

RESEARCH ARTICLE		Research about the role of information technology in modern education	
Mailbi Aissa		Doctor (PhD in pedagogy)	
		Senior Lecturer Azerbaijan State Pedagogical University	
		Azerbaijan	
		https://orcid.org/0000-0002-4693-0321 , gumel.mammadova21@mail.ru	
Doi Serial		https://doi.org/10.56334/sei/8.5.34	
Keywords		Modern technologies, traditional teaching, teaching methods, secondary school, distance education	
Abstract			
One of the key elements of a rapidly changing world is the rapid development of modern technology. The .steps taken since the beginning of the 21st century to apply and improve smart technology have paid off. Today, the fact that these technologies are part of our lives makes people dependent on these technological tools. The vastness of the virtual space, the availability of high-speed Internet, the fact that a few years ago some information and tools were inaccessible to humans, but today access to these tools show that the development of modern technology means, in principle, for everyone, including useful r school students. As modern technological opportunities began to spread on a larger scale, changes began to take place in the teaching and learning process, the greatest result of which was the abundance of information in the organization of modern teaching and learning. In the past, traditional methods were used in education, but in modern times, this trend has changed and the organization of teaching is carried out using modern technological means.			
Citation			
Mammadova G. (2025). Research about the The role of information technology in modern education. <i>Science, Education and Innovations in the Context of Modern Problems</i> , 8(5), 334-3340; doi:10.56352/sei/8.5.34. https://imcra-az.org/archive/363-science-education-and-innovations-in-the-context-of-modern-problems-issue-5-volvi-2025.html			
Licensed			
© 2025 The Author(s). Published by Science, Education and Innovations in the context of modern problems (SEI) by IMCRA - International Meetings and Journals Research Association (Azerbaijan). This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).			
Received: 12.02.2025		Accepted: 26.04.2025	
		Published: 20.05.2025 (available online)	

Introduction

This topic is considered more relevant than other topics, and the scope of research on the topic is much wider. In particular, it is important to note that the application of modern technological equipment to increase the intellectual development of kindergarten and high school-age children and the level of ability of both kindergarten and high school students to use them is one of the main areas of research. In principle, the topic consists of three main parts. The first part examines the grouping of children aged 0-18 by age groups and their ability to use modern technological opportunities. The second part examines the impact of the Covid-19 pandemic on the application of modern technology. In the third part, along with the advantages, the disadvantages of the application of modern technological equipment were studied. This article can also be used by undergraduate, graduate, and doctoral students in higher education, researchers, and elementary school teachers. The article also explores the similarities and differences between traditional learning and interactive learning.

Methodology. Analysis was conducted with the study of the sources related to the subject, the analysis of the results obtained, the analysis and synthesis of the arguments, and also the comparative analysis method.

Discussion

At the end of the twentieth century and the beginning of the twenty-first century, the rapid development of technology began to have an impact in the political, economic, social, cultural, educational and other fields. The connection to the world's single Internet network, the rapid development of science in the field of technology, the invention of new computers and other mobile devices, has given impetus to the rapid development of information technology [The role of information technology in modern education, 2020].

As a result of the development of information technology, some similarities and differences between emerging innovative teaching and learning and traditional teaching and learning have begun to emerge. At the same time, it is possible to see some advantages and disadvantages between these two trainings and teaching. Due to the development of technology, the application of innovative innovations in education can be divided into several stages and directions. This stage and direction can be listed as follows [Himmelsbach, 2021].

- ✓ Pre-kindergarten period (0-3)
- ✓ Kindergarten period (3-5)
- ✓ Preschool period (5-6)
- ✓ Primary education period (6-10)
- ✓ Secondary education period (11-16)
- ✓ Senior secondary education period (17-18)

The pre-kindergarten period covers the period of about 0-3 years, and during this age there is almost no direct contact of children with technical devices and mobile devices. Because the ability of newborns to perceive and perceive and intuition is very limited at that time, it can even be noted that children of that age do not even have the ability to perceive the harmony of different sounds and colors. That is why it is impossible for them to use technological means. [“Impact of technology on kids today (and tomorrow)”, 2019].

