

Impact of Two Coronavirus Waves on Higher Education: Comparative Study

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Abstract

The first wave of the coronavirus pandemic caused the largest disruption of education systems in the history of mankind. All schools and education institutions were forced to shift their education processes from face-to-face to online forms. Some of them had better conditions and more experienced staff for this transition, some of them had to start to create appropriate conditions both for teachers and students. Subsequently, numerous studies and analyses on the impact of the coronavirus pandemic on education have been done worldwide. The paper deals with a specific research question of how schools and education institutions used their experiences from the first wave of COVID-19 pandemic to ensure sustainable quality of education under the pandemic conditions. In this comparative study the authors present the findings resulted from two questionnaire surveys. The study has been processed with a focus on three areas: the quality of teaching, technical equipment used by students and students' opinions and experiences with online forms of education, and influence of the home schooling (microclimate of the home environment) on student's education. In the paper the authors present and discuss in more detail the first area, i.e. they analyse how experiences from the first wave of the pandemic were used to eliminate the negative impact on education and to provide adequate quality of education.

Keywords: waves of the corona crisis, comparative study, higher education, online education, home schooling.

Влияние двух волн коронавируса на высшее образование: Сопоставительное исследование

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Аннотация

Первая волна пандемии коронавируса привела к сильнейшему в истории человечества разрыву в системе образования. Все образовательные учреждения были вынуждены перевести свои образовательные процессы из очного в дистанционный формат. При этом некоторые из них располагали более благоприятными условиями и более опытным персоналом для осуществления этого перехода, другим пришлось начать создание соответствующих условий, причём как со стороны преподавателей, так и со стороны учащихся. В настоящее время проводится множество исследований и анализов влияния пандемии коронавируса на образование. В настоящей статье рассматривается конкретный исследовательский вопрос использования школами и образовательными учреждениями опыта первой волны пандемии коронавируса для обеспечения устойчивого качественного образования в условиях пандемии. Авторы представляют в своей работе результаты сравнительного исследования, основанного на результатах двух опросов в форме анкеты, проведенных в конце первой волны пандемии коронавируса и во время второй волны. В ходе исследования рассматривались три области: качество проведения дистанционного учебного процесса, техническое оснащение, используемое студентами, мнение и опыт студентов о дистанционном обучении, а также влияние домашнего обучения (атмосфера дома) на обучение студентов. Авторы статьи представили и более детально рассмотрели первую из этих трех областей, в частности, проанализировали, как опыт первой волны пандемии был применен в образовательном учреждении, в котором они работают, для предотвращения негативного влияния пандемии на образование и сохранения надлежащего качества образования, которое учреждение предоставляет своим студентам.

Ключевые слова: волны коронавируса, сопоставительное исследование, высшее образование, дистанционное образование, домашнее обучение.

Introduction

COVID-19 driven crisis has influenced all areas of human activities, including the area of education. Closures of schools and other learning spaces have dramatically influenced operations of all kinds of schools and education institutions forcing teachers to move to online delivery of lessons. Neither schools nor higher education institutions were prepared for such a large-scale shift. Despite the fact that the occurred need, or even demand, to support learning and teaching processes represented strongly a challenge equally for education institutions (schools and higher education institutions) as well as for the teachers and the learners, a forced switch without an adequate transition period was stressful and traumatic for everyone (Hašková, Havettová, & Vogelová, 2021). Despite the transition to remote instruction, results of the first research analyses from different countries (e.g. Belgium, the Netherlands, Switzerland, the United Kingdom) have shown serious learning losses in learning achievements (Maldonado & De Witte, 2020;

Christodoulou, 2020; Engzell, Frey, & Verhagen, 2021). One of the most comprehensive and large-scale studies on how tertiary students perceived the impacts of the first wave of COVID-19 crisis in early 2020 was led by the Faculty of Public Administration of the University of Ljubljana (Aristovnik, Keržič, Ravšelj, Tomaževič, & Umek, 2020).

