

**The effects of using mobile technologies and ICT to students' attitudes and  
achievement**

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**Abstract**

This study examines how enhanced media-devices is used in classrooms in Kazakh schools from the perspective of students, teachers, and decision makers. Based on four fundamental research questions, the goal is to analyze the level and impact of mobile technologies on pedagogy and students' perceptions of mobile technologies use in the classroom. Although some schools are afraid to introduce too much enhanced media-devices into their practice, this study aims to prove that introducing mobile technologies into the teaching and learning process is extremely valuable. Despite some innovations in pedagogical strategy, including notable advances in the use of mobile technologies, most secondary schools still have a long way to go as schools around the world still have an old, teacher-oriented paradigm, as opposed to more modern, student-centered approaches. These results indicate that the use of mobile technologies elicit positive responses from students both in terms of how they perceive the mobile activities and how it improved their performance.

*Keywords:* enhanced media devices, multimedia, audio, graphics, video, and virtual reality.

The effects of using mobile technologies and ICT to students' attitudes and achievement.

Mobile technology and the Internet are fundamentally changing the way people communicate, work and play, and how they learn and learn. This chapter provides an overview of research on the development of technology in education, especially in mathematics education. This study investigated the effects of using mobile technologies to students' attitudes and achievement. A quasi-experimental mixed method design was adopted. The 70 participants were 9th grade students of NURORDA high school. There were two experimental groups and one no treatment control group. The experimental groups participated in a weekly mobile supported(iPad), collaborative learning activities spanning over two months. We used educational platforms as Stepik , Screenlife , IXL , KutaSoftware etc. A no treatment control group was adopted which was taught by traditional method. The experimental groups have positive perception of the activities evidenced by student interviews and end activity evaluations. Students' attitude to mathematics, as assessed by a mathematics attitude inventory, the significant increase in enjoyment for the experimental groups. A t-test of the gain score between groups showed a significant difference ( $p\text{-value is } 0.007 < 0.05$ ) , which indicates that the experimental groups had higher gains than the group with no use of enhanced media devices.

### **The potential of technology in everyday life**

Over the past few decades, technology has become an especially important tool in everyday life. Computers have become a common tool for communication, text processing and many other activities, including various types of multimedia, audio, graphics, video, and virtual reality. The development of the Internet and increased accessibility have opened a whole new digital world. Children are not only confronted with new information and computer technologies and mobile phones at school, but also at home. Many children now have computers at home and

have access to the Internet. They use computers and technologies every day for entertainment, communication, and education.

### **Technologies in Mathematics Education<sup>1</sup>**

One of the main goals of mathematics education is to ensure the success of all students in understanding the subject. Mathematics is considered one of the most complex and challenging subjects in the educational aspect. But at the same time, it is one of the most important fields of science, given that mathematical skills and knowledge are important in everyday life and there are many mathematical applications in other subjects and sciences. Christie (1993) argues that "mathematics is the basic tool for analyzing concepts in all areas of human activity" (p. 3).

For these reasons, mathematics is a subject to be taken seriously. Teachers should focus on understanding students' mathematical concepts and provide them with a quality educational environment. For many students it is difficult to engage in mathematical concepts. For learning to take place, students must be actively involved in learning the concepts or objects studied - abstract or specific (Liang & Sedig, 2010).

Given these problems in mathematics, teachers and educators have an obligation to facilitate students' learning and understanding of mathematics. A particularly important key to understanding mathematics is the use of visualization and representation in teaching and learning. As Duval (1999) pointed out, "there is no understanding of mathematics without visualization". (c. 13). Visualizations are designed for specific means, which allow students to study more complex mathematical concepts. Images and symbols of mathematics create a semiotic system that is fundamental to any mathematical activity (Chiappini & Bottino, 1999).

**Integrating Technology into Mathematics.**

The technology is useful to help students view mathematics not only as a set of procedures, but also as reflection, research, problem solving, generating new information and asking new questions. In addition, "it helps them better visualize certain mathematical concepts" (Van Voorst, 1999, p.2). Research has shown that actions that contribute to the construction of images can significantly improve the study of mathematics (Wheatley & Brown, 1994). Greeno and Hall (1997) make several observations about the importance of concepts, concluding that:- computer technology is a powerful tool for thinking- understanding of mathematical concepts and procedures is enhanced when students are able to transfer understanding between different notions.- they can provide students with useful tools to build understanding, communicate information and demonstrate reasoning. Ashburn and Floden (2006) also stress the importance of using technology in mathematics, noting that tools that instantly link graphical and symbolic representations of mathematical expressions can help make understanding more accessible to students. "Simulations that make abstract concepts visible and manageable can help students understand the nature and application of key ideas" (p. 30).

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## **Footnotes**

I started this action analysis in my nine -grade scientific discipline schoolroom as a result of I had determined the interest that students had possessed after they had seen that the Mathematics could be taught by using mobile and other new enhanced devices, made a decision to implement the employment of technology into the schoolroom to look at any changes in educational performance and student action.

- Of course, to obtain a more reliable assessment of enhanced media devices requires to analyze involved a larger number of students - at least 300 people to get a statistically representative picture. However, the data obtained is sufficient to put forward a hypothesis about the serious need to search the enhanced media devices and the premature launch of this technology for mass use in schools in Kazakhstan, especially in regular, municipal schools .In particular, the following issues need to be addressed:
  - ● compatible with all the most common types of devices
  - ● ability to view materials even with low Internet bandwidth
  - ● compatible with all major types of images and video files\* develop a methodology for optimal use of technology in secondary education (in what subjects, for what purposes, using what means of involvement, etc.).

