General concepts about the role of ICT in education

As a result of the spectacular development of digital technologies since the late 1990s, teaching and learning activities have become continuous. Dating back more than two decades, the European Union, recognizing the importance of integrating digital technologies into education systems, formulated as an objective in its policy to promote the acquisition of knowledge in an innovative way by methodologically integrating different technological tools in order to create a knowledge-rich learning environment with the use of info-communication programs.

In 2020, the European Commission published a Communication on the digital education action plan related to 2021–2027, entitled *Resetting Education and Training for the Digital Age*.[1] Two guidelines were formulated: (1) creating an appropriate digital educational environment and (2) developing new digital skills and abilities.

In order to enhance the quality of education and training systems: there is a need to define digital strategies capable of providing the right infrastructure, user-friendly tools, and accessible digital content; a fast and reliable Internet connection is needed to use high-bandwidth applications, programs, and cloud-based services in education; teachers must be proficient in the use of digital tools, be able to learn new, innovative methods, and use them with confidence.

In the field of digital skills and abilities, improving digital literacy requires competence-based knowledge that develops problem solving and critical thinking. In education, emphasis should be placed on the development of actual, applicable, quality knowledge, while through IT education, learning about the digital world must be ensured from an early age.

In recent years, improving the provision of IT tools and encouraging, training, and developing teachers to use ICT tools in education have also been identified as priorities in Romanian education policy. According to the guidelines set out

1 Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions. Digital Education Action Plan 2021–2027. Resetting education and training for the digital age. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0624.

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in the *Europe 2020 Development Strategy on the Digital Agenda for Romania*, educational institutions must be provided with the appropriate infrastructure to enable the proper use of ICT tools. It aims to develop the digital competence of students and teachers by organizing professional courses that can improve the quality of education and their digital skills. Furthermore, it aims to provide an opportunity to integrate Web 2.0 interfaces into the teaching process that would help teachers in their professional development and increase the effectiveness of classroom training. Among its guidelines, it highlights the encouragement of students to actively use interactive teaching materials and information provided by the Internet.[2]

2. New circumstances in teaching languages, social sciences, and engineering

The training in these three fields of education operates on the basis of a unified curriculum, which is based on the national methodology, wherefore the educational framework is unified. The different teaching and methodological features corresponding to each field of education can be taught within the framework of the methodology courses and teaching practices. In addition, a very important factor is that the changes in these three fields of public education are different, not only due to the fields of science but also due to the fact that they have had different roles and statuses in mainstream education in the last 30 years.

In the domain of language teaching, research and development enables teachers to adapt to new circumstances. This is also reflected in the 2020 version of the *Common European Framework of Reference for Languages: Learning, Teaching, Assessment – Companion Volume*, in which, compared to the previous version, more emphasis is placed on online interaction, an essential factor following the shift to online teaching and learning.

In the chapter dedicated to online interaction, online communication is defined as being "always mediated through a machine, which implies that it is unlikely ever to be exactly the same as face-to-face interaction" (Council of Europe 2020: 84). The characteristics of online group interaction "are almost impossible to capture in traditional competence scales focusing on the individual's behaviour in speech, singing or in writing. For instance, there is an availability of resources shared in real time. On the other hand, there may be misunderstandings that are not spotted (and corrected) immediately, as is often easier with face-to-face communication" (Council of Europe 2020: 84). Therefore,

2 National Strategy regarding the Digital Agenda for Romania, September 2014; available in Romanian: Strategia Națională privind Agenda Digitală pentru România. https://www.ancom.ro/uploads/links_files/Strategia_nationala_privind_Agenda_Digitala_pentru_Romania_2020.pdf.

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successful communication requires more redundancy in messages; it needs to be checked if the messages have been understood correctly; reformulations may be necessary for comprehension, and misunderstandings must be dealt with; emotional reactions need to be handled appropriately. The CEFR – Companion volume offers a descriptor scale for online conversation and discussion covering levels from Pre-A1 to C2, focusing on online discussion and conversation as a multimodal phenomenon, emphasizing "how interlocutors communicate online to handle both serious issues and social exchanges in an open-ended way" (Council of Europe 2020: 84). Language teaching and teacher training in Romania aims to follow the CEFR guidelines and principles.

