




Effective practices for increasing student's learning efficiency during the pandemic

 **Diachenko Inna¹⁺**
Kuznetsova Olga²
Ivanenko Iryna³
Khamzina Botagoz⁴
Kaltayeva Gulnar⁵

¹Department of Natural and Social Humanities Disciplines, "Zhytomyr Medical Institute" of Zhytomyr Regional Council, Zhytomyr, Ukraine.

Email: i-dyachenko@ukr.net

²Department of Musical Art, H.S. Skovoroda Kharkiv National Pedagogical University, Kharkiv, Ukraine.

Email: muza.ok7@gmail.com

³Department of Language Training, Bogomolets National Medical University, Kyiv, Ukraine.

Email: ivanenkoi@ukr.net

⁴Department of Radio Engineering, Electronics and Telecommunications, Saken Seifullin Kazakh AgroTechnical Research University, Astana, Republic of Kazakhstan.

Email: be_khamzina@mail.ru

⁵Department of Vocational Education, Saken Seifullin Kazakh AgroTechnical Research University, Astana, Republic of Kazakhstan.

Email: gulnar_s@mail.ru



(+ Corresponding author)

Article History

Received: 11 May 2023

Revised: 5 September 2023

Accepted: 27 November 2023

Published: 15 December 2023

Keywords

Online learning
Efficiency improvement
Ergotherapy
Medical specialities
Nursing
Pandemic
Physical therapy
Students' values.

ABSTRACT

The study aims to investigate methods and tools for studying students' learning efficiency in online learning conditions in specialties like "nursing" and "physical therapy and ergotherapy" during the pandemic. Data was collected from 412 students of universities in Ukraine and the Republic of Kazakhstan. A survey was carried out to assess such methods, tools, and moral values that inspired students innately and motivated them to study in an online learning environment, where students rated elements of Technology Adoption and Use of Effort Expectancy lower than other elements such as moral values as important in both specialties. The elements of Conformity and Tradition were also rated highly. Students also highly appreciated the importance of developing and improving the technical, structural, and regulatory elements of online learning, as well as fostering the value of a healthcare professional survey on elements to improve the effectiveness of training future healthcare professionals in an online format. This suggests that moral and professional values of education and an inner desire to be a high-level professional and quality communication between students and teachers promote quality education in conditions of limited access to clinical practice and online learning.

Contribution/Originality: The article highlights the importance of fostering moral values for students in addition to the perception and use of technology for effective online learning in conditions of limited access. The study also identified methods and tools for studying students' learning efficiency in online learning condition.

1. INTRODUCTION

Learning efficiency in higher education institutions (HEI) depends on various factors, such as students' personality types, qualities, and academic activity methods. However, in pandemic conditions, the impact of the stated factors on students' academic performance may vary; therefore, additional methods of encouragement, control, and achievement are required (Mahande, Akram, & Rahman, 2022). Students should be motivated and

encouraged to learn the material and perform assignments that affect the higher education online environment and impact their communication and education processes (Rohanai et al., 2022).

During online learning, students experience difficulties deriving from the need for more communication between themselves, instructors, and peers. Instructors' lower control during online learning preconditions decreases their concentration during online learning. Most online classes are built on instructors delivering self-study learning materials and home assignments (Alsuraihi, 2022). Researchers have studied many factors that influence the quality of learning and students' perceptions of educational material in an online learning format. In particular, Hilburg, Patel, Ambruso, Biewald, and Farouk (2020) developed and provided recommendations and valuable applications for training during online learning conditions, emphasizing the importance of face-to-face training of medical students during clinical practice. Other studies have studied factors of online learning like time and resource consumption, attitudes toward education, student satisfaction (Hamdan et al., 2021), the efficiency of online learning in the context of accessibility, ease of use, and perception of educational material (Pham, Le, & Do, 2021). Nonetheless, there has been little research on the inherent motivation to teach medical students online during a pandemic, as there is a need to implement internal motives to help people preserve the traditions of learning and work despite external societal changes. Considering the peculiarities of medical professionals working in nursing, physical therapy, and ergotherapy, who are supposed to help people, an essential factor motivating them to study is their inner human values. Mehta, Morris, Swinnerton, and Homer (2019) have developed a survey for students that allows studying the impact of students' values on implementing online learning.

