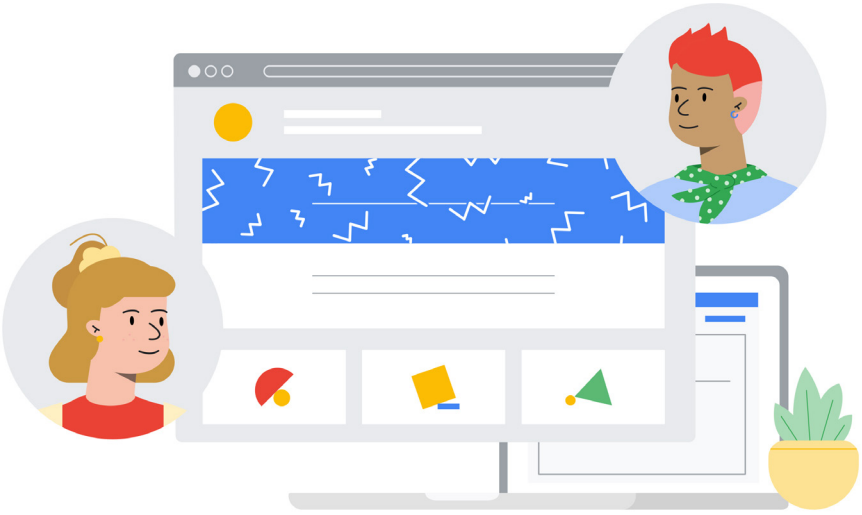
Google for Education



DIGITAL TRANSFORMATION OF POLISH SCHOOLS

RESEARCH REPORT SUMMARY

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CONTENT

PROJECT ASSUMPTIONS

“Digital Transformation of Polish Schools”, is an innovative research and implementation project carried out by Google in consultations with the Ministry of Education and Science and in cooperation with technological partners (Lenovo, Intel), teacher training partner CCT Poland and an independent academic research team. As part of the project, two schools were selected for the pilot digital transformation (Julian Tuwim Primary School No. 234 in Warsaw and Maria Konopnicka Secondary School No. 2 in Katowice). Both schools were equipped with Chromebook laptops (based on ChromeOS, a lightweight, cloud-ready computer operating system created by Google) and a Google Workspace for Education account with a full set of applications. During the project, 56 hours of professional development support were offered to participating teachers. The project spanned from June 2022 to January 2023, and in February 2023 research data was collected and analyzed. Technical specification of the devices used in the project is attached to this document.

Scheme 1. Chromebook ecosystem and Google applications

As part of the project, teachers participated in a comprehensive development program including 64 hours of professional training in the use of Chromebooks and Google ecosystem tools and applications in the teaching process. Teachers participating in the pilot could also take the Google Educator Level 1 and Google Educator Level 2 certification exams. The project “Digital Transformation of Polish Schools” showed the best practices and opportunities for the implementation of the program of digital transformation of education in Poland. The aim of the project was to provide a complete set of tools and solutions to support the process of digital transformation in schools in Poland in order to demonstrate the potential of improving education with the use of technology. The program, starting with a selected set of hypotheses and research questions developed with researchers from leading academic centers in Poland (Jagiellonian University, Cracow University of Economics and Jan Kochanowski University in Kielce), assumed the use of Chromebook laptops in the 1:1 model, the implementation of the Google Workspace for Education platform and comprehensive professional training for teachers and administration of educational institutions. The pilot program has shown that digital transformation brings key and far-reaching benefits for Polish schools both in the didactic and administrative areas, including:

- improving the digital competences of students and teachers
- introducing the skills of the future and increasing competitiveness in the labor market
- providing equipment and infrastructure supporting digital transformation
- preventing digital exclusion.

The goals of the “Digital Transformation of Polish Schools” project and the results achieved in this way support the priorities and assumptions of the **Integrated Skills Strategy (2030)** in the field of shaping the key skills in social and economic development of the future in relation to basic and transversal skills, in particular:

- raising the level of key skills in children, adolescents and adults
- developing a learning culture focused on active and continuous skills development

RESEARCH METHODOLOGY

In the research part of the **"Digital Transformation of Polish Schools"** project, the main goal was to collect and analyze data that finally confirmed the hypothesis that technological solutions based on Chromebook devices and a set of applications of the Google for Education ecosystem used in teaching and learning processes have a positive impact on the effectiveness and efficiency of teachers' work and create educational benefits for students. After consulting project stakeholders and seeking the opinion of experts from the Ministry of Education and Science, the research team proposed a program consisting of various types of research in order to comprehensively and objectively assess the applicability and effectiveness of the use of Chromebook devices and the Google Workspace for Education application in teaching and learning processes.

Scheme 1. Qualitative Research Methods

Teachers (sample n1=30) and students (sample n2=56) representing a primary school from Warsaw and a secondary school from Katowice participated in the preliminary and final quantitative research carried out using survey methods and qualitative research.