Currently, we are facing the second wave of the coronavirus pandemic. While the first wave can be dated in summer semester of the academic year 2019/2020, the second wave has started already in winter semester of the academic year 2020/2021. At Constantine the Philosopher University in Nitra (Slovakia), the transition to remote instruction and online forms of education during the first wave was not easy. Many teachers and students encountered different problems at the beginning. Both academic staff and students had to solve mainly technical problems, and it was technical problems that significantly decreased the quality of education and students' learning achievements. To find out how the experiences obtained during the first wave of the coronavirus influenced the higher education at the university, and how these experiences have been reflected in present-day education activities of the university, within the current second wave of the coronavirus, a comparative study of education processes was conducted.

Aim of the research

In the consequence of the coronavirus pandemic education processes were world-wide disrupted in a scope as it had not been ever before. Education processes within all schools and education institutions had to be transited from their face-to-face forms to the on-line forms. Some of the schools and education institutions already had some experiences with the on-line forms of education, i.e. some of the schools and education institutions already at the beginning of the coronavirus pandemic had created some relevant conditions, and they had also the staff, who more or less already had some experiences with implementation of the on-line forms of education. On other hand, some of the schools and education institutions had to start to create appropriate conditions on both sides, on the teacher side as well as the student side, and initiate formation of relevant abilities and skills mainly of the staff (Šebo, 2020, 2016; Šebo & Hašková, 2020; Kozík, Kuna, & Vanek, 2016; Kozík & Kuna, 2014; Manca & Ranieri, 2013; Teclehaimanot & Hickman, 2011). However, whether teachers or students, we all had to start to learn how to manage education within the new environment of the on-line operation of schools and education institutions. The issue of the impact of the coronavirus pandemic on both the system of education and its particular levels has been elaborated in a lot of studies and analyses (Pavlíková, Sirotkin, Králik, Petrikovičová & Martin, 2021; Petrikovičová, Ďurinková, Králik & Kurilenko, 2021; Tkáčová, Pavlíková, Jenisová, Maturkanič, & Králik, 2021).

In order to mitigate potentially devastating consequences of the COVID-19 pandemic on education, different policy responses of national and/or regional governments and stakeholders have been proclaimed (United Nations, 2020) to sustainably keep quality of education. Preventing a learning crisis from becoming a generational catastrophe requires urgent action from all. The reasons are clear as education is not only a human right, but it is a primary driver of progress and welfare of any society. When education systems collapse, prosperous and productive societies cannot be sustained. For schools and education institutions, i.e. among them also for higher education institutions, an imperative result is to learn from the acquired experiences and to improve quality of the offered education in all its dimensions. This means all dimensions of the new schooling which the pandemic had brought.

We have, on the one hand, general policy strategies and imperatives towards the higher education institutions and, on the other hand, there is a reality, common everyday

life of the universities. A research question for us become the question of how our institution, Constantine the Philosopher University, used the experiences gained while teaching during the first wave of the coronavirus pandemic, i.e. whether these experiences were used to improve subsequent teaching performance of the university so that students would acquire relevant level of learning achievements also under the new on-line education environment.

As at the end of the first wave of the coronavirus pandemic (i.e. at the end of the summer semester of the academic year 2019/2020) a questionnaire survey was carried out to assess realisation of education during the finished term, we decided to carry out this survey repeatedly at the end of the winter term of the academic year 2020/2021 (i.e. a term undergone under the second wave of the coronavirus pandemic) and to process a comparative study of these two questionnaire surveys. Results of the comparative study were to give us answer to the stated research question.

Methodology of the research

The comparative study was processed using findings resulted from two questionnaire surveys, one administrated at the end of the first coronavirus wave and the other one during the second wave. Research sample of the first survey consisted of 151 students enrolled in full-time forms of study at Constantine the Philosopher University and the research sample of the repeated survey consisted of 369 full-time students.

The questionnaire administrated in both of the surveys was the same. In the introduction part of the questionnaire the respondents were asked to state their demographic and segmentation data (sex, faculty, year of the study, study program). The questionnaire items themselves were focused on three areas. Nine questionnaire items were focused on the issue of teaching processes carried out within the finished semester. Another nine questionnaire items were related to technical equipment used by students and to students' opinions and experiences with on-line forms of education. And the final five items were focused on influence of the home schooling (microclimate of the home environment) on students' education.

