

Objective Factors Determining the Development of Online Self-study Skills During the Global COVID-19 Pandemic - from The Perspective of Students' Experiences*

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Abstract

The publication includes a theoretical part that describes in a synthetic way selected objective factors determining the development of self-study skills in the online environment, and a practical part, which focuses on the analysis of the results of a survey conducted among students of Cracow's universities.

The study was conducted using a compiled questionnaire after the first year of crisis education at the end of the summer semester of the 2020/2021 academic year. The survey form was sent to the respondents using the CAWI (computer-assisted web interview) technique using the Google Forms application. In the study participated 825 people. The respondents voluntarily and anonymously expressed their opinion on: advantages, disadvantages, study conditions, threats and expectations related to the remote study process of study during the pandemic and after its end. The statistical analysis of the collected results was performed with the use of the Statistica PL 13.3 package.

The purpose of this study is therefore an attempt to determine whether, in the opinion of the surveyed students, remote study during crisis education was conducive to the development of their self-learning skills, from the point of view of objective factors. In addition, the study presents conclusions and discussions for the further improvement the process of self-education in the online environment.

Keywords: students, self-education skills, distance learning, COVID-19

Introduction

In order to limit the spread of SARS-CoV-2 virus from March 12, 2020 in Poland, teaching activities conducted by universities were suspended (Ministry of Education and Science, 2021). Due to the persistent difficult pandemic situation, didactic classes at most universities in Cracow were held remotely until the end of the 2020/2021 academic year. The only exceptions were laboratory and practical classes and some exams. Students of Cracow universities are perceived as an important element of the social structure of the city of Cracow. In the 2020/2021 academic year, nearly 130 thousand students studied in Cracow (Main Statistical Office in Cracow, 2021), which accounted for about 17% of the city's population (European Statistical Office, 2021). The most numerous groups are students of the Jagiellonian University (35,380 people) (Main Statistical Office in Cracow, 2021).

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In the light of the dynamically occurring changes, the effect of learning at the academic level is the acquisition of competences required of a university graduate in the knowledge-based economy (KBE). Such an economy needs employees not only with extensive knowledge in a given field, but above all people who can independently use their knowledge and constantly expand it at every stage of their lives. The constantly progressing robotization and automation of economic processes require a lot of flexibility from a modern man. That is why it is so important to prepare the student for the systematic improvement of the methodology of self-study, as well as for independent and effective lifelong learning.

When getting to know the various determinants of the effectiveness of the learning process at a university, including the conditions on which the course and results of self-study by remote students depend, it is worth paying attention to some objective and subjective factors accompanying students in the process of independent acquisition of knowledge and skills. It is essential to establish whether and to what extent, in students' opinion, this remote study impacts the development of their self-learning skills.

It is worth emphasizing that studying is the independent acquisition of knowledge in the forms of classes organized by the university (Pólturzycki, 2001, p. 7). Students are therefore expected to be active, focused participants in the study process. It is expected that they will feel the authors of their development, and thus be brave in acting to achieve independence. The actions indicated in the Bologna Process correspond well with the pursuit of create subjective conditions for introducing self-education in studies, where students themselves are self-steering entities (The Bologna process ..., 2015).

The content scope of the concept of self-study and its understanding requires a brief explanation. Self-study is defined by terms such as: student's own study, self-learning, self-education, independent study, independent mental work. The combination of studying with the term self (or independent) has two kinds of meaning: (1) first, studying may manifest itself in the student's independence in planning and carrying out educational activities (in this case, independence is a feature of learning); (2) in the second approach, a distinction is made between the activities of studying carried out during the curriculum classes and those performed by the student outside the university (Krzyżak, 2011, pp. 23-24).

Self-study is also associated with the student's autonomy, which fits in with contemporary thinking about education. In humanistic psychology, the pursuit of self-realization and the development of an individual's autonomy are listed as the main tendencies determining human activity (Kozielecki, 2000, p. 242). A man is seen here as an independent subject, acting intentionally and consciously, capable of shaping himself/herself (Kozielecki, 2000, p. 228). A student's autonomy is a certain configuration of attitudes, competences and personality traits, the external sign of which is the ability to take responsibility for their own learning. Thus, the student's autonomation will be closely related to the development of an appropriate attitude to study and the development of self-motivation and self-control skills.

The online self-learning process is complex and determined by various factors, both objective and subjective (the theoretical aspects of subjective factors and the research part have been described in another publication by the authors). Objective factors influencing the increase in the level of effectiveness of self-study include: appropriate conditions in which remote study takes place, planning and organization of the course of classes, the scope of the possibility of using various forms and sources of transferring knowledge, or a real impact on the course of study thanks to their individualization .

Study conditions, such as computer equipment, Internet availability (Kahlif et al., 2021), housing conditions, and a suitable place for distance learning (Affouneh et al., 2020), are crucial for self-study in an online environment. Whereas a good atmosphere (safe learning environment) will be conducive to taking initiatives, which significantly affects the efficiency of self-learning. In addition M. Kerres (2020) pointed out that a safe study environment will also provide a sense of self-confidence, self-esteem and potential possibilities, as well as a sense of pleasure in studying. A important aspect when working online is the use of legal sources and licensed software. Research findings revealed various challenges in distance learning in crisis situations during COVID-19. Z.N. Khalif and S. Saha (2020) indicated, among others on: learning environment, digital content quality, digital inequality, and digital privacy violation/invasion. Therefore, according to C. Hodges and other researches (2020), it is essential to distinguish between a well-planned online learning experience, effective day-to-day distance learning and what is done in response to a crisis with limited resources and a small amount of time.

