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THE EFFECTIVENESS OF USING GOOGLE TOOLS IN SECONDARY SCHOOL - A CASE STUDY OF GRADE 7

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Abstract:
Within the framework of the Albus research project jointly implemented by Google for Education's official partner iCORE Mongolia, the Ministry of Education, and the General Authority for Education, the research team from the Mongolian National Institute for Educational Research conducted a pilot-study over a period of 3.5 months starting from November 2024 at the secondary school affiliated with the Mongolian National University of Education (MNUE). This study aimed to examine the impact of using Google's educational tools on teaching and learning processes. To address this objective, a mixed-methods approach was used to examine one pilot group and one control group of 7th-grade students from a selected school. Data on implementation and outcomes were collected and analyzed, providign the foundation for the study's conclusions and recommendations. According to the pilot study results, students' use of mobile phones during lessons decreased from 88.6% to 42.9% in the post-survey stage, while their participation in lessons using Chromebooks increased. Also, with the help of Google tools, students became more interested in their lessons, gained more self-confidence, and felt freer to express their own ideas. 71.4% of teachers agreed that using Chromebooks and Google tools supported students in working in teams, and 64.3% of students reported that it helped their communication with classmates. At the beginning of the pilot, about 40% of teachers used digital devices and software 3–4 times a week in classroom teaching,

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but in the post-survey stage, 92.8% of them used Chromebooks and Google tools during some or all lessons. In addition, teachers' digital skills improved, and students showed progress in their STEAM skills, information searching using search engines, and problem-solving skills.

Keywords: pre-survey, post-survey, Chromebook, Google tools, digital, technology

1. Introduction

As in many other countries around the world, Mongolia is placing increasing emphasis on developing 21st-century competencies across all levels of education—from early childhood to lifelong learning—due to the rapid advancements in science and technology, as well as the sudden and unpredictable changes occurring in society, the economy, and the environment (UNESCO, 2016). In this context, the Mongolian National Institute for Educational Research (MNIER) has organized two national conferences (MES, 2022) one of which was held in 2024 with active public participation, focusing on digital transformation in education (Itgel, 2024).

As a result of this conference, research (MNIER, 2023), programs and activities related to digital transformation across all levels of education were identified and set to be implemented through public-private partnerships at both the national and local levels (Parlament, 2020). The Ministry of Education implemented the "Albus" pilot study in 2024, in collaboration with the "Google for Education" program. Google's solutions provide teachers and students with hardware in the form of Chromebooks and access to Google Workspace for Education.

The pilot study investigated how teachers and students at the selected secondary school used Google education tools in their lessons and the effect of these tools on teaching and learning.

The research team from the Mongolian National Institute for Educational Research (MNIER) aimed to determine the effect of using Google for education products in teaching and learning.

2. Methods

The methodology used in the 2021 pilot study on the use of Google tools in middle schools in South Korea was adapted and adopted as a benchmark for this research.

The data were collected in two main stages: pre-survey and post-survey. To analyze whether there were changes in teaching and learning during the pilot, a control group was included in addition to the pilot group.

Data analysis was conducted using statistical software including SPSS-27, JASP, Stata and Jamovi. During the pilot study, data were collected through surveys, observations, and interviews to construct a dataset and which was then analyzed.

Quantitative data were analyzed using univariate analysis, parametric tests (t-test, paired t-test), and non-parametric tests (Mann–Whitney).

2.1 Limitation of the Study

The results of the study will be explained using an example from a particular class at one school selected for the pilot study. These findings have limited generalizability beyond the specific context of the participating school and/or 7th-grade students in Ulaanbaatar.

3. Results and Discussion

3.1 Teachers' Perceptions and Satisfaction Regarding the Use of Google Tools

The use of Chromebooks supported teaching and somewhat increased student engagement; however, teachers noted several challenges, including internet connectivity issues and students' difficulty maintaining focus.

Teachers thought that working in groups and helping each other was the best and most effective way to mitigate the issue. Although Chromebooks provide equal opportunities for all students, their use is limited in some subjects due to the inability to install certain programs that are required for specific assignments and curricula.

Among the 14 teachers who participated in the pilot, the main challenges in using digital tools and software for classroom instruction were poor internet connectivity and limited access to digital technology. It was evident that teachers needed additional time to develop their skills in the effective integration of digital technology into their teaching.

During regular 40-minute lessons, some teachers faced challenges such as a lack of skills in using interactive/smart boards, Chromebooks, and Google tools, as well as slow internet connectivity. In such situations, the issues were resolved by assigning exercises and tasks for students to complete either at home or on paper.

Students commonly faced issues such as being unable to submit assignments due to slow internet, forgetting their chargers, and running out of battery after using Chromebooks all day, which prevented them from using the devices in the last lessons.