Although school environment is accepted as a factor with significant influence on academic performance (teaching and learning achievements) in educational discourse and considerations, little attention is paid to it (Stukalina, 2013). According to Stukalina (2013), higher school improvement is influenced by so-called integrated educational environment. In frame of this integrated educational environment, she distinguishes its four main components, and these are physical and technological environment, executive environment, psychological environment and instructional environment. In a certain approximation, the first and second part of our questionnaire can be perceived as investigation of the instructional environment and technological environment, and the third part as investigation of the physical environment. But at this point a note has to be mentioned. Usually the physical (or school) environment is understood with regard to physical equipment of the educational institution (Comesaña & Juste, 2007), while in our case the focus was mainly on physical conditions of student's home schooling (their home educational environment, microclimate of their home environment from which they participated at the on-line forms of teaching).

Both questionnaires were processed by the same statistical methods and subsequently their results were compared and evaluated in percentage terms. Hereinafter we presented results only of the first part of the questionnaire, and that processed for the whole research samples, without differentiation of the respondents in dependence on their segmentation factors (sex, faculty, year of the study, study program) and without testing dependence

of the respondents' answers on the particular segmentation factors. The findings resulted from the second corona pandemic wave and the first wave were compared.

Research results and their discussion

In the first item focussed on the issue of teaching processes carried out under the corona pandemic conditions, the respondents were asked which ways of teaching the teachers used. There were nine possible ways (teaching methods), from which the respondents marked those which were used by teachers, and additionally they could add further ones, in frame of the response *Others*. The given possible responses, which the respondents could choose, together with the achieved results, are presented in the graph in Figure 1. As the graph shows, in comparison to the first wave of the pandemic, there has been a significant decrease in case of two responses. At particular it was in case of the response *theoretical seminar work assignments*, at which the recorded decline was of 23.9 %, and in case of the response *emails*, at which the recorded decline was of 17 %. A smaller decrease of 6.5 % was recorded also in case of the response *social networks*. In the second wave of the corona pandemic more teachers started to use *video conferencing systems*, even up to 34 %, and significantly more they started to use also *software platforms of team-cooperation* (recorded increase of 16.6 %).

In our opinion, increase in the use of the both stated systems in the second pandemic wave was due to creation and implementation of the institutional platform *Meet.UKF*, as well as due to its promotion among the university academic staff and simplicity of its use. Increase in the use of the *software platforms of team-cooperation* we connect with their promotion among the staff ensured by the university management and with possibilities offered to teachers to be trained to work with the *MS Teams* software application.

