

Students' Online Behaviour in the Time of the COVID-19 Pandemic: Insights from Poland and Ukraine

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Abstract—The COVID-19 pandemic forced universities to rapidly switch to distance learning, while simultaneously accelerating changes that might facilitate a more inclusive model of education. The goal of the research was to investigate the multi-dimensional aspects of learning online, including students' gender, age, and culture. The research results, based on 1562 survey responses from Polish and Ukrainian students, suggest that there are still differences between men and women as far as digital competences are concerned that might have their background in the traditional perception of gender roles. Besides, the pandemic has accelerated the processes of hardware and software enhancement in order to facilitate online learning, especially in Ukraine, which is mitigating technological exclusion. The possibility of accessing learning resources online, might allow people with lower economic status or women to continue education. The research results might be helpful in the development of future educational policies at Polish and Ukrainian universities.

I. INTRODUCTION

The COVID-19 pandemic has triggered research concerning distance education and the future of education. The main investigated paths include: organisation of online learning [1], [2], students' and teachers' attitude towards distance learning [3], and students' wellbeing [4]. Distance learning has the potential to deepen the equality, fairness, and inclusion among the members of the society. It should be noted that distance learning also gives the opportunity for wider access to education for unprivileged people, i.e. inhabitants of rural areas, poor members of some ethnic groups and/or people with disabilities [5]. However, to the best of our knowledge the topic of opportunities that have arisen during the COVID-19 pandemic for shaping the more inclusive future education has not yet been thoroughly investigated. In recent years, the number of Ukrainian students in Poland has been growing constantly. From the perspective of teaching organisations, it is of great importance to investigate whether there are any differences between Polish and Ukrainian students and between students of different gender or age in case of their online behavioural pattern, as it might influence their attitude to learning in general, and to distance learning in particular. This was the main motivation for our research. More

specifically, we would like to answer the research question: Are there any relationships between gender, age, country and online behaviour before and during the pandemic? In particular we are interested whether there are any differences in: (RQ1) perceived student wellbeing? (RQ2) hours spent online? (RQ3) social behaviour patterns (social cycle)? (RQ4) attitudes towards online communication? (RQ5) attitudes towards online education?

In order to answer the research questions, a joint project was undertaken by the faculty of the Cracow University of Economics (CUE), Poland and the Zhytomyr Polytechnic State University (ZPSU), Ukraine.

II. RESEARCH BACKGROUND

The pandemic forced universities to switch to distance learning and thus provided a unique opportunity to experience this type of learning even by people who previously avoided it. Belan [6] has analysed the attitudes of Polish and Ukrainian students towards remote learning and teaching technologies in training teachers of vocational education. He points out that Polish experience may be used as a benchmark for Ukraine. Basing on that premise the author proposes the modernization of the Ukrainian educational system. Klapkiv and Dluhopolska [7] discuss the challenges and opportunities during the quarantine caused by COVID-19 in Poland and Ukraine. It was indicated that the Ukrainian education system was largely unprepared to tackle these challenges due to the bureaucracy, the process rather than result orientation, educational conformism, and the lack of motivation of the main stakeholders.

The influence of distance education on the mental health of students has been already discussed in research works. For example, the relationship between the neuroticism and the pandemic of Polish and Ukrainian students was examined by Długosz and Kryvachuk [8]. The research indicates that high levels of neuroticism were observed among 61% of respondents from Poland and 47% from Ukraine. The research has also indicated that Ukrainian students better cope with

TABLE I
RESPONDENTS' STRUCTURE

		Poland		Ukraine	
		No.	%	No.	%
Gender	Female	643	64%	234	42%
	Male	357	36%	305	55%
	Not specified	5	0%	18	3%
Age	Young: < 20	143	14%	329	59%
	Medium: 20-24	727	72%	213	38%
	Older: 24+	135	13%	15	3%

quarantine and have better mental health. The problem of mental health deterioration during the pandemic has also been investigated in a broader perspective by Ochnik et al. [9]. The research outcomes indicate that the state of students' mental health is alarming and higher educational institutions (HEIs) should provide psychological support for them. There are also research works that explore a broader perspective of distance education, e.g. the problem of the limitations concerning the continuation of university education [4].