The teaching of social science subjects has taken a special path in Romanian education. In the period before 1990, either the subjects belonging to this field of education did not exist or – in accordance with the unilateral political party approach – very limited knowledge was included in the textbooks. Changes in the education system in the early 90s had a positive effect on the teaching of social sciences: logic, sociology, psychology, and philosophy were taught in high school. However, there were no substantial changes in the primary school stage.

The importance of developing a people and society literacy as well as its foundation in primary school and secondary school were outlined in the 2000s but was only concretized in Law on Education no. 1/2011.[3] The new education law fundamentally reformed public education in Romania (Anghelache et al. 2018), so new subjects were introduced in secondary schools: social education in the 5th and 6th grades, civic education in the 7th grade, and economic education in the 8th grade. In addition, personality development as well as counselling and self-knowledge classes are available as optional subjects, and school and career choice activities are available in all grades.[4] In the upper secondary education, the cultural domain of people and society includes the following subjects: history, geography, social education, and religion.

A fundamental change of attitude took place in Romanian education, with a shift from an almost exclusively information-based education to competence-based education and an emphasis on practical experience. This change in approach is reflected in the general curriculum of grades 5–8 and in the school curriculum of people and society education.[5] In accordance with the new general curriculum

3 Law of National Education no. 1/2011, available in Romanian: Legea Educației Naționale nr.1/2011. https://www.edu.ro/sites/default/files/legea-educatiei_actualizata%20august%202018.pdf.

4 Education framework plan for middle school, available in Romanian: Plan cadru de învățământ pentru învățământul gimnazial. http://programe.ise.ro/Portals/1/Curriculum/Pl_cadruactuale/Gimnaziu/OMENCS%203590_5%20apr%202016_Plan-cadru%20de%20%C3%AEnvatamant%20pentru%20gimnaziu.pdf.

5 Curriculum for social education, classes 5–8, available in Romanian: Programa şcolară pentru disciplina Educație Socială clasele a V-a–VIII-a. http://programe.ise.ro/Portals/1/Curriculum/2017-progr/28-Educatie%20sociala.pdf.

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and school curriculum, new textbooks were published. The textbooks also reflect a practical, skill, and ability development goal. For example, in the 5th-grade textbook, students can learn about concepts such as reasoning, forming personal opinions, prejudice, stereotype, various rights and obligations, protection, abuse, social support, privacy, freedom of speech, minority, NGO, etc. (Ciocâlteu et al. 2017). The textbook has a new, more transparent structure, so it is much easier for students to understand and learn new concepts and gain knowledge. With these concepts, they will look at the world through different eyes and will find it easier to overcome obstacles in their personal lives. The textbook has lots of pictures, and the exercises and tasks are also varied.

The 6th- and 7th-grade textbooks are also colourful, interactive, with interesting content in many ways: culture and cultural diversity, cultural identity, interculturality, intercultural communication, acceptance, respect, solidarity, etc. (Bratu et al. 2018, 2019). The lessons contain the relevant concepts and definitions, the text is well structured and easy to understand, supported by many practical examples, and the exercises focus on understanding the curriculum. The textbooks are practical in nature, less theoretical, and this benefits today's students.

All 5th-, 6th-, and 7th-grade textbooks have changed methodologically, as they give the teacher many ideas for conducting group exercises and applying project methods and interactive methods.

All these positive changes began to develop in recent years, but it cannot yet be said that they have already been put to practice or have become a routine. We would rather say that they started down this road as the result of a substantial and necessary change of attitude. At the beginning of this journey, there was a change in the learning and educational environment due to the pandemic, which also put teachers and students to another test, which resulted in an interesting paradox: developing social skills without social coexistence, developing communication skills without the personal presence of the adolescent group.

Online education brought along a special, formerly unknown situation: what, how much, and how to teach students. Regarding the transfer of new information related to social education subjects, the online form of education is not an obstacle. However, the development and improvement of various skills, such as social and communication skills, can be implemented only to a small extent, as the basic condition for this is personal presence.

