
Analysis of Distance Learning During the Covid-19 Pandemic on the Example of a Secondary School in Szczecin, Poland

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Abstract:

Purpose: The aim of the article is to present the opinion of students of one of the secondary schools in Szczecin on the implementation of the remote learning process. In order to examine the impact of the pandemic on the effectiveness of teaching, the results of the Matura exam in 2021 (year of students learning partly remotely) were also compared with the results of the exam in 2019 (year of students learning entirely stationary).

Design/Methodology/Approach: The research analysis used the survey method for which it was used a CAWI (Computer-Assisted Web Interview) internet survey, which was sent by e-mail to a specific research group with a link to the survey. In addition, in order to examine the effects of the pandemic, the results of the Matura exam in 2021 (year of students 2018-2021 studying partly remotely) were compared with the results of the exam in 2019 (year of students 2016-2019 studying entirely stationary). In order to objectively compare the obtained results, the stanine scale was used, which allows to determine the position of the result obtained by the school against the results achieved by all educational institutions in the country.

Findings: The obtained results clearly show that despite the difficult situation in education caused by the coronavirus pandemic, maintaining an appropriate level of teaching largely depended on the creativity of teachers, but also on the students themselves - their discipline and willingness to cooperate remotely with the school and teachers. Despite many disadvantages, distance learning also had many positive aspects. Good cooperation on the teacher-student line resulted in very good results in the final exams of the year, which to a large extent studied at school in a remote form. As the analysis showed, the results obtained by the students were not worse, and even slightly better than those of the full-time students, which clearly shows that with good organization of work, distance learning can be just as effective.

Practical Implications: Distance learning resulting from the global COVID-19 pandemic affected Polish schools overnight, becoming everyday life for thousands of students in the country. The conducted research shows that the period of remote learning gave rise to many problems that needed to be responded to quickly. Therefore, most students view the period of distance learning through the prism of difficulties that they, but also teachers, had to constantly overcome. The analysis of the research results showed how distance learning looks like in reality and which areas of it require further work.

Originality/Value: The originality of the research results from a comprehensive analysis of the distance learning process in one of Szczecin's high schools and showing the differences

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in the educational effects of students between stationary and remote learning, which will allow for the improvement of the distance learning process in the future.

Keywords: Distance learning, COVID-19 pandemic, Szczecin, Poland.

JEL codes: I18, I21, C83.

Paper type: Research article.

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1. Introduction

When the state of the COVID-19 epidemic was announced in Poland, one of the first decisions taken by the government was to suspend the operation of educational institutions as of March 11, 2020. On March 25, 2020, a regulation of the Minister of National Education came into force, obliging these institutions to teach using distance learning techniques. At that time, there were 23,6 thousand schools operating in the country, attended by almost 5 million children and youth². Until the end of the 2019/2020 school year, teaching in the schools was carried out using distance learning only.

Although the next school year 2020/2021 began in stationary form, it was from the day October 26, 2020 – according to the regulation of the Minister of Education and Science, school students at all levels of education again switched to distance learning, which was originally supposed to be in force until November 8, 2020. Unfortunately, due to the unfavorable pandemic situation in the country, distance learning in Polish schools continued until May 16, 2021.

For the vast majority of teachers, students, and their parents, distance learning was a major challenge. They faced a variety of problems on a daily basis – from technological limitations, to problems with communication, as well as psychological issues.

2. Research Methodology

The survey method was used to collect the research material for analysis. This study utilized a CAWI (computer-assisted web interviewing) Internet questionnaire that was sent by e-mail with a link to a specific research group. The survey included high school students who agreed to complete it. Thus, the sample was selected based on

²*Schools during the pandemic. Retrieved from: <https://www.nik.gov.pl/aktualnosci/szkoly-w-czasach-pandemii.html> (accessed March 7, 2023).*

the availability of subjects. In addition, in order to examine the effects of the pandemic, the results of the Matura exam in 2021 (year of students 2018-2021 studying partly remotely) were compared with the results of the exam in 2019 (year of students 2016-2019 studying entirely stationary).