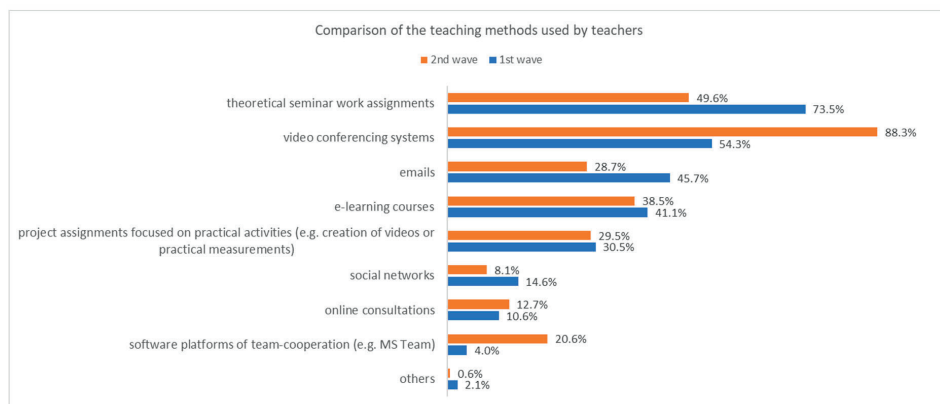


Figure 1. Comparison of the teaching methods used by teachers

In the second questionnaire item the respondents were asked which video conferencing systems their teachers used most frequently. In comparison with the first wave, during the second wave of the coronavirus pandemic there were recorded significant increases in the use of two of the systems. These were the *Meet.UKF* system (increase of 16.8 %) and *Microsoft Teams* (approximately the same percentage increase of 14.6 % of its use). On the contrary, systems like *Zoom*, *Skype* or *Messenger* became less used in comparison with their use during the first wave of the coronavirus (recorded declines of 7.1 %, 10.4 % and

7.4 % of their use, respectively). In our opinion, at the beginning of the pandemic (its first wave) these systems were more known, in meaning that teachers as well as students had general awareness about them, though they did not use them, neither were skilled in their use. But in that time, these systems represented a possible solution which, the teachers knew, were at disposal and could help them to ensure continuation of education. Subsequent development supported by the management of the university, i.e. the above presented promotion of the systems *Meet.UKF* and *MS Teams* together with the trainings organized for the academic staff gave rise to a broader utilization of only these systems in teachers' practice. Moreover, in our opinion, choice of these systems was influenced also by the combination of a broad range of possibilities offered by them on the one hand and simplicity of the use of their basic functions (their operation), on the other hand. Results of this questionnaire item are in a logical coincidence with the facts presented at the results of the previous item, what in a certain way proves that the respondents took the survey seriously, gave objective responses to the particular items, and did not marked the alternative answers in random.

The third item was focused on identification of the e-learning systems which the teachers used most frequently in their teaching practice. The following mostly used ones were identified: institutional education portal *UKF EDU* (based on *Moodle*), *Moodle* and *Google Classroom*. In case of the use of these systems no more significant changes were recorded. In the second wave of the pandemic increase of only 8 % was stated related to the use of the education portal *UKF EDU* and decline of less than 7 % related to the use of the system *Google Classroom*.

In the next questionnaire item the respondents were asked how frequently the teachers use the teaching methods referred to already in the first questionnaire item. Results of this item are presented in a graphical way in Figure 2. As the graph in Figure 2 shows, in the second wave of the pandemic the teachers used much more the *video conferencing systems* and *software for team-cooperation*. At the same time they cut down the use of such teaching methods as *seminar work assignments* and *education through emails*. Use of the other methods remained at the same level. Changes in the frequencies of the use of these methods are about 5 % either in a positive or negative direction (increase or decrease of the frequencies of their use), which cannot be considered as a significant result following the size of the research sample.

The presented results prove a shift from "passive" forms of knowledge acquiring to more vivid and active, and attractive and interesting for students. This also proves that the teachers seek to improve quality of education under the conditions of the pandemic, and the fact that the teachers appreciate the support which they get from the management of the university and implement the obtained knowledge, skills and information into their teaching practice.

Further we were interested how the students liked the particular teaching methods used by the teachers. Overview of the recorded results is presented in a graphical form in Figure 3. As the graphs in Figure 3 show, the highest increase of popularity (attractiveness) was in case of the teaching method through *video conferencing systems* (percentage increase of 15.4 % as the sum of the increases of *I liked it very much* and *I liked it*) and in case of teaching through the *software for team-cooperation* (totally 14.63 % as the sum of the decreases of *I liked it very much* and *I liked it*). On the contrary, the highest decrease was recorded in case of the *seminar work assignments* (14.62 % as the sum of the decreases of *I liked it very much* and *I liked it*). In case of the other methods no significant changes were recorded. The presented results show that students favoured and liked education through the video conferencing systems *Meet.UKF* and *MS Teams*.