Engineering teacher training prepares students to teach subjects in the field of technology. There is a strong connection between engineering teacher training and secondary vocational training: some students in vocational secondary school apply for engineering specializations in higher education. As engineering instructors, teacher trainees will be able to teach specialized subjects at the lower or upper level of vocational training, depending on their qualifications. Renewing vocational training is part of the EU's multiannual policy. It is also identified

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as a specific area in the ET2020[6] work programme as a strategic objective to improve the quality and effectiveness of training through the acquisition of key competences. Therefore, more attention should be paid to improve the level of the basic skills such as numeracy and literacy. Thus, certain subjects, such as science, technology, and mathematics, may become more attractive.

It emphasizes the need to ensure adequate initial teacher training, the continuous professional development of teachers, and the need to make teaching an attractive career in order to raise the standard of training. In recent years, the issue of vocational training has also found a new foundation in Romania. The education and training strategy[7] for 2016–2020 was closely aligned with the objectives set by the EU.

In the third chapter of this study, we focus on new paradigms and good practices presented in the specialized literature, which we consider helpful in updating and developing our methodology courses. This is followed by the fourth chapter, containing a presentation of feedbacks received in a semi-structured interview from our teacher trainees, related to their difficulties and needs revealed by the shift to online teaching.

3. Online, blended, and adaptive teaching and learning – Concepts and developments

A considerable amount of research focuses on ideas and practices regarding online, blended, and adaptive teaching and learning. In the domain of education, these concepts are not new, they were developed in parallel with the development of information and communications technology. The COVID-19 pandemic confirmed that the existing knowledge and experience related to these topics must gain more importance in teacher training. The possibilities for communication provided by the Internet and quick access to information can be equally helpful for individual learning and group activities.

Adaptive learning is "a method of education that uses computers and data to adjust the learning experience to the individual student",[8] according to a definition offered by Macmillan Dictionary. Kerr (2014) examines the concept and practice of adaptive learning, mentioning that ELT publishers started to move

6 Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020): https://eurlex.europa.eu/legalcontent/EN/TXT/HTML/?uri=CELEX:52009XG0528(01)&from=HU.

7 Strategy for vocational education in Romania for the period of 2016–2020, available in Romanian: Strategia educației şi formării profesionale din România pentru perioada 2016–2020. https://www.edu.ro/sites/default/files/_fi%C8%99iere/Minister/2016/strategii/Strategia_VET%2027%2004%202016.pdf.

8 https://www.macmillandictionary.com/dictionary/british/adaptive-learning.

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away from the world of traditional printed textbooks, investing heavily in digital courses containing adaptive learning elements. A growing number of online teach-yourself language learning apps and programs with adaptive learning software are available, such as Rosetta Stone, Babbel, or Duolingo, complementing institutional language learning. *Gamification* may be one of the reasons for their popularity. Users are awarded points and badges, just like in computer games, and can reach different levels. This motivates language learners because the work seems to be more fun. The approach and tools of gamification can be an alternative at several different levels and areas of education if its introduction is preceded by circumspect and careful planning (Balogh 2017). Every student loves learning through playing, discovering and learning new things, for which the Internet offers an excellent opportunity, as there are many repositories where controlled, peer-reviewed curriculum is available. The role of the teacher is to consciously guide the students, to help them navigate the World Wide Web, and to compile learning paths tailored to the students' knowledge. With the help of various routes, it is possible to create both easier and more difficult sets of tasks and thus give students the opportunity to choose according to their knowledge and abilities. It also provides effective support in the development of learning activities in the teaching of subjects related to the field of technology. There are many useful applications available to both teachers and students. The most popular apps are Sutori and Symbaloo, but applications like Wordwall, Quizalize, Kahoot, LearningApps, or Flippity are also well liked.

The growing popularity of online learning platforms is also mentioned by Kerr (2014). These are also known as Learning Management Systems (LMSs) or Virtual Learning Environments (VLEs) such as Moodle. Institutions can use them to store and deliver course content such as activities, tasks, and lectures. They may also offer mechanisms for course administration, assessment, social networking, and other forms of communication. Mostly they are used for blended learning, but exclusively online courses can also be delivered and administered with their help.