Therefore, during the pandemic, this study examined students' values in selected medical specialties for online learning. The main objectives of this study were as follows:

1. To investigate the student's values of the specialties "nursing" and "physical therapy and ergotherapy" regarding effective online learning.
2. To explore ways to improve online learning experiences for students of selected specialties.

2. LITERATURE REVIEW

The problem of learning efficiency in HEIs under pandemic conditions in the context of the dominant personality qualities of students is partially reviewed in the scientific literature. A digital component of learning efficiency is considered in studies that distinguish specific information and communication technologies as student-instructor communication tools (Wargadinata, Maimunah, Dewi, & Rofiq, 2020). Some research seeks to demonstrate the effectiveness and advantages of hybrid learning models implemented through online platforms (Masalimova et al., 2021; Muthuprasad, Aiswarya, Aditya, & Jha, 2021) and the productivity of a full transition to the digital environment (Radha, Mahalakshmi, Kumar, & Saravanakumar, 2020). The primary benefit of e-learning platforms is flexibility. However, family distractions (26.76%) and inadequate internet connectivity (21.53%) are significant drawbacks to consider (Dost, Hossain, Shehab, Abdelwahed, & Al-Nusair, 2020; Fatoni et al., 2020). Several studies have asserted that e-learning has both positive and negative effects on student performance. It mainly occurs because of anxiety about distant circumstances, risks to users' data security, and the necessity of locating effective e-learning and management solutions (Simamora, 2020). According to Hasan and Bao (2020), the perception of "the e-learning crack-up" refers to apprehension about possible academic year loss and resultant psychological distress. Various effects of online education depend, in particular, on a country's development level, the availability of the resources that ensure higher education efficiency, and the implementation of technologies in education under crisis conditions (Gismalla, Mohamed, Ibrahim, Elhassan, & Mohamed, 2021).

Thus, the personality type is defined based on such students' qualities as amiability, diligence, and open-mindedness to new experiences and how these qualities correlate with students' performance during the pandemic (Bahasoan, Ayuandiani, Mukhram, & Rahmat, 2020; Rasiah, Kaur, & Guptan, 2020; Yu, 2021). Other studies highlight aspects such as assessing HEIs curricula efficiency regarding online learning conditions and technologies

used in the learning process. [Rasiah et al. \(2020\)](#) demonstrate that students had a positive e-learning experience, and academic continuity plans implemented by universities were effective. Some students were anxious about the technological disadvantages of information and communication technologies (ICT) (poor internet connections) ([Gismalla et al., 2021](#)), their academic abilities, and their time management skills ([Rasiah et al., 2020](#)). [Muthuprasad et al. \(2021\)](#); [Lapitan Jr, Tiangco, Sumalinog, Sabarillo, and Diaz \(2021\)](#) and [Gismalla et al. \(2021\)](#) also point to the technical limitations of e-learning as a primary concern in terms of remote work conditions. Online learning has become a real challenge for instructors and students ([Lapitan Jr et al., 2021](#)), especially for medical specialties ([Goni-Fuste et al., 2021](#); [Kaur, Dwivedi, Arora, & Gandhi, 2020](#)). Online learning, caused by COVID-19, affects students' mental well-being and weakens their health due to prolonged study in front of the screen ([Abdallah, Mohamed Abd El-Monem, & Mohamed Osman, 2020](#); [Pires, 2022](#)). This is attributed to stress, the impossibility of students communicating with instructors directly, and the necessity to concentrate independently during lessons without instructors' support ([Lim et al., 2022](#)). Students find it difficult to comprehend some aspects of learning because of the prolonged use of digital devices ([Cacayan, Baua, & Alvarado, 2020](#)). Some researchers have studied developing students' personal qualities to improve the effectiveness of online learning ([Gulley, Hall, Newsome, Sidle, & Simpson, 2021](#)). For this reason, instructors have to pay more attention to students ([Senft, Liebhauser, Tremschnig, Ferijanz, & Wladika, 2022](#)).

