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The role of digital technologies in the transformation of ethical norms in the educational process

ZuoYuan Liu[1], Alena Gura[2], Olga Pavlovskaya[3], Nataliya Antonova[4]
[1]College of Marxism, Beijing Institute of Technology, Beijing, Peoples Republic of China
[2]Department of Philosophy, Kuban State Technological University, Krasnodar, Russia
[3]Department of Russian Language and Speech Communication, Kuban State Agrarian University, Krasnodar, Russia
[4]Department of Pedagogy, Moscow City Pedagogical University, Moscow, Russia

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ABSTRACT

In contemporary education, which increasingly incorporates digital technologies, the issue of adhering to ethical norms by both educators and students has gained particular relevance. This study aims to examine the impact of digital technologies on the transformation of ethical standards within the educational process. A survey was conducted among 45 educators and 345 students from three universities before and after the transition to remote learning, to assess changes in the adherence to ethical standards. The results revealed that after the implementation of remote learning, there was a significant increase in the level of adherence to ethical norms among educators (up to 98%) and students (up to 91%). Additionally, there was an improvement in academic performance, with 46% of students achieving a high level of success following the transition to remote learning. The evaluation of the impact of digital technologies on ethical transformation was found to be moderate but positive. Thus, digital technologies can serve as an effective tool for enhancing ethical standards and improving educational outcomes, particularly in the context of remote learning. These findings underscore the importance of integrating digital technologies into the educational process as a means of supporting ethical culture.

Corresponding Author:

ZuoYuan Liu
College of Marxism, Beijing Institute of Technology
No. 6-9 Yard, LangXiang East Street, Fang Shan District, Beijing, 102488, Peoples Republic of China
Email: liu_zuoyuan@onmail.com

1. INTRODUCTION

In the context of the pandemic, digital technologies have gained prominence, impacting the educational environment and leading to ethical transformation within it [1], [2]. The demand for the use of modern technologies to facilitate the educational process has increased during the pandemic [3], [4]. The digitalization of the educational environment affects the adherence to ethical norms by both educators and students, as it brings about a transformation of the educational process as a whole [5]. One of the effective components of modern education is artificial intelligence, which increasingly assumes tasks traditionally performed by humans due to its extensive functionality [6]. Distance learning requires adherence to ethical norms, which not only includes communication via email and online video conferencing platforms (Zoom, Skype, and Google Meet), but also the upholding of academic integrity when instructors write research papers and students complete assignments [7]. For instance, plagiarism checks were introduced for students' theses to enhance compliance with ethical standards during their writing process [8], [9]. Furthermore, before publication in journals indexed in scientometric databases (Scopus and Web of Science),

research articles undergo plagiarism checks [10]. Additionally, violations of academic integrity are often due to a lack of awareness among both educators and students about the specific requirements for maintaining ethical standards of academic integrity, as well as a deficiency in the necessary skills [11].

Thus, to reduce instances of direct copying from others' work and to enhance the awareness of educators and students, it is essential to organize and conduct informational training sessions or online courses. These would provide participants in modern education with the opportunity to learn more about plagiarism and the contemporary requirements for academic publications. The challenges in the digital transformation of education in Russia can also be attributed to the lack of resources for its implementation, the unpreparedness of educators and students, and the low level of technical competence development [12]. Additionally, the use of digital technologies, particularly social networks, in education fosters the development of new relationships between educators and students, raises issues related to copyright, and necessitates a new understanding of the concepts of professionalism and professional competencies. This, in turn, expands their semantic scope and operational features, as digital transformation introduces a new format of interaction between educational representatives and society as a whole [13]. The concept of digital well-being ethics encompasses adherence to ethical norms in all areas of life where digital technologies are utilized [14], [15].

In the contemporary educational process, the relevance of online and distance learning has increased, necessitating the integration of digital technologies into the learning process [16]. The new format of education, based on distance learning, involves the use of modern methodological approaches, online platforms, and mobile applications [17]. Researchers from England emphasize that artificial intelligence and digital technologies should not compromise ethical standards, particularly regarding autonomy, academic integrity, and confidentiality [18]. Moreover, ethical norms are expected to evolve within the context of a learner-centered educational approach and continuous learning [19]. However, the impact of digital transformation on professional competencies and skills is also being analyzed. For instance, previous research highlight that digital technologies contribute to the development of critical thinking when used in the educational process [20]. Additionally, researchers from England note the positive influence of digital technologies on the development of creativity, as their extensive functionality allows for the creation of new ideas, the generation of unconventional concepts, and their practical implementation [21].