The main issues, trends, and research related to *online learning* were also examined by Hockly (2015), who lists the variety of terms referring to the phenomenon, often used interchangeably, such as distance learning, hybrid, or mixed learning, e-learning, blended learning, and web-enhanced learning, mentioning that these terms often overlap, causing confusion in their use. She distinguishes two main categories: blended teaching and learning (a combination of face-to-face and online learning) and fully online teaching and learning (which includes no face-to-face interactions, only work via the Internet).

White (2006) identified some important pedagogical research areas regarding *fully online, distant language learning* such as course development, course evaluation, teaching roles, learner support, choices and challenges in technology use, learner contribution, and perspectives for future research. Lamy (2013)

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identified some other research areas based on White's research such as the effect of multimodality (various modes of producing meaning in digital communication), gathering more information about learners, and online teacher training. White (2014: 538) proposed that more emphasis should be placed in research "on theory, pedagogy, technology use, learner contributions, innovation and less commonly taught languages".

However, it may be more difficult to implement distant learning in disciplines related to engineering, where practical acquisition of knowledge is an integral part of education. The challenge is how to make "real" laboratory practice via the Internet (Balamuralithara 2009). It may also cause problems if the education process requires the use of special programs that are licensed to an institution. In order to make the best possible use of online learning in the field of engineering education, according to Bourne et al. (2005: 131): "(1) the quality of online courses must be comparable to or better than the traditional classroom, (2) courses should be available when needed and accessible from anywhere by any number of learners, and (3) topics across the broad spectrum of engineering disciplines should be available".

In shaping the literacy related to man and society, the online form of education can be well used as a necessary solution in emergency situations such as a pandemic. However, in the long run, personal education or blended learning is more effective in shaping and developing social skills.

Blended learning was first developed in the domain of corporate training, and then it was adapted to higher education as well. Whittaker (2013: 11) states that the term "signifies the inclusion of computer technology providing online or offline activities and materials in the mix, rather than implying this is a wholly new approach to teaching and learning". She defines blended learning as a "combination of face-to-face teaching with computer technology (online and offline activities/materials)" (Whittacker 2013: 12). To this, Hockly (2018: 97) adds that "the use of 'computer technology' as part of blended learning is usually understood to take place in another location to the face-to-face (f2f) teaching, and most likely in the learners' own time". She also states the reasons why blended learning is becoming more popular in language teaching: affordable and easily accessible digital tools; financial considerations; large number of learners and limited space in schools; not enough exposure to the target language in face-to-face classes; political instability in certain parts of the world where the physical attendance of classes is not possible; the pedagogical concept that a balanced use of face-to-face and online teaching and learning can offer significant benefits. Course design for effective blended learning and finding the optimal balance between face-to-face and computer-based work may depend on various factors such as the context in which the course will take place, the available technology, and the needs of the learners. Blended learning as a new form of

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education has also reformed engineering teacher training. Taking advantage of the opportunities offered by the Internet and digital media, it provides an effective learning framework that can best contribute to student development. However, in terms of its pedagogical advantages, it is not popular in engineering education, as the development of the curriculum is difficult to implement in a way that simultaneously develops students' digital skills, critical thinking, and problem-solving skills. On the other hand, due to the rapid pace of technical development, blended learning resources require continuous development and updating (Alkhatib 2018). The curriculum for social education and textbooks already made blended learning possible, as there are also electronic versions of textbooks, containing audio-visual elements such as short films, animations, etc., and they also provide Internet resources and websites.

There is also a significant amount of research related to the use of artificial intelligence (AI) in language teaching (Longwell 2018, Gawate 2019, Wang 2019) and in teaching skills related to engineering (Ramirez-Mendoza et al. 2018, Sakhapov–Absalyamova 2018). Learning platforms powered by AI allow learners to concentrate on issues they have more difficulties with, to work at their individual pace, choosing topics they are interested in, taking into account their cultural background. AI is based on collecting and using data, which allows teachers to foresee their students' future performance and understand them better.

Teacher educators need to be aware of the advantages, possibilities, and benefits but also the limitations and eventual disadvantages of the above mentioned means, concepts, and practices and need to introduce the available knowledge and experience related to them in the curriculum.