3.2 Changes in Teachers' Instructional Practices

At the start of the pilot study, approximately 40% of teachers reported using digital devices and software 3 to 4 times a week during face-to-face lessons. However, by the post-survey stage, 92.8% of teachers (13 teachers) were using Chromebooks and Google tools in some lessons or throughout every lesson. Only one teacher used them 1 to 2 times per month, which was notable. This may be impacted by the specific characteristics of the subjects being taught and the teachers' attitudes toward using technology.

Teachers highlighted that, in addition to using Google tools, some of them also utilized other platforms and programs in their lessons. They emphasized how they effectively integrated technology with the lesson content and topics to enhance instructional outcomes.

The use of Google tools was believed to have brought changes to teaching practices. In comparison, the ability to "teach students in greater depth on the topic" was the least important aspect. Teachers have become more capable of providing clear and reasoned feedback on students' performance, and they have learned to make the core content of lessons more effective.

The use of digital technologies helped teachers enhance their organizational skills, with many teachers reporting an increase of 1-2 hours in screen time, while one teacher's screen time has increased to 4 hours or more.

Teachers gave more importance to using digital technology in the post-survey stage. Even though their recognition of the benefits of technology increased, some difficulties in using it were still present, as shown in the teachers' responses.

Chromebooks and Google tools not only help reduce teachers' workload but also enhance students' engagement in lessons, creating new opportunities to integrate technology effectively into teaching.

Working in an online environment, creating content, and exchanging information became more accessible to teachers, which encouraged their creative approaches. However, some teachers noted that they did not observe significant changes, as they conducted lessons in a practical format. Nevertheless, improvements were seen in student progress, particularly in the enhancement of digital skills.

Since the beginning of the pilot, the use of Google tools—such as Gmail, Google Drive, and Google Forms—has become more widespread, and Chromebook usage has also increased in the post-survey phase.

Table 1: The use of digital tools during the lessons

Group	Stages	Frequency	Mean	Std. Deviation
Pilot	Pre-survey	19	.1158	.13850
	Post-survey	23	.1217	.11661
Control	Pre-survey	19	.1684	.20290
	Post-survey	19	.1474	.11239

When the pilot started, 50.0% of the observed lessons were using digital tools in some way to deliver new information. By the final stage, this number increased to 61.9%. In the pilot group, there was visible progress in using digital tools, but in the control group, the results showed a decrease.

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Table 2: Changes in the use of digital tools in each lesson

Groups	Stages	Frequency	Mean	Std. Deviation
Pilot	Pre-survey	19	.3684	.33715
	Post-survey	23	.4348	.35530
Control	Pre-survey	19	.4079	.38379
	Post-survey	19	.3553	.32613

When observing the use of Google tools and other programs or apps in different parts of the lesson, no change was seen between pre- and post-survey. Teachers kept using digital tools in the same parts of the lesson as before.

Teachers believe that using Google tools provides several benefits for their teaching. For instance, the tools enhanced teachers' ability to analyze student performance, increased student engagement, and facilitated the alignment of instruction with students' individual needs.

3.3 Student Satisfaction and Perception of Using Google Tools

All students who participated in the pilot found the use of Google tools and Chromebooks engaging.

Students reported that the use of Chromebooks and Google tools supported the development of various skills, such as creating animations, answering questions, searching for locations, completing word puzzles, and practicing through games. Additionally, the tools allowed them to access supplementary resources like Canva, Pearson, and Edpuzzle, which positively influenced their creativity.

However, students also mentioned some challenges, such as internet interruptions, distractions, and playing games, with these issues being especially more common among boys.

There has been progress in students' ability to use Google tools. In particular, it has been observed that they are using tools such as Google Search, Google Slides, Google Drive, and Google Classroom more frequently compared to other tools.

Teachers believe that the use of Google tools supports student learning. In particular, they noted that students began using digital tools according to instructions, that the tools helped develop research skills, and that they increased engagement in lessons.

At the post-survey stage, to assess students' satisfaction, they were asked whether they would recommend using Chromebooks and Google tools to other students. The results revealed that 91.7% would recommend Chromebooks, while 88.5% would recommend Google tools.

At the post-survey stage of the pilot, the number of students using Chromebooks increased, while the number of students using smartphones dropped by 50% compared to the pre-survey stage. This serves as a key indicator of the pilot's effectiveness. While Chromebooks and Google tools provide some support in planning lessons and assessments suited to each student's needs, teachers expressed that the implementation is different for each teacher. Some teachers reported that they are beginning to gain

experience in this area, while others mentioned that they have started using the tools effectively.