The kindergarten period covers about 3-5 years. As the kindergarten period is considered to be the first stage of training and education for children, during this period children can be allowed to use technological devices and mobile devices under supervision for a certain period of time. For children of this age, it is more interesting to watch cartoons, use game applications developed by different programmers, play fun and intellectual games. One of the important issues here is the teaching of new foreign languages to children at an early age, especially in kindergarten, both by kindergarten teachers and by parents at home. Taking advantage of modern technology, it is possible to teach a foreign language to young children in an easier and more understandable way, using a wide range of technological methods, in contrast to the traditional method. While access to information for kindergarten-age children in the traditional way of teaching and learning only increases the responsibility of teachers, as modern technology expands, it becomes easier for children to access information and perceive it more visually, and the burden of responsibility is divided into two parts.

1. Responsibility of the kindergarten teacher
2. Parental responsibility

Kindergarten teachers have a greater responsibility in organizing training and education using both traditional and modern technological methods. This is because they need to encourage children to understand the tasks more easily, using both traditional methods and modern technological opportunities. Knowledge of both methods is one of the main conditions for this.

The main responsibility of parents in the organization of training and education of children of kindergarten age is to monitor the training and education of children in kindergarten by teachers, to monitor the implementation of homework given to children. If homework is given in a traditional way, it should be delivered to children in the same way, if it should be done with modern technological capabilities, then they should help children to solve homework using modern technological opportunities. When we talk about modern technological methods, the main issue here is the organization of training and education for kindergarten-age children using mobile applications. [“Effective Classroom Practice: Preschoolers and Kindergarteners”, 2012], [“How to Create an Amazing Tech Savvy Kindergarten Today”].

For children, *the pre-school* period begins after kindergarten, and this period covers children aged 5-6 years. During the pre-school period, direct contact is established between children and teachers, and children begin to improve what they learn during kindergarten. During the pre-school period, which covers a year of training and education, children mainly try to develop writing, reading, arithmetic, as well as other knowledge and skills, and complete preparation for primary school. During this period, teachers mainly use two methods, which are traditional and modern technological methods.

Teachers try to teach children in more traditional ways when they resort to traditional teaching and learning methods in pre-school education. Of course, this method has been used in practice for many years, but it has not been possible to achieve such an effective result. When analyzing the process of involving preschool children in teaching and learning using traditional methods and modern technological capabilities, it can be concluded that the modern teaching method can be considered more effective. It is important to note not only the approach to teaching and learning of children, but also the abundance of information. It is also easy for teachers to improve the quality of teaching and learning of preschool children by using modern technological opportunities. In other words, teachers who use the traditional method are more likely to use state-approved curricula, which are not considered to have such a significant impact on the quality of education in modern times. However, teachers who use modern teaching and learning methods can take advantage of technological innovations to further improve the quality of teaching.

The main innovative methods used by teachers for modern teaching and learning methods are to use tools that meet the requirements of the modern era and help children to remember more easily. There are two main goals in preschool education.

- ✓ First, do not overwork children mentally,
- ✓ Second, to make sufficient use of government-sponsored textbooks and additional textbooks.

Adherence to these two principles creates a communicative relationship between preschool and primary education, which ultimately allows children to receive a better education.[Steinhoff , 2016], ["Technology in Preschool Enhances Interactive Learning at Little Sunshine's Playhouse"].

Children's *primary education* covers the period between the ages of 6 and 10, which begins after the pre-school period and lasts for 4 years. During this time, teachers have the opportunity to provide children with a wider range of information using more innovative opportunities and modern teaching methods. As a result of the development of modern technologies, textbooks taught in primary school are published in both paper and electronic forms. In addition, as children progress to the upper grades each year, their workload increases and the scope and topics of the lessons become more difficult. Here, also the differences between the traditional method and the innovative method are beginning to be felt. In traditional methods, teachers use modern paper-based teaching and learning methods, mostly using paper-based materials and state-approved materials. This is not so effective for primary school children, both in terms of quality and quantity. However, training and education provided to children using modern technological innovations and innovative teaching methods not only have a positive impact on their mental development, but also stimulates the increase of scientific knowledge. It should also be noted that with the full use of modern technology, especially mobile devices, it is possible to provide children with information in the primary school. One of the main reasons for the high level of development of education in the developed countries of the world is the sufficient use of modern technological means and the availability of direct access to high-speed Internet for electronic means.