A properly prepared learning environment on the e-learning platform causes that learners' activities such as: independent exploration of the material, setting tasks tailored to individual abilities and interests play an increasingly important role. In the context of the above considerations about the impact of objective factors on the level of study efficiency, it is necessary to highlight the importance of cooperation with other participants of distance education, e.g. during the development of joint projects using digital technologies (Design-based Learning). At different levels of learning, the scope of exploring digital technologies can be varied and bring different levels of satisfaction, as shown in the research by J. Buchner and M. Kerres (2021). Classes in an online environment should therefore create opportunities to strengthen relationships between students. In an online environment, students can learn anywhere, and collaborate with teachers and other students using various devices (e.g. smartphones, laptops, etc.) with Internet access (Cojocariu et al., 2014; Singh and Thurman, 2019; Dhawan, 2020, p. 7).

Activities such as: working in groups, jointly writing content on a virtual board, establishing a communication code (e.g. with gestures that allow participation in a discussion) are examples of methods to strengthen interaction during remote classes. The common goal of applying these methods is to move towards the development of remote learning, which M. Raygoza, R. León and A. Norris (2020) define as its "humanizing online teaching".

Methodology

Conducting a survey among students of Cracow universities was justified by the growing interest in the impact of remote study during the global COVID-19 pandemic on the quality of education in universities. The conducted review of the literature on this subject was aimed at verifying the legitimacy of the undertaken research topic. For the purposes of the research, the main research problem was formulated, namely: how does online learning during the COVID-19 pandemic affect the development of self-study skills?

Regarding the main problem, the following detailed problems were distinguished:

- what are the advantages of online self-study during the COVID-19 pandemic?
- what are the disadvantages of studying independently during the COVID-19 pandemic in an online environment?
- what objective factors are conducive to the development of self-study skills in an online environment?
- what are the threats of the online environment during a pandemic for self-study?

In empirical research, the following hypotheses were adopted for verification:

H1: According to the surveyed students, studying in an online environment during the COVID-19 pandemic contributes to the development of self-study skills.

H2: Students believe that studying online during the COVID-19 pandemic has more advantages than disadvantages.

H3: The conditions under which remote study takes place during the pandemic significantly affect the development of self-study skills.

After the first year of crisis education, at the end of the summer semester of the 2020/2021 academic year, a survey was conducted among students of Cracow universities, showing their experiences and opinions about the effects of online learning. The research sample was randomly selected and included students who studied at public universities in Cracow (participation in the research was voluntary and the students filled in the submitted questionnaire on their own).

The questionnaire used in the research was developed by a team of employees of Cracow University of Economics. The survey form was sent to the respondents using the CAWI (computer-assisted web interview) technique using the Google Forms application. Only fragments of a larger study have been used in this study. The questionnaire consisted of 8 questions identifying the characteristics of the respondents and 17 detailed questions regarding remote study. The statistical analysis was performed with the use of the Statistica PL 13.3 package. To assess the degree of interdependence of the analyzed variables, the Kendall's Tau correlation coefficient was used, assuming the significance level of $p < 0.05$.

Characteristics of the research sample

The study was attended by students of various levels, forms of study, as well as various faculties and years of study, who voluntarily and anonymously expressed their opinion on the benefits, threats and expectations related to the remote study process during the pandemic and after its end. 825 people participated in the study addressed to students of Cracow's universities, which constituted 0.64% of students at the time the study was conducted in the city of Cracow. Table 1 shows the structure of respondents according to selected criteria.

Table 1: Characteristics of the respondents

1. Gender	Size	Share %	2. Form of study	Size	Share %
Women	532	64.5	Full-time studies	489	59.3
Men	293	35.5	Part-time studies	336	40.7
3. Level of study	Size	Share %	4. Experience in the studying*	Size	Share %
First degree studies	469	56.9	little experience a)	240	29.1
Second-degree studies	280	33.9	average experience b)	296	35.9

Long-cycle studies	76	9.2	extensive experience c)	289	35.0
5. Distance between the university and the student's place of residence	Size	Share %	6. The amount of time spent studying remotely (during the week)	Size	Share %
up to 10 km	340	41.2	less than 15 hours	190	23.0
10 km – 50 km	194	23.5	15 hours – 25 hours	276	33.5
above 50 km	291	35.3	26 hours – 35 hours	188	22.8
			more than 35 hours	171	20.7

* Legend:

- a) little experience in the studying: I year of First degree studies and I year of Long-cycle studies
- b) average experience in the studying: II and III year of First degree and II and III year of Long-cycle studies
- c) extensive experience in the studying: I and II year of Second-degree studies and IV and V year of Long-cycle studies

Source: own study.