III. RESEARCH METHODS

The research is part of a project undertaken by the faculty of CUE and ZPSU. The goal was to investigate multidimensionally the students' perspective of distance learning in the time of the pandemic. Preliminary results of the research that looked at only one country's perspective were published in [10] and [11], with Polish and Ukrainian data respectively. This paper extends these studies by comparing data and providing a multi perspective analysis of respondents' viewpoints, including gender, age, and country.

We gathered the data in May and June 2021 using a questionnaire (see Appendix). In Poland, the survey was sent to students of CUE, mainly representing business studies. 1005 questionnaires were received giving a response rate of 8% (Cochran Formula: the margin of error is equal to 3% with a confidence level of 95%). In Ukraine, the questionnaire was distributed among students of seven universities: Zhytomyr Polytechnic State University, National University of Life and Environmental Sciences, Uman State Pavel Tychyna Pedagogical University, Melitopol State Pedagogical University, Drobych State Pedagogical University, National Pedagogical University, and Kryvyi Rih State Pedagogical University. In total, we received 557 responses from Ukrainian students. We analysed the data using descriptive statistics.

The respondents' structure presents Table I. As far as respondents' digital competences are concerned, about 40% of respondents from Poland and Ukraine assessed their skills as average, however only 2.4% of Poles assess their skills as below average, while 17% of Ukrainians assess their skills as such. There were visible differences between age groups. It is especially apparent in the Young group, where the results are 0.9% and 13.5%, respectively. Hence, it seems that the Ukrainian student population is much more diversified as far as digital competences are concerned. In both countries men

TABLE II
AVERAGE SELF-PERCEPTION OF WELLBEING

		Poland	Ukraine
Total		2.75	2.78
Gender	Female	2.72	2.74
	Male	2.79	2.82
Age	Young	2.73	2.77
	Medium	2.66	2.78
	Older	3.23	3.00

1-severe deterioration, 2-deterioration, 3-neutral, 4-improvement, 5-considerable improvement

assessed their digital competences higher than women. About 9% of Ukrainians reported constant or frequent technical problems, whereas in Poland only 3%. This indicates the differences between technical environments in Poland and Ukraine. In both countries, women assess their technical conditions slightly better, similarly to the Older group of respondents.

In order to capture the possible changes in students' online behaviour, we assessed the number of "friends", both with respect to online and face-to-face contacts before and during the pandemic. We defined "friends" as people with whom respondents actively maintain contact in the private sphere.

IV. RESULTS

RQ1: Students' Wellbeing. The deterioration in students' wellbeing is visible among both Polish and Ukrainian students at a similar level (Table II). However, the Older Ukrainian group did not notice changes in wellbeing (mean: 3.0), while the Older Polish group reported a slight increase in well-being (mean: 3.23).

RQ2: Hours Spent Online. There was a difference in the time spent online between Polish and Ukrainian students before the pandemic: Ukrainian students on average spent six hours more online per week than Polish students. These differences were visible in all categories. It should be noted that during the pandemic the numbers of hours spent online were almost equal in Poland and Ukraine, respectively 36 and 35 hours per week. However, in both respondent populations, women spent less hours online than men, both before and during the pandemic. Similarly, the number of hours spent online in relation to studies before the pandemic was higher in Ukraine than in Poland, the difference visible in all categories.

Table III shows that online studies contributed mostly to the increase in the number of hours online. In percentage change, 100% means that all of the increase is related to online learning. The values for Poland are close to 100%, hence it seems that the entire change was related to online learning. In the case of Ukraine, except for the Young group, the values are quite distant from 100%, for the Medium group it is 129%, which can be interpreted that online learning forced the resignation from other online activities, while in the case of the Older group, the increase in online activity was related to activities other than learning.