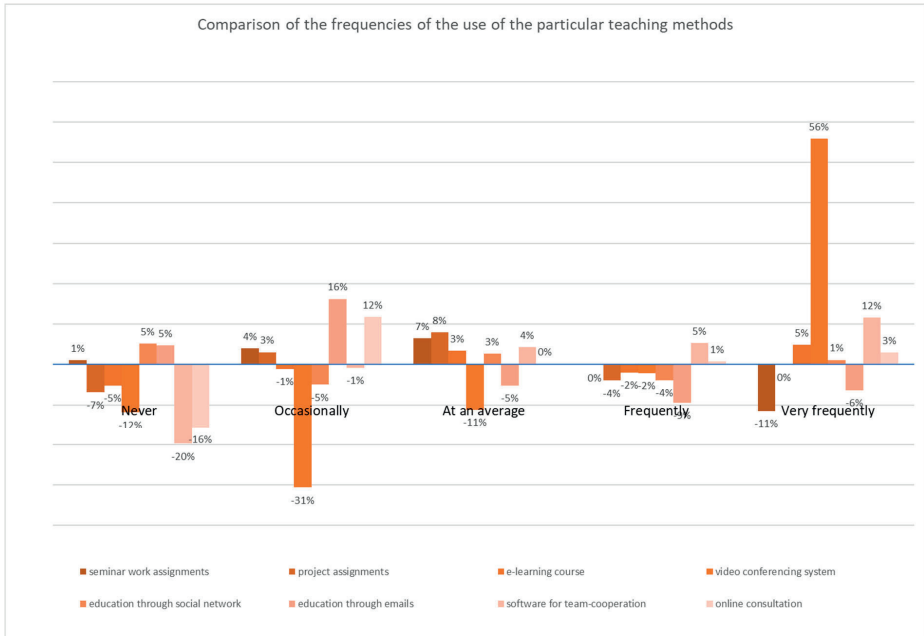


Figure 2. Comparison of the frequencies of the use of the particular teaching methods

Teaching through the seminar works assignments they evaluated rather at an average, and during the second wave it has become even less popular. These results document how important is the above-discussed effort of teachers to cut down the “passive methods” of knowledge acquisition (more or less this regards e.g. seminar work assignments as a form of “self-education”) and to broaden the use of methods in which the students have to be active and to work together.

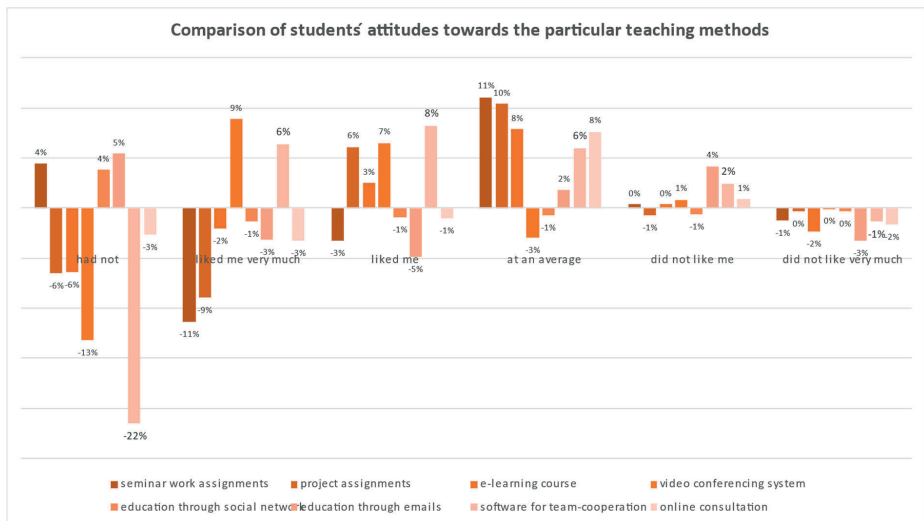


Figure 3. Comparison of students' attitudes towards the particular teaching methods

Purpose of the next questionnaire items was to assess quality of teaching process and teaching materials led and provided by teachers to students. Overview of the results related to the teaching process provided by teachers is presented in Figure 4. The results have proved the rising quality of *video conferencing lectures* led by the teachers in the second wave of the pandemic (12 %) as well as of *the e-learning courses* (7 %), assessed from the students' view. It shows that the teachers became quickly used to the video conferencing system and were able to fully use its potential, and the students have appreciated it.