Table 1. Teachers participating in pre- and post-survey (n_1=30)

	Location	Frequency	Percent	Percent Valid	Cumulative Percent
Valid	Warsaw	14	46,7	46,7	46,7
	Katowice	16	53,3	53,3	100,0
	Total	30	100,0	100,0	

Source: Research results June 2022-January 2023

Table 2. Students participating in pre- and post-survey (n_2=56)

	Location	Frequency	Percent	Percent Valid	Cumulative Percent
Valid	Warsaw	25	44,6	44,6	44,6
	Katowice	31	55,4	55,4	100,0
	Total	56	100,0	100,0	

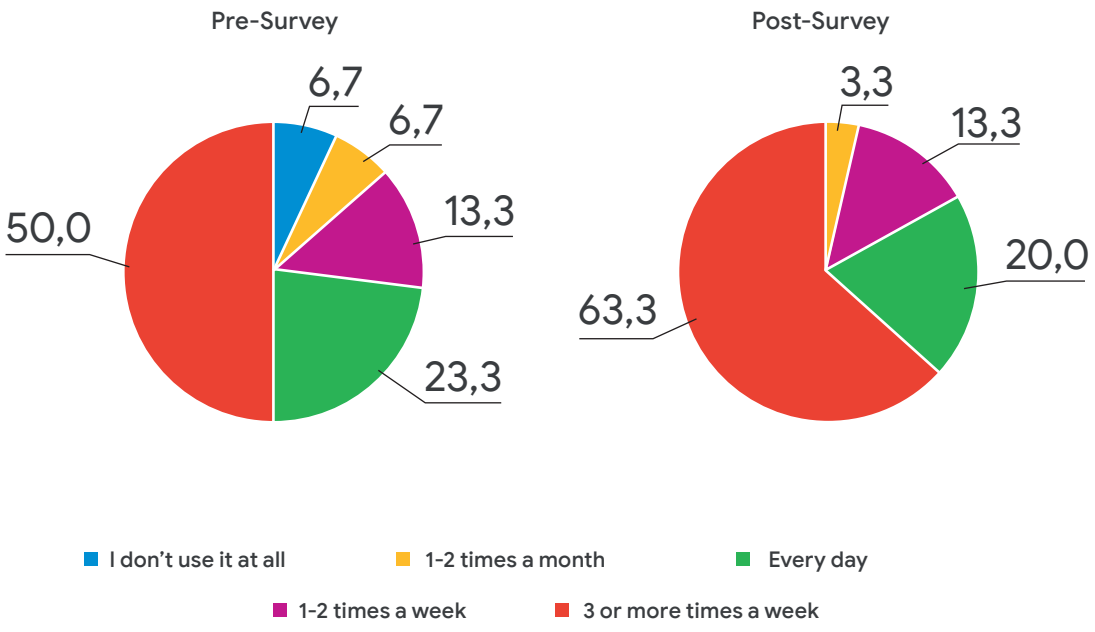
Source: Research results June 2022-January 2023

RESULTS AND MAIN OBSERVATIONS

The data collected during the study and the analysis of the results carried out by the research team using the SPSS (Statistical Package for Social Sciences) tool showed in a statistically significant way that the intervention carried out as part of the project “Digital Transformation of Polish Schools” brought, in accordance with the theory of change , the assumed effects in terms of the positive impact of Chromebook devices and Google for Education ecosystem applications on didactic processes in the surveyed schools. Such a statement was unequivocally confirmed in the results of scientific research, both in the quantitative part using the SELFIE Tool and Google Forms, as well as in the qualitative part of the research program.

Below are the key results and main observations from the study, which in the extended form of a comprehensive report are an integral part of the overall summary of the “Digital Transformation of Polish Schools” project.