Among the surveyed students (825 people), the largest share of respondents due to the distinguished criteria of division in Table 1 can be seen in the group of: women (64%), full-time students (59%), first-year students (bachelor's degree) - little experience in studying (29%), undergraduate students (57%), students living up to 10 km from the university (41%) and students who spend 15 to 25 hours studying remotely during the week (34%). The proportion of women and men in the studied sample is comparable to the overall proportion of women and men studying at universities in the Małopolska Voivodship, which at the time of the research was 59% to 41% (Main Statistical Office - GUS, 2021).

Most of the respondents (98.7%) studied only one major (min = 1, max = 2). Various fields of study were represented, namely: economic and business studies, humanities and social studies, philological (language studies, pedagogical studies, IT studies, exact and natural science studies, technical studies, as well as medical studies.

Research Results and Discussions

The research results concern the research problems proposed in the methodology, namely: advantages and disadvantages of remote learning during the pandemic and selected objective factors conducive to the development of self-study skills in an online environment.

Advantages and disadvantages of remote learning during the pandemic

Students were asked to indicate the most important advantages and disadvantages of remote learning. It turns out that after a year of remote study during the pandemic, the surveyed students indicated 4189 responses regarding the advantages (average 5.0 responses per student), and 3457 (average 4.2) disadvantages of remote study. Only one person (0.1%) stated that remote study had no advantages, and 13 people (1.6%) did not indicate any disadvantages of this form of studying. The list of response categories (number of responses and percentage share) is presented in Figure 1-2.

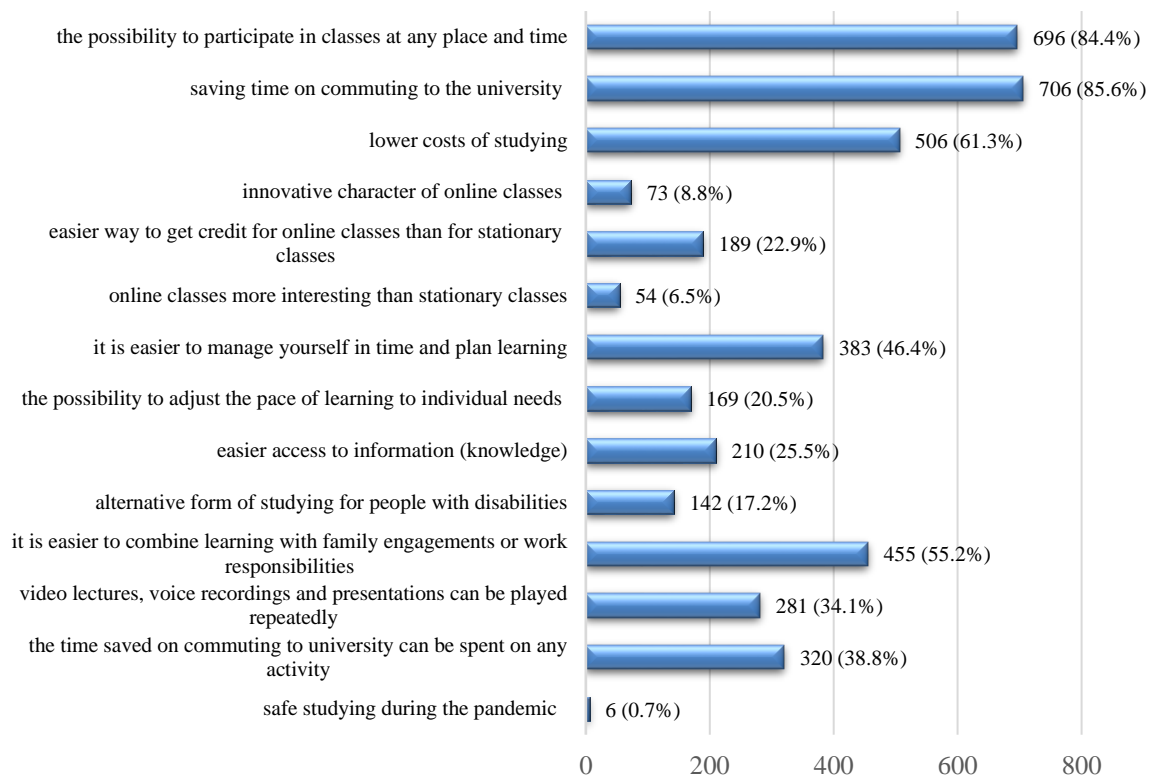


Fig. 1: Advantages of remote learning in the opinion of the surveyed students (N=825)

Source: own elaboration.

Among the answers given by the surveyed students, the most important argument was the time saving on commuting to the university (706; 85.6%) and the possibility to participate in classes at any place and time (696; 84.4%). The analyzed results of surveys conducted at other Polish universities confirm that the most important advantage of remote education, in the opinion of students, is the lack of the need to travel to the university and the associated time savings (Romaniuk, and Łukasiewicz-Wielba, 2020). An interesting SWOT analysis of online learning during the COVID-19 pandemic and other similar emergencies is presented by various researchers (Todorova and Bjorn-Andersen, 2011; Barboni, 2019; Saxena, 2020; Daves, 2020; Sharma, 2020).