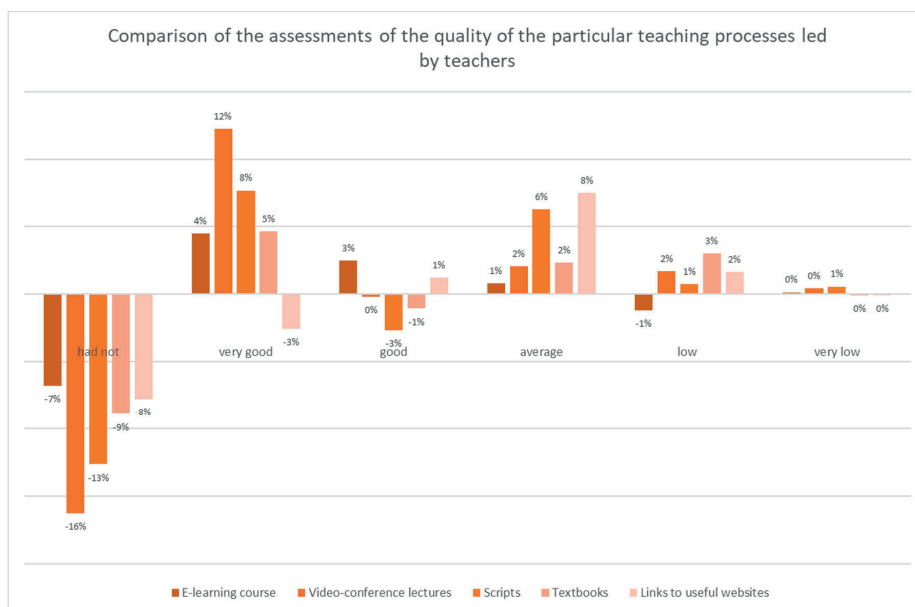


Figure 4. Comparison of the assessments of the quality of the particular teaching processes led by teachers

Significant improvement of quality of education provided by teachers in the second wave of the pandemic has been proved also by results of the next questionnaire item. In this item the respondents were asked to express their opinion whether the exclusive use of the particular method, without adding any other method to it (i.e. without accompanying it by another method) would be sufficient to pass the taught subject. As the results presented in Figure 5 show, at this item during the second wave more significant changes occurred in two cases. The first one was the case of the *video conferencing system* and the second one was the case of the *software for team-cooperation*. As to the lectures led through the *video conferencing system*, in opinion of more than 9 % of the respondents exclusive use only of this teaching method would be sufficient to pass the taught subject. As to the teaching based on the *software for team-cooperation*, exclusive use of this teaching method would be sufficient according to even 15 % of the respondents.

Results of the item in which the respondents assessed quality of the teaching materials provided them by teachers are presented in Figure 6. In comparison with the assessment of these materials at the end of the first wave of the pandemic, during the second wave a slight increase of the positive assessment was recorded. As the graphs in Figure 6 show, the differences between the assessments recorded in the first and second wave were: *very good* increase of 4.1 %, *good* increase of 1.6 %, *average* decrease of 3.8 %, *low* decrease of 0.4 %, *very low* decrease of 1.3 %.



Figure 5. Comparison of the assessment of the sufficiency of the exclusive use of the particular methods to pass a subject