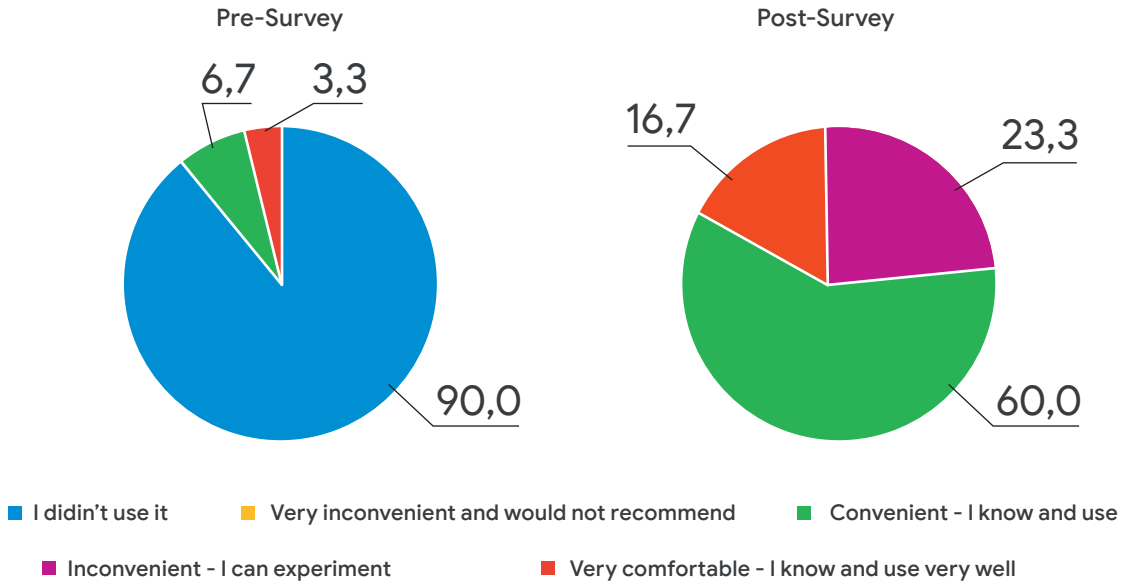
Chart 1. Frequency of using technological solutions (ICT) in percentage



Source: Research results June 2022-January 2023

Particularly noteworthy is the fact that after the project intervention, **the frequency of using technological and communication solutions in teaching and learning increased**. The vast majority of respondents (over 80.0%) indicated that they use technological and communication solutions (ICT) three or more times a week or every day. This result is thirty percent higher than the base moment, i.e. the state before the implementation of comprehensive training on the use of Google ecosystem solutions. In the final survey, none of the respondents indicated that they did not use technological and communication solutions, which confirms the hypothesis that **properly selected and implemented solutions prevent digital exclusion**.

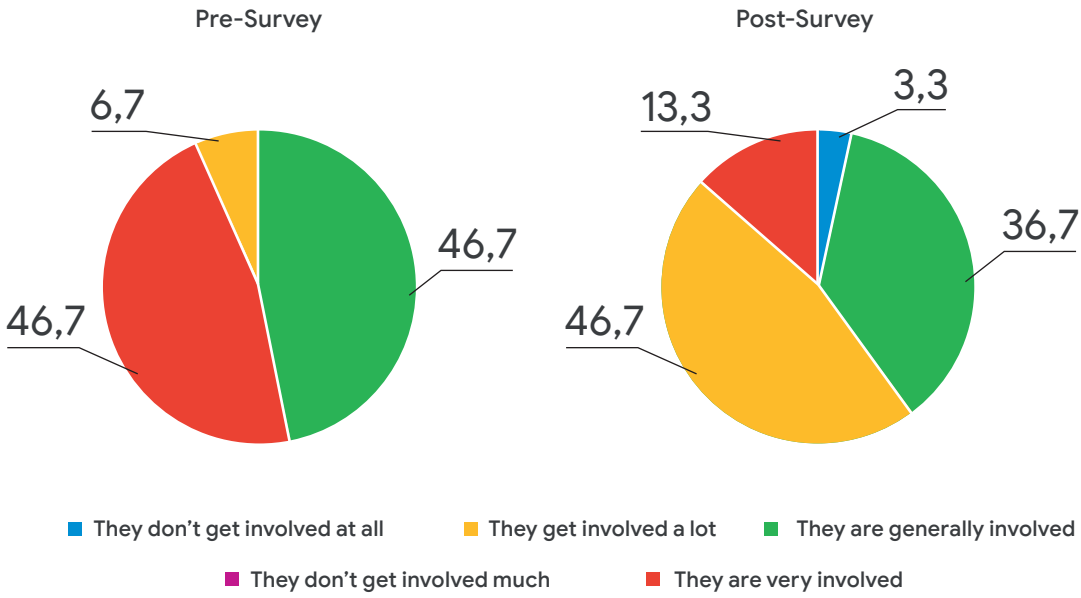
Chart 2. Assessment of the experience of using a Chromebook in the teaching process



Source: Research results June 2022-January 2023

At the beginning of the project 90.0% of the respondents indicated that they did not use Chromebooks in the didactic process, and at the end of the project 76.7% the respondents assess them as comfortable and very comfortable, they know the devices and use them in teaching. This state of affairs confirms the hypothesis that **the use of Chromebook laptops and Google Workspace for Education ecosystem applications is very positively received by respondents who have had no or little experience with cloud solutions so far**.