The group of applications used to facilitate distance learning and provide video communication is most commonly represented by platforms such as Zoom, Skype, and Google Meet, which can be accessed not only on computers but also on mobile phones [22]. Canadian scholars emphasize the user-friendly functionality of Zoom, which not only allows for conducting online classes in video format but also enables screen sharing. This feature, in turn, aids in the visualization of educational material and enhances students' motivation to learn [23]. Online platforms are also utilized for implementing education, each with distinct functionalities aimed at supporting various types of work. For instance, a study conducted in India demonstrated the effectiveness of online platforms in enhancing student motivation through visualization features and 3D formats [24]. The Moodle platform allows for the creation of educational courses and supports distance learning by enabling the posting of necessary assignments and maintaining online grade books by instructors [25]. The Coursera online platform offers distinct advantages, as it hosts courses taught by international instructors in English, allowing students not only to acquire essential educational information but also to improve their English language proficiency [26]. The iSpring platform is designed to facilitate the creation of custom courses [27]. A study conducted in Russia demonstrated the effectiveness of this platform in teaching Russian as a foreign language through online courses developed by native speakers [28]. The Skillshare learning platform, also focused on course creation, is advantageous due to its wide range of thematic courses, enabling students to develop professional skills and competencies across multiple fields of knowledge [29].

The principles of ethical behavior that must be upheld during the use of online platforms include confidentiality, accuracy, and integrity [30]. Furthermore, ethical transformation requires that students independently complete homework assignments and various forms of knowledge assessments. However, there are challenges in verifying the authenticity of these practices, particularly because the learning process occurs remotely through digital technologies. Researchers from the United States and the United Kingdom highlight that these challenges manifest at the level of distance learning, homework completion, and educational policy as a whole, emphasizing the need for transformation and advancement toward a new stage of development focused on the digitalization of education [31]. The aforementioned educational online platforms, which facilitate the creation and presentation of custom courses, necessitate adherence to ethical norms regarding copyright and the proper use of these platforms in educational processes, including citation of the original source to avoid plagiarism [32].

In modern education, specialized programs are widely used to detect plagiarism, such as Dupli Checker, Copyleaks, Plagiarisma, Plagiarism Checker, and Academic Plagiarism. These tools enable the

identification of the originality percentage of a written text and help determine the sources from which text fragments were borrowed [33]. For example, the advantage of Dupli Checker lies in its user-friendly interface and the ability to perform free text checks both by uploading a document and by copying and pasting individual text fragments [34]. The Plagiarisma program is particularly advantageous due to its support for 190 languages, allowing for text verification in multiple languages [35]. Additionally, in the context of academic integrity, various forms of plagiarism are considered, including full plagiarism, direct plagiarism, self-plagiarism, paraphrased plagiarism, accidental plagiarism, and others [36].

The aim of the article is to analyze the impact of digital technologies on the ethical transformation of the educational environment. The objectives of the study are outlined as: to determine the level of adherence to ethical norms by educators and students before and after the implementation of distance learning formats, based on surveys conducted during traditional and distance learning periods; to develop a distance learning program incorporating digital technologies; to conduct training using the developed program, followed by a subsequent survey to assess the effectiveness of utilizing modern technologies in enhancing adherence to ethical norms.

2. METHOD

2.1. Research design and sample

The study is based on an experimental method involving surveys of educators and students, aimed at determining the level of adherence to ethical norms in the educational process and the impact of digital technologies on these norms. Additionally, the development of the distance learning program utilizing digital technologies employed a modeling approach. The study was conducted with a sample of 45 educators and 345 students from the 1st (average age: 17-18 years) and 3rd (average age: 19-20 years) years of the Faculty of Humanities and Social Sciences, Faculty of Information Technology and Technology, and the College of Economics and Management at Beijing Institute of Technology (Beijing, China), Kuban State Technological University (Krasnodar, Russia), and Moscow City Pedagogical University (Moscow). The primary criteria for sampling students were the academic year and faculty, as seen in Table 1. Age and gender characteristics were not considered. Students from other specializations did not participate in the experiment. The study involved 1st and 3rd-year students to compare the level of adherence to ethical norms between students who have just begun their studies in the 1st year and those who are in their 3rd year.