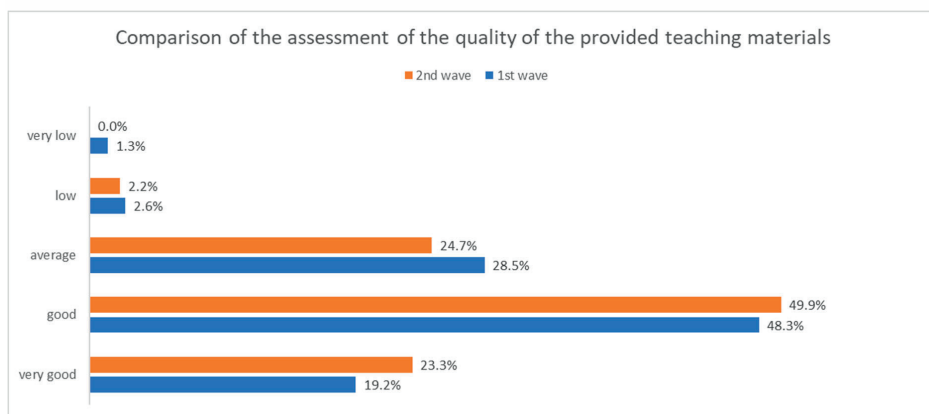


Figure 6. Comparison of the assessment of the quality of the provided teaching materials

In the last item focused on teaching process assessment the respondents were asked to state an average grade for a group of teachers who taught them during the given period (i.e. during the semester under the first or second wave of the pandemic). The overview of the results recorded for this item is also presented in a graphical way - see Figure 7. As the presented results show, the difference between the two waves of the pandemic shows a slight, considering the size of the research sample, not very significant increase in positive assessments of teachers. There has been 5.6 % improvement of teachers assessment by the grade 1 – excellent, 11 % improvement – by the grade 2 – very good and, accordingly, the number of teachers assessments with grades of 3 – good (by 7.5 %), 4 – sufficient (by 6.3 %), and 5 – insufficient (by 3 %) has decreased.

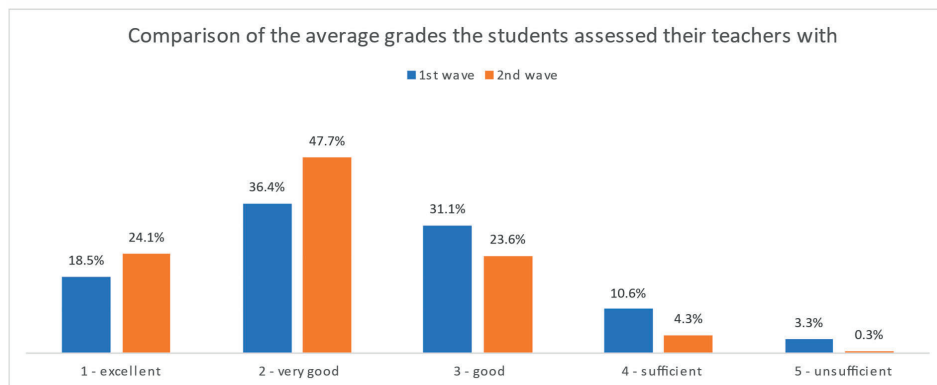


Figure 7. Comparison of the average grades the students assessed their teachers with

Conclusion

As the presented results of the carried out questionnaire surveys show and prove, both academic staff as well as the university management has made a great effort to eliminate all weaknesses which were recorded in connection to the teaching process carried out at the university during the first wave of the corona pandemics. Subsequently due to this effort, in the second wave of the pandemics quality of teaching was much higher (as it resulted from the second round of the questionnaire survey). Additionally to the above presented and discussed results of the first part of the questionnaire, we also would like to mention the most important and interesting findings resulted from its following two parts.

While the focus in the first part of the questionnaire was on teaching process itself, in its second part the attention was paid to technical equipment, which the students had at disposal to ensure their own participation at the on-line teaching forms. As the comparative analysis showed, there had not been any significant difference between the students' responses in the first and second wave of the corona pandemics. Both times the respondents assessed their technical gadgets as sufficient. What they complained about was speed of their computer processors and internet connection (their home computers and home internet).

The last part of the questionnaire was focused on school environment and influence of the home schooling (microclimate of the home environment) on student's education. Also in this part of the administrated questionnaire no significant differences between the students' responses to the particular questionnaire items stated in the first and second wave of the corona pandemics were recorded. Totally, the respondents assessed home schooling to be comfortable for them, and home schooling has been preferred to face-to-face schooling (approximately on the same level in both rounds of the survey).

In two of the five items included in this part of the questionnaire the task of the respondents was to assess which conditions of the schooling are better or easier manageable at home and which at school (university). In students' opinion at school it is easier to set noise, lightening and electromagnetic radiation, while at home it is temperature.