The method of organizing lessons in accordance with modern teaching methods using mobile phones, tablets and computer programs can also be considered as a clear example of adequate use of modern technological opportunities. These electronic tools explain lessons to children visually, conduct research on the Internet and provide additional materials and teaching materials for children. In the context of children's acquaintance with the virtual world, they both acquire certain innovations using entertaining programs, as well as solve tasks in a more entertaining form and without tiring their minds.[Tahir, Arif, 2016:103-129], ["How Primary Students Can Use Technology.."].

The ***secondary education period*** is the post-primary education period, and children in general secondary education are between the ages of 11 and 16 and cover grades 5-9. In contrast to primary education, general secondary education has more hours, curriculum and subjects, and this trend continues from 5th grade to 9th grade. In this period, compared to the period of primary education, children's intellectual abilities are increasing, and the worldview is being formed to some extent.

The recent expansion of technological opportunities has also created additional opportunities for children to increase both their intellectual abilities and their scientific potential. Teachers who prefer to use innovative opportunities try to use more interactive teaching methods with children starting from the 5th grade. Of course, both traditional and modern teaching methods are used during this period of education. As this period is considered to be very important for the future of children, serious attention is paid to the scientific development of children during this period.

If education is organized on the basis of traditional methods during this period, then classes are held only within the curriculum set by the state, using paper-based materials, far from technological innovations. Of course, it is difficult to imagine that this method would be so effective, given the physical and mental development of children at that time. Therefore, the current teaching method is a modern teaching and learning method that is rich in more innovative opportunities, meets the requirements of modern times, has sufficient information capacity, and is adequate to the latest technological capabilities.

In modern times, in order to organize the quality of teaching and learning in some schools, a number of pilot projects are being implemented, the main part of which is the general secondary education period. The focus of these pilot schools is on the contribution that both teachers and students can make to teaching and learning using modern technology. These pilot schools are increasingly using electronic media to improve the quality of education and increase children's intellectual abilities. Here, electronic textbooks, electronic boards, electronic maps, electronic libraries, etc. are adequate with the expansion of technological capabilities.[“New technologies and 21st century children: Recent trends and outcomes”, 2018], [“What Technology Can And Can’t Do For Education”, 2020].

Senior secondary education period is estimated as the period of education of young people aged 17-18. Students studying during this period are aware of almost all technological innovations and are able to take full advantage of these technological tools. Therefore, one of the main issues in schools today is to organize the training and education of students studying in senior secondary education through electronic means. The vast majority of students in 10th and 11th grades are able to use mobile phones, tablets, laptops and other electronic devices. This requires that students in that age group be organized in accordance with modern teaching and learning aids. On the other hand, the vast majority of high school students go to university for preparatory courses, where it is necessary to take full advantage of modern technology.

Senior secondary education period is considered to be the most advanced stage of both physical and mental development of students. At that time, we can witness the process of self-improvement of young people who have already reached adolescence using technological innovations. The issue of childhood and quality of textbooks published today is one of the most topical issues. In previous years, teaching and learning in schools and higher education institutions were organized in the traditional way, but in modern times, the teaching and learning process has begun to be carried out with the help of electronic means. On the other hand, teachers have a great responsibility to organize this teaching and learning process. There are a number of things teachers need to do in this process.

- ✓ To learn more about the latest technological tools,
- ✓ To apply the learned technological techniques in practice,
- ✓ To build the teaching process with 10th and 11th grade students in accordance with these technological innovations, etc.