TABLE III

PROPORTION OF THE TOTAL ONLINE ACTIVITY INCREASE ATTRIBUTED TO ONLINE STUDIES AND THE CHANGE OF THE PERCENTAGE OF ONLINE LEARNING IN TOTAL ONLINE ACTIVITIES

		Increase		Change	
		Poland	Ukraine	Poland	Ukraine
Total		97%	110%	17%	8%
Gender	Female	98%	97%	16%	7%
	Male	97%	123%	15%	9%
Age	Young	104%	101%	20%	6%
	Medium	96%	129%	16%	12%
	Older	103%	37%	15%	-8%

In the time spent online related to studies, it is worth noting that in Poland there was an increase in each group (although the increase gets smaller with age), which means that online learning was a significant factor in the increase in time spent online. A similar situation was observed in the Ukrainian Young and Medium groups, but it is interesting that in the Older group we have a decrease, which means that the increase in time spent online was mostly not due to online learning, but other online activities. This can be related to the types of contacts – in the Older Ukrainian group the largest decrease in face-to-face contacts can be observed, with the largest increase in online contacts, which directly translated into increased online activity related not to studies, but to maintaining social contacts.

The share of online learning in the total time spent online increased both in Poland and Ukraine, but it seems that Ukrainians spent proportionally more time on learning online before the pandemic (Table III).

RQ3: Social Pattern Behaviour. There are visible differences in the average number of friends online between Polish and Ukrainian respondents: the average number of contacts online decreased in Poland from 13 to 12 and increased in Ukraine from 11 to 14. On average, the number of face-to-face friends decreased in both populations, however this change was more drastic in the case of Polish respondents (decrease from 16 to 8; among Ukrainian respondents the decrease from 10 to 8) (Table IV shows the changes). Polish respondents keep in touch with online contacts much more intensively than their Ukrainian counterparts. In both respondent groups the increase in constant online communication is visible during the pandemic but more considerable in the case of Polish respondents (16% increase).

RQ4: Attitudes towards Online Communication. The pandemic contributed to a more favourable perception of online communication among Ukrainian respondents (Fig. 1). Although it is difficult to notice any global differences between Poland and Ukraine in terms of age, it is interesting that in terms of communication “constantly” the increase in Ukraine is slight, while in Poland it is significant. There is an increase in the number of online contacts in Ukraine. The number of contacts is growing but their intensity is smaller, unlike in Poland, where we observed a decrease in the number of

TABLE IV

CHANGE IN A NUMBER OF ONLINE AND FACE-TO-FACE FRIENDS

		Online friends		Face-to-face friends	
		Poland	Ukraine	Poland	Ukraine
Total		-1	3	-8	-2
Gender	Female	-1	3	-9	-2
	Male	0	2	-7	-1
Age	Young	-2	3	-7	-2
	Medium	-1	2	-9	-1
	Older	2	4	-7	-5

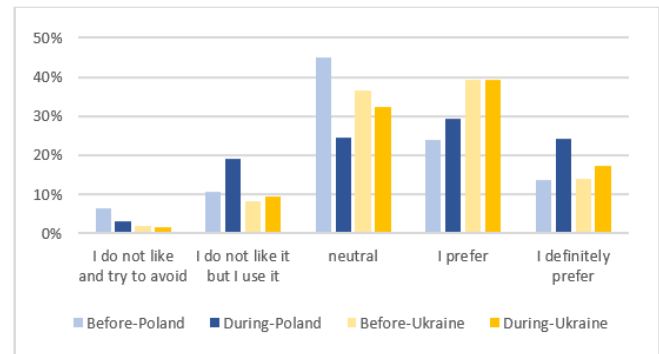


Fig. 1. Respondents' attitudes towards online communication

contacts, but a visible increase in their intensity.