In order to objectively compare the obtained results, a stanine scale, which is used in didactic measurement, was used. Thanks to it, it is possible to determine the position of the result obtained by the school in relation to the results of all educational institutions in the country. In this way, the answer to the question of whether the introduction of distance learning techniques significantly influenced the quality of the students' educational process was obtained. The stanine scale introduces 9 ranges of results (Table 1).

Table 1. Stanine scale

State name	Result ranges expressed in %	Percentage of results contained in the range
1 - lowest	below 4	4
2 - very low	4-10	7
3 - low	11-22	12
4 - below average	23-39	17
5 - average	40-59	20
6 - above average	60-76	17
7 - high	77-88	12
8 - very high	89-95	7
9 - highest	above 95	4

Source: Regional Examination Board. Retrieved from: <https://www.oke.poznan.pl/>.

3. Characteristics of the Research Sample

The survey was conducted between March 8 and March 26, 2021 among students of grades I-III of a secondary school in Szczecin (aged 16-18), and the questionnaire contained 10 questions. Out of almost 400 people studying at the analyzed educational institution in the school year 2020/2021, 208 students took part in the voluntary study, which represents more than 50% of the school's student population.

Among the participants of the study, the largest group were students of the first grade – 79 people (38,2% of respondents), then students of the second grade – 69 people (33,3%) and students of the third grade – 60 people (28,5%).

4. Research Results

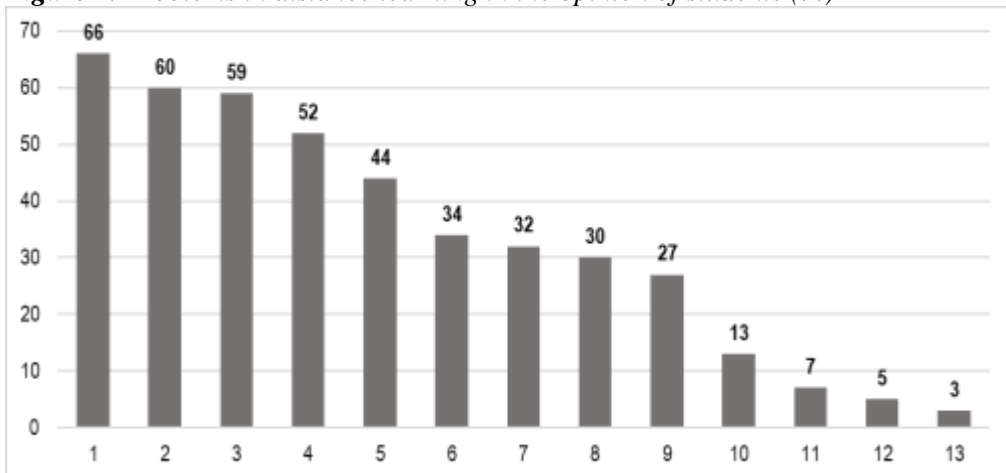
The opinions of high school students about the advantages and problems they faced in distance learning, their contacts with teachers and school, and their subjective feelings during the coronavirus pandemic were analyzed. The situation that happened to teachers, students and their parents during this period was for most of

them was new, unprecedented (a negligible percentage of teachers conducted classes remotely before the pandemic), which they had to face on a day-to-day basis. In fact, during the pandemic, the entire Polish education system at various levels underwent a digital revolution in teaching methods.

Relatively efficient remote education was ensured by the use of the Microsoft Teams platform for teaching, thanks to which it was possible to conduct online classes. Despite the return to classroom teaching, the Teams platform continues to be an important tool supporting the educational process in many schools in Poland.

At the beginning of the survey, the respondents were asked to identify the problems they encountered with distance learning (they could select more than one) that made it most difficult for them to learn effectively (Figure 1).