Compilation of modern teaching aids in electronic form, development of entertaining games that increase the scientific base through a number of mobile applications and have a positive impact on the mental development of children, creates great interest in the organization of training and education in children in accordance with modern

technology. In previous years, due to the lack of modern technological capabilities, the principle of teachers working with students was both simple and small-scale. Of course, this was not enough for children in high school. Now it is possible to create an electronic library at the expense of modern technological capabilities, which can be said to be very useful for both teachers and students preparing for higher education. In addition, the creation of e-books has greatly facilitated the work of students and teachers. Taking advantage of the opportunities created by modern technology, it has a great role in the daily updating of technological innovations in various fields of science for high school students, in particular, in the organization of scientific research and laboratory work, electronic testing, data collection and delivery. [“Children, technology and teaching”, 2018], [“Children in a Digital World”, 2017].

At a time when *the Covid-19 pandemic* was spreading rapidly around the world, restrictions were imposed in almost all areas. In addition to confining people and restricting their free movement in a number of areas, serious restrictions have been imposed on their daily activities. Of course, there was education in these areas. From the very beginning of the pandemic, almost all countries of the world began to move to online education by closing kindergartens, schools and universities in order to reduce the number of infections and reduce mortality. Although this form of teaching created some difficulties in the beginning, it is possible to say that in the next stage it has become an established system. Although online classes in secondary schools from first grade to eleventh grade prevented the spread of this deadly virus to some extent, they did not have such a positive effect on the quality of education in general. Of course, there are a number of reasons for this. These are;

- ✓ Not having the same internet speed all over the world,
- ✓ Being new of the online teaching method to the modern education system,
- ✓ Lack of online teaching experience for teachers and students,
- ✓ Significant differences between the online form of education and the traditional form of education,
- ✓ Using different forms of programs for the organization of education by each institution.

Of course, the speed of the Internet is not the same all over the world, and therefore organized training can not have the same effect in all countries. For example, the high speed of the Internet in Western countries has helped to establish a proper education system, as well as a more comfortable learning process than in other regions. In France, Germany, England, Italy, Canada, some Scandinavian countries and others, this experience gave better results than other countries. However, this quality was not achieved in countries with low internet speeds.

The fact that the online education system is new to the modern education system can also be considered as one of the factors affecting the quality of education. Along with the advantages of the modern education system, it is possible to note that it has such weaknesses. Because it is very difficult for good school children, especially young students, to join the education using these technological means.

The fact that the practice of organizing teaching and learning online came to the fore after the emergence and spread of the Covid-19 pandemic shows that this system is new for teaching and learning, and therefore distance learning is a new method for both teachers and students.

After the transition to distance education, it became clear that there were significant differences between the application of teaching methods organized by modern technological methods and the application of traditional teaching methods. During the organization of teaching by traditional methods, students are forced to come to school and come into direct contact with the teacher. In this case, the teacher is able to better focus the attention of students, which allows for better organization of teaching. However, in the organization of distance learning with modern technology, remote control of lessons is not enough to draw children's attention to learning more seriously. This leads to a general decline in education.

Teams and Zoom are the most widely used distance education programs since the Covid-19 pandemic began to spread. Another advantage of these programs is that there are no restrictions on the number of participants. At the same time, it is possible to organize different groups through these programs, which makes it possible to organize group lessons in general. [Altwayjry, Ibrahim, Binsuwaidan, Alhajjar, Alsouk, Almutairi:2021]

Although modern technological innovations have some advantages in the organization of training and education, it is possible to note that they have disadvantages. Of course, the fact that technological devices have a strong ability to emit radiation, first of all, weakens the human body, especially the eyes. On the other hand, access to the Internet and the presence of different games outside of class are addictive for children[“Children in a Digital World”, 2021], [“Lessons from Remote Learning During COVID-19”, 2021].

Conclusion

As a result of research on the topic, it can be concluded that the positive effects of modern technology on the organization of teaching and learning are greater. These effects not only improve the modern education system, but also have a positive impact on the organization of training and education of schoolchildren. One of the main advantages of modern technology is the electronicization of textbooks, the development of applications for the development of the learning process on mobile devices, the use of virtual space by children, more convenient access to educational information.