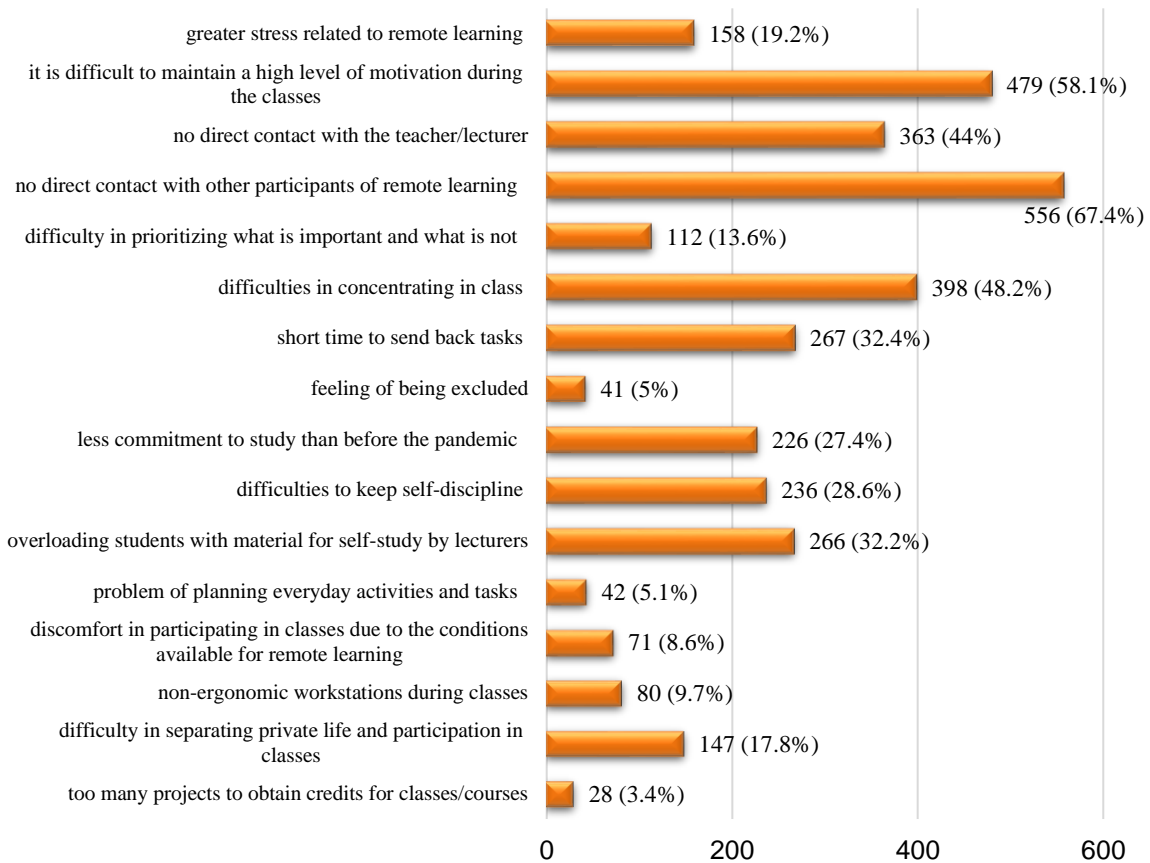


Fig. 2: Disadvantages of remote learning in the opinion of the surveyed students (N=825)

Source: own elaboration.

Among the surveyed students who find disadvantages in remote learning, the largest group finds it difficult to deal with the lack of direct contact with the peer group (556; 67.4%) and to maintain a high level of motivation during classes (479; 58.1%). Similar disadvantages in remote learning were indicated by students of the Warsaw School of Economics (SGH), such as: difficulty focusing attention, lack of direct contact with other students or difficulty making new friends. On the basis of the remote learning survey report of the Education Quality Commission of the Warsaw School of Economics (SGH), 1847 students took part in the survey (Godlewski et al., 2020).

From among the many objective factors presented in the theoretical part of this study, which favor the development of self-study skills in an online environment, three were selected for the analysis, namely:

- 1) conditions, under which remote learning takes place,
- 2) freedom of access to various forms and sources of knowledge, while studying remotely during a pandemic,
- 3) threats of remote study during a pandemic.

The results of the questionnaire survey are presented below, broken down by the above-mentioned factors.

Conditions, under which remote learning takes place

Most of the students had the equipment that allowed them to freely participate in remote classes - the equipment for remote learning was exclusive to 95.3% of the surveyed students. Students used a laptop to the greatest extent (721; 87.4%), and to a lesser extent a desktop computer (86; 10.4%), a smartphone (13; 1.6%) and a tablet (5; 0.6%).) while studying remotely (see Figure 3).

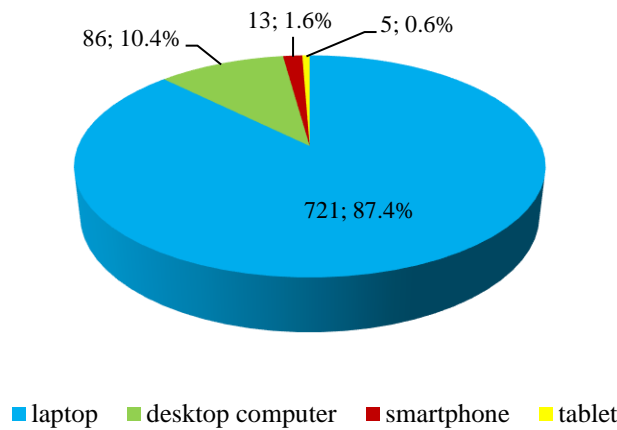


Fig 3: The type of equipment used as the primary equipment for remote study (N=825)

Source: own elaboration.

The lack of equipment limitations and a fairly easy contact between teachers and students can be proved by the high attendance at distance classes, as many as 88.7% of the surveyed students defined their attendance during the last semester in the range of 75-100%, over 9% indicated that they participated in classes in 50-75%, only 2% of respondents stated that they were present at less than 50% of all classes.

Technical issues that should be considered when studying in an online environment are a key element in developing self-learning skills. First of all, it is about ensuring the right connection to the Internet, as well as a reliable computer or software. The surveyed students expressed opinions on various technical problems. For 443 (53.7%) of the surveyed students, the greatest threat in remote study is the failure rate of e-learning systems. Half of the surveyed students (413; 50.1%) indicated the risk of remote study, which results from poor availability and quality of Internet connections. The threats in remote study also included problems related to the lack of access to the Internet, and this aspect was noted by almost one third of the respondents (259; 31.4%). On the other hand, 164 people (nearly 20%) of the respondents notice that the low quality of their computer equipment may be a threat to studying in the online environment. Only 80 (9.7%) of the respondents saw the problem of non-ergonomic workstations during remote classes.

Suspension of full-time stationary classes, which before the pandemic took place within the walls of the university, contributed to the desire of most students to return to their family home. This situation resulted from many reasons, including a regulation to leave student dormitories as a result of the announced pandemic, the possibility of direct support from the loved ones, or saving the cost of studying. Taking into account the answers of the surveyed students, it can be unequivocally stated that one of the main advantages of remote learning during the pandemic is saving on travelling to the university premises. As many as 86% of the surveyed students notice the saving of time on commuting to the university as an advantage of remote study, of which approximately 40% live closest to the university premises (see Table 2). Slightly fewer students (61%) emphasize that one of the most vital advantages of remote learning are lower study costs, e.g. lower travel costs to the university, lower living costs in the place of classes. This advantage of remote study is highlighted by the greatest number of people (approx. 44%) who live the farthest from the university (see Table 2).

Table 2: Assessing the advantages of remote study due to the distance between the student's place of residence and the seat of the university(N=825)

Distance between the university and the student's place of residence	Saving time commuting to the university N=706	Lower costs of study N=506
up to 10 km	39.9%	31.2%
10 km – 50 km	24.4%	25.1%
above 50 km	35.7%	43.7%
Total	100.0%	100.0%

Source: own elaboration.

An important aspect in terms of the conditions in which studying in the online environment takes place, which was raised during the research among students, is a very large number of academic hours (estimated) spent during the week for remote learning, including the student's self-learning. Almost 21% of the surveyed students spend more than 35 hours a week on distance learning, about 56% - spend between 15 and 35 hours of study time, and more than 23%

spend up to 15 hours a week on distance learning. Based on the analysis of the collected results, it can be determined that the amount of time spent on distance learning depends on the year of study (in the first year - the lowest share of time spent and the highest in the higher years) and depends on the form of study (in full-time studies by over 30% more time than in part-time studies). This is due to the curriculum and the amount of work assigned in the form of implemented projects, or the preparation of answers to given problems (questions) on the basis of the analyzed case studies.

Freedom of access to various forms and sources of knowledge

Among the challenges of crisis education during a pandemic is the need for access to e-materials that will enable self-study. This additionally requires taking into account the difficulties in reaching various sources of information (knowledge), due to the limited activity of libraries or limitations in movement.

The question about access to information (knowledge) while studying remotely was included in the survey conducted among students of Cracow universities. According to its results, one fourth (210; 25.5%) of students considered easier access to knowledge while studying remotely as an advantage of this form of learning. It can be observed that the results are similar in the group of women (116; 55.2%) and men (94; 44.8%).

Students were eager to work with e-materials received from lecturers. Almost half of the respondents (394; 47.8%) prefer this method of remote classes, and significant differences in the responses of men and women can be noticed. Women (269; 68.3%) prefer sending e-materials for self-study more than men (125; 31.7%).

Better access to knowledge and information is influenced, among others, by the possibility of repeated playback of video lectures, voice recordings and presentations. This factor was recognized by one third of students as one of the advantages of remote study (281; 34.1%). Table 3 presents the results of students' opinions on the assessment of access to video lectures, voice recordings and presentations that can be played back multiple times. The results were presented from the point of view of the level of experience in the field of studying at the university under examination and the form of studies.

Table 3: Assessment of access to materials during remote classes by students (N=281)

Form of studies	Experience in the studying (share %)			Total of shares %
	little	average	extensive	
Part-time studies	11.7	11.4	11.4	34.5
Full-time studies	22.1	30.2	13.2	65.5
Total	33.8	41.6	24.6	100.0

Source: own elaboration.

As can be seen, the analyzed factor is appreciated as an advantage of remote study and, at the same time, an aid in shaping the ability to learn independently, primarily by full-time students (65.5%), and among them are mostly students with intermediate experience (30.2%). However, part-time students (34.5%) are interested in this form of developing their skills of independent study to a lesser extent, regardless of their experience.

Threats of Remote Learning During a Pandemic

Almost all of the surveyed students (821 out of 825) expressed their opinions on the dangers of remote learning. In addition to the previously mentioned technical problems (see study conditions in this paper), the students also indicated a number of important threats, including: posture defects (over 49%), eye diseases (over 46%), deterioration of the level of knowledge and skills (approx. 30%), difficulties in maintaining a high level of motivation (over 29%), obesity (over 18%), or excessive copying and cheating (total over 15%) (see Figure 4). A study conducted in Germany shows the negative impact of working at the computer, not only during a pandemic. Computers in schools lead to lower learning outcomes causing addiction and obesity (Spitzer, 2012).

Moreover, additional risks and difficulties written by students in the questionnaire sheet (1.5%) related to remote learning concern: the inability to get to know fellow students from the year more closely, failure to adapt the method of classes to the form, organizing and conducting tests, which take on "almost bizarre" forms (e.g. visibility of the entire student's figure at the camera, having a mirror, etc.), poor organization of lecturers' classes (conducting exercises), depression among students and teachers, having greater problems in learning their profession in a practical manner (no exercises on mannequins e.g. in medical studies), the lack of a sense of responsibility of some teachers for their students. Four people did not express their opinion on the threats.

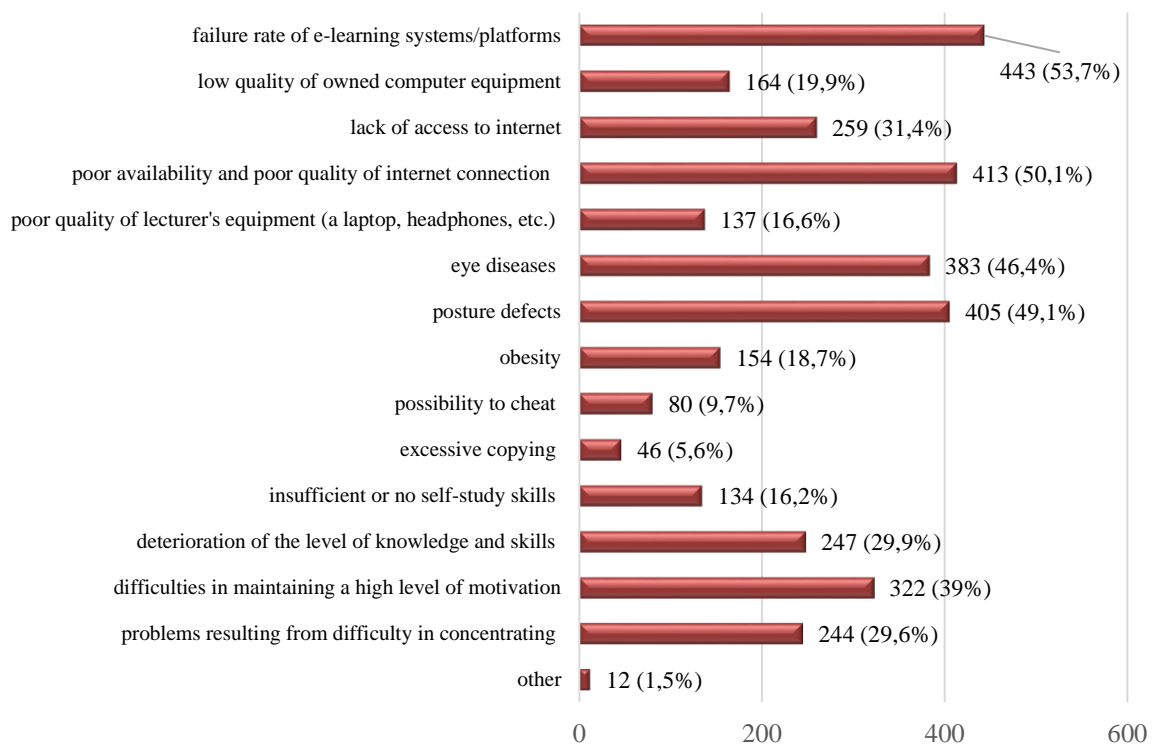


Fig. 4: Threats in remote learning

Source: own elaboration.

Conclusions

The collected data on the basis of a sample of 825 people do not give a complete picture of the scale of the problem under study and require further in-depth research and analyses. However, the research carried out among students of Cracow's universities was sufficient and allowed for the verification of three hypotheses.

In the study, hypothesis 1 was positively verified. The results of the research show that students learning in the online environment during the pandemic (having more limited contact with the lecturer than is usually the case when studying in a traditional way) had to develop the ability to learn independently to a greater extent, e.g. to carry out tasks assigned by the instructors individually or in groups, work together as a team on projects required to pass the subjects (spend more time reading the materials provided and solving problems independently). Only nearly 16% of students expressed opinions regarding the lack or low level of self-learning skills. The research results also show that students have a positive attitude to remote learning, which is an important factor that determines the effectiveness of independent learning.

Hypothesis 2 was also confirmed as the students indicated more advantages than disadvantages. This can be seen in the quantitative comparison of the advantages over the disadvantages presented in figure 1 and 2 of this publication. The students gave 4189 answers regarding advantages (average indications per student 5.08), while 3,457 answers related to disadvantages (average indications per student 4.19).

Hypothesis 3, which states that the conditions in which remote study takes place during a pandemic significantly affect the development of self-study skills has also been confirmed. This is indicated by the results of research, among others: in terms of opinions expressed by students about the conditions that influenced the course of the learning process during remote learning, as well as their opinions about the easiness of access to various forms and sources of knowledge during remote study in the times of the pandemic.

Considering the need to switch to remote learning due to the further threat of COVID-19, it is crucial to avoid equating remote learning in emergency situations with online learning when formulating conclusions based on the results of the survey conducted among students of Cracow's universities. The findings from this study can help the lectures and also the students to understand the basic problems of online education.

In improving the learning process, one should consider introducing such organizational solutions (especially during part-time studies), which will enable students to focus more attention and relieve their health-related tensions. Part-time students often emphasized that their remote classes are accumulated in all-day blocks and carried out without a long

break from morning to evening, which does not allow for effective independent learning. Due to the fact that students expect to carry out some classes in remote mode permanently, it would be advisable to develop a list of classes that can be implemented remotely after the end of the pandemic, in particular, in the opinion of students, these should be lectures, seminars and consultations. In addition, training in the field of occupational hygiene for students should be organized, e.g. time management, promoting an active lifestyle. It is essential to develop consistent guidelines for teachers in the field of the techniques used to assess the knowledge of students, because in the opinion of the respondents, the teachers allowed them too short time to take the exams remotely, which was often a source of stress for them. Therefore, the issue of time allocated by examiners to write the exam should be rationally planned.

When studying remotely during the pandemic, students notice the need for independent learning, and moreover, they begin to understand that higher education is primarily about self-education. In all extremes of the shift of self-study to the online environment caused by the COVID-19 pandemic, changes in the field of higher education may constitute an opportunity to revise the attitude towards both stationary and remote learning. The experience gained during the pandemic should be a permanent element of the teaching activities of universities as a supplementary form of education. As P. Jandrić (2020) emphasizes that the situation which occurred (the COVID-19 pandemic) and this historic moment puts "pressure" on research and changes in digital education, and calls for rethinking the future, and above all the scope of using digital technologies and sharing research results from various fields. Currently, there is a need for a high level of preparation both on the part of students and teachers, so that it is possible to quickly adapt to the existing conditions in the environment and to efficiently implement various study modes, for example, distance learning or online learning in difficult situations such as the COVID-19 pandemic. According to Martin (2020), the most important things a teacher must remember when teaching online are: instructions, content, motivation, relationships and mental health. The necessary changes in the ways of designing and creating high-quality content will bring a new openness and responsibility in learning as blended learning becomes a new learning format (Mathivanan, 2021).

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References

- Affouneh, S., Salha, S., N., and Khlaif, Z. (2020), Designing quality e-learning environments for emergency remote teaching in coronavirus crisis. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, 11(2), 1–3, <https://dx.doi.org/10.30476/ijvlms.2020.86120.1033>.
- Barboni, L. (2019), From shifting earth to shifting paradigms: How webex helped our university overcome an earthquake, CISCO, Upshot By Influxive, <https://upshotstories.com/stories/from-shifting-earth-to-shifting-paradigms-how-webex-helped-our-university-overcome-an-earthquake> (access: September 25, 2021).
- Buchner, J., Kerres, M. (2021), 'Students as Designers of Augmented Reality: Impact on Learning and Motivation in Computer Science', *Multimodal Technologies and Interaction*, 5 (8), 41, pp. 5-16, <https://doi.org/10.3390/mti5080041>.
- Cojocariu, V.M., Lazar, I., Nedeff, V., and Lazar, G. (2014), 'SWOT analysis of e-learning educational services from the perspective of their beneficiaries', *Procedia-Social and Behavioral Sciences*, 116, 1999–2003, <https://doi.org/10.1016/j.sbspro.2014.01.510>.
- Dhawan, S. (2020), 'Online Learning: A Panacea in the Time of COVID-19 Crisis', *Journal of Educational Technology Systems*, 49(1), 5-22, <https://doi.org/10.1177/0047239520934018>.
- European Statistical Office (EUROSTAT), (2021), <http://ec.europa.eu/eurostat/en/web/population-demography-migration-projections/statistics-illustrated> (access: September 6, 2021).
- Godlewski, W., Hurbik, D., Jawor, R., Lizon, R., Marek, J., and Pechcińska, A. (2020), *Zajęcia zdalne oczami studentów SGH. Raport ankietyzacji zajęć zdalnych – Komisji ds. Jakości Kształcenia*, Warszawa: <https://tiny.pl/9h6lr> (access: June 26, 2021).
- Hodges, C., Moore, S., Lockee, B., Trust, T., and Bond, A. (2020), *The Difference Between Emergency Remote Teaching and Online Learning*, <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning> (access: June 23, 2021).
- Jandrić, P. (2020), 'Postdigital Research in the Time of COVID-19', *Postdigital Science and Education*, 2(2), 233–238, <https://doi.org/10.1007/s42438-020-00113-8>.
- Kerres, M. (2020), 'Against all odds: Education in Germany coping with COVID-19', *Postdigital Science and Education*, 2 (3), pp. 1-5, <https://doi.org/10.1007/s42438-020-00130-7>.
- Khlaif, Z.N., and Salha, S., (2020), 'The Unanticipated Educational Challenges of Developing Countries in COVID-19 Crisis: A Brief Report', *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, 11 (2), 130-134, <https://dx.doi.org/10.30476/ijvlms.2020.86119.1034>