Figure 1. Problems in distance learning in the opinion of students (%)



- | | |
|--|---|
| 1. Problems with concentration during online classes | 7. No direct contact with the teacher |
| 2. Too much time spent in front of the computer | 8. Stress related to remote learning |
| 3. No direct contact with colleagues | 9. Problems with understanding new teaching content |
| 4. Internet connection problem | 10. Too many information channels/information chaos |
| 5. Too many assignments submitted by teachers | 11. No Internet |
| 6. Planning daily learning | 12. No conditions for distance learning |
| | 13. Sharing a computer with other household members |

Source: Own elaboration.

The greatest inconvenience of remote learning, mentioned by 2/3 of the respondents, was the problem of proper concentration during the lesson, resulting on the one hand from too long time spent in front of the computer during the day (60%)³, and on the

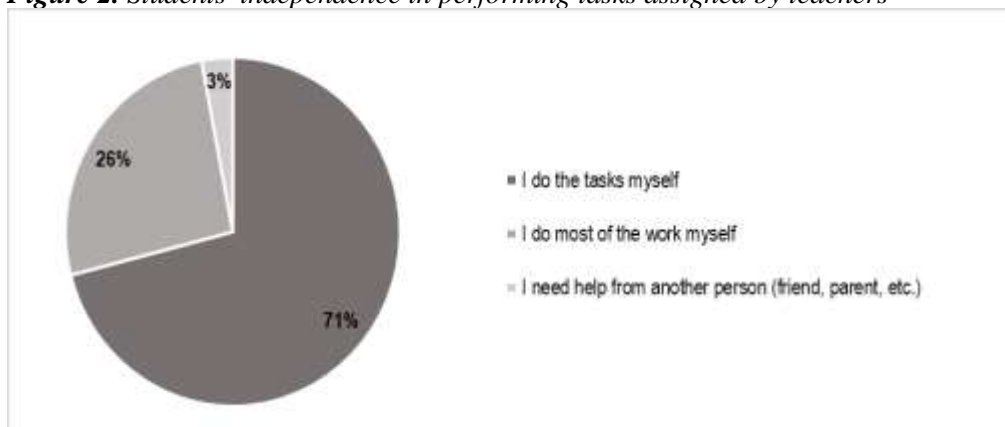
³Almost half of the surveyed students declared that they spend more than 7 hours in front of the computer every day during on-line classes and homework.

other hand from the conditions at home, where very often the siblings also fulfilled their school duties during the online classes, which was a real challenge in the case of limited space (own room) and equipment. Working on personal devices means both overuse and fear for the security of sensitive data or private documents.

Nearly 60% of respondents experienced technical problems, most commonly related to unstable Internet connections (52%) and lack of Internet access (7%). The students' responses clearly show a longing for direct contact with peers (59%) and teachers (32%), which, as the post-pandemic period has shown, has led to an increase in psychological disorders among students.

For one in three students, remote learning was a stressful situation, exacerbated by too much teacher-assigned material to complete on their own. The students did not have major problems solving the tasks given by teachers – 97% of the respondents solved them completely or mostly on their own, and only 3% of the students needed help from other people (Figure 2).

Figure 2. *Students' independence in performing tasks assigned by teachers*



Source: *Own elaboration.*

The lack of direct contact with the teacher was also a problem in terms of understanding the content discussed during the lesson, cited by 27% of the students surveyed. Only 26% of students did not hesitate to ask the teacher to explain points they did not understand during online classes. More than 60% of respondents said that such an option would depend on the teacher conducting the lesson, and 12% would never decide to provide such help.

According to the students' responses, the fear of asking questions during classes was caused by, among other things, the fear of "creating chaos" in the classroom ("*teachers often do not see a virtual hand raised*"), lack of understanding on the part of the teacher and other students, or difficulty in explaining the problem. Although the vast majority of lessons were conducted through the Teams platform,

information between the teacher and the student was also transmitted through other communication tools, i.e., electronic diary, Discord, Moodle, Zoom, Messenger, WhatsApp and others, which, according to 13% of respondents, led to information chaos.