The primary criteria for sampling educators were the faculty and specialization (Faculty of Humanities and Social Sciences; Faculty of Information Technology; College of Economics and Management) and teaching experience, with the aim of assessing the level of adherence to ethical norms among educators in their professional practice, as shown in Table 2. Age and gender characteristics were not considered. The average teaching experience of the educators is 7-8 years. Specifically, 20 educators have 9 years of experience, 7 have 8 years, 8 have 7 years, and 10 have less than 7 years. The criterion of teaching experience was considered to evaluate the adherence to ethical norms in teaching across different faculties.

Table 1. Characteristics of the student sample

	Indicators	Percentage (%)
Quantity	345	100
Year	1	58
	3	42
Age	17	33
	18	23
	19	21
	20	23
Faculties	Faculty of Humanities and Social Sciences	35
	Faculty of Information Technology	32
	College of Economics and Management	33

Table 2. Characteristics of the educator sample

	Indicators	Percentage (%)
Quantity	45	100
Teaching experience	9 years – 20	
	8 years – 7	
	7 years – 8	
	Less than 7 years – 10	
Faculties	Faculty of Humanities and Social Sciences	33
	Faculty of Information Technology	33
	College of Economics and Management	34

2.2. Survey

The study was conducted in three phases. The first phase took place in September 2023, while the second and third phases occurred between March and May 2024. The aim was to identify the characteristics of ethical transformation during distance learning using digital technologies and their impact on the level of adherence to ethical norms by educators and students. In the first phase, educators and students were initially sent a Google Form via email containing the following questions: "do you adhere to ethical norms in communication during education?", "do you adhere to ethical norms of academic integrity when writing scientific articles (for educators)/completing homework assignments (for students)?", "does ethical transformation affect academic performance?", "evaluate your performance during traditional learning", "are digital technologies used in the educational process?", "indicate the level of impact of digital technologies on the ethical transformation of the educational environment", and "assess the level of adherence to ethical norms in the educational process". After completing the survey, respondents were required to return the questionnaire to the email address specified in the Google Form. There were no time constraints for the respondents.

In the second phase, students participated in training using a program specifically developed for distance learning with digital technologies, which also addressed ethical issues in the context of educational digitalization. The program consists of structural components such as ethics, distance learning, and digital technologies. Central to the program is the thematic module "digital technologies and ethics in distance learning," which is divided into individual sessions aimed at enhancing ethical standards during distance learning and developing technical competence related to digital technologies, as presented in Table 3.

The training program requires material resources, including computers and headphones, as it is conducted in a distance learning format. The human resources needed for the implementation of the training are represented by educators who, before conducting the sessions, must familiarize themselves with the fundamental information about ethical norms and the specifics of using digital technologies in distance learning. The training program incorporates materials on ethical norms and the use of digital technologies in distance learning, available through online courses on educational platforms, textbooks, and video and audio recordings. Additionally, the program includes the use of applications such as Zoom and Google Meet, which are essential for conducting online sessions. Students will need a computer or mobile phone with internet access to download the necessary applications.

Table 3. Content of the training program

Thematic module	Objectives	Resources used
"Digital technologies and ethics in distance learning"	– Enhancing ethical standards during distance learning – Development of technical competence (digital technologies: virtual reality, augmented reality, artificial intelligence, emotional intelligence, 3D printing, and Internet of Things)	– Textbook "rebooting ethics education in the digital age" [37] – Online course "digital transformation" on the Coursera platform [38] – Textbook "digital ethics" [39] – Research article "digital ethics now" [40] – Online course "intelligence tools for the digital age" on the Coursera platform [41] – Online course "big data, artificial intelligence, and ethics" on the Coursera platform [42] – Online course "introduction to augmented reality and ARCore" on the Coursera platform [43] – Online course "virtual reality" on the Coursera platform [44] – Online course "introduction to artificial intelligence (AI)" on the Coursera platform [45] – Online course "emotional and social intelligence" on the Coursera platform [46] – Online course "3D printing software" on the Coursera platform [47] – Online course "internet of things and AI cloud" on the Coursera platform [48]