In general, online learning for students of medical specialties needs to be optimized ([Pires, 2022](#)). Digital technologies help solve logical problems through real-time brainstorming activities and collaboration ([Meirbekov, Maslova, & Gallyamova, 2022](#)). Online learning helps students develop autonomous approaches and enhances their thinking and attentiveness. The use of specific tools and teaching methods, particularly command-and-oriented learning, in the online format will positively impact the quality of education of medical students ([Dost et al., 2020](#)). These processes are predetermined by students' isolation from social communication. Nevertheless, education is compulsory for high scores, so students must be engaged in the learning process ([Valdez, Datu, & Chu, 2022](#)).

3. METHODOLOGY

3.1. Methods

The research methodology involved analyzing survey data. The questionnaire used in this analysis was developed by [Mehta et al. \(2019\)](#) and included a "survey on technology adoption" and a "portrait values questionnaire," along with an author-created scale. This allowed for the examination of the unique motives behind students' choice of specializations while undergoing online learning in specific fields. The assessment of the first part was conducted using a 7-point Likert scale (7 indicating strong agreement and 1 indicating strong disagreement), while the second part was assessed using a 6-point Likert scale (6 indicating a high level of similarity to the respondent and 1 indicating little or no similarity). Table 2 presents the final list of included questions and corresponding scores. The survey on adopting and using technology for students comprised of several parts, including performance expectancy, effort expectancy, social influence, habits, hedonic motivation, price value and behavioral intervention. Additionally, a survey on the theory of human values evaluated the significance of human values for prospective doctors as an indication of motivation towards efficient online learning for future medical professionals. To investigate efficient approaches for instructing students via online learning, a team of specialists (HEI administration responsible for planning educational processes in the studied institution, with over five years of experience) designed a supplementary survey enabling students to appraise the technical, structural, and regulatory aspects, as well as the values of healthcare providers involved in the online learning process. A 7-point Likert scale (7-strongly agree, 1-strongly disagree) was used to assess the questions. The questionnaire questions were developed using ZOOM during a 1-hour communication session with 5 participants. Questionnaires were sent out by electronic means of communication with students (e-mail) using Google Forms, which ensured automated collection of students' data and answers.

3.2. Sample and Data Collection

The study aimed to examine techniques and instruments for assessing the effectiveness of students' learning under online learning conditions in fields such as nursing, physical therapy, and ergotherapy, particularly during the pandemic. Research participants were chosen based on their voluntary participation in the study, their completion of an entire questionnaire, and their responses to questions. A total of 450 questionnaires were distributed, and 412 students successfully submitted their responses. The total 412 students comprised 54.13% Ukrainian and 45.87% Kazakh, from medical universities, with 370 (89.81%) female and 42 (10.19%) male respondents (see Table 1).

Table 1. Distribution of respondents per country, instructional year, and gender.

No	Characteristics	Frequency	Percentage
1.	Country		
	Ukraine	223	54.13
	Kazakhstan	189	45.87
2.	Year		
	Second-year	127	30.83
	Third-year	169	41.02
	Fourth-year	116	28.16
3.	Gender		
	Male	42	10.19
	Female	370	89.81

The accuracy and precision of the provided answers correlated with checking the email addresses to which they were sent, which were then included in the research. Such an approach allowed us to obtain timely and reliable data, excluding the possibility of substituting incorrect data. The data received from the respondents are included in the research results.

3.3. Data Analysis

All responses to the questionnaire were calculated as percentages to evaluate certain statements, the mean and standard deviation of the score, and the differences between the responses of students from Ukraine and Kazakhstan using SPSS software.

4. RESULTS

The survey was conducted among students of the “nursing” and “physical therapy and ergotherapy” specialties studied in the second, third and fourth year of medical universities. Most survey participants were third-year students (41.02%). The survey results of students studying during the 2021/2022 academic year revealed that they still needed support for the online study process (Table 2).

The results showed that students of the selected specialties positively assessed their adaptability to learning in a distance format. Students indicated that, during online learning, the people around them had a positive attitude toward online learning, which contributed to an increase in the learning of future medical professionals. The results comparison of students studying “nursing” and “physical therapy and ergotherapy” from different countries demonstrate no statistically significant differences in the assessment of values and statistical analysis of the evaluations between students from Ukraine and Kazakhstan ($p > 0.05$). The student survey results on the second part of the questionnaire allow for assessing their internal cultural values, which will contribute to effective learning in a distance format, presented in Table 3. The results indicate that their work values are equally important for students in both specialties and countries. Additional questions were developed to examine the peculiarities of the influence of values on students' studies in a distance format. The results of the assessment of the importance of certain items for improving the online learning process are demonstrated in Table 4.