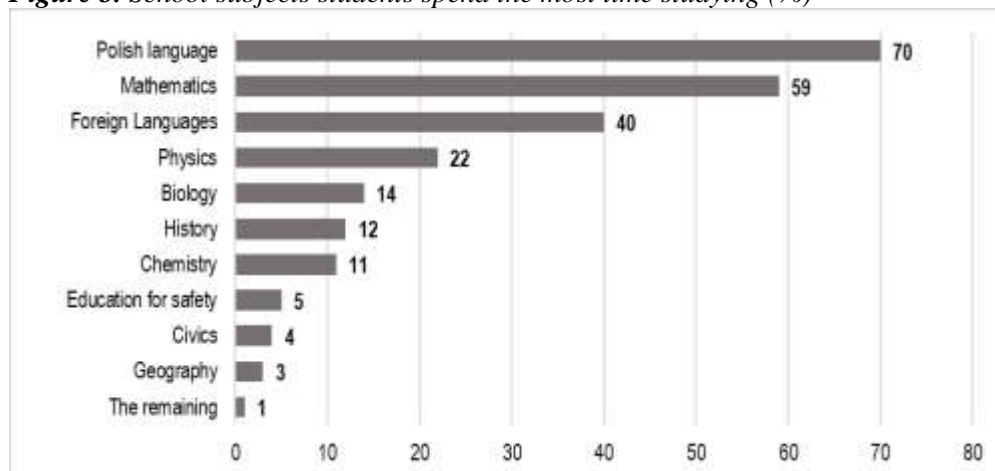
Undoubtedly, a major problem, especially for teachers, was the development of techniques for testing students' knowledge and skills. They primarily used the Teams platform, but also utilized applications such as Quizizz, Quizlet, Testportal, and Socrative for this purpose.

Despite the best efforts of the teaching staff, the majority of the surveyed students used prohibited materials at least once during tests. According to teachers, this problem has not been completely solved.

By far the largest part of their extracurricular time was spent on core subjects – Polish language, mathematics or foreign languages, which are compulsory for the Matura exam.

On the other hand, geography and social studies were the least burdensome for the respondents, and their learning took up the least amount of free time (according to the students' statements, active participation in online classes in these two subjects was mostly sufficient to acquire knowledge and skills in the topics discussed) (Figure 3).

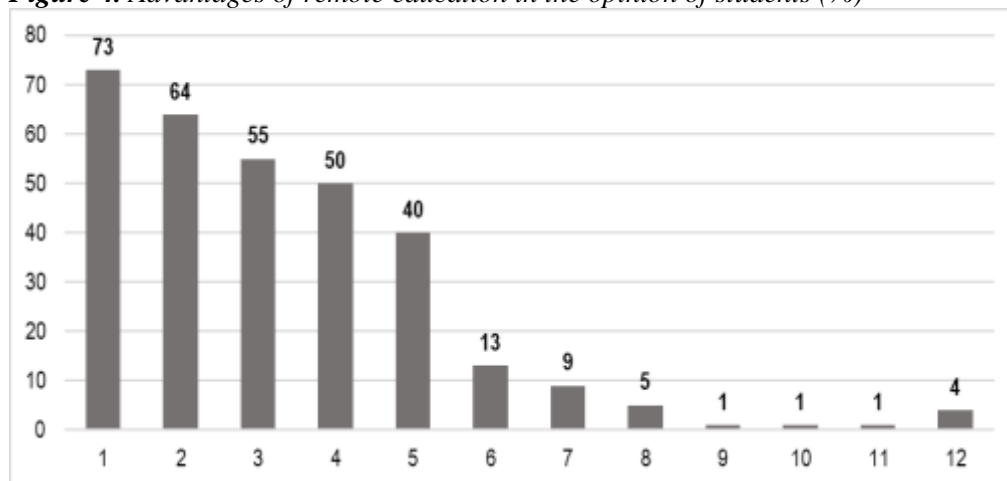
Figure 3. School subjects students spend the most time studying (%)



Source: Own elaboration.

It must be objectively stated that despite the inconvenience caused by the change of teaching from face-to-face to distance learning, a large percentage of students indicated many advantages of this type of education (Figure 4).

