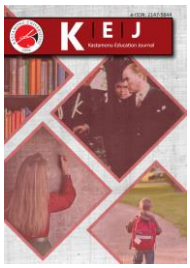
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# Ethical Issues in Educational Technology

# Eğitim Teknolojisinde Etik Sorunlar[1]

**Inayet Aydın**[2]

**Keywords**
1.Ethics
2.Educatioanl technology
3.Ethical issues in educational technology
4.Ethics in educational technology
5. Privacy and protection of children

**Anahtar Kelimeler**
1. Etik
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**Abstract**

*Purpose:* The purpose of this study is to identify the ethical issues created by educational technology from the perspective of children and youth and to develop recommendations for addressing the ethical problems they face in educational technology based on ethical evaluations.

*Design/Methodology/Approach:* This study utilizes the "Narrative Review" method.

*Findings:* This study reveals scientific findings on the inequalities created among students by educational technology, its impact on the child's privacy, values, and world of meaning, its effects on students' learning, cognitive functions, and creativity, its influence on students' emotional development and human relationships, as well as the negative effects of virtual reality and gamification, and the impact of technology on children's fundamental academic and physical skills.

*Highlights:* This research emphasizes the significant responsibilities that educational managers, decision-makers, policymakers, and teachers, especially those concerning "minors" under the age of 18, need to take on regarding the responsible, safe, and ethical use of technology in educational processes. The study delves into protecting children from potential harm and negative effects resulting from their use of educational technology.

**Öz**

*Çalışmanın amacı:* Bu çalışmanın amacı, eğitim teknolojisinin çocuk ve gençler açısından yarattığı etik sorunların neler olduğuno ortaya koymak ve yapılan etik değerlendirmeler sonucunda çocukların eğitim teknolojisinde maruz kaldıkları etik sorunların giderilmesine yönelik öneriler geliştirmektir.

*Materyal ve Yöntem:* Bu çalışmada "Anlatı İncelemesi" yöntemi kullanılmıştır.

*Bulgular:* Bu çalışmada eğitim teknolojisinin öğrenciler arasında yarattığı eşitsizlikler; çocuğun mahremiyet, değer ve anlam dünyası ile çocuğun kimliğine etkileri; öğrencilerin öğrenmesi ve zihinsel işlevleri ile yaratıcılıkları üzerindeki etkileri; öğrencilerin duygusal gelişim ve insan ilişkilerine etkileri; yaratılan sanal gerçekliğin ve oyunlaştırmanın olumsuz etkileri ile teknolojinin çocukların temel akademik ve fiziksel becerileri üzerine etkilerinin olduğu bilimsel bulgularla ortaya konmuştur.

*Önemli Vurgular:* Bu çalışma ile özellikle 18 yaş altındaki "küçüklerin" eğitim süreçlerinde eğitim yöneticilerinin, karar vericilerin, politika belirleyicilerin ve öğretmenlerin teknolojinin sorumlu, güvenli ve etik bir şekilde kullanılması konusunda üstlenmeleri gereken çok önemli sorumluluklar vardır. Bu süreçte çocukların eğitim teknolojisi kullanım süreçlerinde kendilerine gelebilecek zarar ve olumsuz etkilerden korunması ayrıntılı olarak ele alınmıştır.

[1] This study was presented as an oral presentation at the International Conference on Educational Technology and Online Learning Symposium held on June 20-23, 2023.

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## INTRODUCTION

Throughout history, the use of teaching techniques and tools in the education of individuals has always been an important issue, and the search for more effective teaching approaches has never ended. According to Haran (2015), educational technology is "a complex and integrated process that involves people, procedures, ideas, devices, and organization to analyze all aspects of the human learning process and the problems experienced in this field and to design, implement, evaluate, and manage solutions to these problems". In general, the purpose of using technology in education has been to facilitate and enhance the processes of learning, teaching, and education. Educational technology has gradually evolved from clay tablets to blackboards and, ultimately, to artificial intelligence and robots, representing a significant area of development and progress. Within this historical timeline, various research has been conducted on educational technology, and it has become an important sub-discipline and research area within the field of Educational Sciences.

### The concept of "Educational Technology"

The Association for Educational Communications and Technology (AECT) (2008) defines educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Cited in Garrison, 2004). Different points are emphasized, and different approaches are highlighted when defining educational technology. These definitions can be grouped into three main categories (Saettler, 1999, p. 5):

a) The approach that considers educational technology as a branch of educational theory and practice, focusing on the design and use of messages that primarily control the learning process.

b) The approach that views educational technology as equipment, materials, and products used in the process of learning and teaching. According to this perspective, educational technology includes machines, materials, projectors, films, screens, and computer programs used for instructional presentations.

c) The approach that regards educational technology as "systematic knowledge obtained from scientific research." According to this perspective, educational technology is defined as the application of scientific data in the field of education.

This study focuses on educational technology within the scope of the use of technological tools in the learning and teaching processes. These technological tools can be used in various areas, such as the design and development of learning materials, the improvement of teaching methods, and the assessment of student achievement. Interactive software and applications, online learning platforms, virtual and augmented reality applications, distance education tools, and multimedia learning materials are among the primary examples of educational technology. Educational technologies generally serve five main purposes for teachers and students (Loui, 2005, p. 436): a) Facilitating effective communication among students, teachers, and among students themselves, b) Producing documents, drawings, and other works by students and teachers, c) Sharing the materials and works produced, d) Archiving classroom sessions for future reference, e) Accessing specialized resources via the internet. The main technological developments regarding the use of educational technology in education are explained below.

### The Role of Technology in Education

In recent years, educational technology has rapidly evolved and changed. The widespread adoption of the internet and the increased use of digital devices have created significant opportunities for educational technology. Educational technology plays a crucial role in enriching students' learning experiences, enabling teachers to provide more effective instruction, and enhancing learning outcomes. Using technology in education offers new possibilities for stimulating and enriching young minds. Today, it is possible to incorporate various technological advancements into education, including assistive technology, virtual and augmented reality, high-tech collaboration tools, gamification, podcasting, blogging, 3D printing, artificial intelligence, personalized learning, and much more. Among the main technological developments that have played an important role in education are the following:

*a) The Internet:* The internet, derived from the words "international network," has become indispensable in people's lives. It is a global network of interconnected computers used for information sharing (Aydın, 2013). A life without the Internet has become almost impossible, and many services necessary for daily life have started to be realized through the Internet. Internet technologies have a great impact on the transformative role of computers in individual and social life (Froehlich, 2004). The popularization of the internet has revolutionized educational technology, allowing students, teachers, and other education professionals to access information from around the world.

*b) Smartphones and Tablets:* The proliferation of mobile devices has led to a significant change in educational technology. Smartphones and tablets provide students with access to learning materials and the ability to manage their learning processes.

*c) Digital Books:* Digital books, which can replace traditional printed books, make it easier for students to access educational materials.

*d) Virtual Classrooms*: Virtual classrooms enable students to attend live lessons via the internet, while teachers have the opportunity to better monitor student progress. These technological advancements have transformed the landscape of education, making it more accessible, interactive, and efficient for both students and educators.

*e) Artificial Intelligence (AI):* The emergence of big data, cloud computing, artificial neural networks, and machine learning has enabled engineers to create machines that can mimic human intelligence. Machines capable of perceiving, recognizing, learning, responding, and problem-solving are referred to as artificial intelligence (Zhai et al., 2021, p. 1). The use of AI in education is

increasingly widespread, aiming to provide students with personalized learning experiences and assess student development more effectively. With this technology, the learning process of students can be monitored, and learning materials tailored to the strengths and weaknesses of each student can be provided. Data on students' learning levels and styles can be collected, allowing for the delivery of the most suitable and personalized learning materials.

*f) Game-Based Learning:* Game-based learning plays a significant role in making the learning process enjoyable for students. Gamification, as a technique used in education, aims to enhance learning by gamifying it, increasing students' interest and motivation. In general, gamification in education seeks to strengthen learning behaviors by encouraging student participation, interest, and engagement with the learning environment (Castro, Sibove & Ting, 2018).

*g) Virtual Reality:* Virtual reality is an educational model where students learn by experiencing and living within virtually created environments (Kayabaşı, 2005). Virtual reality enables interactive learning, allowing students to gain experience in different settings and have more effective learning experiences. According to Gobbetti and Scateni (1998, p.4), virtual reality is fundamentally about creating a world that feels, sounds, behaves, and appears like the real world. In a virtual reality environment, users have the opportunity to enter an artificially generated space, experience different scenarios, and control that virtual world. Başaran (2010) found that virtual reality technology is engaging, encourages active participation, is suitable for students who learn schematically and visually, helps gain a general understanding of the subject, facilitates the application of knowledge, accelerates learning, and makes comprehension easier. Some of the opportunities provided by virtual reality technology in education are listed below (Boz, 2019):

- Conducting experiments that could be dangerous in the virtual world.
- Performing experiments and applications without the use of lab animals.
- Examining a virtual cadaver, any internal organ, or an unborn fetus as if handling them physically.
- Watching an operation, experiment, movie, play, fashion show, or lecture as if present in that environment.
- Visiting a city, museum, or any building as if touring inside it.
- Taking a trip to Mars, walking on the Moon.
- Learning to ski, drive a car, or dance.
- Preparing for a real presentation by giving one in a virtually created environment.