In all categories, the changes in attitudes towards online communication were slightly positive with a greater difference among females (Table V). In both Poland and Ukraine, we saw a difference according to the age: the scale of positive attitude change in the Older group is much higher than the average. This means that a significant part of this group - forced to use online communication due to the circumstances of the pandemic - gained a more positive opinion of it, while the Young and Medium groups hardly changed their opinion (perhaps because they were already used to this form).

RQ5: Attitudes towards Online Education. Both Polish and Ukrainian men preferred distance learning more than women (before and during the pandemic), but these preferences were stronger among Ukrainian men. However, as Table VI shows, women changed their preferences more than men, in favor of distance learning. Similarly to changes in online communication, we assessed the changes in the attitudes towards online

TABLE V

CHANGES IN ATTITUDES TOWARDS ONLINE COMMUNICATION

		Poland	Ukraine
Average		0.16	0.06
Gender	Female	0.17	0.08
	Male	0.13	0.06
Age	Young	0.05	0.05
	Medium	0.15	0.07
	Older	0.30	0.27

TABLE VI
RESPONDENTS' DISTRIBUTION IN ACCORDANCE TO ATTITUDES'
CHANGES TOWARDS DISTANCE LEARNING

			I do not like	Neutral	I prefer
Total	Poland		5%	-20%	15%
	Ukraine		1%	-10%	8%
Gender	Poland	Female	5%	-23%	17%
		Male	-12%	-16%	13%
	Ukraine	Female	-1%	-12%	12%
		Male	4%	-8%	6%
Age	Poland	Young	-1%	-14%	14%
		Medium	7%	-23%	16%
		Older	3%	-19%	16%
	Ukraine	Young	2%	-9%	7%
		Medium	0%	-7%	7%
		Older	7%	-40%	33%

education. A positive change was visible in both countries (0.25 for Poland and 0.13 for Ukraine, respectively), but greater in Poland. Taking into account the gender criterion, the positive change in attitude was greater in the case of women (especially in the case of Ukraine where it was over three times higher than men). In the Young and Medium groups the scale of changes was similar to the average for both countries, while in the Older group it was greater than average: in the case of Ukraine it is over three times higher than the average.

V. DISCUSSION

The differences between digital competences of Polish and Ukrainian respondents might have three fold explanation: (1) Ukrainian youth enter higher education on average 2 years earlier than their Polish counterparts, which is a huge difference at this age; (2) differences in the level of IT education at the earlier stages, and (3) economic differences between Poland and Ukraine, resulting in lower availability of computer equipment in Ukraine. Interestingly, a much greater share of Ukrainian women than men assessed their IT skills as below average. It seems that Ukrainians are aware of some deficiencies in digital competences, and that is why actions have been taken to develop these skills by students [12], [13].

In general, Ukrainians perceive their technical conditions as worse than Poles. In Ukraine, a lot of students come from villages, without access to the Internet. Ukrainian families on average are much poorer than Polish ones; sometimes Ukrainian students do not have private computers and they can only use computers at universities, having access to the Internet via their mobile phones. Technical problems mainly concern younger Ukrainian respondents, which might be explained by their strong economic dependence on parents (for whom the Internet does not have to be a priority, especially in a generally poor economic condition).

Similarly to the findings in [4] we noticed the deterioration in students' wellbeing. However, contrary to the research

results reported by [8] we did not notice considerable differences in wellbeing deterioration between Polish and Ukrainian respondents: indeed slightly more visible wellbeing deterioration was detected among Polish respondents. At the beginning of the pandemic there were severe restrictions on face-to-face communication, which may be the reason for the deterioration of the wellbeing of respondents. It should be noted that in Ukraine the survey was conducted at the time when learning at universities was on premise (contrary to Poland), hence Ukrainian respondents' memory might fade as far as bad distance learning experience is concerned. Improvement of the wellbeing of the Polish Older group of respondents might be explained by the fact that this group contains students above the age of 24, including part-time students, for whom remote learning is much more attractive due to less organizational effort and resources required to study in this mode.

Some Ukrainian students have limited access to computers and that is why the pandemic has not caused such a great increase in the number of hours spent online like in the case of Polish respondents. Besides, a lot of Ukrainian students take part in distance courses offered by various companies that also increase the total number of hours online. Not surprisingly, learning activities contributed the most to the increase in time spent online during the pandemic. In general, before the pandemic, classes in HEIs in Ukraine (with a few exceptions) were conducted on premise, in connection with which the transition to distance learning caused a sharp increase in the number of hours that Ukrainian students spent online for educational purposes.

There were significant differences in online behaviour patterns between Polish and Ukrainian students: in Ukraine there was a slight decrease in personal contacts and a high increase in online contacts; in Poland there was a huge decrease in face-to-face contacts and a small decrease in online contacts. The decrease in online contacts in Poland might be the result of the decrease in face-to-face contacts – when restrictions were severe and the number of face-to-face contacts decreased, then online contacts resulting from them also decreased. Pandemic regulations were similar, hence the differences between the results might be attributed to culture differences. In Ukraine a lot of families were forced by the pandemic to buy devices that facilitate online communication, and that is why its increase is noticeable.

Interestingly, during the pandemic almost the same numbers of face-to-face contacts were reported in both countries – 8 in Poland and 9 in Ukraine. Maybe this convergence defines the social sphere, but this topic would require further investigation. Differences in the frequency of online communication might be attributed to the differences in device ownership: Polish students usually have computers with Internet access that allow them to communicate constantly or several times a day, whereas some Ukrainian students only use computers with Internet access at campuses, which allows them to communicate online once a day or a few times a week. There is a difference in the behaviour between Poles and Ukrainians: in Poland the decreases in face-to-face contacts

are greater, however it seems that older students in Poland transferred some contacts from face-to-face to online. In the case of Ukraine such an interpretation may apply to all age groups. This might be caused by the increased availability of communication equipment in Ukraine.

In Poland most respondents were neutral towards online communication. This might be explained by the fact that they have had access to this way of communication for a long time and might be tired of it being a part of everyday life. On the contrary, in Ukraine, respondents seem to like this way of communication. Maybe they still treat it as something new that opens up more possibilities.

The quality of distance learning in Ukraine might be lower than in Poland since this country has less experience in this type of teaching, however at the time of conducting the survey students had classes on premise and that is why they might be more in favour of distance learning. In Poland the usage of distance learning was more intense and some students might be fed up with it. Such a recurring difference between the members of the Older group and the other groups may result from the fact that earlier these students had no habit, or even had resistance, to online learning, and using this form, being forced by the pandemic, could significantly change this attitude. Interestingly, women change their attitude towards online learning to much more positive than men, similarly to older students.

In further research, we would like to investigate thoroughly different aspects of online learning, focusing mainly on the perspectives of online learning and the model of education after the pandemic.

APPENDIX

Survey items related to the current study

- 1) Gender; Age
- 2) Digital competences: beginner; below average; average; above average; professional
- 3) Technical conditions (ICT): constant problems; frequent problems; sufficient for basic needs; occasional problems; have no problems
- 4) The number of hours spent online per week (not counting professional work, but including studies) is approximately (up to 15h; 16-25h; 26-35h; 36-45h; over 45h)
- 5) The number of hours per week related to online studies
- 6) Estimated number of friends in regular socializing via electronic media (social media)
- 7) Estimated number of friends in face-to-face contacts
- 8) The frequency of communicating with friends via electronic media (occasionally; a few times a week; once a day; several times a day; constantly)
- 9) Attitude towards Internet communication
- 10) Attitude towards distance learning (e.g. training videos on Youtube)

- 11) Mental health change after switching to distance learning (significantly deteriorated; worsened; no change; improved; significantly improved)

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REFERENCES

- [1] I. Bondar, A. Humenchuk, Y. Horban, L. Honchar, and O. Koshelieva, "Conceptual and innovative approaches of higher education institutions (HEIs) to the model of training a successful specialist formation during a covid pandemic," *Journal of Management Information and Decision Sciences*, vol. 24, 2021, pp. 1–8.
- [2] M. R. D.Center, "Learning from student browsing data on E-learning platforms: case study," *In Position Papers of the 2020 Federated Conference on Computer Science and Information Systems*, 2020, pp. 37. DOI: 10.15439/2020F138
- [3] R. Afroz, N. Islam, S. Rahman, and N. Z. Anny, "Students' and teachers' attitude towards online classes during COVID-19 pandemic: a study on three Bangladeshi government colleges," *Research in Business & Social Science*, vol. 10, 2021, pp. 462–476. DOI: <https://doi.org/10.20525/ijrbs.v10i3.1155>
- [4] Z. Kawczyńska-Butrym, V. Pantyley, M. Butrym, G. Kisla, and L. Fakeyeva, "Students in times of pandemic: employment, living conditions, and health. Case Studies from Poland, Ukraine, and Belarus," *Geographia Polonica*, vol. 94, 2021, pp. 429–440. DOI: <https://doi.org/10.7163/GPol.0213>
- [5] P. Tsatsou, "Digital inclusion of people with disabilities: a qualitative study of intra-disability diversity in the digital realm," *Behaviour and Information Technology*, vol.39, 2020, pp. 995–1010. DOI: <https://doi.org/10.1080/0144929X.2019.1636136>
- [6] V. Belan, "Using distance learning technologies for training future teachers of professional technical courses at the universities of the Republic of Poland and Ukraine," *Professional Pedagogic*, vol. 2, 2020, pp. 145–152. DOI: <https://doi.org/10.32835/2707-3092.2020.21.145-152>
- [7] Y. Klapkiv and T. Dluhopolska, "Changes in the tertiary education system in pandemic times: Comparison of Ukrainian and Polish universities," *Revista Romaneasca pentru Educatie Multidimensionala*, vol. 12, 2020, pp. 86–91. DOI: <https://doi.org/10.18662/rrem/12.1sup2/250>
- [8] P. Długosz and L. Kryvachuk, "Neurotic generation of Covid-19 in Eastern Europe," *Frontiers in Psychiatry*, vol. 12, 2021, pp. 1–8. DOI: <https://doi.org/10.3389/fpsy.2021.654590>
- [9] D. Ochnik, A. M. Rogowska, C. Kuśnierz, M. Jakubiak, A. Schütz, M. J. Held, A. Arzenšek, J. Benatov, R. Berger, E. V. Korchagina, I. Pavlova, I. Blažková, I. Aslan, O. Çınar, and Y. A. Cuero-Acosta, "Mental health prevalence and predictors among university students in nine countries during the COVID-19 pandemic: a Cross-national study," *Scientific Reports*, vol. 11, 2021, pp. 1–13.
- [10] D. Dymek, M. Grabowski, and G. Paliwoda-Pękosz, "Change of students' online behavioural patterns during the COVID-19 pandemic: insights from Poland," in *Proceedings of the International Business Information Management Association Conference*, vol. 38, 2021, pp. 3263–3272.
- [11] S. Didkivska and T. A. Vakaliuk, "Insights from Ukrainian students on distance learning During the Covid-19 Pandemic," in *Proceedings of the International Business Information Management Association Conference*, vol. 38, 2021, pp. 1569–1578
- [12] T. A. Vakaliuk, V. Kontsedailo, D. Antoniuk, V. Korotun, S. Semerikov, and I. Mintii, "Using game Dev Tycoon to develop professional soft competencies for future engineers-programmers," in *CEUR Workshop Proceedings*, 2020. DOI: <http://dx.doi.org/10.2139/ssrn.3719840>
- [13] B. Kovalchuk and A. Zaika, "Formation of digital competence of future masters of industrial training of agricultural profile," *Information Technologies and Learning Tools*, vol. 85, 2021, pp. 118–129. DOI: <https://doi.org/10.33407/itlt.v85i5.3897>