The third stage involved conducting a follow-up survey during the period of distance learning. The survey comprised questions such as: "do you adhere to ethical communication norms in distance learning?", "do you follow ethical norms of academic integrity when writing scientific articles (for faculty)/completing assignments (for students)?", "does ethical transformation affect academic performance?", "evaluate your performance during distance learning", "are digital technologies used in the educational process?", "specify the impact of digital technologies on the ethical transformation of the educational space", and "assess the level of adherence to ethical norms in the educational process." The procedure for this survey was identical to that of the initial survey conducted prior to the implementation of distance learning.

2.3. Statistical processing, research limitations, and ethical issues

The responses from participants were analyzed using Statistica and Microsoft Excel software, resulting in the creation of diagrams depicting the metrics for each question separately for all faculty members and students. The study's limitations include the small sample size, as the experiment was conducted with only 45 faculty members and 345 students from the 1st and 3rd years. Students from other universities were not included in the experiment. The experiment was conducted in adherence to all ethical standards, ensuring anonymity and confidentiality. There were no requirements to provide personal information such as names, surnames, or addresses. Written consent was obtained from all participants for conducting and processing the data. Participants were required to indicate their current course and faculty at the time of the experiment. Faculty members were required to specify their teaching faculty and years of experience.

3. RESULTS

Figures 1-5 present the results of the survey conducted with faculty members and students during conventional in-person instruction prior to the pandemic and during remote learning. The responses are displayed in a comparative context to assess the impact of digital technologies on ethical standards among students and faculty. Figure 1 illustrates the responses from faculty members to the following questions: “do you adhere to ethical norms in communication during teaching?”, “do you adhere to ethical norms of academic integrity when writing scientific articles?”, “does ethical transformation affect academic performance?”, and “are digital technologies used in the educational process?”

The data indicates that 91% of faculty members adhere to ethical norms in communication, while 9% do not. When asked about adherence to academic integrity in writing scientific articles, the majority of respondents (65%) affirmed their compliance, while 35% admitted to not following these ethical norms, highlighting a need for improved adherence to ethical standards in the educational process. Furthermore, 75% of faculty members believe that ethical transformation impacts academic performance, whereas 25% disagreed and selected “No”. Regarding the use of digital technologies in education, responses were distributed such that the majority (53%) reported not using digital technologies in the educational process, while 47% indicated that such technologies are employed.

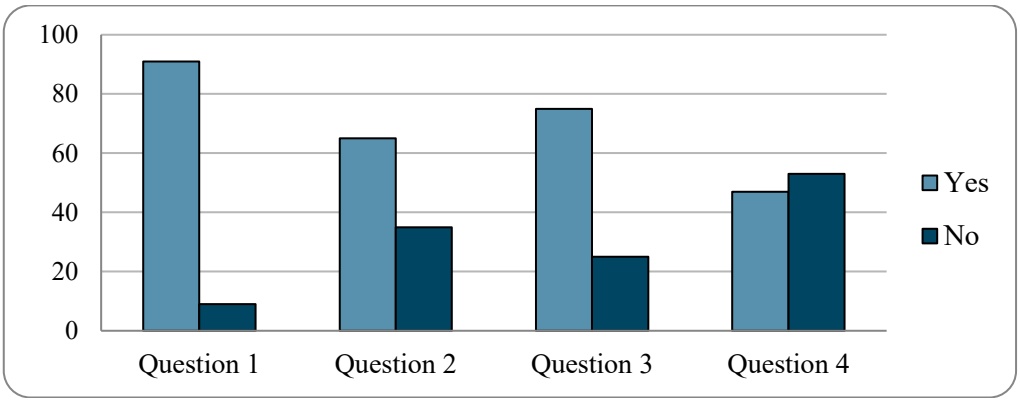

Figure 1. Faculty members’ responses to questions 1-4 prior to remote learning

Figure 2 presents the responses of student participants to the questions: “do you adhere to ethical norms of communication in education?”, “do you adhere to academic integrity norms when completing assignments?”, “does ethical transformation impact academic performance?”, and “are digital technologies used in the educational process?” The data reveals that 80% of students follow ethical communication norms during their education, whereas 9% answered “No”, indicating a need to enhance adherence to ethical norms among students. Regarding adherence to academic integrity norms in assignment completion, the majority of students (52%) answered “No”, while 48% answered “Yes”, highlighting the need to improve adherence to academic integrity norms during preparation for classes and completion of assignments. Half of the students (51%) believe that ethical transformation affects academic performance, whereas 49% disagreed, selecting “No”. For the fourth question, the majority of student respondents (54%) indicated that digital technologies are not used in their education, while 46% confirmed their use.