- Khlaif, Z.N., Salha, S., Fareed, S., and Rashed, H. (2021), The hidden shadow of the coronavirus on education in developing countries. *Online Learning*, 25(1), 269-285. <https://doi.org/10.24059/olj.v25i1.2287>.
- Koziński, J. (2000), *Konceptje psychologiczne człowieka*, Wydawnictwo Akademickie „Żak”, Warszawa, ISBN: 83-86770-47-3
- Krzyżak, J. (2011), ‘Dylematy wokół samodzielności studiowania’. *Studiować interesująco i efektywnie*, Węgrzecka, M. (ed.), Wydawnictwo Uniwersytet Ekonomiczny w Krakowie, Kraków, ISBN: 978-83-7252-538-3.
- Main Statistical Office in Cracow (GUS w Krakowie), (2021), <https://krakow.stat.gov.pl/opracowania-biezace/informacje-sygnalne/edukacja/szkolnictwo-wyzsze-w-województwie-malopolskim-w-roku-akademickim-20192020,1,14.html> (access: June 6, 2021).
- Main Statistical Office, (GUS) (2021), <https://stat.gov.pl/obszary-tematyczne/edukacja/edukacja/szkolnictwo-wyzsze-w-roku-akademickim-20202021-wyniki-wstepne,8,7.html> (access: September 5, 2021).
- Martin, A. (2020), ‘How to optimize online learning in the age of coronavirus (COVID-19): A 5-point guide for educators’, *Journal of Educational Technology Systems*, 49(1), https://www.researchgate.net/publication/339944395_20.
- Mathivanan, S.K., Jayagopal, P., Ahmed, S., Manivannan, S. S., Kumar, P. J., Raja, K.T., Dharinya, S.S. and Prasad, S.G. (2021), ‘Adoption of E-Learning during Lockdown in India’, *International Journal of System Assurance Engineering and Management*, <https://doi.org/10.1007/s13198-021-01072-4>.
- Ministry of Education and Science (Ministerstwo Edukacji i Nauki) (2021), <https://www.gov.pl/web/edukacja-i-nauka/ministerstwo-nauki-zawiesza-zajecia-dydaktyczne-na-uczelniach-do-25-marca-aby-zapobiec-rozprzestrzenianiu-sie-COVID-19> (access: September 10, 2021).
- Półturzycki, J. (2001), *Jak studiować zaocznie*. Poradnik metodyczny, Wydawnictwo Naukowe Novum, Płock, ISBN: 83-88193-42-2.
- Raygoza, M., León, R., and Norris, A. (2020), ‘Humanizing Online Teaching’, <https://digitalcommons.stmarys-ca.edu/school-education-faculty-works/1805> (access: September 23, 2021).
- Romaniuk, M. W. and Łukasiewicz-Wieleba, J., (2020), ‘Crisis Remote Education at The Maria Grzegorzewska University During Social Isolation in the Opinions of Students’, *International Journal of Electronics and Telecommunications*, 66 (4), 807-812, <https://doi.org/10.24425/ijet.2020.135675>.
- Saxena, K., (2020), ‘Coronavirus accelerates pace of digital education in India’, EDII Institutional Repository, <http://library.ediindia.ac.in:8181/xmlui/handle/123456789/10145>.
- Sharma, M. (2020), ‘Impact of Covid-19 on Online Education Sector and Edtech Companies’, *Palarch's Journal of Archaeology of Egypt/Egyptology*, 17(12), 1278-1288, ISSN: 1567-214.
- Shing, V., and Thurman, A., (2019), ‘How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018)’, *American Journal of Distance Education*, 33(4), 289-306, <https://doi.org/10.1080/08923647.2019.1663082>.
- Spitzer, M., (2012). ‘Digitale Demenz. Wie wir uns und unsere Kinder um den Verstand bringen’, Droemer Verlag, München, ISBN: 978-3-426-30056-5.
- The Bologna process: setting up the European higher education area, (2015), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=legisum%3Ac11088> (access: September 26, 2021).
- Todorova, N., and Bjorn-Andersen, N., (2011), ‘University learning in times of crisis: The role of IT’. *Accounting Education*, 20(6), 597–599. <https://doi.org/10.1080/09639284.2011.632913>.