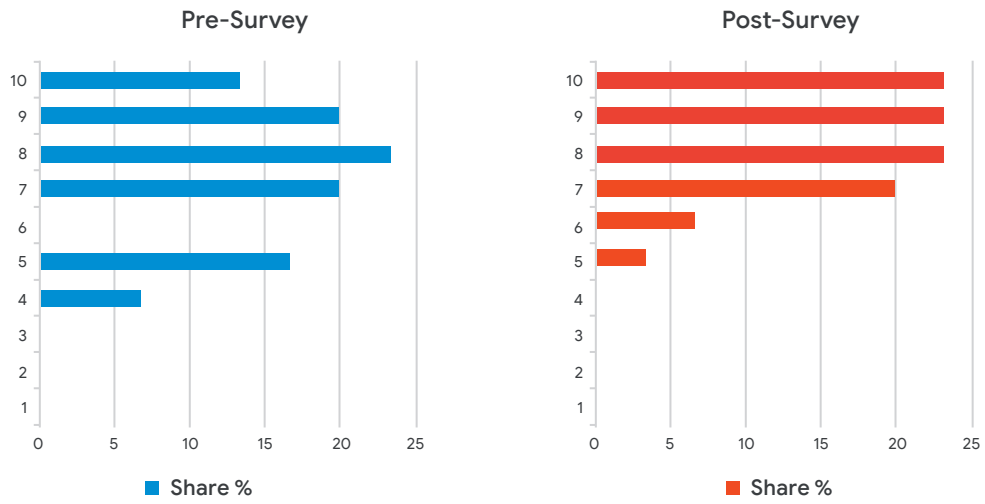
Chart 3. Involvement of students in the classes



Source: Research results June 2022-January 2023

Also noteworthy is **the double increase in high student engagement in classes** (from 6.7% to 13.3%) **when using Chromebooks and Google ecosystem applications**.

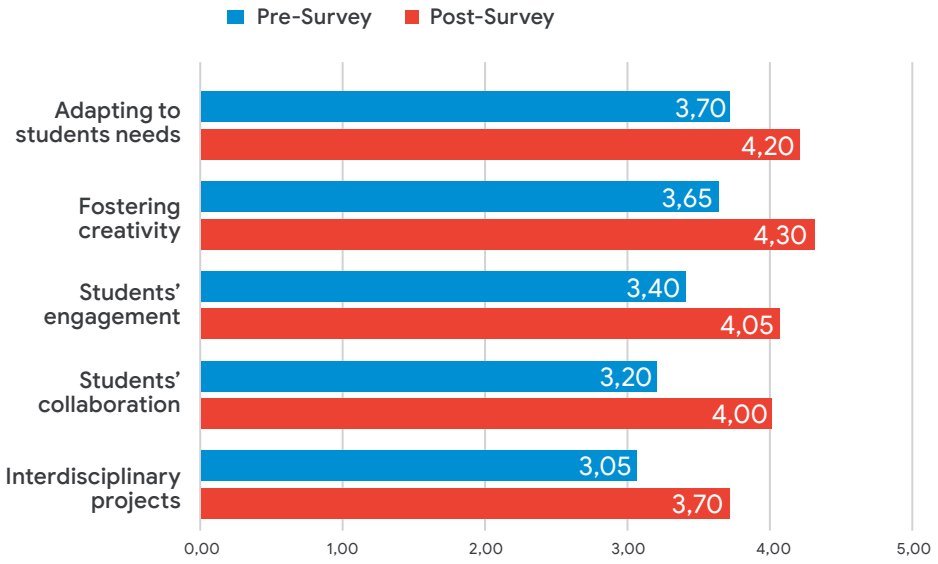
Chart 4. Google ecosystem app recommendation level



Source: Research results June 2022-January 2023

The over 10% increase in the level of recommendations recorded in the relatively short period of the project (greater share of high 9 and 10 grades and a significant reduction in the share of low 4 and 5 grades) confirms the good assessment of teachers' experiences with the use of Chromebooks and Google applications in the didactic process. The table below presents sample statements of teachers who participated in the project "Digital Transformation of Polish Schools", going through the process of professional development in the use of information and communication technologies in teaching.

Chart 5. The use of technology in the classroom (teachers' opinion)