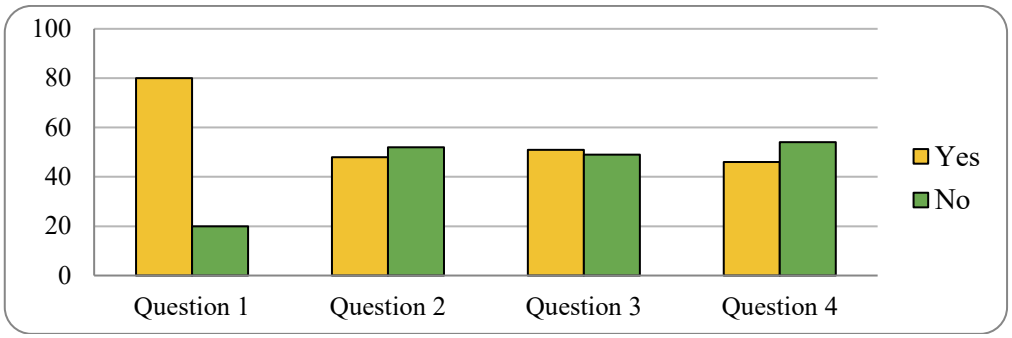

Figure 2. Responses of student respondents to questions 1-4 before the transition to remote learning

In response to the question “assess your level of academic performance during traditional learning (for students),” the majority of students (54%) selected the option “average”, while 20% reported a low level of performance, and only 26% indicated “high”. This distribution suggests a need for the integration of modern technologies to enhance student motivation, which, in turn, is expected to positively impact academic performance indicators, as shown in Figure 3. Furthermore, Figure 4 illustrates the responses of both faculty and students to the question, “indicate the level of impact of digital technologies on the ethical transformation of the educational space.”

The majority of faculty (56%) and students (64%) assess the impact of digital technologies on the ethical transformation of the educational process as moderate. Only 24% of faculty and 26% of students selected the “high” impact option. The responses for “low” impact are distributed as: 30% of faculty and 10% of students. Additionally, Figure 4 displays the responses of faculty and students to the question, “evaluate the level of adherence to ethical norms in the educational process.” Comparative analysis of the data reveals that the level of adherence to ethical norms in the educational process is at a moderate level, with 70% of faculty and 60% of students selecting this option. A high level of adherence is characterized by low percentages, with 22% of faculty and 20% of students selecting this option. The responses for “low” adherence are distributed as: 8% of faculty and 20% of students.

During the second phase, training was conducted using a specially developed program for remote learning with digital technologies over the course of one month, with sessions lasting 45 minutes each. The methodology was centered around the integration of ethical norms and digital technologies within remote education. The implementation of the program required both material and human resources. The universities hosting the experiment provided the necessary material infrastructure and were responsible for organizing the training. The sessions were conducted by faculty members from these universities, who had provided written consent to participate. As the training was delivered remotely, all participants needed a computer or mobile phone with internet access and the Zoom and Google Meet applications. The training program was hosted on the online platform Patreon, where students were required to register and subscribe to the program's page. Invitations to subscribe and access codes were sent to students via email. Access to the page and all educational materials was restricted to students and faculty who had participated in the first phase of the experiment, registered on the platform, and subscribed to the page. Educators had the capability to upload various videos, materials, and links to online courses, while students could engage in discussions, share ideas, and present observations throughout the training.