*h) Augmented Reality (AR):* Augmented reality technology enriches content by adding sound, images, and GPS data to an existing object, allowing individuals to feel as if they are in a constructed place and time. In education, augmented reality is used to provide students with experiences that do not exist in real life (Arıcı, 2019). Augmented reality can serve various purposes in education, making it easier for students to acquire, process, and remember information. Additionally, it makes learning more engaging and enjoyable. Augmented reality can be used at all education levels, from preschool to university and even in the workplace. For example, students can explore ancient Rome in a history lesson using augmented reality, walking through the events and places described by their teacher as if they were experiencing them in real life. Digital tours to museums or zoos in different countries can be organized, with lessons being narrated as if the students were present at that moment (Demirer and Erbaş 2015). Augmented reality technology can be used to teach concepts such as the area of a rectangle and triangle or allow students in science classes to view the muscular and skeletal systems in three dimensions and examine them from all angles. In such an environment, students remain focused and engaged, and their curiosity for learning increases. Learning becomes more efficient, saving time for students to develop their interests and skills in different areas (Arıcı, 2019). Many similar subjects can be taught interactively through augmented reality technology.

*ı) Blockchain:* Blockchain can be described as a type of digital ledger or record list where data is encrypted and stored in digital form, and data in blockchain is stored in blocks that are connected to each other in chronological order (Ocak, 2023). Blockchain technology allows students to securely store their education records and achievements. Additionally, blockchain technology provides students with verified certificates and other education documents. Thanks to the possibilities brought by technology, educational institutions can provide all kinds of information, such as qualifications or achievement certificates, in a permanent and secure manner via blockchain. Students can store and share the educational documents they have completed with anyone they choose and provide instant verification (Blockchain, 2019). Blockchain technology has emerged as a potential solution in the field of education. It can be applied to areas that require computing infrastructure and systems based on trust, such as the recognition of past learning in open and distance education, massive open online courses, on-campus applications, and learning management systems (Yıldırım, 2018, p. 147).

*i) Cloud computing:* The cloud computing model is a technology that extends the capabilities of computers, allowing users to access a range of software and services over the Internet (Rayport and Heyward, 2009). Cloud-based educational applications provide a new and flexible solution for accessing data and services, where knowledge and experiences can be shared effectively over the web, enabling collaborative work on projects (Li and Chen, 2011). The use of cloud computing in education can take various forms (Selvi and Küçüksille, 2012, p.252). a) Enabling students to carry out their educational activities without time and space limitations b) To access library content and online resources electronically, c) Recording student performance and grades electronically and querying them according to desired criteria, d) Providing regular feedback to students and making progress, e) Creating online communities where students, educators, and administrators can work together, f) Creating a basis for sharing

ideas and experiences among educators and administrators, g) Ensuring that students and employees of the institution can access electronic resources regardless of time and platform, h) Web-based course and class registration, i) A new way and environment for students to connect with educators and administrators.

*j) Robotics in Education:* Social robots, with their lifelike behaviors and social sensitivities, appeal to students and are used to make education more engaging. The increasing trend of using robots in education offers significant contributions by providing students with a personalized learning experience that suits different learning styles, reducing the workload of teachers, and allowing them to focus more on individual student needs. In today's world, where teachers have limited time to allocate to students, robots have great potential to teach every student in small groups and provide private lessons (Belpaeme and Tanaka, 2021). The use of robots in education is expected to bring various benefits, such as making lessons more enjoyable for students through interactive learning experiences with robots, boosting students' self-confidence, making them more active and independent thinkers, and increasing their interest in science and technology. However, there are significant technical, economic, and logistical challenges to the widespread implementation of social robots in classrooms.

As can be seen, such technological developments change the way education is delivered, providing the opportunity to make learning experiences more personalized, interactive, accessible, engaging, and effective. As technology continues to advance, the technological possibilities that can be used in education become limitless. The presence of technology maximizes the level of education and makes it much easier. Today, with direct access to the Internet, students do not have to wait for a teacher to present a topic to them. They can quickly learn everything they need on an online platform or with the help of different educational applications. Technologies such as computers, tablets, or cell phones help individuals educate themselves. During the COVID-19 pandemic, students were saved from being completely uneducated thanks to technology that made distance education possible. Thanks to educational technology, distance is no longer an obstacle for students who want to learn, education is no longer limited to books, and everyone has the chance to discover new knowledge and try something new (Prasanna, 2023). On the other hand, in the face of these rapid developments, educators are forced to use technology in teaching to improve interaction, participation, and sharing in their classrooms and lecture halls. In addition to all these benefits of educational technology, there are also harmful effects on children and young people.

## Ethics, Technology Ethics and Ethics in Educational Technology

In its broadest sense, ethics is concerned with what is good and bad, right and wrong, in the decisions and actions of individuals. According to Spinello (1995, p. 14), the purpose of ethics is to help us behave in an honorable way and live in a way that preserves the fundamental values that make us fully human (cited in Britz, 1996). Ethics demands that individuals' intentions, actions, values, and beliefs be carefully and critically examined in terms of good-bad, right-wrong. As human beings, we all have basic duties and obligations and certain things we should and should not do. In other words, there is an ethical dimension to human existence. As human beings, we experience life in a world of good and bad, and we characterize certain actions as right and wrong. Being human requires us to make choices. Ethical sensitivity to these choices depends on the responsible exercise of our freedom and guides our struggle to answer fundamental questions that make us question how we should live our lives and how we can make the right choices (Thiroux & Krasemann, 2014). Every technological development brings its own ethical challenges. Humans design, produce, use, market, buy, and sell technology, but it is also necessary to question the purposes, motives, and rules by which humans work to advance technology (Hanks and Hanks, 2015).

The ability to communicate quickly and effectively, made possible by the creation of the Internet, has had a profound impact on people, transforming the daily lives of millions of people around the world. One of the most obvious benefits that technology offers is the opportunity for individuals to participate in a wide range of social and educational environments through cyberspace without giving up the comfort, and security of their homes. New forms of media, computers and communication systems have become an integral part of the lives of today's students. Children now have to learn, play, and communicate in a very different way from their parents while swimming in a vast ocean of technology (Flanagan, 2014, p. 70).

The pace of development and advancements that technology has reached today triggers many people's concerns and even fears about technology and leads people to adopt a hostile attitude towards technology (Agazzi, 2019). While the conveniences brought by technology are accepted by everyone, this situation has also caused many concerns. Today, there are significant differences of opinion between those who advocate and oppose technology. Techno-optimists believe that ever-evolving technology can make the world a better place by improving people's lives and that the solution to social problems depends on technological innovations. Techno-pessimists, on the contrary, believe that modern technology creates more problems for humanity than it solves and argue that the search for more technology will lead to new, unpredictable, and dangerous consequences (Diana, 2016). While it is not possible to defend or reject technology as a tool in its entirety, ethical use requires a benefit/harm analysis.

In an environment where more and more daily activities are transferred to the online arena, the negative effects of virtual reality on children, video games that promote violence or antisocial behaviors, and other problems that can be caused by spending too much time on the Internet are areas of ethical debate that need to be considered (Flanagan, 2014, 70). Especially the ethical problems created by educational technologies, which have become an integral part of children's learning processes in in-school and out-of-school environments, are issues that should not be ignored these days when we are lost in a kind of technology intoxication.

It is also not possible to deny that technology has increasingly become more of an imposition than a choice. Ellul, who has made significant contributions to the philosophy of technology, states, "modern technology has become an all-encompassing phenomenon for civilization, and efficiency is no longer an option but has become the determining force of a new social order imposed on all human activities" (Ellul, 1964, p. 17). According to Günay (2017, p. 163), "modern technology attacks existence; it establishes dominance over it; it captures and controls it; keeps it under control; assigns tasks to it, and exploits it to the fullest." In this sense, technology does not leave room for individual choice; it compels it. Technology has also become a necessity and imposition in the education of children and young people.

Kiaulehn (1972, p.19) argued that technology is a tool and expressed the responsibility of human beings in this regard:

> Machines are neither good nor bad. It is human beings who are good and bad. The machine only does what man wants. Thanks to the machine, man is freed from slavery. If the freed slaves could not make their lives happier, what is the machine's fault? .... The reprehensible are the agitators who, out of thoughtlessness or fear of tomorrow, join the ranks of the enemies of the machine... Going backwards leads us to the barbarism of yesterday.

Although technology is seen as a tool, it is also observed that it is gradually turning into an end. It is clear that technology plays an important role in the formation of human nature and identity. Today, human beings shape and develop themselves largely through technological tools and applications. Especially when it comes to children, ethical discussions become much more important. There is a great need for serious and thoughtful discussions on how to stand at a point between total resistance to technology and overconfidence in it. While there are individual studies in the literature that address ethical issues in educational technology, there are not many comprehensive works that approach the topic of technology ethics in education from both philosophical and technical aspects in a multidimensional way. The aim of this study is to comprehensively address the ethical issues caused by educational technology for children and bring the other side of the coin to the agenda. Thus, it is hoped that the study will contribute to filling an important gap in the literature.