4. Teacher trainees' experience and reflections related to online teaching

This chapter shortly presents the results of a semi-structured interview organized in order to learn about our students' opinions and insights related to their online teaching practice experience.

Most of our translation and interpretation students, a large number of engineering students from five areas of engineering (Computer Science, Automation and Applied Informatics, Mechatronics, Manufacturing Engineering, Telecommunication) and social sciences students (Communication and Public Relations, Public Health Services and Policies) are also teacher trainees.[9] The subject structure of the Teacher Training Institute is defined by a

9 In 2019–2020, the third year was composed of 17 teacher trainees out of 29 translation–interpretation students, 19 teacher trainees out of 90 engineering students, and 10 teacher trainees out of 49 social science students.

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decree of the Ministry of Education.[10] According to this, teacher trainees study Teaching Methodology related to their specialization in the second year. In the third year, this is followed by Pedagogical Practice I, within the framework of which students observe classes, and Pedagogical Practice II, when they teach independently. The structure of training for the teaching of social sciences is similar to the language and engineering teacher training: in the second year, students study Social Science Methodology, and in the third year they also have Pedagogical Practice, when they observe social education classes in 5–8 grades and practice teaching this subject.

The interview was conducted in the second half of the 2019–2020 school year, in the first phase of the pandemic. Thirteen students participated in the interview: five language teacher trainees, three students from social sciences, and five engineering students. We informed all our students about the possibility of participating in the interview, held a preliminary discussion with those who had indicated their intention to participate, and assured them that the data were used exclusively for research purposes, and their name and personal information would not be disclosed. The average time of an interview was 40 minutes, implemented on a Google Meet interface. The conversations were recorded with the consent of the students.

During the COVID-19 pandemic, teacher trainees could not visit classes or practice teaching face to face because schools were closed, and all teaching took place online. Observing and practising teaching online was challenging, as nobody was prepared for this scenario. The questions of the semi-structured interview referred to the following issues: advantages and disadvantages of face-to-face versus online teaching; their previous experience in using ICT tools; changes in student autonomy and in the role of the teacher; perspectives of education following the shift to the online space; their difficulties and any new things they learned while working online; skills and knowledge that were not included in their training but that would have been useful in online teaching. The data collected during the interview were thematically organized, processed, and then summarized.

Among the benefits of personal presence in the classroom (compared to online teaching), they mentioned the following: more possibilities for interpersonal connections, interactivity, teamwork, direct, spontaneous interaction; the teacher can see the students and realizes sooner if they do not follow the explanation or they do not understand something; gestures, physical movement, and action make learning and memorization easier and more fun; learners can concentrate more easily and for longer, and they are more motivated.

10 Order of the Ministry of Education no. 3850, issued on 2 May 2017, regarding the methodology of organizing psychopedagogical programmes at the accredited universities, available in Romanian: https://www.edu.ro/sites/default/files/fisiere%20articole/ORDIN%203850-2017_0.pdf.

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As advantages of online work (opposed to classroom presence), they mentioned: it is easier to play videos, sound files, start online games in class; students are not late for class, it is not necessary to get up earlier and to travel long distances in rush hours; students do not disturb each other, do not distract each other from the explanations; the teacher needs to spend less time resolving conflicts.

However, they observed several disadvantages of the online school: technical difficulties such as weak Internet connection; lack of modern, suitable devices (computers or tablets); lack of user knowledge and experience; sitting in front of a computer, laptop, or tablet for hours is uncomfortable and tiresome; communication is difficult due to the lack of physical, personal interaction (invisible gestures, facial expressions, and movements); breaks cannot be filled with games or movements; there are fewer opportunities for students to help each other, discuss what some of them have not understood; there are fewer opportunities for teamwork; students may feel lonely and isolated; it is easier to learn a language if students can touch, move certain objects, or with the help of role-play activities; because of the practical aspect of engineering-related topics and skills, these subjects can be taught mainly with the use of illustrative tools – learners following the practice through the screen is not the same as actually doing it; action-based learning in online space is more limited; it is harder for the teacher to supervise the students and make sure everyone is paying attention and not doing something completely different.