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References

- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability*, 12(8438), 34. doi:10.3390/su12208438
- Christodoulou, D. (2020). Writing attainment in 2020-21. *Medium.com*. Retrieved December 20, 2020, from https://medium.com/@daisy_92426
- Comesaña, J., & Juste, M. (2007). Description of Environmental Factors in Schools: Lessons from a Study in North-West Spain. *International Review of Education / Internationale Zeitschrift Für Erziehungswissenschaft / Revue Internationale De L'Education*, 53(2), 205-218.
- Engzell, P., Frey, A., & Verhagen, M. D. (2020, October 29). *Learning Loss Due to School Closures During the COVID-19 Pandemic*. <https://doi.org/10.31235/osf.io/ve4z7>. Retrieved from <https://osf.io/preprints/socarxiv/ve4z7/>
- Hašková, A., Havettová, R., & Vogelová, Z. (2021). Learning to teach and learn (not only foreign languages) during the coronavirus pandemic. *XLinguae*, 14(1), 3-16. doi: 10.18355/XL.2021.14.01.01
- Kozík, T., & Kuna, P. (2014). Vzdialený reálny experiment s využitím prvkov priemyselnej automatizácie [Remote real experiment with the use of industrial automation elements]. *Edukacja - technika - informatyka: wybrane problemy edukacji technicznej i zawodowej*, 5(1), 581-597.
- Kozík, T., Kuna, P., & Vanek, L. (2016). Participation in a discussion about media: Technical education in Slovakia at the turn of the millennium. *International Journal of Pedagogy Innovation and New Technologies*, 3(1), 106-110.
- Maldonado, J. E., & De Witte, K. (2020). *The effect of school closures on standardised student test outcomes*. Leuven: KU Leuven.
- Manca, S. & Ranieri, M. (2013). Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. *Journal of Computer Assisted Learning*, 29(6), 487-504.
- Pavlíková, M., Sirotkin, A., Králik, R., Petrikovičová, L. & Martin, J. G. (2021). How to keep university active during COVID-19 Pandemic: Experience from Slovakia. *Sustainability* 13, 10350. <https://doi.org/10.3390/>
- Petrikovičová, L., Ďurinková, A., Králik, R. & Kurilenko, V. (2021). Methodology of Working with a Textbook Versus Field Activities of Teaching Geography during the Corona Crisis. *European Journal of Contemporary Education*, 10(2), 428-437. doi:10.13187/ejced.2021.2.428
- Šebo, M. (2016). Comparison of LMS and Facebook in terms of education support. *Proceedings of the 3rd International Multidisciplinary Scientific Conference on Social Sciences and Arts* (pp. 125-135). Sofia, Bulgaria. doi:10.5593/sgemsocial2016B13
- Šebo, M. (2020). Skúsenosti so vzdelávaním počas koronakrízy [Experiences with education during the coronacrisis]. *ITEV – Innovations and Technologies in Education*, 3(1), 64-69.
- Šebo, M., & Hašková, A. (2020). How students perceive educational support through Facebook. *Education and Self Development*, 15(3), 67-75. doi:10.26907/esd15.3.06
- Stukalina, Y. (2013). Management of the educational environment: the context in which strategic decisions are made. *Procedia – Social and Behavioral Sciences*, 99(2013), 1054-1062. doi:10.1016/j.sbspro.2013.10.579
- Teclehaimanot, B., & Hickman, T. (2011). Student-teacher interaction of Facebook: What students find appropriate. *TechTrends*, 55(3), 19-30.
- Tkáčová, H., Pavlíková, M., Jenisová, Z., Maturkanič, P. & Králik, R. (2021). Social Media and Students' Wellbeing: An Empirical Analysis during the Covid-19 Pandemic. *Sustainability*, 13(18), 10442. <https://doi.org/10.3390/su131810442>
- United Nations. (2020). *Policy Brief: Education during COVIC-19 and beyond*. Retrieved from https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf