ARTICLES

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Identification of social innovations in e-learning education of students during the COVID-19 pandemic

Abstract

The article is theoretical and analytical in nature and aims to identify the manifestations of social innovations in e-learning education at the Wroclaw University of Economics and Business during the COVID-19 pandemic. The study focuses on the need for academics to use innovative (novel) distance learning tools. In addition, an attempt was made to assess the impact of selected tools on the development of new competencies among students. In order to achieve this goal, a proprietary online questionnaire was developed and free interviews were conducted with students. The survey was created in MS Forms application. A total of 151 students (second year) studying at the Faculty of Production Engineering of the Wroclaw University of Economics were surveyed. The survey period was in the summer semester 2020/2021. The study showed that the use of virtual tools contributed to the development of additional skills among students, such as teamwork and collaboration skills or creativity.

Keywords Distance education, E-learning, Social innovation, Innovative e-learning tools, Competencies, Higher education, COVID-19 pandemic

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Introduction

E-learning is a form of learning that has been widely used in both enterprises and educational institutions such as universities, which is the focus of this article. In the literature, e-learning is also referred to as distance learning or distance education. Therefore, in the present study, these terms will be used interchangeably. Many universities in Poland, responding to the needs of modern education, have long created e-learning platforms, approaching distance education as a complement and enrichment of the educational process with active, audiovisual methods. Some universities use simple text-based forms of e-learning for student self-study. Others are introducing more advanced, interactive forms of distance learning, such as the Polish Virtual University (http://www.puw.pl) (Unold, 2010).

These are undoubtedly manifestations of social innovation in the field of education. These innovations occur through the implementation of a new or significantly improved product (educational goods or services), process, working method, or new organizational method (form) in educational practices in the workplace or in the relations of educational institutions with their environment. Innovations of this type may involve the entire education system or its components (Vincent-Lancrin, Urgel, Kar, & Jacotin, 2019). As it is the case with other innovations, they may have the character of planned and intentionally undertaken actions aimed at fostering development, but they may also be forced by e.g. a suddenly changing situation in the environment.

Findings from the Organization for Economic Cooperation and Development study show that, contrary to popular belief, there is a fairly widespread occurrence of innovations in the education sector. This is especially true for higher education in Europe, which has seen faster rates of adaptation and accepting innovations than secondary and primary education sectors (Vincent-Lancrin, Urgel, Kar, & Jacotin, 2017).

With the outbreak of the COVID-19 pandemic, regardless of the degree to which this type of innovative education had been used to date, all universities in Poland, but also worldwide, were challenged with an emergency requiring action to sustain the teaching process. To meet this challenge, distance learning and online teaching solutions were implemented. It is important to point out that online learning is not new, nor is distance learning. However, COVID-19 has raised the need to explore online teaching and learning opportunities). It turns out that properly chosen e-learning tools play a key role during the ongoing pandemic as they help teachers to plan educational activities, provide teaching materials, track and verify learning progress (Almaiah, Al-Khasawneh, & Althunibat, 2020) and also help diversify the classes. This concerns in partular:

- virtual whiteboards, which enable team task solving, creative problem solving by using available templates such as "5 Whys", mind maps, or brainstorming,
- applications such as Canva or Genially to create interactive presentations, posters, flyers, resumes,
- knowledge verification tools such as Kahoot, Quizizz, or Wordwall, which support users in creating games, quizzes, rankings, etc.

It is important to remember that e-learning has both benefits and limitations for both students and teachers. On the one hand, distance learning technology allows students to attend classes at their preferred times and places (asynchronous mode), or only places (synchronous mode) (Sun & Rueda, 2012). The use of various tools affects the development of the so-called soft skills of employees, such as design, teamwork, creative thinking, emotional intelligence, dealing with stress, and technical skills associated with the operation of various tools. On the other hand, unlike conventional teaching in educational facilities, teachers and students are not physically present in the classroom, so students may lack opportunities for interaction, collaboration, and direct communication, leading them to be less engaged in learning activities (Tuckman, 2007). Furthermore, distance learning provides students with much more freedom to decide how and when they interact with others. Therefore, it is important for teachers and curriculum designers to better understand what factors influence students' engagement in the educational process (Sun & Rueda, 2012) so that online learning actually contributes to the acquisition of the necessary knowledge, but also shapes the already mentioned soft competencies. Hence, the need has arisen for building a research approach focused on social issues. The present paper focuses on the perspective in which changes in the environment have forced universities to look for innovative ways of doing things to continue the learning process. The purpose of this paper is to identify the manifestations of social innovation (viewed by its individual types) in e-learning education at the Wroclaw University of Economics during the COVID-19 pandemics. The focus of the study is on the need for academics to use novel (innovative) distance learning tools. Furthermore, an attempt was made to assess the impact of the selected tools on the development of new competencies among students.

The first part of the paper is focused on presenting the issue of e-learning and social innovation in distance learning based on the literature studies. The remaining part of the paper is devoted to the presentation of the results of our research.

1. E-learning in higher education

Due to the rapid evolution of technology, there is no universal definition of e-learning. It has been defined in many different ways. Terms such as e-learning, online learning, technology-enhanced learning, and distance education are used interchangeably (Moore, Dickson-Deane, & Galyen, 2011). For example, Urdan and Weggen (2000) analyzed these problems from the standpoint of delivery of contents and defined it as "the delivery of content through all electronic media, including the Internet, intranets, extranets, satellite broadcasts, audio/videotapes, interactive television, and CD-ROM. Meyen et al. (2002) and colleagues focused on knowledge acquisition and consider e-learning as "the acquisition and use of knowledge disseminated and made available through a variety of means". Khan (2005)looked at e-learning from the perspective of pedagogy and contents and access and defined it as "an innovative approach to providing a well-designed, learner-centered, interactive learning environment for anyone, anywhere, and anytime, by leveraging the attributes and resources of various digital technologies along with other forms of learning materials tailored to an open, flexible, and distributed learning environment". Unold (2010), on the other hand, wrote about distance education in the context of a distance between the teacher and the student. This distance, as this scholar pointed out, can be both geographic and temporal.

Researchers, however, are in agreement that e-learning has grown rapidly nowadays due to various technologies and devices for accessing educational resources. These include laptops, computers, smartphones, and tablets (Al-Fraihat, Joy, Masa'deh, & Sinclair, 2020).

E-learning can also be approached from the standpoint of:
- means of communication,
- schedule,
- e-learning class structure,
- technologies used.

There are different ways for students to communicate with each other and with the lecturer. E-learning can occur through web applications. Another way to communicate (if the distance is not an issue) can be peer-to-peer communication to create blended e-learning that offers both online and face-to-face interaction. Modern technological advances are expanding the definition of the peer-to-peer term, as two-way video or two-way audio can be used to create a blended e-learning experience.

E-learning can be both synchronous and asynchronous, depending on the schedule used. In the first case, communication takes place in real time, e.g. video conferencing, teleconferencing, or online chats. The second

method uses other means of communication that do not require real-time responses, e.g., email, blogs, online forums, etc. This results in the response of both the student and the teacher being either delayed (asynchronous learning) or immediate (synchronous learning).

The structure of an e-learning class refers to the way the class is taught. E-learning contents can be self-studied (with the teacher providing students with the materials they need to complete/ pass the course, which they must learn according to a set schedule), taught by an instructor (if the teacher actively participates in the learning process, offering their support to help pass the course), or self-studied with an expert (a combination of self-studied and instructor-led methods). In both the first and second methods, the student interacts with the teacher who checks his or her progress.

E-learning can be accomplished through the use of various forms of technology supported by media generating information. While video/audio is a viable means to implement instruction, more current technology enhances learning efficiency because it offers more means to convey information. Technology is the most volatile element of e-learning. The more advanced it is, the more e-learning opportunities there are. The evolution of the Internet has contributed to the emergence and growth of e-learning as the technology itself has developed. With the increase in speed and decrease in the size of devices, learning becomes more flexible, thus affecting the popularity of e-learning. Nowadays, most people have access to the Internet through various devices like cell phones and smartphones, and therefore taking online classes has become very convenient. Whether students are on the go, engaged at work, or staying at home, they can use the tools that are used in e-learning (Unnikrishnan, 2016).

When describing the problem of e-learning, it is important to clearly distinguish between two approaches: corporate and academic, as there is a significant difference between corporate training and academic education provided via e-learning. In this paper, the focus is on academic e-learning, which is characterized by, among other things (Szopa, 2009):

- the deadlines synchronized with the schedule of the academic year, and the training itself is closely related to the subject matter of the discussed course,
- classes in student groups, analogous to conventional classes,
- the traditional way of grading and examining,
- a high degree of interaction with the teacher and between students,
- often a low budget (or lack of budget) for introducing new products, educational content primarily created independently by the teacher.

Many scientists (Aboagye, Yawson, & Appiah,2020; Alqahtani, & Rajkhan, 2020; Maatuk, Elberkawi, Aljawarneh, Rashaideh, & Alharbi, 2022; Stecuła,, & Wolniak, 2022) became interested in the issue of e-learning due to the situation related to the COVID-19 pandemic. Therefore, the demand for transforming traditional classes into e-learning classes has increased so that they do not distort the effects of education with the use of modern methods. Therefore, the authors of this study decided to analyze what e-learning tools were known to students before and after the outbreak of the pandemic.

These features are related to the synchronous mode of learning as indicated above, which enforces the need for a variety of distance learning tools that activate learners in the classroom. These tools are objects or devices used to directly influence the implemented teaching process in distance education. They are supposed to enable the educational process and ensure its good quality (Walancik & Dwilewicz, 2018). Example comparison of these tools is shown in Table 1.

Table 1 Characteristics of innovative teaching tools

Tool	Tool characteristics	Areas of study where the tool can be used	license
Virtual boards MIRO/MURAL	• A scalable, device-ready whiteboard that enables working in co-located, distributed, or fully online teams. • Possibility to work in real time and asynchronously • Integration with popular tools such as: Google Drive, Dropbox, Jira, and Google Contacts • Ability to work on ready-made templates, e.g.: "5 Whys" model, mind maps, brainstorming, etc. • Tracking student's progress	• Humanities	• Free version
Canva	• This is a tool that allows users to create graphic designs, even for people with no experience. • The site includes a library of templates, fonts, and images that can be quickly and easily modified. • The tool also helps create infographics, presentations, posters, resumes, flyers, etc. • Possibility to work individually and in teams	• Social Sciences	• Paid version

cd. Table 1

Genially	• Creating visual and interactive content, presentations, infographics, images, games, reports • Possibility to organize all content needed for the lesson: videos, texts, commands, documents, links to external resources, in one slide		
Wordwall	• Creating interactive exercises in online and printable versions • Preparing materials based on available templates such as: match-ups, missing words, chart with labels, test, gameshow quiz, roulette, wheel of fortune, etc.		
Quizizz	• Users can create their own quizzes and use those already created. • The tool is used for introducing new topics (recognizing the level of knowledge to start with), checking the knowledge gained by students during class, students' independent preparation for the class (as a homework assignment).	• All fields of study in which users want to verify learning outcomes	
Kahoot	• Creating games, quizzes by both teachers and students and sharing them • Asking questions/organizing polls during class. Questions/answers are shown on the main device, such as the teacher's screen on the MS Teams platform • Assigning students challenges to complete at an individual pace to revise the material • Check learning outcomes with reports		• Free version

Source: Author's own elaboration based on: (Canva, 2021; Genial.ly, 2021; Kahoot, 2021; Miro, 2021; Mural, 2021; Quizizz, 2021; Wordwall, 2021)

These tools can be divided into two groups, i.e. those that enable creative work and teamwork. This means Miro/Mural virtual whiteboards, which enable, among others, working on ready-made templates, e.g. the "5 Whys" model, mind maps, or brainstorming, but also creating user's contents; Canva, which allows users to prepare presentations, posters, business cards, application documents, etc.; and Genially,

which can be used to create interactive presentations or infographics. The second group of tools can be successfully used to verify learning outcomes in addition to adding variety to classes. This includes tools like Wordwall, where students can participate in interactive games like roulette, which can be a good exercise to start with for the group to get to know each other better. The idea of the game is that each student must spin a virtual wheel of fortune/roulette and answer the question that falls on the dial. Other exercises include match-ups (where students have to connect a specific term with its definition from randomly placed tiles) or quizzes (multiple-choice test with a time limit). Many of the exercises allow for rankings, which further motivates students to take action. Other useful tools in this group are Quizizz and Kohoot, where users can create quizzes or polls to find out what students think about a given topic.

It is worth noting that both groups of tools can be used in lectures and classes, but it seems that the first one will be most useful in subjects falling in the area of humanities and social sciences, while the second one will be used wherever there is a need to verify the learning outcomes.

Importantly, these tools are available both in a free version, which gives access to a large number of templates and, according to the authors' experience, is sufficient for the needs of online classes, and a paid version, which allows the use of unlimited resources offered by individual tools.

Lecturers are well aware that maintaining student attention and engagement is often a difficult task when teaching conventional classes, and this problem is further compounded when teaching online. It is worth recalling here, the so-called listener attention curve, presented in Figure 1.
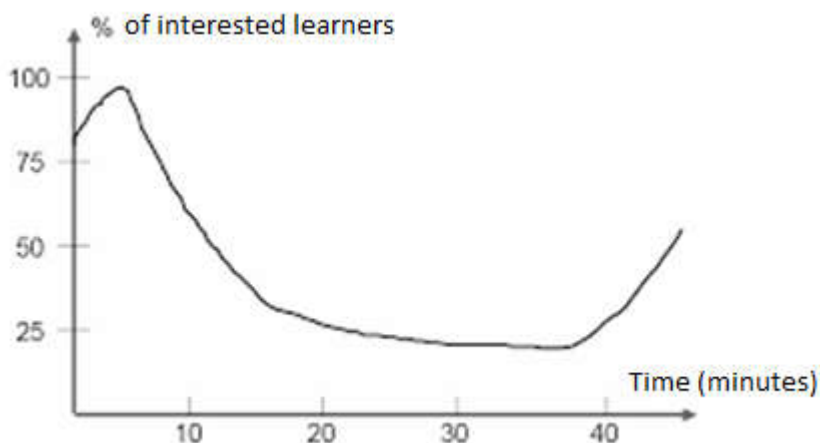
Figure 1 Student attention curve
Source: (Mills, 1977)

It is known that the prerequisite for proper perception during class is to maintain student attention. From the standpoint of human function, class time is divided into what is called periods of activity and low-level activity. Audience interest is highest in the first 10 minutes of class, then wanes before rising again after 30 minutes. In teaching, especially in lectures, the teacher should strive to increase the periods of activity to the maximum while decreasing the periods of inactivity. It is suggested that after 20 minutes or so it may be useful to add some variety to the session by using the tools described above, e.g., taking a short break for an exercise related to the topic of the lecture, a quiz, an opinion poll, or other forms of activity, even though this may increase the length of the session. As already suggested, students in online classes have a great deal of freedom in deciding how, when, and if they will interact with others at all (this is a significant disadvantage of distance education, where lack of physical participation in class results in a lack of engagement). Therefore, in the absence of the possibility of the direct impact of the teacher on the student, it seems reasonable to use different ways to activate the audience. (Ciesielka, 2007).

The tools presented in Table 1, in addition to activating students, engaging them in the learning process or making classes more interesting, also contribute to the development of their competencies. An analysis of the websites of these tools revealed that they promote the development of soft competencies, such as the ability to work under time pressure, resistance to stress, creativity, focus on the goal, emotional intelligence, logical and analytical thinking or communication skills. Examples of these competencies are presented in Table 2.