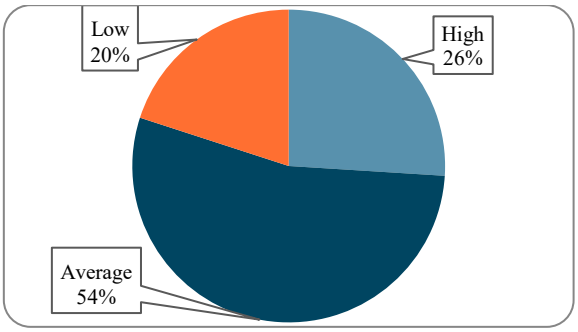

Figure 3. Responses of student respondents to question 5

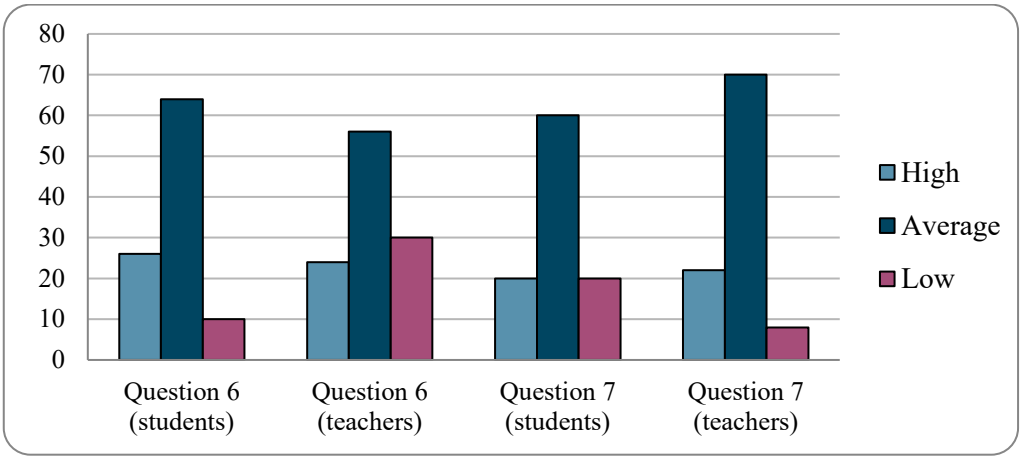

Figure 4. Responses of faculty and students to questions 6 and 7

Figures 5 and 6 present the responses from participants to the questions: "do you adhere to ethical communication norms in education?", "do you adhere to ethical norms of academic integrity in writing scientific papers (for faculty)/completing assignments (for students)?", "does ethical transformation affect academic performance indicators?", and "are digital technologies used in the educational process?" The results of the follow-up survey show higher adherence levels compared to the survey conducted prior to remote learning. For the first question, the majority of faculty (98%) and students (91%) reported adhering to ethical communication norms in education, while only 2% of faculty and 9% of students indicated otherwise. Regarding the second question, 85% of faculty and 58% of students confirmed adherence to academic integrity norms in writing scientific papers and completing assignments, respectively, whereas 15% of faculty and 42% of students did not follow these norms. Most faculty (85%) and students (70%) believe that ethical transformation impacts academic performance indicators, while 15% of faculty and 30% of students disagreed. In comparison to the survey conducted before remote learning, responses to the question "are digital technologies used in the educational process?", showed that 77% of faculty and 66% of students answered "Yes", while 23% of faculty and 34% of students responded "No".

In response to the question, "evaluate your academic performance during remote learning," 46% of student respondents selected "high", while 44% reported a medium level of academic performance, and 10% indicated a low level. Regarding the question, "specify the impact level of digital technologies on the ethical transformation of the educational space," the predominant response among faculty was a high level (45%), whereas among students, the predominant response was a medium level (60%). For faculty, the intermediate and low levels were distributed as: 35% (medium) and 20% (low), while among students, 36% selected "high", and 4% chose "low". A comparative analysis of the data reveals that the adherence to ethical norms in the educational process post-remote learning remains at a medium level, with 50% of both faculty and students selecting this option. Compared to the pre-remote learning survey, the high level of adherence showed increased figures for both faculty (45%) and students (40%). The low-level responses were distributed as: 5% for faculty and 10% for students.

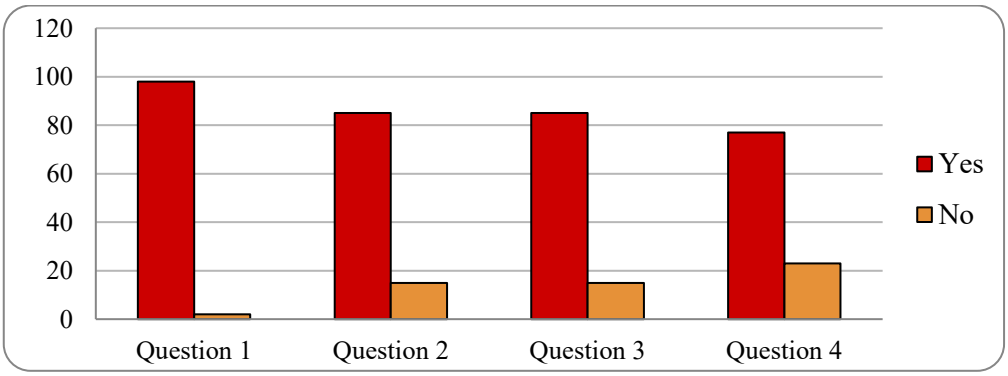

Figure 5. Responses of faculty to questions 1-4 after remote learning

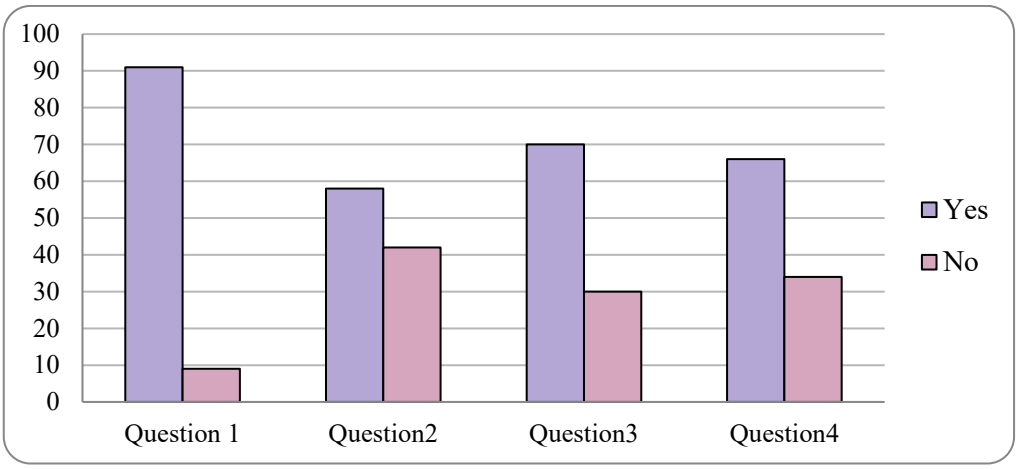

Figure 6. Responses of students to questions 1-4 after remote learning

4. DISCUSSION

The results of surveys conducted before and after remote learning indicate the ongoing relevance of the issue of ethical transformation in the digital educational space, both in Russia and internationally. For instance, a study conducted in Catalonia highlighted that the scope of issues related to ethical transformation is expected to expand due to the rapid advancement of digital technologies [5]. These findings contrast with our study, which concluded that the adherence to ethical norms increased during remote learning (with 45% of faculty selecting a high level of adherence to ethical norms) and that students' academic performance improved from a medium level (54%) to a high level (46%). Other studies also indicate that the implementation of digital platforms contributes to the enhancement of academic integrity, particularly through increased transparency and accessibility of information [49], [50].

Researchers from England, based on their experiments, conclude that digital technologies have a significant impact not only on the educational process but also on various other spheres of societal activity [51]. Similar conclusions can be drawn from our study, as post-remote learning, the majority of faculty members (45%) indicated a high level of influence of digital technologies on the ethical transformation of the educational space, while 60% of students rated it as a medium. A study conducted in Germany demonstrated the impact of digital technologies and artificial intelligence on ethical norms [52], [53]. The study concluded the necessity for developing and integrating specific ethical norms into the educational process to regulate the use of digital technologies. Our research aligns with these findings, as education based on digitalization requires adherence to ethical norms by both faculty and students in the preparation of academic articles and completion of assignments. The results of our study reveal that prior to the implementation of remote learning with digital technologies, 65% of faculty adhered to ethical norms in writing academic papers, and 48% of students adhered to them in completing assignments. However, following remote learning with digital technologies, these figures increased to 85% among faculty and 58% among students. Thus, the integration of modern technologies into the educational process and their regulation through ethical norms is essential.