## METHOD/MATERIALS

In this study, the "Narrative Review" method was used. A narrative review method consists of a comprehensive and critical overview of previously published research on a particular topic of interest to a researcher. Also called a traditional review or literature review, narrative reviews help to establish a theoretical and methodological framework or context for what is already known about a particular topic. By conducting a literature review, gaps in the field are found and existing patterns and trends are identified. A narrative review is a good way to evaluate, critique and summarize existing research on a topic (The Edanz Team, 2023). In this study, the findings obtained from the literature scanned by the "Narrative Review" method are discussed under 21 sub-headings.

## FINDINGS

With the increasing use of technology in education, the ethical responsibilities of technology producers, educators, and technology users have become an area of serious debate. Students and teachers use information technologies every day in the academic environment to perform different educational activities. The use of information technology (IT) has also raised new ethical issues. These technologies provide many benefits, but the unethical use of IT by students and teachers raises a major cyber-ethics and professional ethics debate in educational institutions. Some of the main ethical issues arising from the use of technology in education include privacy, security, and use of personal data, hacking, intellectual property, netiquette, vandalism, access, misdirection, impact of personalization on individual abilities, inappropriate use of resources, academic dishonesty, false virtual identities, online harassment and hate speech, academic and online freedom of expression (Olcott at all, 2015). In addition, there are many ethical problems, such as the damage to their innocence, privacy, safety, health, and well-being of students, and the inability to protect them during the interaction process with the technology used for education and training purposes for minors under the age of 18. The ethical problems that technology poses to children are discussed below under 21 themes/ headings.

### Key Ethical Issues Raised by Educational Technology on Children and Young People

Within the scope of this research, the following findings were reached as a result of the systematic review of the main ethical issues related to the effects of educational technology on children and their world. The harmful effects of educational technologies used in and out of school on children and the main ethical issues are discussed below under the main headings by reviewing the relevant literature and research findings.

**1.The effects of technology on inequalities among students:** The widespread use of digital technology in economic, political, social, and cultural life around the world raises many concerns about the emergence of new forms of inequality and the exacerbation of existing inequalities between societies. At the same time, technology that makes our lives easier also leads to great inequalities, segregation, and division among individuals, social groups, or societies. There is a growing gap between those

who can and cannot use ICT and between those who can and cannot access it. This situation, also known as the digital divide or digital disconnect, raises issues of inadequacy, inhibition, and inequality between different social groups in terms of access, use, and impact of information technologies. The exponential growth of information and communication and its transformation in all aspects of daily life have led to the emergence of a wide range of problems resulting in social exclusion and digital inequality (Braman, 2006). Not all students have equal access to educational technology due to financial, geographical, or other reasons. In this situation, educational technology tools create differences in students' access to learning opportunities, leading to a digital divide and reproducing inequality, widening the achievement gap between students. Factors beyond a child's control, such as poverty, literally shape a child's life and change even the brain's ability to think. Likewise, their emotions influence what knowledge a child learns and how they can apply that knowledge (Audley-Piotorwksi at all, 2012, p. 101).

In affluent countries, children start to benefit from online communication opportunities at a high level from the first years of their lives onward. For example, in the UK, children aged 5-15 spend two hours online every day (CRIN, 2022). However, according to a 2020 joint report by UNICEF and the International Telecommunication Union (ITU), two-thirds of the world's school-age children aged 3-17 (1.3 billion children) do not have an internet connection at home. Globally, 58% of school-age children from the richest households have an internet connection at home, compared to just 16% in poorer households. A similar disparity exists across countries by income level. In low-income countries, at most 1 out of every 20 school-age children has an internet connection at home, while in high-income countries, around 9 out of 10 have internet at home (UNICEF, 2020). Limited access to technology for underprivileged students eliminates the possibility of using technology fairly and providing equal opportunities for all students. While the Internet has become an inseparable part of children's personal development and social life, it has also brought inequalities among children to the forefront, as many children are deprived of access to information, opportunities for self-expression, increased awareness, and social interaction.

**2. The impact of technology on the children's world of values and meaning:** The development of personality takes place at home, at school, and in society, through interacting with others. Schools and the education system are institutions and an important environment in which students are immersed for 12 years, aiming at the harmonious development of the heart, head, and hands. Undoubtedly, teachers play an important role in the development of students, teaching human virtues and promoting universal ethical values (Kanagasabapathy, 1990, 9).However, with the development of technological tools, parents and teachers have resorted to the convenience of putting technological tools in the hands of children to keep them occupied so that they can spend more time on their own lives and work. For years, televisions fulfilled this function. Now electronic toys such as computers, tablets, and cell phones, also called digital nannies, are being used to keep children occupied. These electronic robots, which are put into children's hands to keep them entertained and busy, have started to negatively affect their development and turn them into machines. However, in order for children to become healthy individuals, introducing them to activities that will develop their world of value and meaning is among the most important responsibilities of educational institutions, teachers, and families.

According to Tepe (2008), "*human beings are needed for value and meaning to exist. Undoubtedly, value and meaning are phenomena of the human world. It is human beings who give meaning to the world, it is what human beings, at least some human beings, do and the products they produce that make the world meaningful. Therefore, meaning and value cannot be mentioned in a world without human beings*". So what are the negative effects of technology on children's world of value, and why is it important to develop children's world of value, and meaning in educational environments? As a result of our children being forced to be dependent on screens and virtual environments for long periods of time during school hours and at home for the purpose of education as human beings, values such as ambition, hedonism, winning, selfishness, and success gradually replace values such as compassion, caring, helping, living with the other in mind, and sharing, which are required for human-to-human relations. This can lead to the neglect of the basic values and meanings that should be developed in childhood.

The purpose of education is not only to transfer knowledge to individuals but also to revive the spirit of questioning their daily lives and behaviors in terms of good/bad, right/wrong, guided by ethical values. Education helps to build a person's character. Schools are the most important institutions where teachers mediate the development of basic virtues and major character traits in students (Aydın, 2019, 9). "Value education" is a process in which human ideals are transferred to children and contribute to the development of their character. One of the tasks of education is to raise children's awareness of ethical values from an early age, to evaluate the effects of these values and ethical behaviors on themselves and others, to enable them to think about values and behaviors, and to support them gaining various experiences to transform them into a form of character. In order to develop children's world of values, it is important in education and training processes to help students develop their personalities to cope with challenges. It is possible to do this through human-to-human communication experiences, not in front of screens or virtually. It is crucial to help children develop physically and emotionally in order to effectively fulfill their social, moral, and democratic responsibilities today and in the future. In order to promote more peaceful and democratic societies, children's value worlds can be enriched by instilling ethical values, defending human rights, protecting the environment, and developing sensitivity and

behavior in students. An approach that helps students discover their true purpose in life, involves giving back to the society in which they live and strive to improve , which are among the main goals of a universal value education process (Gupta, 2023).

Excessive exposure to technology is also a serious problem for family and community values. The more time children spend in front of screens, the less time they spend with their families. This leads to the weakening of family relationships and the avoidance of family. Long screen time, especially for very young children, negatively affects face-to-face interactions that help them develop valuable social skills. One of the expected functions of the education system is to ensure social understanding and cohesion (Bursalıoğlu, 2010). This can only be achieved if children and young people naturally take part in social relations and learn this tacit knowledge. Therefore, establishing a healthy balance between technology and interactions where children can learn basic ethical values in school and education processes can be considered among the basic duties of schools and teachers.

**3. Forcing children from humanism to posthumanism:** Humanism, that is, the being we call "human": a) It is a subject that is a) self-conscious, b) able to think rationally, c) endowed with intelligence, d) able to determine its own course of action depending on its needs and desires and to act in accordance with its wishes. The human being is endowed with a set of attributes such as rationality, authority, autonomy, and agency. Humanism considers the human subject as the center of the world and humanity, which is affected by human thought and action. The human being's self-awareness, self-knowledge, what he or she is, and self-consciousness are taken as signs of being human. More importantly, the concepts of human dignity and Human Rights are based on this universal idea of autonomy, self-consciousness, coherence, and self-determination. The term "Transhuman" or posthuman refers to individuals who use pharmaceuticals, bioelectronics, genetics, or other technologies to make significant alterations to their physical, emotional, or cognitive abilities. Of course, no human today is entirely untouched by modern biotechnology: the coffee we drink, the glasses we wear, or the medications we take all affect humans to varying degrees (Bess and Pasulka, 2018). However, transhumanism believes that through technology, humans can transcend their biological limitations, leading to faster, smarter, less disease-prone, and longer-lived human bodies in the future. Technological and biological modifications will enhance the 'human,' allowing for the improvement of the 'self' or 'personality.' Transhumanists believe that current human forms are a transitional stage, and the post-human, as an enhanced human, will be a combination of humans and machines (Nayar, 2014, pp. 14-16). The fact that children are increasingly forced to relate to machines rather than to human beings weakens their ability to develop "humanistic" values and leads them to become part of the machine, and children are increasingly forced to become "posthuman". Technology is an important factor affecting the growth and development of children today, and this influence can trigger many aspects of posthumanism. Here are some factors that explain how technology can push children towards posthumanism:

a) Humanism argues that humans are a species distinguished from non-human beings and that humans have intrinsic value. While making a clear distinction between humans and machines, posthumanism blurs the boundaries between humans and machines. Posthumanists think that humans can integrate with machines and that machines can have human-like abilities. Children today are exposed to technology at an earlier age and spend more time with digital devices. This means that their physical and mental worlds are increasingly influenced by technology. Forcing children to interact with technological machines for long periods of time intensively encourages greater integration of the human with the machine, which is one of the main propositions of posthumanism.
b) Humanism believes that human beings should use their potential for an advanced humanity and argues that this potential can be realized through education, cultural development, and moral values. Posthumanism, on the other hand, argues that humans can shape their future through technology. Posthumanists point to a future where humans can transcend their biological and mental limits and create new species or ways of being. Technology contributes greatly to children's education and learning experiences, but this supports a posthumanist vision in which children can access information more quickly and effectively. This change aims for a radical transformation from an increasingly 'analog,' humanist, literate, book or text-based social, cultural, and economic system to a 'digital,' posthumanist, code, data, or information-based system (Herbrechter, 2013, p. vii).
c) Humanism holds that every human being has inherent rights and that everyone is of equal value. Therefore, equality and respect for human rights are of paramount importance in relationships between people. In posthumanism, the impact of technological entities such as the digital world and artificial intelligence is of great importance. Interactions with these entities can replace interpersonal relationships. Children use digital tools to identify and express themselves on online platforms. This points to digital ways of identity formation and self-consciousness development, which can increase the potential for children to shape their identities and self-consciousness through technology.
d) Humanism represents a human-centered philosophical approach and emphasizes the value and potential of human beings and human relationships with human beings. Humanism encourages people to empathize with each other and understand human emotion so that relationships between people become deeper and more meaningful. Posthumanist thought also values beings that are not limited to humans and entities that are not unconscious or artificial, such as

artificial intelligence. Therefore, beyond relationships between humans, it can focus on relationships with non-human beings and human-machine relationships. Today, children interact through digital means of communication. These forms of communication encourage children to connect with each other digitally rather than through physical contact. This serves posthumanism's ideal of blurring the boundaries between humans and technology.

e) Humanism emphasizes student-teacher relationships in education. Teachers are encouraged to adopt a personalized approach to understand students and discover their potential. In posthumanism, the impact of technological entities such as the digital world and artificial intelligence is of great importance. Interactions with these entities can replace interpersonal relationships. Technologies such as virtual reality and augmented reality enrich children's experiences, but these technologies transform children's perception and experience, becoming the means to open the doors to a posthumanist future.

**4. The effects of technology on the child's identity:** Self-understanding, identity perception, and freedom are very important for a person's sense of identity. The most important characteristics of being called humanare that it is "unpredictable" and has a structure that is "more complex" than thought. Human beings are natural, they act with their will. However, genetic modification created by technology has the potential to take human beings to a very worrying place in which everything we value in our current world, all the values that give meaning to our lives, are at risk. What happens when autonomy and free will, the most important human values, are manipulated by others (Bess, 2023)?

On the other hand, people create imaginary identities in the virtual worlds created by the Internet and live unreal parallel lives for hours. These lives are not real, but they are lived as if they were (Turkle, 2003). Individuals need virtual identities in order to present their own information by hiding or changing it on the internet. With virtual identities, individuals can hide information specific to their real-life identities or shape them in a way that will be accepted in virtual environments. Social media, one of today's most popular virtual environments, contributes greatly to internet users' presence in social groups, communication and interaction with other users, and the creation of virtual identities. The privacy and anonymity created by virtual identity support users to be more free and behave as they wish in social media environments. Thus, individuals participate in virtual environments with their perfected identities, communicate with other users, and become members of virtual environments (Dursun & Barut, 2016). The main features that distinguish virtual worlds from physical ones are disembodiment, immortality, the disappearance of time and space, the ability to change one's self-worth, and the opportunity to escape to fantasy worlds (Ercan, 2019, p.122).

Children may create a virtual identity for themselves on social media and other online platforms, and this identity may cause them to show and normalize behaviors that they do not exhibit in real life. In addition, as technology use increases, children may distance themselves from the real world. This can disconnect their identities from the real world. Technology also negatively affects children's ability to communicate face-to-face, and the virtual communication they establish does not adequately prepare them to overcome the difficulties they may encounter in real life. On the other hand, technology can also increase the difficulties children may face in the process of discovering their own identities. The virtual world may cause children to express themselves in different ways than in the real world. Children can leave many digital traces while using technology. These traces can lead to negative consequences in areas such as job applications or personal relationships in the future.

**5. The harmful effects of technology on children's innocence:** Children are beings of "innocence" or "purity", and protecting their innocence is an important responsibility. Innocence is the quality of having no experience or knowledge of the more complex or unpleasant aspects of life (Collins English Dictionary, 2023). The concept of child innocence refers to the purity of children, their lack of knowledge and experience, and their purity, which has not yet been corrupted by worldly affairs. The idea of children's innocence points to dangers that can harm children sexually (Bühler-Niederberger, 2017). The internet is full of violence, pornography, and other harmful content to which children are exposed at an early age. This content can negatively affect children's ethical and value systems. Even for educational purposes at school and at home, children can be exposed to potentially dangerous content in poorly protected and unsupervised internet environments. Pornographic videos and pictures that suddenly appear in front of them can harm their innocence and lead to abuse. According to a survey conducted by TUİK, 13% of children between the ages of 6 and 15 in Turkey have seen sexually explicit photos on the Internet, while 14% have met with people they do not know on the Internet (Aydın, 2013). This "sexualization" of children by technology at an early age and their easy access to online pornography is also associated with increased sexual and inappropriate aggressive behavior at school. Research shows a link between exposure to pornography and sexually aggressive behavior, especially in boys. With the proliferation of the Internet and other forms of media, adolescents have easy access to sexually explicit material. Watching pornography more frequently has an impact on actions such as sexual aggression and adolescent dating violence (Rothman & Adhia, 2016; Wright, Tokunaga, & Kraus, 2016).

**6. Effects of Technology on Children's Privacy, Confidentiality, and Safety:** Educational technology tools can be used to collect and store students' personal information. Everything children do online leaves a digital trail, and data collectors can compile these

trails and use highly detailed information about individuals to manipulate them. Therefore, to protect students' privacy, schools, teachers, and technology providers need to take great care with privacy policies and data security measures. The use of educational technology can pose privacy and security risks for students, such as unauthorized sharing of personal information, hacking, or cyberbullying. Disclosure, sharing, or inappropriate use of student data are among the major ethical risks (Zhai et al., 2021, p.14). Like adults, children's right to privacy is recognized as a natural right protected by law. Therefore, the right to privacy is a constitutional right protected under private law. The protection of privacy also includes the protection of personal data (Britz, 1996). According to a report to the Human Rights Council, a child's digital identity is being established by parents sharing intrauterine images of the child before birth, and teachers are increasingly sharing children's data on the web. Around 80 percent of children living in developed Western countries have a digital footprint by the age of two, largely due to the actions of family members (UN, 2021). It is an important ethical responsibility for educational institutions and educators to take adequate technical measures to protect the information privacy of children as a vulnerable social asset worthy of protection.

Children's devices are also threatened by spyware and adware. Spyware collects information about users through internet connections and can capture email addresses, passwords, and credit card numbers. Adware is also a form of spyware and collects information about a user's browsing preferences in order to display personalized ads in the browser window. Thieves are now trying to enter your digital doors as well as your physical doors (Ribble, 2009, 80). Since children are easier targets for this kind of software, data security issues become important ethical issues.

**7. The negative effects of technology on students' mental functions and cognitive development:** Rapidly evolving technology leads to a decline in individuals' cognitive, social, and survival skills. Many techno-optimists see AI as something that enhances human capacities, but there are many who do not. The increasing dependence of humans on machine-driven networks greatly reduces their ability to think for themselves, act autonomously, and interact effectively with others. On the other hand, what impact is emerging technology having on children's thinking? How functionally do children use their intellect- the ability to think, understand, comprehend, and adjust their behavior by constantly playing games (Turkle, 2003)? While the lightning-fast advancement of technology may seem like a great advantage, devices and learning applications can work faster than the speed of the human mind. This leads to students skimming through the materials, not understanding the nature and depth of the content, or missing some important points. Accurate, coherent, and high-level cognitive thinking takes time to develop. Therefore, it is important to slow down the use of technology in education and design teaching and learning processes to allow for more reflection and contemplation (Future Educators, 2023).

Technology has well-intentioned contributions, such as saving individuals time and facilitating the performance of certain mechanical activities. However, technology has automated almost all school activities. Why would a child need to learn the basics of math when they can use a calculator on their phone, or why would they need to learn spelling when they can use autocorrect software? Thus, technology, which initially served positive intentions, has led to a situation where new generations are unable to perform everyday cognitive activities without technology. In addition, when children use technology to solve every problem in school, their problem-solving abilities, a much sought-after skill set, are not sufficiently developed and are gradually lost (Allisonacademy, 2023).

**8. The impact of technology on children's literacy skills:** Technology is seen as the pen and paper of our age, and the necessary skills and competencies in reading and writing in children are neglected. However, reading and writing are among the most important skills that children can use throughout their lives. These skills will be useful in all areas of children's lives as well as their academic success. Today, electronic reading devices are often portable and allow children to store many books or documents on a single device. While this provides flexibility in reading, the act of reading is increasingly being replaced by listening or watching.

For example, is reading a book the same as watching a movie? Reading is usually considered a passive activity because it is an action that one performs alone. However, reading, like listening, is a mental activity. The reader, like the listener, needs to visualize what he/she reads in his/her mind, understand the ideas put forward in the text he/she reads, comprehend the connections between the ideas, compare them with his/her own knowledge and put them in order, reconstruct his/her existing knowledge with them, and select and separate the ones he/she wants to keep in his/her memory. This shows the importance of critical thinking in reading and the importance of an interactive relationship with the book (Adalı, 2010). Of course, videos are often used in educational activities. But watching a movie is like being in a car as a passenger. A driver drives you and you watch the scenery, and what is happening along the way. Reading a book is like being behind the wheel. You have full power over how to get to your destination. You can go fast or slow, or you can stop for a while to admire the scenery and let your imagination run free. The contribution and excitement of interpreting the author's words in your head are different. Reading a book allows you to imagine more than watching a movie. When you watch a movie, everything is shown to you, and your mind has little to do. When you read, nothing is shown to you. You read the words and your mind makes its own movie. You have more control over what you imagine. Reading also contributes to expanding one's vocabulary, improving memory, increasing imagination, relieving stress,

entertainment, peace of mind, etc. However, reading takes a lot of time and keeps us away from other people. For this reason, today's children are not willing to devote essential time to reading. In a visualized and digitalized world, they prefer saving time by watching ready-made content and socializing with others at the same time. However, the visual content constantly presented by others blocks our imagination, affects our memory, and impairs our mental health.

On the other hand, students' handwriting skills are not developed because they are directed towards technological tools. However, there are brain research studies that show that the act of writing by hand helps both learning and memorization, provides slower and more effective learning, and has stimulating effects. Although easier and faster, typing on a computer is repetitive and routine, as each keystroke requires almost the same action. Writing by hand is more challenging, complex, and slower, and it allows your brain to create more "connections" for thoughts to be imprinted in our minds (Future Educators, 2022).

Bainbridge (1983) describes the hidden dangers of relying too much on automated systems. "You build a machine to enhance human performance, and ironically, that machine continues to dull human abilities." He expressed it with these words. He was not wrong in this prediction. People can no longer remember their phone numbers, most of us can't even read our own handwriting, and we can't go anywhere without GPS. While technology is doing everything for us, we hardly have the chance to use our skills, and we have started to lose many of our mental abilities (Fry, 2019,136-137). Especially when it comes to children, could it be that the technological tools that are handed to them at the stage of developing their mental skills are blunting these skills?

**9. The impact of technology on students' emotional development:** Human-machine relationships, which are increasingly replacing human-human relationships, are a topic worth serious consideration. What will be the satisfaction of emotionally relating to artificial creatures that do not die, do not demand, do not get angry, and do not sulk, instead of the challenging aspects of real human relationships? What about human emotions? Would humans feel sympathy and responsibility towards machines? If we can relate to machines as psychological beings, do we have a moral responsibility towards them? The widespread use of technology can cause emotional vulnerabilities, especially in children. The virtual world may prevent children from preferring real-life relationships to fulfill their emotional needs (Turkle, 2003). These are questions of the future that need to be answered today.

Educational technology often leads to students learning while sitting in front of their computers. This can deprive students of social interactions and other learning opportunities. Technology can harm children's emotional development in several ways: a) Technology can cause social isolation in children. The virtual world can prevent children from interacting with friends in real life, which can lead to emotional isolation. b) The widespread use of technology can increase children's emotional vulnerability. The virtual world may prevent children from preferring real-life relationships to meet their emotional needs. c) Technology can cause children to be distracted. Video games, in particular, can cause children to be distracted for long periods of time and have difficulty focusing on real-life activities. d) Technology use can increase children's stress and anxiety levels. Children and young people in particular are more sensitive to the approval of others on social media, and children are constantly comparing themselves with others.Their anxiety and stress levels increase when they do not get enough likes or face criticism.

On the other hand, children try to bond with artificial pets and experience feelings of care and affection. But these animals are not real and can be misleading about the demands of real life. The new generation, who finds it natural to think of their glasses as screen monitors and their bodies as elements of their syborg selves, envisions a life filled with wearable computers. But to what extent will all these developments contribute to human happiness? We need to take a closer look at the psychological effects of the technologies and dizzying innovations we use today. With computer technology, we have created a very powerful object, an object that offers the illusion of companionship without the need for intimacy, an object that allows you to be alone and never be alone. In this sense, computers add a new dimension to the power of the traditional teddy bear or security blanket (Turkle, 2003). For the emotional development of our children, we need to give more space to real people, real emotions, and real relationships.

**10. The Impact of Technology on Students' Creativity:** Language, reasoning, imagination, and the ability to create technology are the powers that distinguish humans from all other living beings and enable them to have a transformative effect on the non-human world. Of course, today we live in a very different world from that of our ancestors. What happens if machines, which humans have created using these powers, create everything for humans? Does humanity need to create? Can humans live without creating? How satisfying can it be to produce arts such as painting, sculpture, graphics, etc., without using their hands and eyes?

One of the important tasks of schools is to cultivate aesthetic sensibility in children and young people through art education, enhance their capacity for creative thinking, help them understand the world, provide an environment for them to express themselves, assist in their personal development, and enable students to understand and evaluate works of art. A child's education cannot be considered complete without art education for several fundamental reasons, including the fact that art imparts lifelong critical analysis skills, the ability to deal with uncertainty and problem-solving skills, and a sense of determination. Art is a unique way of getting to know and understand the world. The creative skills that children develop through art lead them to new ideas, new experiences, and new challenges. Art activities expand children's opportunities to explore the world, help them establish

systematic and enjoyable relationships with the world they live in, and increase their sensory awareness, enhancing their sensitivity (Aydın, 2018).

However, today's children can obtain everything they need from the internet, so why should they feel the need to be creative? People often think and become creative when solutions are limited. Currently, technology provides students with almost everything they want. Students can pass their exams, but they may fail in life because intellectual creativity and uniqueness are required for success. The availability of everything students need does not allow them to use their creativity more effectively. Our children are becoming lazy about thinking and developing original ideas, and this is killing their creativity (Gstylemagazine, 2021).

Just as we need sleep to rest and process the events of the day, we also need solitude to strengthen our inner selves. Becoming addicted to social media 24/7 and constantly being connected to others through social media doesn't truly allow for solitude and can lead to overstimulation. However, this special time of solitude allows for thinking and creativity; our muscles relax, energy is restored, food is metabolized, our pupils narrow to reduce stimuli, and our heart rate and blood pressure slow down. During this time, the brain releases the neurotransmitter acetylcholine, increasing blood flow and alertness in the prefrontal cortex to help process information more effectively. Time spent alone is not only important for creativity, but it is also crucial for self-confidence and emotions. By taking time to calm ourselves and be alone, we can learn to manage our emotions and find solutions within ourselves (Murphy, 2016). How much time do children have to do all of these things?

**11. The negative effects of technology on cyberbullying, child neglect, and abuse:** The Internet exposes children to various risks, including exploitation and harassment by adult users, cyberbullying by peers, and technology addiction (Turkle, 2003). Educational technologies used for long hours and without control at school and home also create a serious environment for children to be exposed to these risks. Risks such as bullying, sexual harassment, and abuse are always present in virtual environments. Risks related to information security, such as virtual identity theft, avatar copying, misuse for fraud, and cybercrime, are always possible in virtual environments, threatening children's information security."

According to Remond, Kern, and Romo (2014), cyberbullying, a new form of traditional bullying, is now carried out through electronic devices that transmit messages, sound, and visuals. Cyberbullies use two important electronic tools to harm their victims. The first one is personal computers, from which they send disturbing and derogatory emails and instant messages to their victims. The second one is mobile phones. Cyberbullies use mobile phones to send malicious text messages to their victims (Patchin and Hinduja, 2006). With internet access now possible through mobile phones after computers, incidents of cyberbullying, such as swearing, threats, defamation, and exclusion, have increased in schools (Çetin et al., 2011). The rise of cyberbullying in schools has placed new responsibilities on teachers and school administrators to create a regular and healthy school environment and to protect students from all kinds of harm (Li, 2010).

**12. The Effects of Technology on Children's Social Development, Communication, and Relationships:** Technology reduces children's direct peer interaction. When they communicate through digital devices, they hide behind a "digital wall" and can have conversations they might not have face-to-face. This digital barrier can lead to a disconnect between children, themselves, and others (Hatch, 2011, p. 24). Despite the positive contributions of digital technologies to students' learning and development, our biological need for real-time interaction is being overlooked. Human beings have lived as social beings for tens of thousands of years, and expecting their genetic predisposition to change so easily is not very realistic (Allisonacademy, 2023). Social skills play a significant role in a student's life. However, modern technology diminishes students' human-to-human social skills because many students spend their time on the internet and mobile devices. Children are not inclined to go outside to interact with their peers and learn from real-life experiences. The most crucial tool for social development is going out, making friends, and learning how to coexist with others (Gstylemagazine, 2021).

The proliferation of digital technology use and, especially, its becoming an indispensable part of children's daily lives, along with the reduction of outdoor play areas, is believed to have negative effects on children. Therefore, it is observed that screen addiction and the increasing time spent on gaming on technological devices lead to a decrease in children's face-to-face communication with peers and group play, while solo gaming increases (Rosen et al., 2014). The only solution that teachers and educational institutions can offer is to encourage children and young people to engage in face-to-face interaction with others and to create such opportunities in schools and educational processes.

**13. The Effects of Technology on Children's Learning and Decreased Academic Achievement (Faster but Less Retained Learning):** Technology has both positive and negative effects on children's learning and academic achievement. The use of technological devices can lead to passive learning experiences for children, where students simply become spectators and do not actively guide their own learning processes. Resources like the internet provide instant access to all kinds of information. However, this ease of access can lead children to experience digital obesity, hinder them from conducting thorough research, and result in them only grasping surface-level information. Consequently, students may neglect deep learning and resort to rote memorization

just to pass tests. Otherwise, children's ability to focus, exert effort, persevere through challenges, and develop motivation for learning can be impeded. In such cases, the instant gratification culture can be further encouraged through these applications.

The OECD's (2015) global research has shown that significant investments in computers and classroom technology in schools do not necessarily lead to the expected improvements in students' performance. According to the report, the impact of school technology on international test results, such as the PISA tests and tests measuring digital skills conducted in more than 70 countries, was examined. It was revealed that educational systems that made substantial investments in information and communication technologies did not achieve "observable improvements" in PISA test results for reading, mathematics, or science. Students who used computers very frequently in school achieved worse results, while students who used computers at a moderate level, such as once or twice a week, had "slightly better learning outcomes" compared to students who rarely used computers. The results indicated that there was "no significant improvement" in reading, mathematics, or science in countries that invested heavily in information technology. High-achieving school systems like those in South Korea and Shanghai, China had lower levels of computer use in schools. Singapore, where technology was used only moderately in schools, ranked highest in digital skills (BBC, 2015). Of course, there may be research findings that suggest otherwise. However, it is also observed that many alternative school models, such as tech-free education or nature schools, which aim for technology-free learning and traditional ways of learning for children, are rapidly gaining popularity.

**14. Technology's impact on a child's physical development and the problem of obesity:** Technology's excessive use contributes to a sedentary lifestyle, physical inactivity, and an increased risk of obesity and other health problems, particularly in children. The decrease in kinesthetic skills and the obesity issue are becoming increasingly important. Children who spend their entire day in front of a computer and then use it again for entertainment are doomed to a sedentary lifestyle. According to Sisson, Broyles, Baker, and Katzmarzyk (2010), in a study conducted on children aged 6-17, it was found that those with low levels of physical activity who use technological devices for extended periods are twice as likely to become obese compared to those who do not use such devices (cited in Mustafaoğlu, Zirek, Yasacı & Özdinçler, 2018).

The increase in screen time among children and adolescents contributes to the risk of obesity because screen-dependent activities trigger issues such as decreased physical activity, lower calorie expenditure, and more. Children who stay up late due to extended screen time experience an increase in the hunger hormone, "ghrelin," while their fullness hormone, "leptin," decreases. On average, a sleep-deprived person consumes an extra 300 calories per day and feels the need to snack more frequently. Consequently, in addition to physical inactivity in front of screens, the constant snacking habit in children significantly contributes to weight gain. Children's exposure to advertisements and marketing tactics for high-fat, high-sodium, low-nutrient foods while in front of screens also negatively impacts their preferences and health (Boyers, 2018). Considering all these risks, educational efforts that lead children to spend long hours with technological devices may contribute to their learning, but they expose them to significant problems such as reduced kinesthetic skills and obesity caused by inactivity. As adults, subjecting children to such actions is contrary to the ethical principle of "do no harm."

It is a known fact that children are at a higher risk of musculoskeletal problems due to the fact that technological products are generally designed for adults (Oates, Evans, & Hedge, 1998). In a study conducted on students aged 10-17, it was reported that 60% of the students experienced discomfort in specific areas of their bodies during computer use (Harris & Straker, 2000). Another study found that 9-10-year-old students had poor posture, and their postures tended to deteriorate continuously during 15-25 minutes of computer lessons at school. Children with poor posture were found to have musculoskeletal problems. It was reported that 16% of children felt more discomfort, especially when using a mouse (Breen, Pyper, Rusk, & Dockrell, 2007). Compared with desktop computer use, tablet use in children has been reported to lead to a more flexible and asymmetrical body posture, increased forward-leaning and elevated shoulders, and increased activity of neck muscles. However, it has been found that poor posture and increased muscle activity are more related to musculoskeletal problems in various body parts (Straker et al., 2008, cited in Mustafaoğlu, Zirek, Yasacı & Özdinçler, 2018).

**15. The harmful effects of technology on child's health and well-being:** The widespread use of technology and its impact on human health have brought the concept of "Digital Health and Wellness" to the forefront. Digital healthy living is used to denote being physically, socially, and emotionally healthy in our technology-centric world. Excessive use of social media, particularly by children and adolescents, can lead to emotional health problems such as anxiety and depression, as they often compare themselves to others. A lack of balance in digital behaviors can lead to tension in social relationships. Spending more time on phones instead of with friends or family, or conversely, family and friends paying more attention to their phones than to children, can lead to certain emotional problems. Spending too much time in front of screens promotes a sedentary lifestyle and can result in physical health problems, sleep disorders, headaches, and eye fatigue. Moreover, technologies like tablets, smartphones, and computers, due to the extended periods of concentration required by children, can lead to eye fatigue, causing symptoms such as blurred vision and dry eyes (Murphy, 2016).

In a study conducted on young adults aged 20-24 in Sweden, new symptom cases reported in the hands/fingers through text messages were found among initially asymptomatic individuals after one year of follow-up. Five years later, there were cross-sectional relationships between continued symptoms in the neck and upper extremities through text messages. Repeated grasping movements, referred to as "Text Thumb," during texting or playing video games can cause narrowing of the flexor tendon in the thumb. These repetitive movements can lead to symptoms such as finger pain, weak grip, and degeneration, potentially resulting in permanent tendon damage (Gustafsson at all, 2017).

Teenagers and young adults are at the highest risk of hearing loss due to the use of personal audio devices with headphones. Research shows that nearly 50% of individuals aged 12 to 25 are exposed to unsafe levels of sound while using personal audio devices. According to the World Health Organization (WHO), unhealthy sound levels can occur when exposed to 85 decibels for 8 hours or above 100 decibels for 15 minutes. The World Health Organization recommends that the highest noise level exposure in the workplace should not exceed 85 decibels for up to 8 hours (Murphy, 2016). Additionally, excessive use of computers and phones in non-ergonomic conditions can lead to health problems such as carpal tunnel syndrome, eye fatigue, and back and neck pain. Technology use has also been associated with mental health issues such as anxiety, depression, and addiction (Ribble, 2009).

In today's world, the pervasive integration of technology into human life and the fact that many functions of life cannot be performed without technology have led to a phenomenon known as "techno panic." Techno panic refers to the feelings of anger, frustration, and intolerance that individuals experience towards various technological devices that fail to meet their expectations. When individuals encounter user errors due to their own technical inadequacies, they may become disappointed and direct their anger towards a technological device (Urbandictionary, 2023).

Sleep is a physiological and psychological phenomenon that every person needs every day. Many people spend one-third of their lifespan sleeping, highlighting the significant role of sleep in human life. Despite the importance of sleep in our lives, sleep disorders often disrupt people's lives and even reduce their quality of life (Li and Liu, 2011, 65). Excessive technology use can disrupt children's sleep patterns and reduce the quality and duration of their sleep. Studies have shown that prolonged exposure to blue light can suppress melatonin levels, a hormone that supports sleep and increases wakefulness the next morning. Exposure to blue light also reduces the amount of rapid eye movement (REM) sleep, which is the stage of sleep where dreams occur. REM sleep facilitates memory consolidation and more effective brain function by assisting in transmissions between neural networks in the brain. Sleep deprivation can result from missing calls or messages, staying awake late to use devices, and anxiety caused by interruptions from calls and messages (Murphy, 2016). In recent years, sleep disorders have become an increasingly prevalent issue among university students. According to reports, more than 16% of university students suffer from sleep disorders (Li and Liu, 2011, 65).

**16. Technology Addiction in Children:** In today's digital world, young children have become a primary target audience for digital toys and electronic devices. Technology has evolved into a major economic sector with the development and marketing of educational entertainment products aimed at children (Gibbons, 2012). When technology usage turns into addiction, it can lead to significant social and cognitive changes in a person's life. Engaging in certain technological activities can increase the release of a neurotransmitter called dopamine, which regulates emotional responses and provides a sense of pleasure. When an individual stops engaging in the activity, they may seek out another "stimulant" to maintain that sense of enjoyment. Research has shown that prolonged Internet use can reduce the number of dopamine transporters, resulting in an increased release of dopamine, thus enhancing the feeling of happiness (Murphy, 2016). It is evident that children who are glued to screens, particularly to video games, are negatively affected in terms of their health and overall quality of life.

**17. The Negative Effects of Technology on Memory and Attention:** Technology can be a significant source of distraction for students, leading to a decrease in focus, attention, and productivity. Furthermore, technology allows individuals to access information easily instead of storing it in their memory, causing people to underutilize their memory muscles, which can lead to memory weakening over time. However, attention plays a crucial role in shaping and supporting memory formation. Attention is essential for encoding information and developing memory, and it is critical for the development of early literacy skills. The increasing diversity of technological devices has been reported to lead to shorter attention spans, weaker concentration, and higher levels of distraction (Fan at all, 2005).

Constant exposure to new visual stimuli can lead to memory problems because when our brains are bombarded with a large number of stimuli, it can make the processes of storing and recalling information in memory more challenging. Children's brains are still developing and are more sensitive to the effects and overuse of technology compared to adults. Constant exposure to numerous visual stimuli can result in distractions and difficulties in maintaining focus. Stimulation caused by visual cues such as loud advertisements or bright lights can disrupt sleep quality and lead to sleep deprivation. The continuous bombardment of visual stimuli can also contribute to eye fatigue and discomfort.

Especially during activities that require focus and concentration, such as reading books, studying, or preparing for exams, children's attention can easily be disrupted due to regular notifications. To overcome this, it is crucial for them to take measures such as setting aside technological devices, turning off notifications, or even powering off mobile devices to control distractions (Gstylemagazine, 2021). Posner (2015) has found that when your attention is diverted while focusing on something, it takes an average of twenty-three minutes to return to the same state of focus (Cited in Hari, 2022, p.21). Students continue to use their cell phones and tablets throughout the day, both for school activities and beyond. Exposure to pleasure-oriented materials such as social media and video games rapidly stimulates children's dopamine systems, causing their brains to become accustomed to enjoyable, intense, and short-lived content, which in turn reduces their attention span. Research shows that Generation Z children have an attention span of approximately 8 seconds. While teachers may have good intentions, the teaching process should not be entirely delegated to technology, and technology should only be used in the classroom when absolutely necessary (Allisonacademy, 2023). In school and educational processes, it is crucial to incorporate non-technological activities, games, and group work that can help improve children's attention and concentration.

**18. The Effects of Gamification on Children:** Gamification is defined as the application of game elements in non-game contexts with the aim of creating more commitment and ownership in learning tasks. Games, by using dynamics, mechanics, and aesthetics, motivate students, increase their sense of responsibility, and strengthen their connection with the content and proposed tasks (Castro, Sibo, & Ting, 2018, 5). However, the negative effects of gamification on children can manifest in various ways when game design elements are applied to non-game contexts. One of the key considerations here is striking a balance between maintaining the fun of games while emphasizing learning and avoiding overshadowing learning by placing too much focus on the game itself (Zhai et al., 2021, p. 13). Is it ethical to use addictive video and mobile games that manipulate reward centers in the human brain for educational purposes? (Bossmann, 2016). Gamification in education undoubtedly provides valuable contributions. However, when looking at both sides of the coin, it seems impossible not to have some ethical concerns about gamification. Below are some of these concerns:

a) Gamification encourages making mistakes, makes it less stressful for students to make errors, and allows for more experimental learning. However, in real life, there isn't always the freedom to make mistakes and start from scratch.
b) Gamification makes learning fun, prevents students from getting bored, and can increase motivation for learning. However, if students focus solely on seeking pleasure from a young age and do not develop the ability to cope with challenging situations, they may become less resilient in life. Encouraging hedonistic, non-delayed gratification, and pleasure-focused habits can have negative effects on children's ability to become healthy adults in the long run.
c) Students can become overly dependent on gamified learning tools and may lose interest in real-world activities and other interactions.
d) Having students constantly in a win-oriented system can distance them from the reality of facing losses, which is a reality they will encounter many times in their lives.
e) Games often emphasize competition, especially in social settings. However, one of the most basic values children should learn is cooperation and the spirit of helping others.
f) Life is not a game. Gamification occurs in a virtual world, making it more difficult for students to learn real-world skills and hindering their ability to solve real-world problems.
g) Gamification can lead to excessive gaming addiction, negatively affecting a student's overall well-being, including academic performance. Research has shown that excessive gaming can lead to physical and mental health problems such as depression, anxiety, and sleep disorders (Van Rooji et al., 2011).
h) Video games offer children a simpler and faker form of social interaction than real relationships (Van Rooji et al., 2011).
i) Games can harm academic performance; students who play games for extended periods are more likely to have lower grades. Students may become so engrossed in games that they cannot complete assignments or prepare for class. Playing video games takes time away from homework, social interactions, and other school-related tasks (Lemmens et al., 2009).
j) Games can be a valuable tool to enhance student engagement, motivation, and learning outcomes in the classroom. However, it is important to remember that excessive use of games in education can lead to negative side effects such as addiction, a lack of critical thinking, and low academic performance.

**19. The negative effects of virtual and augmented reality applications on a child's perception of reality:** Bess (2023) suggests that devices like smartphones are rapidly distancing us from the real world. We lose our ability to live in the world without certain electronic extensions. The more you live on screens, the more you live in a narrow, increasingly artificial, and abstract world. This virtual world may be safe and controllable, but it's not as rich and unpredictable as the real world. What could be the consequences if the connection with the real world is completely lost during childhood? It is a significant issue for children who cannot adapt to the difference between the virtual world created by technology and the real world. The real world is what we perceive through our senses, and we perceive this world with our organic system, our body. Here, the humanist human is a concrete being. However,

with posthumanism, where humans are encouraged to evolve, they are forced towards disembodiment and a post-biological era (Moravec, 1988). The 'cyborg child' (Turkle, 1998) "makes no distinction between online and offline, virtual and real; digital life is so deeply intertwined with their lives that the experiences children have in their virtual worlds are accepted as real experiences. For children who have been immersed in media from their earliest memories, life on the screen is a daily, natural practice; they do not know any other way of existence" (Thomas, 2006, p. 128).

**20. The commodification of technology (Technology turning into a rent-seeking field)**: Most technologies labeled as educational technologies are designed to profit, monitor students, and create dependency among users. The education sector is considered a significant market due to its large audience. The technology industry entering and taking over the education sector also plays a critical role in transforming societal culture. Technology is not an area where you can invest once and be done with it. The cost of constantly upgrading or maintaining your systems in line with ever-changing technology is quite high. In a world where new innovations emerge almost every day in the digital technology field and upgrading software and applications consistently requires more powerful devices, the belief that technology is the sole solution in education leads to substantial financial resources being allocated to technology (Allisonacademy, 2023).

The FATIH (Increasing Opportunities and Advancing Technology) Project, under the leadership of the Ministry of National Education in Turkey, first came onto the national agenda in November 2010, and significant investments were made in this project. The aim of this project was to cultivate generations who effectively use information technologies through the provision of interactive boards in schools, portable computers for teachers, and tablets for students. According to Ministry of Education officials, a total of 11 billion 524 million 965 thousand TL was allocated for the FATIH Project, and by the end of 2022, approximately 4 billion 770 million TL had been spent (Birgün, 19.01.2023). Despite being presented as the "project of the century," audits conducted by the Turkish Court of Accounts (Sayıştay Başkanlığı) have revealed that these significant investments have largely remained idle. It was determined that the systems established were not operational in many schools, and despite infrastructure development, interactive boards were not available in thousands of schools (Birgün, 19.01.2023). As seen, the FATIH Project, which set out with ambitious goals but failed to achieve the targeted success and efficiency, holds important lessons regarding the need for careful planning in investments in educational technology and the necessity of using national resources effectively and efficiently.

Indeed, teaching and learning can be done without technology, but the key question is how valuable the specific skills acquired will be after several generations of technological advancement. Therefore, to avoid regretting the purchase of new technology, educational institutions are responsible for estimating the real long-term costs of this investment and how they will be reflected in the tuition fees that students and parents will have to pay.

**21. Technology and academic integrity issues**: Educational technology tools can enable students to prepare their assignments, projects, and papers more quickly and easily. However, it is also possible for students to misuse these tools and engage in plagiarism. Therefore, teachers should provide students with education on proper referencing and citation and raise awareness about the ethical use of technology tools (Gstylemagazine, 2021).