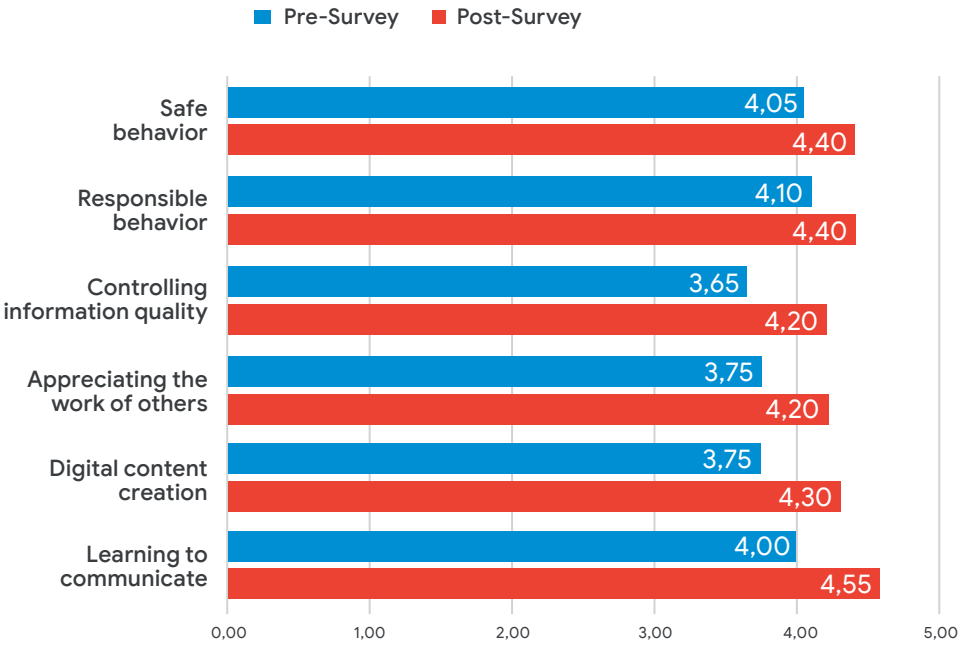


Source: Research results June 2022-January 2023

The results in this area indicate that teachers' opinion on this subject is on the rise. However, while the criteria for adaptability and fostering creativity show similar results in both schools. However, the criteria for engaging

students, their cooperation and conducting interdisciplinary projects are already divergent in both schools. This may be due to the fact that the high school class is the first class. The students got to know each other and the teachers. Hence, there may be difficulties in establishing closer cooperation. However, a positive aspect is the increase in teachers' assessments, especially in terms of student involvement and cooperation. These results point to the positive aspects of using digital tools in team building and communication.

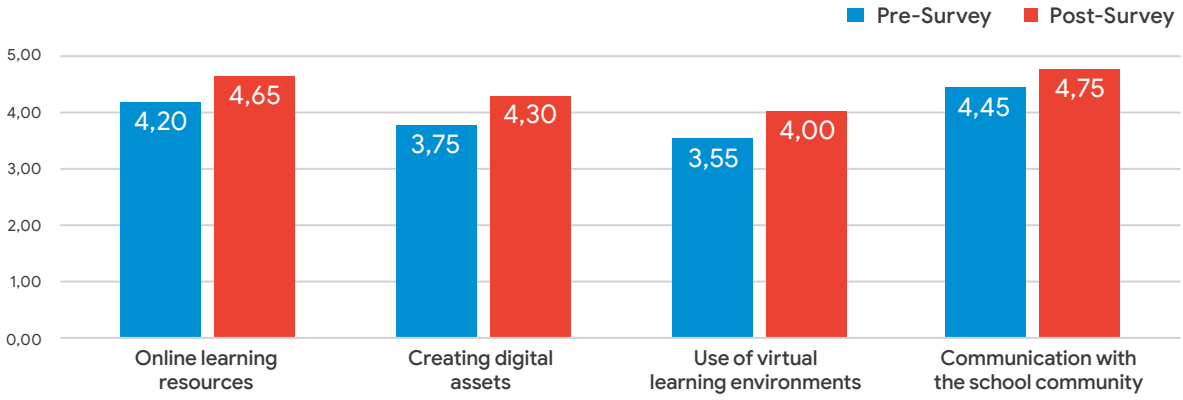
Chart 6. Students' digital competences (teachers' opinion)



Source: Research results June 2022-January 2023

Teachers' initial ratings were above average, but there are also visible increases in grades in all assessed elements. It is interesting that in elementary school these increases were not as high as in secondary school. However, it should be remembered that the teachers' assessments concerned all students with whom they had contact, not only those selected for the project. It is noteworthy that teachers highly evaluate students in terms of safe and responsible behavior in the virtual world. In addition, it is worth noting that particularly high increases in ratings occurred in the criterion regarding the creation of digital content and methods of communication. Which will certainly be developed in the future.

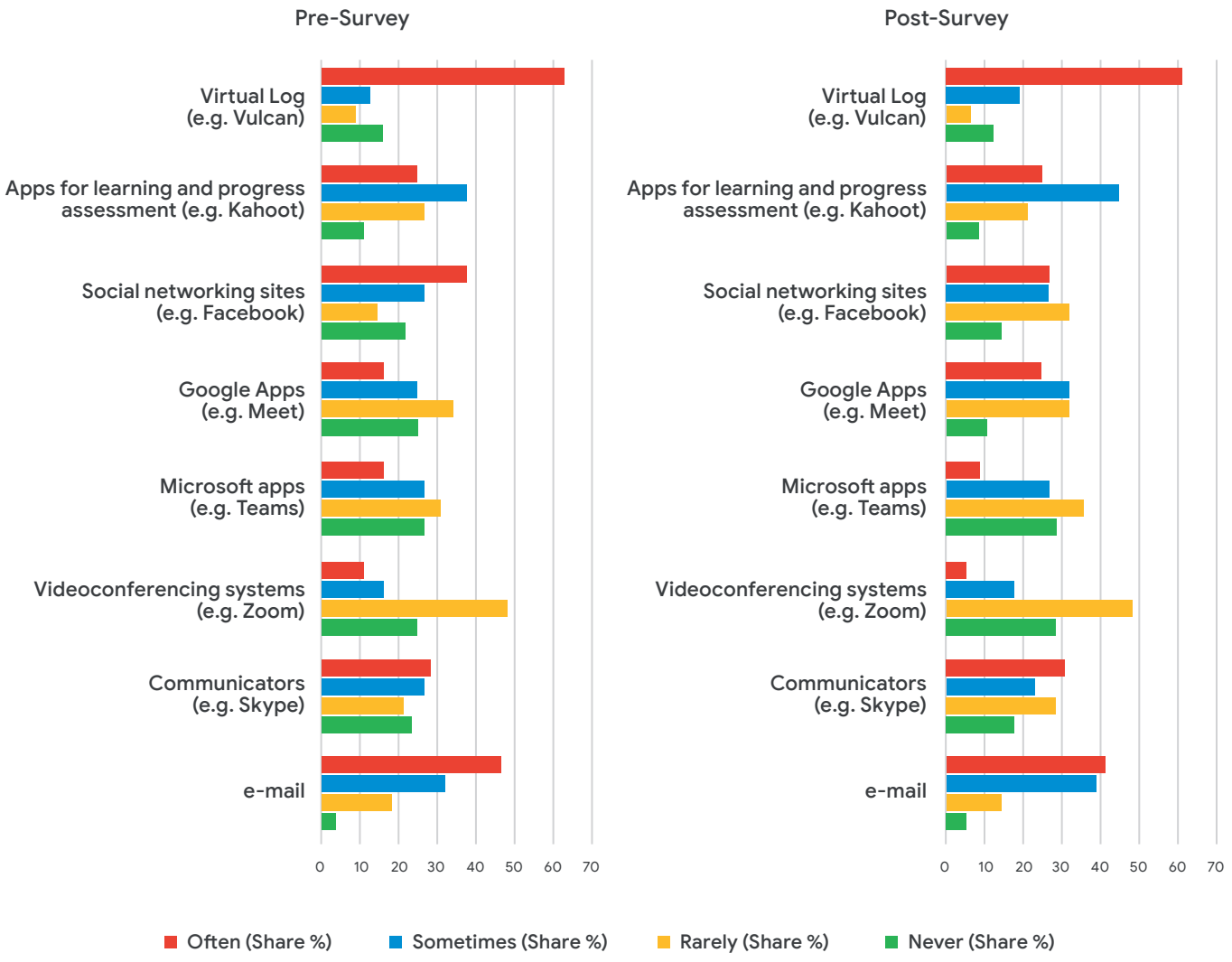
Chart 7. Teachers' digital competences (self-assessment)



Source: Research results June 2022-January 2023

It is a fact that teacher ratings for online learning resources are high, and in this case, the increase in ratings was not so high. A similar situation occurs in the case of the element related to communication opportunities with the school community. However, the element concerning the use of virtual learning environments deserves attention. For this criterion, the initial ratings were the lowest in the given area, and the increase in ratings is also not too high after the training cycle. This may be due to limited time to absorb the knowledge from the training, as well as the very period in which it was possible to apply the newly acquired knowledge.

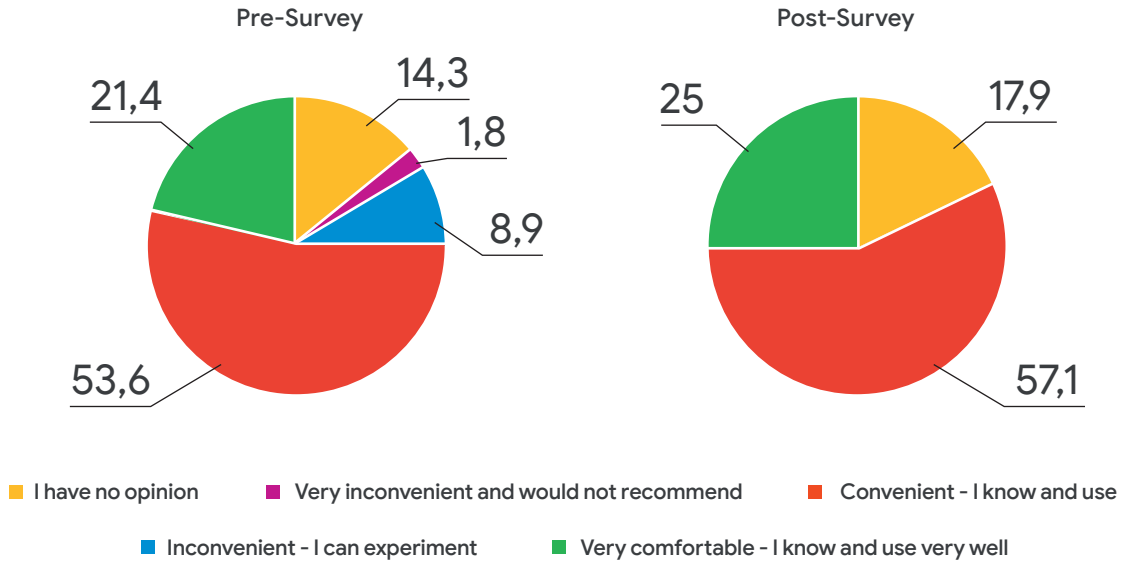
Chart 8. Frequency of use of systems and technologies (ICT) by students



Source: Research results June 2022-January 2023

Respondents indicated that the solutions in the field of systems and technologies (ICT) most often (often and sometimes) used by them in didactic activities are e-mail (80.7%), virtual journal (VULCAN) (83.3%) and Google applications (57.1%). Complementary solutions from providers other than Google are videoconferencing systems (e.g. Zoom), which are rarely used (48.2%). Similarly, applications to verify learning progress (e.g. Kahoot) and messengers (e.g. Skype) are also sometimes used (44.6% and 23.2%, respectively). For the applicability of systems and technologies (ICT) such as Google applications (e.g. Meet), the result is nearly one-fifth (16.0%) higher than the baseline, i.e. the state before the implementation of a comprehensive training for teachers on the use of Google Workspace ecosystem solutions for Education.

Chart 9. Evaluation of students' experiences with the use of Google applications in the educational process



Source: Research results June 2022-January 2023

From the perspective of their previous experience in the use of Google Workspace for Education application ecosystem solutions in the educational process, students assess them as convenient and very convenient (82.1%).

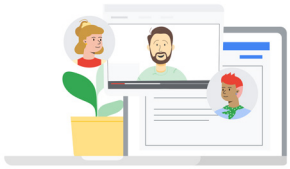
Table 3. Sample statements of teachers from schools covered by the project

„The project met my expectations, I learned how to work with digital tools on a daily basis and how to effectively encourage and interest students so that the acquisition of knowledge was easier for them."
„The project gave me the opportunity to increase my own skills and thus the possibility of transferring the acquired knowledge to students using professional digital education systems and tools."
„I hope that the digital transformation will cover our entire school and increase the involvement of students in acquiring new skills and knowledge. In addition, it will facilitate the transfer of information between the student and the teacher based on one secure, integrated IT environment. It will also increase students' awareness of how important it is to create an appropriate cloud work environment and will make it easier for them to use information technology freely in the future."
"I passed both certificates and I like and use the Google environment at work and every day."

Source: Research results June 2022-January 2023

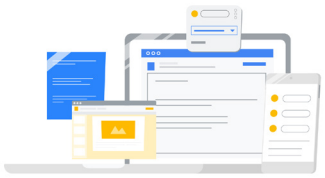
RECOMMENDATIONS

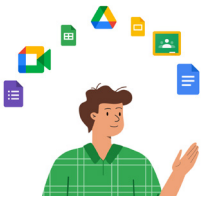
Conclusions and observations derived from the results of scientific research conducted as part of the “Digital Transformation of Polish Schools” project, which clearly confirm the legitimacy of using modern information and communication solutions in teaching and learning processes, prompt the research team to present the following recommendations in relation to the research area:



Teachers and students should have access to a variety of ICT devices, applications and tools to support teaching and learning, including Chromebook laptops (and other cloud-ready operating systems), as they represent a paradigm shift that is likely to have significant implications for the changing labor market.

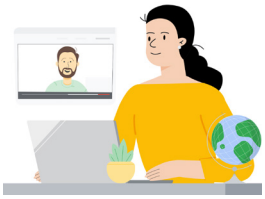
Devices and applications working in a secure and closed cloud environment („cloud first” approach) have a positive impact on the effectiveness of teachers’ work and learning of students, who are more and more willing to work and learn in the virtual space of the Internet.

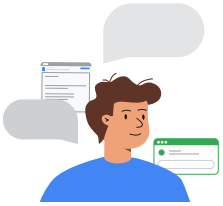




Institutions responsible for the development of the education system should ensure appropriate infrastructure in schools, in particular stable and broadband Internet access, which is a prerequisite for the implementation and development of modern education based on information and communication technologies.

The 1:1 education model with the use of modern, cloud-based ICT solutions should be widely used and promoted in the educational system as expected by the system’s stakeholders (teachers, students and parents).



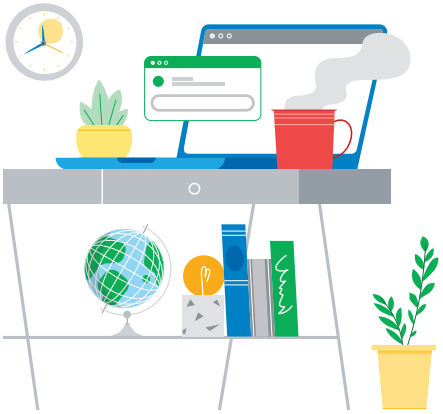


The objectives of the digital transformation of the school should be communicated to stakeholders (internal and external) in an open and clear manner so that the value of digitization of the Polish school is widely recognized.

The education system should provide teachers and school administrators with high-quality support for professional development, in particular in the field of digital competences through participation in training, and the need for professional, cyclical certification as confirmation of possessed knowledge and skills in this area.

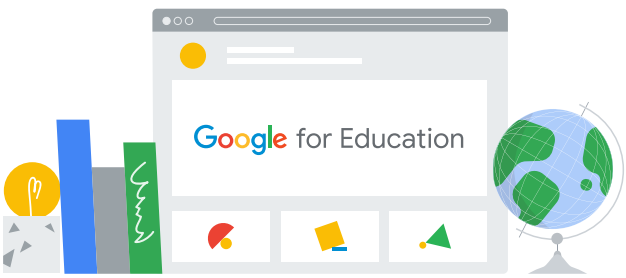
FURTHER RESEARCH

Due to the idiographic nature of the study and the time of its implementation, there is no basis to demonstrate the durability of the trend, i.e. the consolidation of the change in terms of time and ways of using the Google for Education environment. Only by continuing the project and extending it to other schools would it be possible to demonstrate the preservation of the introduced changes in the way of teaching and learning as a result of the adoption of new technologies. However, already at this stage, it is possible to indicate the prerogatives that support the replication of the project. Scalability is possible. The provision of tools and software with added value in the form of teacher training is underway. Cloud technology with the Google for Education suite of apps combined with portable Chromebook devices means versatility, community, sharing and freedom. Teachers and students immersed in the ecosystem can participate in the learning and teaching process anytime and anywhere.



The project “Digital Transformation of Polish Schools” is in line with the generally prevailing trends of digitization, automation and computerization covering the global economy, where almost everything is transformed towards the dictates of digitalisation. The modern school of the future is a school open to change, a relational school and a technological school. Building such an image of school as a place preparing the society of the future is able to fulfill the dreams of young people about a better tomorrow, including interesting work, interesting challenges and conquering the world. In order for minds to be open and ready for change, they must be properly shaped. And this is where new technologies come in handy.

The “Digital Transformation of Polish Schools” project is the best example of this, showing how technology can support young people and employees in taking up this important challenge. The shaping of minds is indisputably the most important task. It is today’s responsibility for the future. The design and research following the ongoing project should be continued. This is important due to the confirmation of the theses about educational excellence in the digitization trend. The world is undeniably changing. Among many trends, technology is dominant. There is no human activity today that is not supported by technology. Therefore, the digital exclusion of subsequent generations cannot be allowed. To this end, the ideal to strive for is the creation of a coherent and relevant environment of collaborative education. Chromebook devices and applications of the Google for Education ecosystem result in the creation of such an interactive environment where learning from each other: students, students from teachers, and what is also starting to be observed teachers from students, gives the effect of collaboration supremacy over existing teaching. In this view, the dictate of technology becomes a positive disruptor.



APPENDIX

Devices specification used in the project **“Digital Transformation of Polish Schools”**.

	Student	Teacher
Product Series	IdeaPad Flex 5 Chromebook series	IdeaPad Flex 5 Chromebook series
Product Family	Flex5 CB 14IAU7	Flex5 CB 14IAU7
Procesor	CORE I3-1215U 1.2G 6C 8T	CORE I5-1235U 1.3G 10C 12T
RAM	8GB(4X16GX32) LP4X 4266	8GB(4X16GX32) LP4X 4266
SSD	256GB SSD M.2 2242 G3 TLC	256GB SSD M.2 2242 G3 TLC
Screen	14 WUXGA GL 300N MT N	14 WUXGA GL 400N MT N SRGB
Battery	4CELL 51WH INTERNAL	4CELL 51WH INTERNAL
OS	CHROME FREE	CHROME FREE
Color	STONE BLUE	STONE BLUE
Other 2	LENOVO DIGITAL PEN USI NO HPS	LENOVO DIGITAL PEN USI NO HPS
Power Adapter	45W USB-C 30%PCC 3P BK EU	45W USB-C 30%PCC 3P BK EU
Part Number	82T5000WPB	82T5000XPB