The fact that the topic is generally divided into several parts allows us to understand it more deeply and clearly. That is why the main research part of the general topic was studied by dividing and analyzing school-age children according to the educational period. At the same time, the issue of when to apply technological opportunities at a higher level and its advantages and disadvantages were studied.

References

1. Altwajry N., Ibrahim A., Binsuwaidan R., Alnajjar L.I , Alsouk B., Almutairi R. (2021) “Distance Education During COVID-19 Pandemic: A College of Pharmacy Experience”// Risk Management and Healthcare Policy 2021:14 2099–2110, <https://www.dovepress.com/distance-education-during-covid-19-pandemic-a-college-of-pharmacy-expe-peer-reviewed-fulltext-article-RMHP>
2. “Children in a Digital World” (2017), https://www.unicef.org/media/48581/file/SOWC_2017_ENG.pdf
3. “Children, technology and teaching” (2018), <https://www.oecd-ilibrary.org/docserver/f21353a9-en.pdf?expires=1636573129&id=id&accname=guest&checksum=B19A9E7955373CE578D2B272E457239B>
4. “Effective Classroom Practice: Preschoolers and Kindergarteners” (2012), <https://www.naeyc.org/resources/topics/technology-and-media/preschoolers-and-kindergartners>
5. Himmelsbach V. (2021). “How Technology In The Classroom Can Impact Student Learning”, <https://tophat.com/blog/how-does-technology-impact-student-learning/>
6. “How Important Is Technology in Education? Benefits, Challenges, and Impact on Students Thursday”, (2020), <https://soeonline.american.edu/blog/technology-in-education>
7. “How Primary Students Can Use Technology Effectively Elementary teachers can – and should – incorporate technology thoughtfully, just as their secondary counterparts”, <https://edtechmagazine.com/k12/article/2019/02/how-primary-students-can-use-technology-effectively>
8. “How to Create an Amazing Tech Savvy Kindergarten Today”, <https://www.ictesolutions.com.au/blog/how-to-create-an-amazing-tech-savvy-kindergarten-today/>
9. “Impact of technology on kids today (and tomorrow)” (2019), <https://www.wgu.edu/blog/impact-technology-kids-today-tomorrow1910.html#close>
10. Li C., Lalani F. (2021). “The COVID-19 pandemic has changed education forever. This is how”, <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>
11. “Lessons from remote learning during COVID-19” (2021), <https://www.worldbank.org/en/topic/edutech/brief/how-countries-are-using-edtech-to-support-remote-learning-during-the-covid-19-pandemic>
12. “New technologies and 21st century children: Recent trends and outcomes” (2018) // OECD Education Working Paper No. 179, <https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP%282018%2915&docLanguage=En>

13. Steinhoff A. (2016). "The Use of Technology in Early Childhood Classrooms",
<https://novakdjokovicfoundation.org/use-technology-early-childhood-classrooms/>
14. Tahir R., Arif F. (2016). "Technology in Primary Schools: Teachers' Perspective Towards the Use of Mobile Technology in Children Education"// Emerging Trends and Advanced Technologies for Computational Intelligence, pp 103-129,
https://www.researchgate.net/publication/303823366_Technology_in_Primary_Schools_Teachers'_Perspective_Towards_the_Use_of_Mobile_Technology_in_Children_Education
15. "Technology in Preschool Enhances Interactive Learning at Little Sunshine's Playhouse" (2018),
<https://littlesunshine.com/technology-in-preschool-enhances-interactive-learning-at-little-sunshines-playhouse/>
16. "What Technology Can And Can't Do For Education",
<https://publications.iadb.org/publications/english/document/What-Technology-Can-and-Cant-Do-for-Education-A-Comparison-of-5-Stories-of-Success.pdf#20200621%20-%20Reporte%20BID.indd%3AChapter%202%3A1891>