Table 3: Changes in the use of digital tools in each lesson

Groups	Stages	Frequency	Mean	Std. Deviation
Pilot	Pre-survey	19	.0132	.05735
	Post-survey	23	.0978	.16409
Control	Pre-survey	19	.0000	.00000a
	Post-survey	19	.0000	.00000a

The use of digital tools by teachers to assess students and by students for self-assessment during lessons was examined. At the pre-survey stage, only one lesson out of 38 involved students performing self-assessment. However, at the post-survey stage, the use of Google tools for assessments increased, with teachers assessing students in 2 lessons, students evaluating their peers in 3 lessons, and students self-assessing in 2 lessons. This indicates that both teachers and students increasingly use Google tools for assessments.

According to the teachers, most of them think that using Chromebooks and Google tools (such as Classroom, Docs, Slides, Spreadsheets, etc.) helps improve students' STEAM skills. Also, 75% of the teachers agreed that using these tools brings positive changes to students' learning activities during the lessons.

As mentioned earlier, using Google tools for learning created many problems with the internet connection, as seen in the figure. However, there were no problems related to outdated technology or the teachers' skills.

3.4 Changes in Students' Socio-emotional Skills through the Use of Google Tools

We examined whether digital tools are necessary for developing students' socio-emotional skills and which tools are most effective in supporting their development.

Table 4: The suitability of digital technology in developing student' socio-emotional skills

Criteria	Average suitability			
	Mobile phone	Tablet	Chromebook	Laptop
Socialize with friends	4.57	3.89	3.94	3.91
Read e-books and textbooks	3.54	4.11	4.51	4.26
Watch movies	3.94	4.43	4.40	4.57
Do homework	3.49	4.34	4.54	4.31
Get additional information during class	4.06	3.69	4.34	4.14
Watch funny things	4.54	4.29	4.23	4.34
Learn how to solve problems	3.86	3.83	4.26	4.26
Learn how to work creatively	3.83	4.14	4.46	4.20
Collaborate	4.00	4.20	4.40	4.06
Play games	4.46	4.17	3.77	4.11
Average	4.03	4.11	4.29	4.22

A mobile phone is very good for playing with friends, watching funny things, and playing games. But Chromebooks are better than other devices for reading digital

textbooks, finding extra information during lessons, learning to solve problems, working creatively, and working with others. Children say other laptops are best for watching movies.

Chromebooks are more suitable than mobile phones for activities that support students' socio-emotional skills. However, they show slightly lower results compared to mobile phones when it comes to communicating with friends and playing games.

More than 70% of teachers believe that with the help of Google tools, students have become more interested in their lessons, gained more self-confidence, and feel more comfortable expressing their thoughts. Also, there is a need to teach and advise teachers on using Google tools to help students communicate better with their classmates.

Students also highlighted that because of weak teacher monitoring, they faced problems such as copying from other sources or classmates, not being able to fully use their devices or Chromebooks, feeling upset, isolating themselves, and falling behind in their learning activities.

71.4% of teachers agree that using Chromebooks and Google tools helps students work better together as a team, while 64.3% of students feel these tools improve their communication with classmates. There are clear changes in students' communication and collaboration after using Chromebooks and Google tools (such as Classroom, Docs, Slides, Spreadsheets) in teaching. In some cases, students worked together and improved their communication, but on the other hand, the use of technology sometimes caused distractions, feelings of isolation, and misunderstandings.

4. Conclusion

- To implement the pilot, the school improved internet access and provided laptops to teachers who previously did not have them. Additionally, to create conditions for using digital tools in every class, training managers collaborated with teachers to organize lesson preparation and schedule time to review lesson results. This demonstrates the school's commitment to promoting the use of Google tools.
- Initially, Google tools were seldom used at the start of new lessons, but their use has increased during lesson beginnings.
- Teachers' attitudes toward digital tools have changed. Compared to the start of the pilot, teachers showed a more positive view of using these tools for teaching and supporting student learning when the pilot results were reviewed.
- Teachers' digital skills improved during the pilot. Progress was made in the use of Google tools, with noticeable changes in monitoring lessons and students' performance, communicating with students, and increasing engagement through digital communication.
- Although using Google tools in teaching required teachers to spend a significant amount of time preparing learning activities, it increased student engagement and helped adapt instruction to the individual needs of each student.

- Students were very satisfied with Chromebooks, and besides learning to use Google tools, they showed progress in their STEAM skills and socio-emotional skills. Google tools also helped students develop independently.
- There was improvement in exploring and problem-solving skills for both teachers and students.
- The use of Google tools led to more experimental lessons based on subject characteristics, and there was an increase in assigning group tasks to students during non-class hours.
- Using Google tools made it more common to conduct subject-based experimental lessons, and giving group assignments to students outside regular class time became more frequent

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Conflict of Interest Statement
The authors declare no conflicts of interest.

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