Honesty can be defined as having the quality of being honest and possessing strong moral principles. Dishonesty (fraud) can be expressed as a tendency to lack honesty or truthfulness, inclining towards deceit or deception. Academic integrity consists of written and unwritten norms in the academic field that should be followed, such as independent work, producing original scholarly work, and transparently and accurately referencing and attributing the resources and contributions of others (Cojocariu and Mareş, 2022, 2). One of the major challenges teachers face is cheating during exams and students having a lack of awareness of their knowledge of the subject matter. This is also a significant issue in online tests because teachers often do not know whether students have access to other devices while taking the exam. This problem can lead to long-term consequences, primarily because educational institutions cannot guarantee that the student truly possesses the knowledge required for higher education levels or for performing their job (Allisonacademy, 2023).

Applications of artificial intelligence, such as ChatGPT, promise to revolutionize our methods of information retrieval, article composition, software code writing, and business plan creation, as they possess the ability to generate human-like texts. Learning to write an article from scratch is a challenging process that requires the use of skills like critical thinking, organizational skills, and self-expression. On the other hand, creating vivid and beautiful images with each stroke of a brush may be considered the essence of human creativity. Delegating these tasks to a smart machine, while convenient, is regressive in terms of human intelligence and creativity. Consequently, the New York state school system has blocked students and teachers from accessing ChatGPT in their classrooms, citing concerns about its adverse effects on student learning and the safety and accuracy of content (Elsen-Rooney, 2023). Some online art communities have prohibited users from uploading images created using artificial intelligence image generators such as DALL-E, Midjourney, and Stable Diffusion (Hoffman, 2023).

## DISCUSSION

In this section of the study, ethical issues arising from educational technology on children and youth are discussed under four main headings.

*The Impact of Technology on a Child's Identity, Personality, Values, and Worldview:* When examining the influence of technology on a child's identity, personality, values, and worldview, it is evident that excluding children from technology and educational technology in today's world is both impossible and senseless. However, there is a legitimate concern that, as we chase technological "advancements," we may risk losing some of the most valuable aspects of our lives. Ethical concerns cannot be disregarded when presenting educational technologies to our children. The challenge we face is to be sensitive to our core values and to find a vision and roadmap that will not lead to the loss of these values but, rather, their enhancement (Bostrom, 2021). One of the technoethical issues is that designers tend to see technology as "mere tools," while users experience them as carriers of meaning and ideas, sometimes even extensions of themselves (Turkle, 2003). Children are beginning to perceive technology as an extension of themselves, shifting their relationship more towards machines rather than humans, and rapidly pushing them from humanist values towards "posthumanism." The "posthuman" individual is being chemically, surgically, or mechanically transformed through technoscience, engulfed by technology, and forced to exist in a world where they are irreversibly altered by technology. This imposes a form of modification, hybridized life forms, new forms of sociality, and a new understanding of life itself on children (Nayar, 2014, p. 2).

*The Impact of Technology on a Child's Innocence, Privacy, and Safety:* Children, who are increasingly left alone with technology, are known to face numerous risks that jeopardize their innocence, privacy, and safety. They encounter pornographic materials at a very young age and become targets of advertisements and malicious software. Children leave digital footprints with every interaction on the internet, which are then manipulated by data-collecting websites. Manipulation, in its broadest sense, simply means directing or controlling something. In this sense, manipulation is an attempt to influence individual decision-making processes and behaviors (Susser, Roessler, & Nissenbaum, 2019). Those who collect data on technology, knowing children's preferences, interests, habits, friends and acquaintances, abilities, education, physical health, and financial status, are in a significant position to have an impact on children (Richards, 2013). It allows for a better understanding of students' goals, what motivates them, what their weaknesses and vulnerabilities are, and when they are most susceptible. Information technologies make it cheap and easy to generate, collect, analyze, and use data of this kind about children and young people. Therefore, such technologies make us highly vulnerable to manipulation by those who create, control, and distribute these systems. Concerns about children and young people being manipulated through technology, their individual decision-making processes being directed or controlled, and thus their capacity for making independent choices being jeopardized are growing (Susser, Roessler, & Nissenbaum, 2019).

*The Impact of Technology on Child Development and Health:* Intensive use of technology, even for educational purposes, leaves children sitting in front of screens for extended periods of time. This negatively affects children's physical development and can lead to problems at a young age. A study investigating the relationship between computer use and musculoskeletal disorders found that half of the 6th-grade students reported experiencing discomfort in at least one part of their body, with the most common complaints being related to the neck, back, and shoulder areas (Jacobs, Hudak, & McGiffert, 2009). Activities such as walking, running, swimming, or playing games that engage the body, like volleyball and tennis, can help counteract the negative effects of prolonged technology use (Murphy, 2016). It has been reported that only 4 out of every 10 children aged 6-11 meet the recommended guidelines for both daily physical activity and technology device use. Furthermore, it has been found that as children get older, their levels of physical inactivity increase (Fakhouri at all, 2013).

Technological developments have increased young people's interaction with screen-based technologies (screen time), while simultaneously a decrease in young people's contact with nature (green time) has been observed. According to research findings, high screen time appears to be associated with negative psychological outcomes, while high green time appears to be associated with positive psychological outcomes (Oswald, Rumbold, Kedzior, & Moore, 2020).

T*he Impact of Technology on a Child's Education and Academic Achievement:* The belief that traditional education is failing and inadequate has become widespread in the technology sector, and there is a significant effort to use technology to bridge this gap. Through the development of the internet and computers, various tools like distance education, virtual and augmented reality, high-tech collaboration tools, gamification, podcasting, blogging, 3D printing, artificial intelligence, personalized learning, and much more have been introduced into both in-school and out-of-school education for children. As a result, the processes of learning and teaching have undergone numerous changes, requiring a fresh perspective on everything. Many educational toys, including electronic and computer-based ones, such as spelling, counting, and handwriting instruction, remote-controlled devices, electronic board games, and electronic pets, have entered children's lives from a very young age (Spatariu, Peach, and Bell, 2012, p.27). The digital world is growing and changing rapidly, and technology companies are releasing their products so quickly that everyone

should take a moment to consider the potential issues that may arise from their use (Ribble, 2009, p.24). However, this educational effort immersed in technology tends to increase children's attention and memory problems while weakening their memory. Furthermore, learning becomes shallow and less enduring. Due to the need to juggle multiple tasks simultaneously, the children's means of concentrating are reduced.Students and teachers increasingly need to be aware of ethical rules. As educational activities extend beyond the boundaries of schools, the ethical use of technology becomes even more critical. The use of technology by students for studying at home and teachers delivering lessons in an online environment has given rise to widespread ethical issues. To support students, teachers, and administrators in using technology responsibly, the United States developed the National Educational Technology Standards (NETS) in 2007. These standards are utilized in every state in the U.S., and achieving deep learning on a single subject is diminished (ISTE, 2023). Students and teachers should prioritize being conscious of the ethical use of educational technology.

## CONCLUSION AND RECOMMENDATIONS

Certainly, protecting children from the harmful effects of technology places significant responsibility on technology producers, education and school administrators, teachers, and parents. To achieve this goal, the following recommendations can be helpful:

a) Technology creators, educators, and children should be educated about technology ethics. Training should be provided on the responsible, safe, and ethical use of technologies.

b) Teaching children how to use technology correctly is crucial. They should be taught when and how to use technology, and awareness should be raised about internet safety and online privacy.

c) Efforts should be made for "technology for humanity, not technology in place of humanity." Children should not be detached from an education process that allows them to acquire fundamental values like compassion, empathy, cooperation, interest, and responsibility.

d) Education should focus on making students critical and selective viewers and consumers. Time spent on screens should be limited, and the type of content accessible to children should be controlled.

e) To preserve children's values and worldviews, they should be encouraged to form real relationships with peers and engage in interactive activities. Real-life activities that enhance their social interactions and fulfill their emotional needs should be prioritized.

f) Technology use should be restricted to protect children's innocence, privacy, and safety. Filtering and parental control features should be used to block access to inappropriate content.

g) The digital balance should be maintained to prevent technology dependency. This means balancing technology usage with other activities. For example, after using technology, children should have the opportunity to engage in physical activities, outdoor play, or creative pursuits.

h) Measures should be taken to address issues related to digital health and well-being, such as obesity, snacking, sleep deprivation, and eye problems.

i) While educational technology is designed to support children's learning processes, it should be managed correctly by teachers. Teachers can enhance learning by providing interactive materials tailored to students' interests. However, non-technological activities that support children's physical, social, and emotional development should also be included.

j) All educational administrators and teachers should ensure the ethical use of educational technology and respect students' personal and privacy rights. Student privacy rights should be respected, and student information should not be shared with third parties without the consent of the student, parent, or legal guardian.

k) Clear privacy policies should be established regarding how students' data will be used during the use of educational technology, and these policies should be easily understood by everyone.

l) Academic honesty and copyright should be taught and monitored during the use of educational technology.

m) Digital educational materials should be selected and used in a way that does not harm students. Inappropriate materials should be avoided.

n) Parents should be informed about their children's use of educational technology and educated about the ethical use of technology. This way, necessary precautions can also be taken at home during children's technology usage.

o) Educational technology should always be used correctly and contribute positively to children's education.

p) The use of gamification in education should be carefully considered, taking into account potential long-term effects on students' overall performance and development.

q) All measures should be taken to reduce the "screen time" children and young people spend with screen-based technologies and increase the "green time" they spend in contact with nature.

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I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

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