Figure 4. Advantages of remote education in the opinion of students (%)



1. The ability to spend more time on subjects that interest me more
2. Flexible study time tailored to my needs
3. Possibility to carry out other activities during the lesson, not directly related to it
4. Ability to adjust the pace and method of learning to my liking
5. Possibility of self-learning
6. Opportunity to meet with the class and the teacher online
7. No need to waste time commuting to school
8. Interesting lessons suggested by teachers
9. Availability of materials on the Teams platform
10. More free time
11. Lack of rigor regarding appearance
12. I don't see any advantages of distance learning

Source: Own elaboration

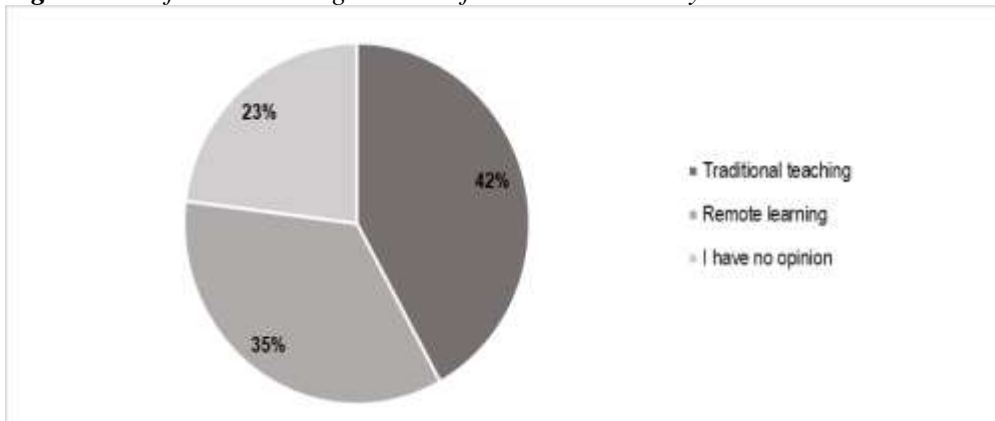
The greatest advantage mentioned by the respondents was the possibility of devoting more time to subjects that students are more interested in (73%), which undoubtedly has its source in the profiles of individual classes, where the content of selected subjects is covered as part of the advanced level⁴. A large percentage of students (64%) considered the flexible study schedule to be an advantage, as well as the ability to adapt the pace and method of teaching to their own individual needs (50%).

More than half of the respondents (55%) indicated that online lessons, where the teacher's control over students is quite limited, give the opportunity to carry out other activities not necessarily related to school education. In addition, students pointed out to the positive side of distance education, including the time savings associated with commuting to school or the lack of rigor related to the appearance during classes. Only 4% of students believe that distance learning has no positive

⁴*Social and legal profile – Polish language, history, social studies, biological and chemical profile – biology, chemistry, mathematical and natural profile – mathematics, physics, geography and mathematical and physical profile – mathematics, physics.*

aspects. Although the majority of students (2/5 of the respondents) consider the stationary method of teaching to be better and, above all, more effective, 1/3 definitely prefer distance learning (Figure 5). Undoubtedly, the reason for such a large group is because of the benefits mentioned above, which were indicated by the students.

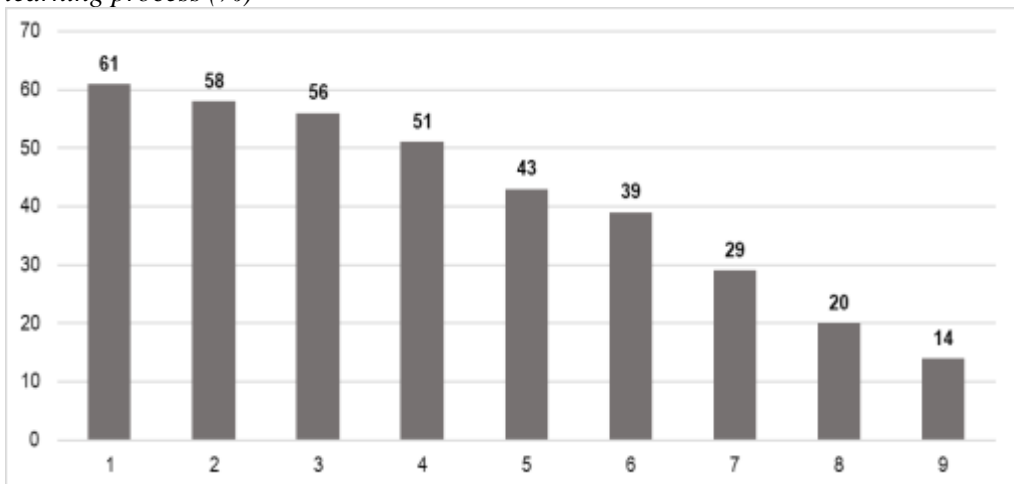
Figure 5. Preferred teaching method of the students surveyed



Source: Own elaboration.

As part of the survey, students were also asked to indicate the aspects of distance learning that, in their opinion, teachers should improve in order to make teaching using this method more effective (Figure 6).

Figure 6. Respondents' suggestions for increasing the effectiveness of the distance learning process (%)



1. Recording online classes so that the student has access to them
2. Greater understanding of teachers
3. More explanation of difficult topics during lessons
4. Less homework

5. Saving tests etc. in the electronic journal
6. More trust in students
7. Increasing the variety of teaching methods
8. More online lessons
9. Greater availability of the teacher outside of class

Source: Own elaboration.

The largest group of respondents (61%) favored live recording of teacher-led classes live, so that lesson materials can be used at any time. Of course, it was possible, but many teachers showed great restraint in this element. This was related to the assumption that the student would not be careful enough during online lessons, knowing that he/she had the alternative of recording the lessons, and the fear of violating the right to protect the teacher's image and other personal rights by disseminating online lesson materials.

Nevertheless, many teachers decided to take such a step by posting a recording of their classes, e.g., on YouTube. The respondents also paid attention to the teacher-student relationship during the classes and the way their teachers conduct the didactic process. A large group of respondents (58%) expected teachers to be more understanding, bearing in mind that distance learning was a novelty not only for teachers, but also for students.

Less than 40% of the respondents cited a lack of trust on the part of teachers as a problem. Students also expected teachers to spend more time during lessons, explaining difficult topics (56%), giving less homework to do on their own (51%), and presenting more interesting interactive materials during lessons, or simply conducting lessons live rather than sending them as presentations, links, assignments, etc.

Another major problem students faced with distance learning was the availability of a teacher, which was usually limited to class time. However, it must be objectively stated that many teachers were fully available on the Teams platform and answered many questions and doubts of students, even in the afternoon or on the weekend.

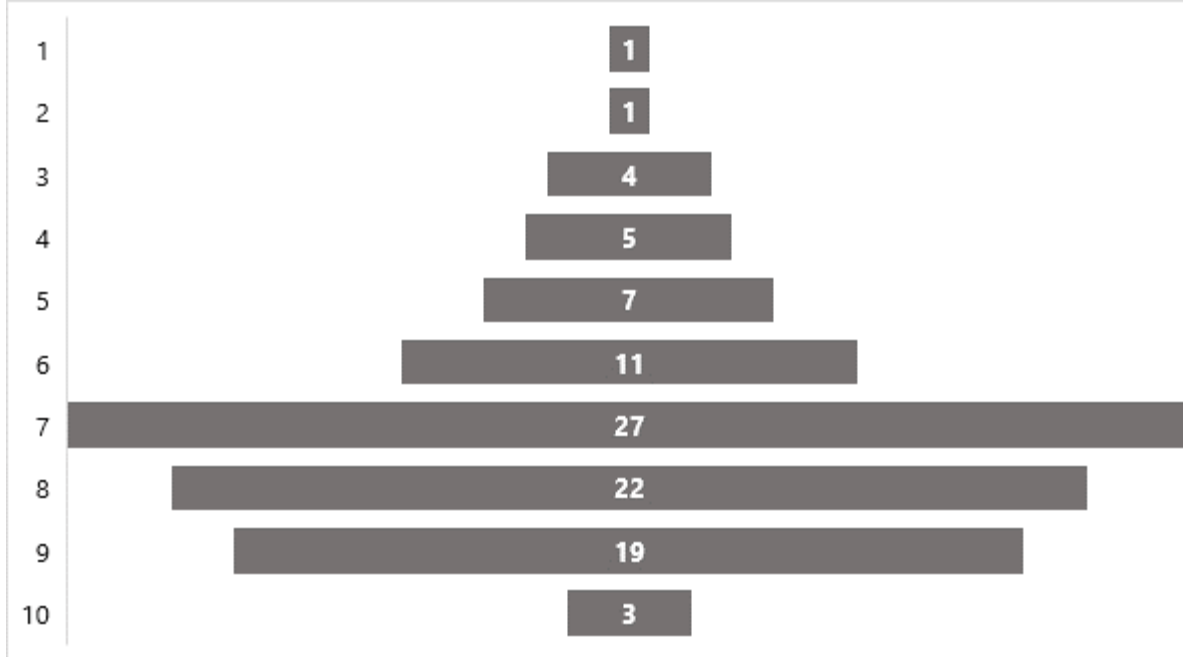
The final aspect of the survey was the evaluation of the school in terms of distance learning⁵ (Figure 7).

The analyzed school, despite the many problems faced by both teachers and students during remote learning, was rated good or very good (7-10) (71%), which is undoubtedly a great success of the school. Only 6% of students described the level of distance education as weak or very weak (grades 1-3). Similar sentiments were also expressed by the parents of students who assessed the school's activities even

⁵The remote learning process was rated on a scale of 1-10, where 1 was the lowest rating and 10 was the highest.

more positively during the pandemic (80% of the surveyed parents rated the school as good and very good, and only 3% – poorly and very poorly).

Figure 7. Evaluation of distance learning at school from students' point of view (%)



Source: Own elaboration.

During the survey, students could also submit their observations on remote learning at school (41 such comments were submitted). The following recurring statements deserve attention:

- the teachers do everything in their power to prepare us for the exam. Their work is invaluable,
- more teacher initiative and less putting the blame for everything on self-study,
- it seems to me that learning is mostly the student's contribution, and we should be made aware of this from the beginning of education,
- there is no point in teaching PE remotely,
- online lessons are the best that could happen. I am a person who likes to work independently and I have a passion outside of school that I try to devote as much time as possible to. Now, however, I am able to devote much more time to developing this passion, and do my homework at a different time,
- teachers should complete Teams training to take full advantage of the platform,

- teachers should be more understanding and trusting of students. Some teachers still assume that technical problems are our invention,
- distance learning from the perspective of a high school graduate is the best thing that could have happened to me this year (more time for self-study or no more hour-plus commute to school),
- some teachers should remember that students are human too. We may feel bad, have technical problems, an important matter at home (where we are currently spending the day, often as the only members of the household), there may be a sudden random situation,
- teachers shouldn't give us bizarre and more difficult tasks just to keep us from cheating. We learn more through cheating than by writing "I don't know",
- some teachers have really risen to the challenge of remote teaching, and the workload is at a level that ensures the continued educational development of the students,
- teachers give their best. They answer our questions on weekends and after hours. They seem to be trying to help us.
- the school is doing very well with distance learning. The teachers are very involved and try to make sure that the level of education is not lowered by this difficult situation. The only problem may be the pace of work, which is sometimes too fast.

The last aspect of the research on the impact of distance learning during the COVID-19 pandemic on the effectiveness of teaching students was the comparison of the results of the Matura exam of the year of students who studied full-time throughout the high school cycle (2019 Matura exam), with the year who started their education in stationary form and finished in remote form (2021 Matura exam) (Table 2).

Table 2. *Matura exam results in 2019 and 2021, together with the stanines for selected subjects at basic (B) and advanced (A) level*

Item	Result 2019 (%)	Result 2021 (%)	Difference 2019-2021 (%)	Stani ne 2019	Stani ne 2021	Stanine difference 2019-2021
Polish language (B)	75	75	0	8	8	0
Mathematics (B)	92	92	0	8	8	0
English language (B)	97	99	2	8	9	1
German language (B)	99	96	-3	9	8	-1
Polish language (A)	90	80	-10	9	8	-1
Mathematics (A)	73	66	-7	7	7	0
English language (A)	87	93	6	7	7	0
German language (A)	92	92	0	8	8	0
Biology (A)	73	76	3	8	9	1

Chemistry (A)	68	74	6	7	8	1
Physics (A)	82	76	-6	8	7	-1
Geography (A)	61	72	11	8	8	0
History (A)	65	78	13	7	8	1
Social studies (A)	89	80	-9	9	9	0

Source: Own elaboration based on: Regional Examination Commission. Retrieved from: <https://www.oke.poznan.pl/> (accessed March 13, 2023); Central Examination Commission. Retrieved from: <https://cke.gov.pl/>.

Comparing the results of 2019 and 2021, in the compulsory basic subjects, it can be seen that in both periods comparable results were obtained – in the case of Polish and mathematics, they were the same, and in the case of foreign languages, the result in English in 2021 was 2 percentage points higher than in 2019, and in German it was 3 percentage points lower. In the case of the first two subjects, the results for both full-time and distance students were in the 8th stanine (very high level).

In the stanine classification, the results obtained in both analyzed foreign languages changed between 2019 and 2021 – English language changed from 8 to 9 (the highest), and German language – changed from 9 to 8. Among the 10 selected subjects⁶ which were taken at the Matura exam at the advanced level, in 5 cases in 2021 the result was higher than in 2019, and in 4 – lower (in one case the result in both analyzed years was the same – German language).

The biggest, positive difference was in history (13%) and geography (11%), and the greatest negative difference was in Polish (10%) and social studies (9%). Referring the obtained results to the stanine scale, it can be seen that 3 subjects increased their rank (biology, chemistry, history), 2 – lowered it (Polish, physics), and in 5 cases stanines remained at the same level (social studies, geography, German, English, mathematics).

The above shows that the difficult educational situation related to the period of the COVID-19 pandemic in the analyzed school did not have a negative impact on the quality of teaching, which is confirmed by the slightly better results achieved by the cohort of students who spent more than 1/3 of their education in high school through distance learning.

5. Conclusions

Despite the many problems faced by teachers, students and their parents during the coronavirus pandemic, it is not clear that this is a lost generation. Maintaining an adequate level of teaching depended largely on the creativity of the teachers, but also

⁶Only those subjects that were taken by at least 10 students on the high school exit exam were included in the analysis.

on the students themselves – their discipline and willingness to cooperate with the school and teachers at a distance. Some of the benefits and positive observations about distance learning cited by the majority of students surveyed include the following. Other studies have contacted similar results in other countries (Grima *et al.*, 2022; Khan *et al.*, 2022).

- flexible study time,
- the ability to adapt the pace and method of learning to your own needs,
- relatively good organization of distance learning by the school,
- appreciation of the majority of teachers for their efforts in the effective design of the remote education process,
- saving time, e.g. related to commuting to school, etc.,
- the ability to use the Microsoft Teams platform for remote learning.

Of course, we must not forget that the period of distance learning created many problems that had to be solved quickly. As a result, most students view the period of distance learning through the prism of the difficulties that they, as well as the teachers, had to constantly overcome. During distance learning, the most common problems identified by students were:

- lack of direct contact with teachers and peers,
- difficult access to the teacher for students and parents,
- technical and hardware issues,
- low variety of teaching methods used by teachers,
- lack of trust on the part of teachers towards students,
- students' problems with understanding some content,
- too fast pace of work during the lesson,
- too much of a burden with school work,
- information chaos,
- too much time in front of the computer,
- psychological problems of both students and teachers.

The good teacher-student cooperation resulted in very good results in the high school graduation exams of the year group, which largely received their school education remotely.. As the analysis showed, the results obtained by the students were no worse and even slightly better than those of the full-time students, which clearly shows that with good organization of work, distance learning can be just as effective.

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