Tables

Table 1

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**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
1	Pair pretest	7.0833	24	4.50040	.91864
	posttest	19.4375	24	4.64691	.94855

**Paired Samples Correlations**

		N	Correlation	Sig.
1	Pair pretest & posttest	24	.538	.007

**Paired Samples Test**

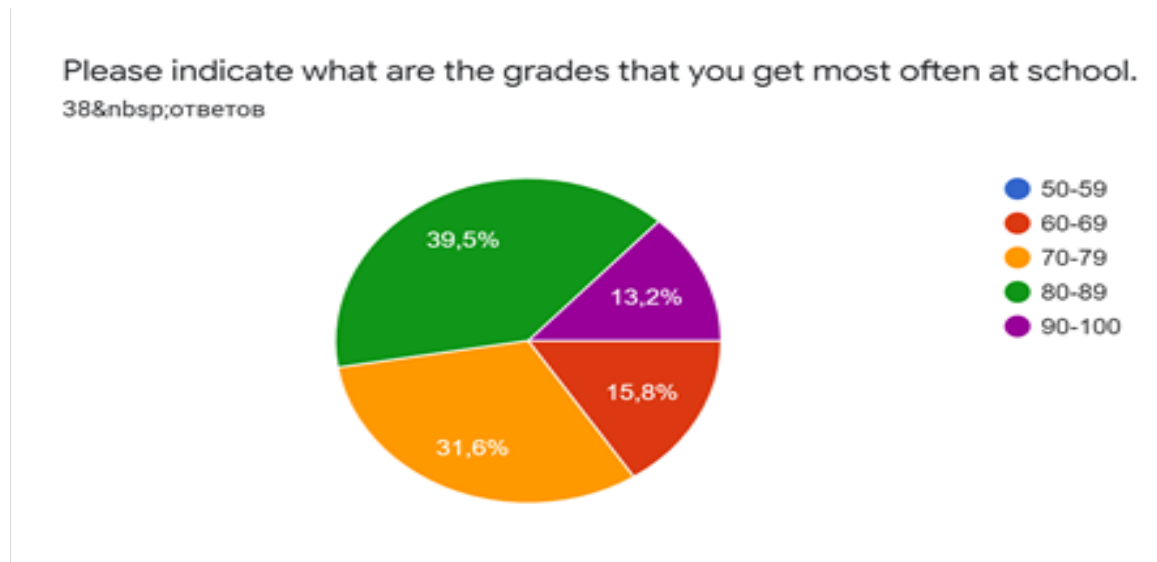
	Paired Differences				f	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		
				Lower		



air 1	pretest	12.35417	9980	4.3	9811	.8	14.21204	10.49629	13.756	3	000
	posttest										

*Note:* In November-December 2019, 11 more lesson plans were done for seven different lessons on the topic "Geometric progression" in the subject "Algebra": Few types of math platforms were used in November-December 2019 to approximately 20 students of the "9B" class. This was an experimental class of the project, where the effect of the new training format was measured. Students watched videos and solved math problems from several school tablets. The rest are from personal mobile phones and tablets. The videos were viewed at the beginning of the topic study. In parallel, two control classes were selected for the experiment, which studied the same topics with the same teacher, but without using enhanced media devices. In these classes, the number of students was slightly higher than in the experimental class, but comparable. In addition, in the second half of January 2020, an electronic survey was conducted among students of all three classes using the Google Forms cloud application. The questionnaire contained from three to seven questions, depending on whether a student from an experimental class or one of the control classes filled out the questionnaire.

Figures title:



Please indicate to what extent do you agree with the following statements.

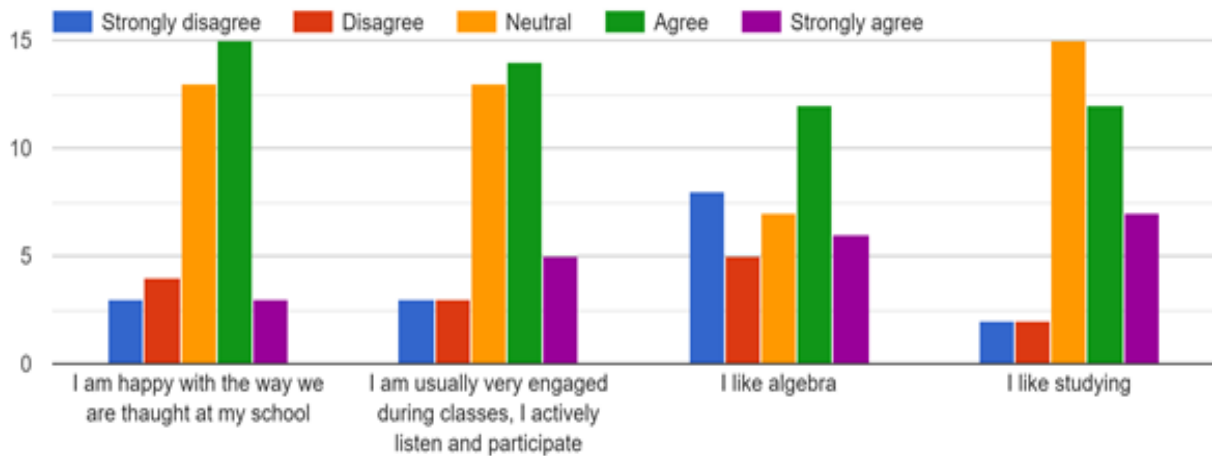


Figure 1. 38 students from three classes filled out the questionnaire: "9A" class-16 students, "9B" - 10 and "9C" - 12. Answers to the questionnaire are available here. The vast majority of students claim that they study well - at least 70-79, and more often 80-89 out of 100 points.