Research conducted in the United Arab Emirates and England highlights the role and impact of globalization processes, digital transformation, information changes, and the transformation of social media resources on the educational process as a whole [54]. The researchers conclude that these processes create a competitive environment among universities, which, in turn, necessitates new ethical standards to be established between educational institutions. A similar study on the specifics of digital transformation was conducted in Spain [55]. The scholars emphasize the need for integrating digital technologies into education while ensuring the ethical use of data. Furthermore, it is crucial to eliminate unethical use of technology to fully realize digital transformation within universities.

An analysis conducted in Australia on the adherence to ethical norms within the context of digitalization in education revealed that the active use of modern technologies leads to ethical transformations and dilemmas [56]. Australian researchers conclude that various types of thinking, including ethical thinking, emerge in online communication, which regulates the communicative processes between students and instructors or among students themselves. It is also noted that ethical thinking does not always prevail. Compared to the results of our study, following distance education using digital technologies, the adherence to ethical norms in education improved, with 98% of instructors and 91% of students adhering to

these norms. American researchers investigated the ethical norms of social workers in the digital society and concluded that these norms are frequently related to issues of confidentiality, professional boundaries, conflicts of interest, and others [57]. The study concluded that addressing ethical issues could involve developing new ethical standards that account for the emerging requirements of the digital society.

5. CONCLUSION

The survey results conducted during conventional in-person learning prior to the pandemic and during distance learning reveal that the majority of instructors (91%) and students (80%) adhere to ethical norms during conventional education. A majority of instructor respondents (65%) observe ethical norms of academic virtue in writing scientific articles. However, 52% of students do not adhere to academic virtue norms in completing homework assignments. Additionally, 75% of instructors and 51% of students believe that ethical transformation impacts students' academic performance. The majority of instructors (53%) and students (54%) reported that digital technologies are not used in the educational process. The follow-up survey showed higher adherence to ethical norms compared to the pre-distance learning survey. Most instructors (98%) and students (91%) reported that they adhere to ethical communication norms in education, with only 2% of instructors and 9% of students not doing so. Furthermore, 85% of instructors and 58% of students indicated that they follow ethical norms of academic virtue in writing scientific articles and completing homework assignments, respectively. A majority of instructors (85%) and students (70%) believe that ethical transformation affects academic performance. After distance learning, 46% of student respondents achieved a high level of academic performance.

The comparative analysis reveals that adherence to ethical norms in the educational process remains at an average level post-distance learning, with 50% of both instructors and students selecting this response. The practical significance and prospects for further research are demonstrated by the potential application of the proposed methodology to assess adherence to ethical norms in education among instructors and students from different countries in a comparative context. Moreover, the developed program can be utilized in the educational process, particularly in its distance learning format.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
ZuoYuan Liu	✓	✓							✓			✓	✓	
Alena Gura					✓				✓		✓			
Olga Pavlovskaya		✓				✓		✓		✓				
Nataliya Antonova					✓		✓			✓				

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The authors confirm that the data supporting the findings of this study are available within the article.

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BIOGRAPHIES OF AUTHORS

ZuoYuan Liu is a Ph.D. in Philosophy, associate professor at the College of Marxism, Beijing Institute of Technology, Beijing, Peoples Republic of China. His research interests include: ethical norms, modern technologies, distance learning, and ethical transformation. He can be contacted at email: liu_zuoyuan@onmail.com.

Alena Gura is an associate professor at the Department of Philosophy, Kuban State Technological University, Krasnodar, Russia. Her research interests include: modern information technologies in education and artificial intelligence in the system of professional training. She can be contacted at email: alenagura82@outlook.com.

Olga Pavlovskaya is a doctor of Philology, head of the Department of Russian Language and Speech Communication, Kuban State Agrarian University, Krasnodar, Russia. Her research interests include: modern technologies, educational environment, artificial intelligence, and communication. She can be contacted at email: opavlovskaya8@outlook.com.

Nataliya Antonova is an associate professor at the Department of Pedagogy, Moscow City Pedagogical University, Moscow, Russia. Her research interests include: educational process, distance learning, online courses, and modern education. She can be contacted at email: naantonova2@outlook.com.