Related to changes in student autonomy, most respondents stated that students became more independent while working online. Autonomy also stemmed from the fact that students could not contact each other or the teachers as spontaneously and as often as before, and instead they turned to online resources, trying to be informed, to discover certain solutions. The role of the teachers also changed: they deliver information, give technical support, and coordinate online work without the possibility to conduct activities for experiential learning, team building, or personality development.

The respondents mentioned a few possible changes such as: digital tools will play an increasingly important role and will also influence changes in teaching methods. They believe that digital tools are useful and increasingly popular, but they cannot replace the teacher. Learners like to use electronic gadgets, applications, and programs, wherefore these means can be helpful in language teaching and learning. However, they also highlighted the importance of maintaining personal communication, teamwork, pair work, role-playing games, simulations, physical activity, learning by doing, and class work based on interactivity.

We also asked what prior knowledge or skills would have been helpful to them in teaching online. Based on the answers, it would be useful to include the following in the methodology course material: managing interfaces for online lessons (such

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as Google classrooms); organizing group or pair work online; practising how to reorganize, adapt certain types of tasks to online work; developing writing skills in the online space; problem solving and class management online.

5. Discussion – Changes and perspectives

Restrictive measures to curb the coronavirus pandemic provided a new impetus to discover the potential of digital education, to flexibly transform the learning environment in order to meet current needs, and to be space- and time-independent. Students adapted well to the new circumstances, having to adapt to a more independent learning and a daily schedule based thereon. In this unexpected situation, teachers were also forced to reform the way of conveying knowledge in a short time. Based on the online teaching experience of more than a year, we formulated changes that are important (in terms of attitude) for teacher education and that can serve as a guide for the coming period as well.

When, in accordance with the new provisions, the universities in Romania closed, the management of Sapientia University acted efficiently and expeditiously. By defining and providing the use of a single online platform, teaching and learning activities could be continued almost without interruption. Thanks to this, teachers were able to focus on figuring out how to continue their semester activities (lectures, seminars, and practical classes) and what technologies to use. There were serious disruptions in educational institutions where the management did not organize and standardize the online form of education, where teachers were entrusted with finding the online communication channel through which they could deliver content to students. Some teachers with various digital skills and experience did not thrive in using online platforms, and students had great difficulties transitioning from one online interface to the other to attend classes.

In teacher education, in order to ensure the continuity of education in all situations, a detailed strategy and framework based on a unified concept must be developed, which provides support and suggests guidelines even in unexpected situations. This unified concept will be developed after detailed discussions and coordination among the teachers of the different methodology courses at our university.

Besides the teachers who preferred the traditional teaching techniques, the number of those who used info-communication tools and digitally prepared curriculum in the class was more pronounced (Harangus 2017). On the other hand, education, having moved to the online space, called for a different set of tools, methodology, and time management. Consideration had to be given to the inexperience resulting from the use of devices, initial errors, and the replacement

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of traditional instructional materials with digital formats. Although interfaces suitable for online teaching were available, teachers were not aware of the great potential of these applications.

In teacher training, within the framework of ICT courses, more emphasis should be placed on the use of those digital tools and web platforms that can help to take advantage of the educational opportunities of virtual reality. This can help teacher trainees to transfer knowledge effectively as practising educators.

Our study proved that in the domain of teaching foreign language and social sciences it was easier to find online solutions in order to continue teaching, while in engineering education, where teaching had been based on more face-to-face practice with the help of different equipment and tools, it was more difficult to adapt to the new teaching system. There are several fields related to engineering where it is simply impossible to create an online version for practice. At first, it seemed that education forced into virtual space posed insurmountable problems. Despite the difficulties, the transition took place, with teachers from public schools adapting to the challenges. They tried to manage the situation with ingenuity; they sent educational films and made videos about the materials needed for the practical lessons.

Consequently, in engineering teacher training, more attention should be paid to the methodological preparation of undergraduate engineering students in order to be able to choose the tools from the available, versatile web interfaces and online educational opportunities, which can be beneficial for both teachers and students to help achieving learning outcomes in the case of online teaching.

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