Table 2 Competencies that are developed through the use of innovative teaching tools

Tool	Developed competence (skills) resulting from the characteristics of the tool
Virtual whiteboards MIRO/MURAL	• Design • Teamwork (collaboration) • Creative thinking • Communication • Persuasive skills • Reaching compromises • Conflict resolution
Canva	• Innovation • Openness to new solutions • Engagement • Motivation to work
Genially	• Positive attitude • Technical skills

cd. Table 2

Wordwall	Technical skills Coping with stress and time pressure Goal focus and task orientation Openness to new solutions emotional intelligence
Quizizz	Ability to learn independently Results orientation Logical and analytical thinking Positive attitude
Kahoot	Good work/learning organization Motivation to learn

Source: author's own compilation based on (Canva, 2021; Genial.ly, 2021; InterviewMe, 2021; Kahoot, 2021; Miro, 2021; Mural, 2021; Quizizz, 2021; Wordwall, 2021)

It is worth noting that most of them refer to the so-called competencies of the future. They make it possible to distinguish human work from that of information systems, robots, or artificial intelligence because humans will still be difficult to replace in these areas. They include:

- cognitive competencies: commonly referred to as thinking competence. It is a very broad term, encompassing creativity, logical reasoning, and complex problem-solving.
- social competencies: they are essential in a work environment that requires contact with others, teamwork, or managing people. These include effective teamwork, leadership, entrepreneurship, and emotional intelligence.
- digital and technical competencies: these are termed hard skills. Digital competencies are particularly important and are becoming fundamental. They are not limited to programming or data analysis, but encompass a wide range of skills from digital problem solving to privacy or cybersecurity expertise (Włoch & Śledziewska, 2019).

Until recently, soft skills were considered "inferior" and less important than hard skills. Today, employers often pay more attention to the former. This is because it is often easier to teach an employee hard skills (related to a specific profession and the substantive knowledge needed to perform it) than to invest in developing their soft skills. Hence, it is very important that students also acquire soft skills during their studies at universities (InterviewMe, 2021)

At the same time, it is worth noting that the literature indicates that e-learning forms of teaching, develop students' competencies, we are talking about cognitive skills that encourage them to learn and direct themselves. Nowadays, global education places a clear emphasis on the development of digital skills (this trend is already observed

at the elementary school education level (Upper Secondary Education Bureau, Ministry of Education, 2010) (Songkram, Khlaisang, Puthaseranee, & Likhitdamrongkiat, 2015).

Parkes, Reading and Stein (2013) also attempted to identify the competencies that students should possess in order to be comfortable in an e-learning environment. Their research revealed that there is a need to develop technology use and social interaction skills. This means that the conscious use of e-learning (including various remote learning tools) in education will promote the development of new competencies among students. It is also worth exploring what these competencies may be. The authors of this work will try to determine whether and what competencies are developed through the use of e-learning tools.

Research shows that creativity can be trained (Corso & Robinson, 2013). It is pointed out that consciously used creative practices in education should support students in building knowledge by defining things that, in their opinion, are particularly important. This strengthens the learners' sense of their own identity and individuality. It also influences the development of learners' personal qualities, e.g. a strong sense of responsibility for oneself and others. New model of education should be based on the deliberate development of learners. The adoption of new strategies and learning models will play a crucial role in the future and will support many of those who did not have enough ideas, required skills. In order to effectively respond to rapid changes in society and work environment, education should provide students with the essential knowledge and practical skills. Therefore, students should be encouraged to think creatively and involved in the creation of case studies through e-learning programs (Radović-Marković et al., 2020).

Distance education comes with some benefits, but also some limitations. Among the advantages are the following:

- e-learning environments can be designed and take into account individual needs to accommodate student differences and preferences, For example, some students need to focus on specific contents or work on additional supporting materials, while others may be ready to complete the entire course at a rapid pace (Akkoyunlu & Soylu, 2006)
- asynchronous e-learning can provide flexibility of time and place, while synchronous e-learning provides the flexibility of place, so each learner chooses when and where it suits them to learn (Al-Musa & Al-Mobark, 2005),

- e-learning can be beneficial both for students, because they do not have to move around, which saves their time, and for an institution such as a university, which can reduce the number of physical classes (Al-Musa & Al-Mobark, 2005), thus reducing the cost of maintaining infrastructure,
- e-learning can provide opportunities for students to interact with each other through, for example, discussion forums while eliminating barriers such as the fear of talking face to face with others in a physical environment, which can arise for students with introverted traits, i.e., closed-minded students with communication difficulties (Hameed, Badii, & Cullen, 2008).

E-learning also has some disadvantages, among which are:
- in e-learning, the student may feel dissatisfied due to isolation and lack of direct social interaction (Hameed, et al., 2008)
- e-learning may have a negative impact on the development of some students' communication skills (Akkoyunlu & Soylu, 2006); (Klein & Ware, 2003).
- e-learning may be less effective than face-to-face classes in terms of aspects of the learning process such as clarifying questionable issues that may be easier to explain during face-to-face contact.
- e-learning may also lack the support provided by non-verbal cues or the ability to observe group interactions (Al-Musa & Al-Mobark, 2005).

The obvious strategy should be to benefit from the positive implications of e-learning while mitigating its negative aspects. One such opportunity would be the development and implementation of blended learning courses, that is, combining distance learning with traditional classroom instruction (Akkoyunlu & Soylu, 2006). However, the COVID-19 pandemic does not always provide such opportunities. During periods of peak incidence rates, universities are operating with full e-learning mode, which, it seems, should prompt conscious reaching for tools that engage students in the learning process.

At this point, it is worth considering what influences the success of distance learning. The research by Selim (2003), who found that the ease of use of online courses is a major factor and a determinant of finding it an effective and efficient learning technology, was considered noteworthy. Selim (2007) described the critical success factors of e-learning in four categories: trainer, student, information technology, and university support. Research shows that the attitudes of students and instructors toward e-learning can determine its success. In general, previous research on e-learning focused more on the technology itself and the contents, but more recent studies have indicated that student attitudes and the ability to interact

in groups also play an important role in the success of e-learning. Analysis of the research in this area clearly shows this changing trend:

- from 2001 to 2003, the focus was on course content and customization.
- from 2004 to 2006, research focused on the usability of e-learning platforms and on the adoption and confirmation of the intention to continue learning
- from 2007 to 2009, the research focused more on student satisfaction levels and e-learning methodology.
- from 2010-2012, the research looked at the expectations and satisfaction of e-learning users.
- from 2013 to 2016, the research is more focused on the overall success of e-learning and how characteristics and student needs and preferences affect e-learning.

This means that there is a need to intentionally influence students' attitudes by providing solutions that meet their expectations of distance learning.

In conclusion, despite the positive changes in education, including distance education often having the nature of innovation, universities still face many developmental challenges. First, teaching is still too focused on attracting large numbers of students to a university without considering the need to develop new strategies for practical skills training. Second, teachers' skills and capabilities have improved, but they still need support to transform their skills into high-quality e-learning materials and diverse learning solutions for their students (Käyhkö *et al.*, 2021).

2. Social innovation in e-learning

Before characterizing social innovation in the context of distance education, it is necessary to look at the definition of innovation itself and what social innovation means.

One of the precursors of the term "innovation" according to Piwowar-Sulej and Kwil (2018) was Schumpeter. This researcher indicated one of the most popular definitions of the term. He identified innovation with the introduction of new products on the market, new methods of production, entry into new markets, acquisition of new sources of raw materials, and introduction of new industrial organization. Carayannis, Gonzalez, and Wetter (2003) proposed a classification of innovation concepts according to four dimensions:

- innovation process (how innovations are developed, disseminated, and adopted);
- content of innovation (technical or social in nature);

- innovation context (the environment in which the innovation emerges and is developed);
- impact of innovation (social or technological): change resulting from the innovation.

As the pace of life in society is accelerating, solving social problems should be quick, efficient, and creative. Therefore, one should find the best solutions using improved or new methods (innovation). Oslo Manual (OECD/Eurostat, 2018) points to four types of innovation:

- product innovation, which means the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, embedded software, ease of use, and other functional characteristics.
- process innovation, which is based on a new or significantly improved method of production or delivery. This category includes significant changes in technology, equipment, and/or software.
- marketing innovation, concerning the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing.
- organizational innovation, with its assumptions concerning the implementation of a new organizational method in the firm's business practices, workplace organization, or external relations.

In addition to the above-mentioned typical economic and managerial approaches, innovation also includes psychological and social aspects (Taatila, Suomala, Siltala, & Keskinen, 2006). Therefore, in order to meet the social needs of a given society, this typology should be expanded to include one more concept: social innovation (Skubiak, 2016).

In the characterization of social innovations, an important criterion is timing of the implementation of changes. The time to implement innovative changes can be viewed broadly. Social innovations are then considered to be new and already proven solutions, solutions that have been tested and applied in new geographic areas, and in increasingly broad areas of social activity. The narrow concept of social innovation focuses attention on the first application of innovative change. In practice, social innovations are not limited to the first application of a solution, but take into account subsequent solutions and different places in order to spread them as widely as possible. It seems that the ambiguity of innovation in terms of the time of introduction of changes is justified and does not need to be specified, especially when one has in mind social innovation and its purpose: improving the quality of life of society. Effects of changes as a criterion for social

innovation focus on the outcomes of innovation. They express the results of activities and their forms. They are the result of human activity and the activity of society participating in social innovation processes. First of all, they refer to intentional, purposeful changes in social structures, customs, and lifestyles created by or with the participation of society itself. They can also be viewed as unintended social changes that represent an extra outcome of technological or organizational innovation. In terms of the effect of changes, one can mention soft social innovations, such as changes in the work organization, aimed to improve the quality of life at work, and hard social innovations (technical, technological), also meeting the objectives of social innovation. Furthermore, it is possible to enumerate social innovations with a direct innovation effect, and those with an effect arising from a long innovation process. The effects of changes can be expressed as macro-, meso- and microeffects, depending on their scale of occurrence. Macroeffects are defined as those that occur nationally or more broadly. Mesoeffects are those that occur regionally, locally, while microeffects serve small groups of people or even are single applications. In general, it can be assumed that the effects of all social innovations contribute to the quality of life. This occurs regardless of the magnitude of these effects and whether they occur directly or not, in an intended or unintended manner (Olejniczuk-Merta, 2013).

Moulaert, Martinelli, Swyngedouw and Gonzalez (2005) highlighted three basic dimensions of the social innovation concept:

- Meeting human needs that are not currently satisfied because "not yet" or "no longer" is perceived as important in the market or state (content/product dimension);
- changes in social relations, especially in relation to management also increase the level of participation of all groups (especially poor) in society (process dimension);
- increased opportunities and socio-political access to resources (empowerment dimension).

As reported by Skawińska, Sobolewska-Poniedziałek and Zalewski (2014) the goal of social innovation is to better meet the needs of the region: local communities, businesses, and organizations. Furthermore, the authors created their own approach to the innovations described. They indicated that innovations:

- are initiated from the bottom up by various entities (e.g., academic sector, businesses, nonprofit organizations, local governments, etc.) and require coordination by a leader,

- satisfy, in a new way for a community, the identified need of the population, not previously realized, through better use of factors of production, creating new value for the actors,
- result in increased social capital (trust and other attributes) and the development of civil society.

The previously described issue of e-learning implementation at universities can therefore be matched with issues related to social innovations: online classes were initiated by an entity such as a university and coordinated by a faculty manager in order to sustain the implementation of the teaching process, thus satisfying the need for student education. This was possible through the use of e-learning tools, which simultaneously contributed to the development of soft skills among students.

However, in order to better understand the concept of social innovation, one must look at the different types of innovation. An interesting classification was presented by Wronka-Pośpiech (2015), who identified seven different types of social innovation. These are presented in Table 3.

Table 3. Classification of social innovations

Types of social innovations	Characteristics
New products	These are any products/goods that can support communities (including people with disabilities) in various activities. In relation to online education, it can be the use of innovative tools to support the learning process and increase its attractiveness. These could be tools for teamwork, creative work or student opinion surveys.
New services	These include services that can be received without leaving home. In case of universities, these will be e.g. virtual exercises, lectures or seminars.
New processes	These include activities designed to support the activities of various groups in society through appropriate processes. A good example in relation to online learning can be sharing documents for collaborative work which develops and improves the process of collaborative knowledge creation and sharing.
New markets	These are new markets, undeveloped so far, that meet social needs. In relation to universities, it can be the creation of so-called "time banks".
New platforms	These are various online platforms that can support and facilitate activities of communities. In online learning, platforms can be used which enable the implementation of the teaching process, real-time communication, etc.
New organizational forms	These include, for example, new businesses, social impact initiatives. In the academic environment, these can be employee initiatives to support team development, collaborative learning, exchange of knowledge and experience.
New business models	These include various new entrepreneurial strategies used in the context of social challenges. A good example could be a new approach to individual or organizational learning and development that promotes training related to student/teacher needs, is easily accessible exactly when and how it is needed.

Source: author's own elaboration based on (Wronka-Pośpiech, 2015)

The social innovations presented in Table 3 are new solutions (products, services, models, markets, processes, etc.) that simultaneously meet societal needs more effectively than before and lead to new or better opportunities and dependencies and better use of assets and resources. These innovations can be both intentionally planned, in order to achieve measurable benefits, and forced, resulting, for example, from an urgent necessity.

Social innovations in education occur through the implementation of a new or significantly improved product (educational goods or services), process, working method, or new organizational method (form) in educational practices in the workplace or in the relations of educational institutions with their environment. Innovations of this type may involve the entire education system or its components (Vincent-Lancrin et al., 2019). An example worth citing here was described by Chen and Roldan (2021). The term in which the COVID-19 pandemic emerged for the Innovation Farm project they described brought many changes, as the pandemic had a huge impact on every individual and every aspect of society. The students began working on Android applications based on artificial intelligence to solve social problems in January 2020. As of mid-March, when the class moved online and the pandemic became more imperative, they adopted a modified version; namely, to create Android applications based on artificial intelligence to solve important social problems related to COVID-19. Students quickly transferred the social issues they began working on (such as financial insecurity, health, transportation, environment, and education) to the COVID-19 context.

Today, there are serious concerns about whether digital innovations based on new technologies and globally available data can provide inclusive and sustainable development opportunities for people and communities. It is important to ensure that the digital divide, which was witnessed during the COVID-19 pandemic, is reduced by actions at multiple levels, such as politics, institutions, education, research, and workforce initiatives. In the digital age, one should not be content with just advances in data and technology, but seek to transform these resources into social innovations that stimulate growth and improve the well-being of people and the planet. At its best, sustainable innovations emerge from the rapidly evolving interface between the technological potential and the emerging needs of societies, which is related to social responsibility. Therefore, solutions are urgently needed to meet this challenge (Käyhkö *et al.*, 2021).

According to Abhari *et al.* (2020), social responsibility lies at the heart of modern information systems (IS) education because of the increased public attention to the ethics, human factors, and social consequences of emerging technologies. The authors, noting these issues to implement social innovation based learning in IS programs, proposed (as shown

in Figure 2) in the form of a model, four interrelated learning strategies: social exploration, social ideation, social experimentation, and social validation.
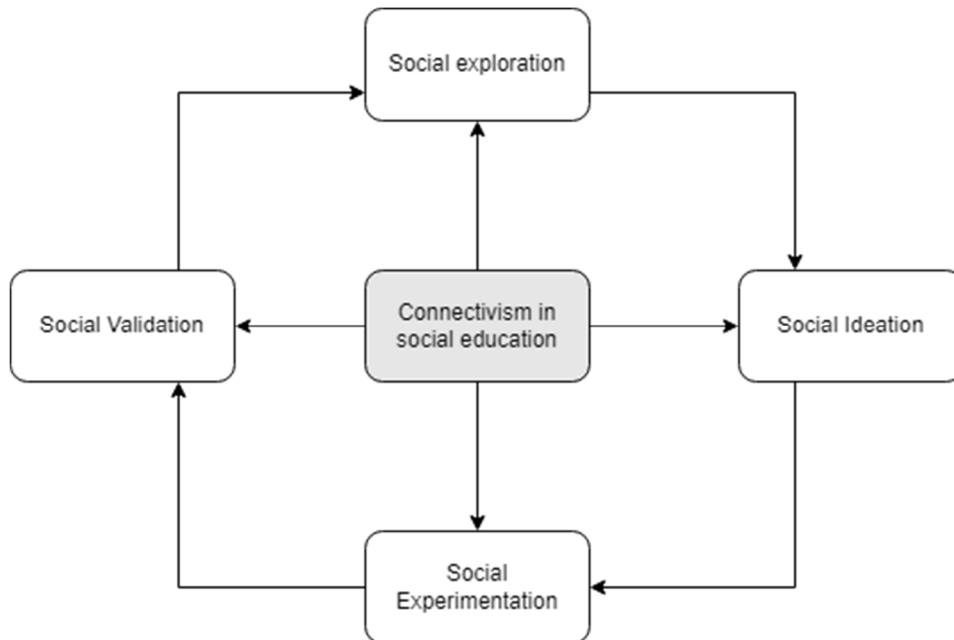
Figure 2. Connectivist Social Learning Model
Source: Author's own study based on: (Abhari et al., 2020)

The social exploration presented in Figure 2 is the first stage of connectivist learning, in which students investigate problems and gather knowledge to shape the next stage of social ideation. These ideas allow students to combine different disciplines and subjects and engage in proposing potential solutions to existing and emerging social problems. During the social ideation stage, students brainstorm different strategies to come up with a set of possible solutions, using the knowledge they acquired during social exploration. The purpose of social ideation is to develop possible solutions to a specific authentic learning problem. Students can compete to propose better solutions while working together to critically analyze their own or others' ideas. Next, social experiments allow students to predict and develop different aspects of solutions by testing and evaluating hypotheses in a social environment. The goal of this phase is to apply the knowledge gained from social exploration, critical analysis, and feedback from social ideas to evaluate solutions and develop a plan. Instructor support helps students determine the validity of their solutions through formative assessments and collaborative discussions. The final phase that follows social experimentation is social validation,

in which students publicly present their experimental results and solicit feedback from community members and experts in the field. Opening up to critical feedback is an absolute necessity for scientific progress (Abhari et al., 2020). The strategy presented by the authors shows important social issues that should be addressed during distance education. Students, through social exploration, can analyze the problems that occur and accumulate knowledge. Social ideation enables them to apply the knowledge they have gained and to stimulate creative and innovative thinking. Social experimentation provides opportunities for students to develop, among other things, logical and analytical thinking by creating and testing hypotheses and research questions in a social setting. The final stage, social validation, allows students to be more open-minded, communicative, and work in teams. This model, therefore, enables the creation and improvement of soft competencies. Furthermore, communities can also contribute to scientific design and funding, going beyond the passive role of merely adopting innovations developed by scientific experts. The overall success of developing countries is based on building effective links between the education ecosystem and social innovation and the bioeconomy. To this end, e-learning ventures and virtual biotech labs are innovative initiatives that are rapidly transforming societies in developing countries. Efforts in distance education, e-learning, and open learning are certainly beneficial to resource-constrained developing countries where the number of potential students is far greater than the number of experienced teachers and educational institutes that can provide the required infrastructure for basic and advanced scientific education (Ray, Srivastava, Diwakar, Nair, & Özdemir, 2016). In addition, it is also worth paying attention to the future competences of students. It was done by Ostoj (2018). In her research attempted to determine the motivation to take up gainful employment by students of economic studies during their education - in the context of financial and non-financial criteria. Therefore, it is worth looking at social innovation in the context of distance education because it addresses the needs of all participants in the learning process.

Methodology

The research procedure adopted in this study was based on the information gathering techniques such as secondary data analysis and primary data analysis. In the first, a literature survey was conducted to analyze both domestic and foreign literature. Analysis of primary data included a questionnaire survey and free-form interviews. The empirical study was therefore both quantitative and qualitative in nature.

A proprietary online survey was developed for the study. The survey was created in MS Forms application. A total of 151 students studying

at the Faculty of Production Engineering at the Wrocław University of Economics and Business, Poland, were surveyed. The respondents in the study group included both women, who constituted 66%. respondents, and men (34%). The group analyzed was people aged between 21 and 28 years, The respondents were sophomore full-time students (54%), and part-time students (46%). The study group included both economically active students (76%) and non-working students (24%). The study period was during the summer term 2020/2021.

The questionnaire contains three types of questions, i.e. closed-ended questions with suggested answer options, semi-open questions in which the respondent, in addition to choosing the prepared answer options, is allowed to provide his/her own answer, and conjunction questions which allowed the respondent to choose more than one answer, along with a rating scale of "definitely not", "rather not", "neither yes nor no", "rather yes", and "definitely yes". The answers to the questions were shown graphically and descriptively. MS Excel was used to analyze the data.
The study sought to answer the following questions:

- Q1: What was the level of familiarity with each tool among students before and during the outbreak of the pandemic?
- Q2: Did the distance learning support tool used contribute to the development of new competencies among students?
- Q3: What competencies did students develop by working with distance learning tools in their online classes?

Free-form conversations with students allowed the information gained from the surveys to be complemented. These included the respondents' assessment of distance learning at the university, their needs in relation to the teaching process, and perceived problems.

Findings

With reference to the purpose of this article, first of all, an attempt was made to recognize the manifestations of social innovations at the Wroclaw University of Economics during the COVID-19 pandemic. It should be pointed out that the university studied had some previous experience with distance learning. However, it treated them as a complement to the teaching process carried out in a conventional manner. Before the outbreak of the pandemic, some classes were taught in an asynchronous form of e-learning using the Moodle platform. However, the pandemic situation necessitated the implementation of the solutions that had not previously been implemented at the university, indicating that forced innovations took place here to sustain the teaching process. It became necessary to find such solutions that would allow synchronizing

the subsequent class dates and the implemented teaching content with the schedule of the academic year, allowing students to complete the curriculum in real time.

During the research, an attempt was made to determine, with reference to the classification of social innovations presented in Table 3, their manifestations in the analyzed university, i.e. what innovative products, platforms, processes, etc., were used by the teaching staff during classes.

The university, after moving entirely to a distance learning form of teaching and meeting, has offered new services such as online classes and training. They concerned mostly the transformation of exercise classes, including those conducted in laboratories or physical education classes, into an e-learning form. University staff, therefore, had to be quickly trained to meet student expectations for classes using this mode. They also had to adapt online materials and assignments to make them accessible and understandable to everyone by sharing the materials in e.g. Share Point (new processes). This provided an opportunity for collaborative teamwork both between students but also between students and teachers. This allows everyone to create a single document while seeing content being entered or modified in real time. Furthermore, new innovation processes here were related to the use of new forms of examinations (e.g., via MSForms or Moodle). Both tools offer the options to create both test-based and descriptive exams.

It is worth pointing out that soon after the announcement of the necessity to close the university, a support group (a new organizational form) was established at the analyzed university on the initiative of one of the employees. At first, a detailed user manual for the new MS Teams platform (new platforms) was developed, and then a channel called "online teaching support" was created, where each employee could share their insights, report emerging problems, etc. At the same time, the university provided employees with the opportunity to participate in training courses on the use of selected distance teaching tools. During the first lockdown, training on the use and operation of Miro and Mural virtual whiteboards was organized. As interviews with academics revealed, a large group of them attended the workshop.

This was followed by an attempt to identify innovative products used during distance learning (Q1). As can be seen in Figure 3, prior to the pandemic, the software most frequently used by students was Canva (52%), Kahoot (46%), and Quizizz (41%). In contrast, the least popular tools were Genially (1%), Mural virtual boards (4%), Wordwall (11%), and Miro virtual boards (12%). As indicated by the respondents during distance learning, the lecturers most often used Miro virtual whiteboards (46%). It is worth pointing out that the widespread use of Miro was due to the fact that employees participated in a training organized

by the University of Economics on the use of these boards and the possibility of their use during classes. The training and the functions of this tool proved to be so useful in making the classes more attractive that the teachers willingly used this solution. As it results from the description of Miro boards functionality, they allow many users to work at the same time: everyone can actively participate in creating the architecture diagram, add their ideas, or make comments. It is a very important tool for distance learning, also when teaching only online (as it is now, after the COVID-19 pandemic outbreak), because the whiteboard allows the class participants not only to work in a group but also to get to know each other - the students often came from different towns, universities (if they had studied before) and mostly did not have the opportunity to get to know each other in person. As this type of board allows everyone to work in a group at the same time, it fosters students' interpersonal relationships and prosocial behavior (e.g., cooperation).

The lower indications for tools such as Kahoot, Canva, and Quizizz seem to be due to their limited field of use, reduced mainly to quizzes.
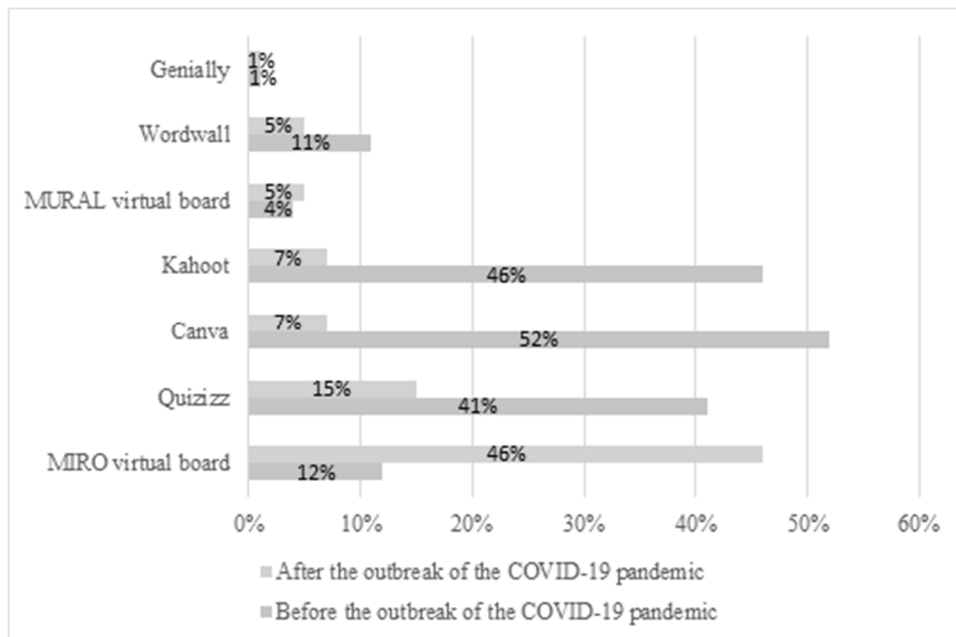

Figure 3. Degree of familiarity with distance learning tools before and during the COVID-19 pandemic
Source: author's own elaboration

The study further sought to find whether the use of a variety of innovative tools during online classes contributes to the development of additional skills among students. Figure 4 shows that some of these tools did indeed enable such development (Q2). According to the respondents, these included Miro (27% definitely yes/rather yes), Quizizz (about 18% definitely yes/rather yes), and Canva (17% definitely yes/rather yes).

Bodnenko, Kuchakovska, Proshkin, & Lytvyn, (2020) suggest that a virtual digital board (like MIRO) is a convenient instrument for cooperative student learning, that allows students, even at a distance from one another, to combine text, images, videos, audios, etc. in one interactive format. The authors came to similar conclusions: virtual boards act as an effective means of realization of various forms of conducting classes (web competitions, interactive games, quizzes), allow to organize student surveys and carry out reflection, expand opportunities for research work of students, consulting. It should be noted that the use of virtual digital boards in the educational process promotes the formation of students' ability to work independently with different sources of information, allow to immediately see the result and evaluation of their work through the ability to respond quickly to the participants of one board or giving access to their board.

Interesting insights on the use of Canva in teaching were provided by (Bondarenko et al. (2020) . The authors indicated that this application can contribute to the effective acquisition of geographic knowledge (but also knowledge in any other field) in higher education. The researchers pointed out that in the long term, cloud technologies (such as Canva) should become a valuable educational tool for creating virtual information and learning environments connected into a shared national and then global learning space. Furthermore, these researchers stressed that the generation of students who cannot live without modern devices should learn to use them rationally rather than be deprived of them.
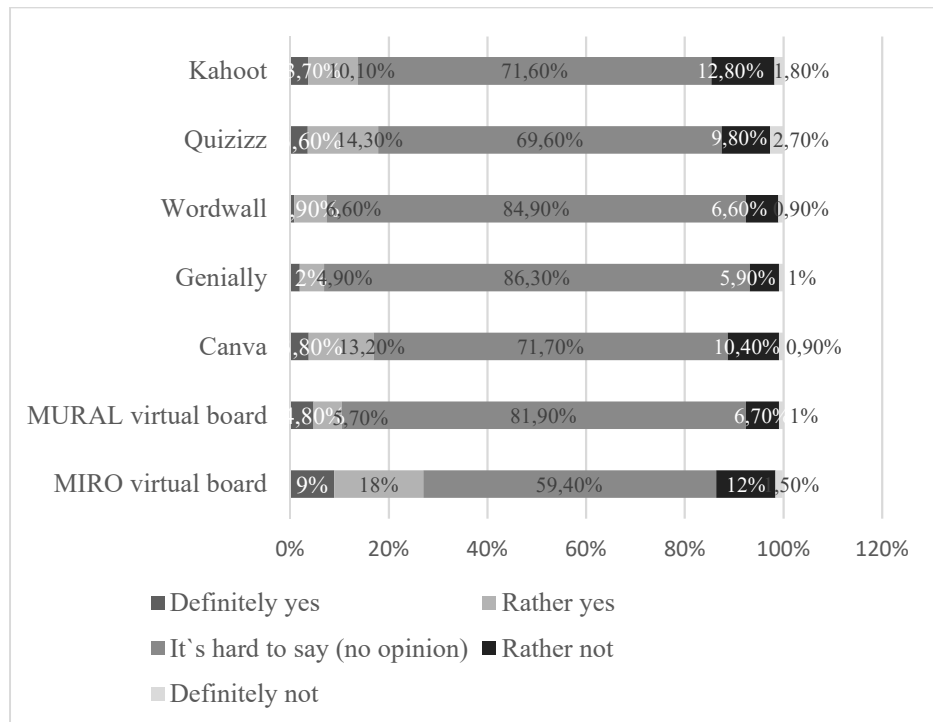
Figure 4. The impact of distance learning tools on the development of employee competencies
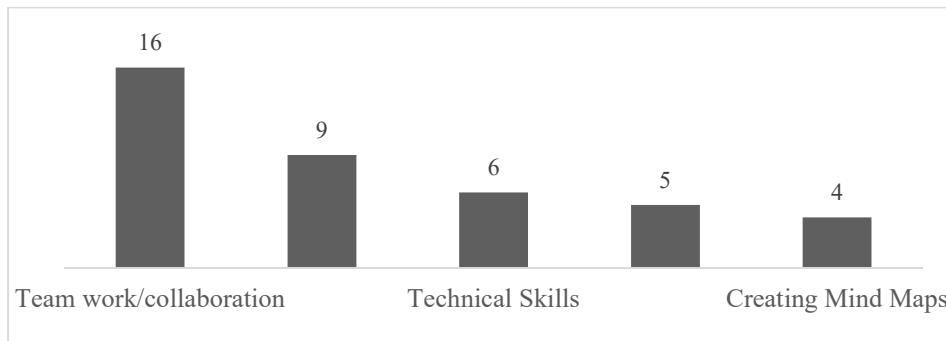Source: Author's own elaboration

The answers received correspond with those obtained for the question of what competencies the students developed by using distance learning tools (Q3). Among these competencies, the respondents mentioned teamwork, which develops perfectly when working on virtual whiteboards, and creative thinking, which can be developed by designing in Canva. These competencies are extremely important because face-to-face meetings are missing when classes are taught only online. Developing soft skills allows students to not only perform efficiently in their classes but also adapt to new situations such as getting a job during or after their studies. Furthermore, the teamwork and creativity indicated by the respondents can be helpful in making connections, training to be more confident in expressing opinions, or being more open to change (see Figure 5).

Poce, Agrusti and Re (2017) confirmed the above results regarding the development of soft skills during distance learning. The authors highlighted the use of the Orbis Dictus platform as part of the "Writing Methods and Techniques in Education" module taught at Roma Tre University, Faculty of Education. They showed that the use of such

techniques enabled students to work in a flexible and dynamic environment that supported the teaching pathway by providing all the necessary tools. The use of the group e-learning process and essay co-writing activities, continuously supervised by the e-tutor, required strong coordination among the students, resulting in stronger support from the participants in the presented classes, mainly due to the motivational expectations of the group peers. The cooperative mode of learning and working was actually accepted by the students from the very beginning. This has led to very good results in terms of participation and work organization and, as the findings show, in terms of product quality. Students were able to cope with the core elements of their learning pathway: creative storytelling and technical/scientific language. The use of such material proved to be important both in the initial phase in which students were introduced to the proposed contents and in the final phase of the actual written performance of the original story.

Maatuk et al. (2022) addressed similar issues in the context of e-learning - they examined the challenges and possibilities of implementing distance learning at universities from the perspective of students and lecturers. For this purpose, they surveyed students and lecturers of the Faculty of Computer Science at the University of Benghazi in Libya. Research has shown that the implementation of the e-learning system in education has a positive effect on increasing the effects of education, but negatively on social relations both between peers as well as between students and lecturers due to long-term isolation from society. In addition, researchers found that the learning burden is primarily on students rather than faculty, and this is seen primarily as a disadvantage. Other very significant disadvantages include the lack of Internet access at the university and - very important for this study - the lack of experience of students in the use of e-learning tools in education. It is also worth emphasizing that, according to the academic teachers who took part in the study, e-learning is beneficial for students, as it helps to develop their technological skills and competences of the future.

Figure 5. Competencies that students developed using distance learning tools
Source: Author's own elaboration

The survey also asked students if they would use these tools in the future (see Figure 6). The most indications were found for Miro boards (52%), Canva (37%), with slightly less frequent indications for Quizizz (28%) and Kahoot (27%). The high popularity of Miro seems to be, besides the fact that they were eagerly used by teachers in their classes, due to the fact that it is a tool commonly used in business (see Figure 6). Therefore, using the Miro board in class provides an opportunity to prepare students for their future work. Their ability to use the tool is not only related to the accumulated knowledge, but also to increased self-confidence, which positively impacts both student-teacher and graduate-employer relationships.
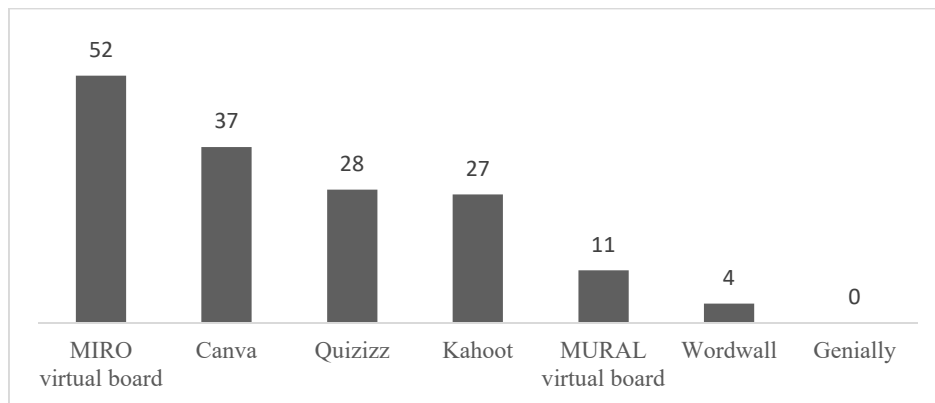
Figure 6. Tools that students will use in the future
Source: Author's own elaboration

Quiz tools can also be used in business settings during, for example, casual staff meetings or training sessions. Implementing such tools in business can sometimes be difficult to accept for employees who consider them unnecessary. However, it seems that using quiz applications can make standard multimedia presentations more attractive. Using these tools in the teaching process can support acceptance and show opportunities for future use as well.

Similar results were obtained by van den Berg and Verster (2020) who addressed a Design-Based Research (DBR) initiative where students in an Information Systems (IS) module proposed social, digital innovations for complex problems within marginalized communities in Cape Town, South Africa. The goal of their project was to develop digital innovations that recognize agency traits in communities through life experiences and local knowledge. IS students' projects emphasized empathy, storytelling, and prototyping as part of the design thinking process. The outcome of the research was the development of competencies in team problem solving and ultimately the creation of transdisciplinary knowledge.

The same observations were made by Abhari *et al*. (2020) who demonstrated in their research that the IS teaching model based on the "Connectivism" learning paradigm (a theory of teaching: learning in the digital age), can help students not only see information systems as social systems but also consider them as catalysts for positive change. The results also confirmed the positive impact of the model on students' social skills. This study contributes to the future of IS education by proposing social innovation-based learning as a practical education paradigm for the digital economy.

Based on Table 3 presented in the theoretical part describing the types of social innovations and the results of empirical research, the characterization of their manifestations in the university studied was made and proposals for improvement that could be successfully implemented in distance education not only during the COVID-19 pandemic but also permanently during e-learning classes were presented. The second column of the table summarizes the results of the empirical research showing the identified social innovations, while the third column shows the desired directions of change (see Table 4)

Table 4. Types of social innovations diagnosed at Wrocław University of Economics and Business and desired directions of improvement

Types of social innovations	Social innovations identified at Wrocław University of Economics and Business	Proposals for using social innovations that have not yet been used
New products	Using tools such as: Canva, Quizizz, Kahoot, and, after the outbreak of the pandemic, Miro boards.	• Using other innovative tools when teaching online classes e.g. interactive presentations created on the Genially platform. • Creating assignments for class in an interactive format such as on a Wordwall site.
New services	• Conducting virtual exercises, lectures, seminars, selected labs, and even physical education classes. • Organizing online conferences. • Sharing documents for peer-to-peer knowledge editing/sharing (Share Point). • Using new forms of examinations (e.g., via MS Forms or Moodle).	• Training students and staff on e-learning tools
New processes		• A new form of examining students: by creating quizzes e.g. on Genially, Kahoot or Quizizz
New markets	• N/A	• Creating time banks at colleges and universities.
New platforms	• Use of the MS Teams platform for classes and communication with students.	• Use of subject-assigned platforms by lecturers at the university, e.g., biznesplan.io platform.
New organizational forms	• Online teaching support	• Creating associations/foundations to support remote learning at universities.
New business models	• N/A	• Application of the just-in-time learning method.

Source: author's own elaboration

The social innovations shown are but part of the options that can be implemented at the university. It would be worth developing them and implementing new ones to make the university's educational services more attractive. The authors noted untapped potential in each of the innovation types shown in Table 4.

In the case of new products, the Genially tool should be emphasized, although it was very rarely indicated by students as being used in classes

both before and after the outbreak of the COVID-19 pandemic. This tool can be used not only to create presentations, but also infographics, gamification, creating activities from quizzes to escape rooms filled with interactivity and animations, interactive digital guides, and interactive images enriching them by creating layers of text, audio, or video recordings. Genially allows users to create interactive materials for their classes, but also to examine students (new forms of examinations) and make classes more interesting with additional features not found in other tools. Using it in the classroom can support teaching but also foster creativity, innovation, engagement, and collaboration with others among students.

Creating assignments for classes in an interactive form, e.g. on a Wordwall page, is a very interesting solution from the point of view of adding variety to the classes with additional visual elements. The use of roulette in practicing, for example, transformational thinking among students can result, as with Genially, in creativity and ingenuity. Such a practice can also be used to increase communication and foster interpersonal relationships among students, e.g. by asking questions about a person's hobbies or favorite movies, a person can open up and tell more about themselves than if they were to introduce themselves in a normal way.

Alqahtani & Rajkhan (2020) found that success factors in e-learning teaching are related to technological knowledge management, leadership support, increased student awareness of the use of e-learning systems, and the high level of information technology required by instructors, students and universities. Researchers indicated that no matter how great the technology is, e-learning readiness continues to play a leading role in improving the educational process. Moreover, Blended Learning was the most preferred e-learning system among the five methods discussed in this study (other methods studied: traditional teaching, flipped classroom, synchronous and asynchronous learning). The results of this research provide useful information for university managers in the process of implementing modern technologies in e-learning education.

In case of new services, it would be worth thinking over the issues related to training students in the use of e-learning tools: it is possible to create a new teaching subject that would concern such issues, because very often there is not enough time for the tutors to complete the curricula tasks during teaching the subject along with training in the use of the e-learning tools. Furthermore, lecturers, in addition to being trained in the technical use of the tools, could be trained in how to adapt the tools and their functionalities to the subject taught.

In addition to the above-mentioned Genially, an interesting form of examining students could be the use of quiz tools such as Kahoot. The use of such a quiz, in which all participants answer at the same time,

in addition to issues related to the attractive form of the exam, triggers a feeling of healthy competition in the participants. In the case of new markets, which were not previously identified, the university could create a "time bank" that allows for sharing free time, knowledge, and skills among students and academics at both domestic and foreign universities (on a shared resource basis). The time bank, therefore, provides many opportunities for collaboration and the exchange of ideas between users. Furthermore, it can serve as a place to solve problems, including those of a social nature.

A great opportunity for developing social competencies is to implement new platforms assigned to individual subjects. One of these might be the biznesplan.io platform where class participants can create their business plans throughout the term and the lecturer can monitor the progress of their work. This platform develops communication in the group that creates the business plan and instills the rules of social life, e.g. social intelligence.

In the case of new organizational forms, it is worth noting the creation of foundations which will support distance learning at universities, e.g. by increasing access to IT equipment and e-learning tools (addressed to both students and lecturers).

The last item in the table, new business models, can be linked to the application of just-in-time learning concepts to meet the needs of the organization towards the learning style of the graduates it employs. This primarily involves developing skills in acquiring tailored knowledge that is readily available exactly when they need it.

Vujovic and Parm Ulhøi (2008) reviewed the websites of 20 universities selected from a pool of internationally ranked institutions to analyze such projects in the context of social innovation implementation. Of these, seven universities were located in North America, Europe and Asia, seven in Latin America, and six in Mexico. The analysis was qualitative and inductive in nature. All websites reviewed contained information related to COVID-19, such as sanitation measures, recommendations, news, and university guidelines. They also included information about social innovation projects organized by these universities. The identified projects were divided into four areas: research, including projects related to vaccine development and treatment; education, including digital systems ensuring academic continuity and public education programs; technology used in team development projects and strategies; and innovation, with holistic proposals for emotional, physical, and psychological care and well-being. Several projects have used technology tools to address various complexities of health constraints, resulting in digital social innovations.

Ostoj (2018) indicated that the largest percentage of respondents considered the level of remuneration to be the most important criterion for accepting a job offer. The study included students of economics

at the Faculty of Economics of the University of Economics in Katowice (Poland). The second most frequently assessed criterion was the ability to develop new skills and competences. This study suggests that the ability to apply knowledge gained during studies was less important for students than developing skills and competences in new fields – like a social innovations. This suggests that developing competences among students may motivate them to act. Thanks to such conclusions, it is possible to notice the growing importance of non-financial motivational factors at work.

The research results and research by other authors presented in the work show how important it is to develop social competences - including social innovations of students.

Conclusion

The article substantiates the importance of using e-learning tools to organize students' cooperative learning in the conditions of distance education (social distance).

Our study aims to contribute to the literature on social innovations in e-learning teaching. Hence, the article provides an overview and discussion of social innovations in distance learning at a higher education institution. A literature study was conducted on social innovations, e-learning, and the possible tools that can be used to support this type of education. Tables 1 and 2 present the characteristics and functionalities of each tool, respectively, and their impact on the development of new competencies in students. This concerns soft competencies, which refer to the competencies of the future which are popularized today. Table 3 presents the types of social innovations. These may be new products/goods that assist the community (including people with disabilities) in various activities or new services that can be obtained without leaving home.

The social innovations analyzed in this paper were innovations forced by the epidemiological situation related to COVID-19. In order to sustain the learning process, the analyzed university decided to introduce distance education. During online classes, lecturers most often used Miro virtual whiteboards, which stimulate collaborative work. They allowed students to work in real-time and teachers to monitor their progress. The study revealed that the use of these tools had a positive impact on the development of new competencies in students. Among these competencies, the respondents mentioned teamwork, which develops perfectly when working on virtual whiteboards, and creative thinking, which can be developed by designing in Canva. This seems to be a value

in itself as these competencies can be helpful in establishing contacts, expressing opinions accurately, or developing openness to change. Students declared that they would use Miro boards in the future because this tool is commonly used in business. It is worth pointing out that the staff at the university studied were trained in the use of these boards, and a large group of them successfully used them in their classes. It can be assumed that training in the use of other innovative tools would also be enthusiastically received among the teachers and subsequently used in their classes. This would undoubtedly improve the quality of teaching and offset the problem of limited student engagement in class.

This study also contributes to empirical research. In addition to the diagnosis of social innovation in the surveyed companies related to, among others, the introduction of new products (i.e. distance learning tools, such as Miro, Canva, Quizizz, Kahoot), new services (i.e. virtual exercises, lectures, seminars, selected laboratories, and even physical education classes), or new platforms (MS Teams, MS Forms), the desired directions of improvement were also proposed, e.g. the creation of time banks, or the creation of associations/foundations that support distance learning at universities. The results obtained can be both useful for academics and beneficial to universities by implementing social innovations in the teaching process. Knowledge and use of e-learning tools may also be important for entrepreneurs: with new competencies, graduates can be more "attractive" in the labor market.

However what the , Stecuła & Wolniak (2022) stated showed that overcoming technical and social problems largely determines the effectiveness of the use of e-learning in teaching at the higher education level. It should also be noted that not all fields of study are suitable for e-learning in the same way. The respondents indicated that the difficulty in teaching practical subjects is a particularly important problem. While there are no major difficulties in teaching theoretical subjects with the use of e-learning, effective e-learning is difficult to implement in the case of skills and practical subjects. Research results suggest that after the end of the COVID-19 pandemic, practical courses / subjects should be taught in the traditional way, while e-learning can be used to teach theoretical subjects. Such an approach may allow universities and students to take advantage of the advantages of e-learning, i.e. reduce travel costs and time, and offer effective study of practical skills without losing the quality of education.The research showed that there are few studies addressing the issue of social innovation in the context of e-learning and distance learning tools presented. This is a new problem, thus contributing to science while addressing current issues related to society's adaptation to virtual reality in the teaching process. Therefore, future research will include conducting similar but more in-depth analyses on a larger scale, including

subsequent university years and other majors. It seems that gathering a broader research material will allow using statistical analyses that will confirm the statistical significance of the results.

Furthermore, conducting further research towards the identification of interactive learning tools and their impact on the development of competencies of students can make an important contribution to making recommendations that may prove helpful in meeting students' learning needs but also improving their learning satisfaction rates. This also seems important given the need to equip students with the skills and knowledge to help them successfully enter the workforce.

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