Table 2. Student survey on technology adoption and use.

Effective practices	Students of the specialty "nursing"		Students of the specialty "physical therapy and ergotherapy"	
	Mean	SD	Mean	SD
Performance expectancy (PE)				
PE 1 I find e-learning useful in my daily life	5.23	0.25	5.05	0.32
PE 2 Using e-learning helps me accomplish things more quickly	4.21	0.56	4.52	0.58
PE 3 Using e-learning increases my productivity	3.41	0.62	3.63	0.85
Effort expectancy (EE)				
EE 1 Learning how to use e-learning is easy for me	3.63	1.11	3.52	1.26
EE 2 My interaction with e-learning is clear and understandable	3.65	1.01	3.41	2.21
EE 3 I find e-learning easy to use	3.21	0.52	3.25	0.65
EE 4 It is easy to become skillful at e-learning	2.89	1.05	2.96	1.25
EE 5 Using e-learning is as easy as using any other systems I have previously used	3.32	0.58	3.65	0.68
Social influence (SI)				
SI 1 People are important to me think that I should use e-learning	3.61	0.85	3.35	1.19
SI 2 People who influence my behaviour think that I should use e-learning	4.85	0.88	4.96	1.25
SI 3 People whose opinions that I value prefer that I use e-learning	3.63	0.96	4.15	0.85
Habit (HAB)				
HAB 1 The use of e-learning has become a habit for me	5.26	0.96	5.11	0.85
HAB 2 I am addicted to the use of e-learning	5.25	0.96	5.14	0.98
HAB 3 I must use e-learning	5.98	0.63	5.85	1.11
Hedonic motivation (HM)				
HM 1 Using e-learning is fun	4.06	1.25	4.65	1.09
HM 3 Using e-learning is very entertaining	4.25	2.21	4.58	2.23
Price value (PV)				
PV 1 Compared to the effort I need to put in, e-learning is beneficial for me	4.63	0.85	4.74	0.68
PV 2 Compared to the sacrifice I need to make, e-learning is worthwhile for me	4.12	0.85	4.85	0.69
PV 3 Overall, e-learning is good value	5.25	0.85	5.18	0.98
Behavioral intervention (BI)				
BI 1 I intend to continue using e-learning in the future	5.11	0.54	5.32	0.65
BI 2 I will always try to use e-learning in my daily life	5.17	0.85	5.35	0.58
BI 3 I plan to use e-learning frequently	4.85	0.78	4.95	0.58

Note: SI 4 – SI 8, HM 2 were removed because these questions did not have the necessary content load in this survey.

Source: Mehta et al. (2019).

The survey results confirmed that traditional student-instructor communication using technologies and the delivery of information in a structured form and instructor-maintained control remains the most efficient method for understanding unknown material in pandemic conditions. In this case, the most effective way to increase self-discipline and self-management in mastering the unknown subject was by providing guidebooks and resource materials and setting task deadlines for the instructor. Structural-and-logical schemes, tables, and seminars in ZOOM with subsequent written assignments based on the content of the covered topic helped most students make sense of the unknown content. Individual written answers were given by an instructor to the written tests, and the possibility of comparing them with students' responses helped them memorize the course content and face-to-face dialogue with an instructor during ZOOM seminars. Additionally, the subsequent fulfilment of individual written tasks on the covered topic helped most students memorize the course content. Face-to-face dialogue with an instructor during ZOOM seminars, with subsequent fulfilment of individual written tasks, helped most students master the course content in a timely manner. The students highly evaluated the possibility of using printed

workbooks for online learning, additional small-group activities and tools for self-monitoring, and digital applications with a learning plan and deadlines for specific tasks. Medical students from both countries highly appreciated the impact of the values of medical professionals on their online learning. Approval was even higher than the technical aspects of improving knowledge. Based on the obtained data, it can be argued that education on moral and professional values in medical students is vital for improving online learning. This will impact the education of future medical students when they study using computers or smartphones because control over the performance of tasks or learning, in general, is weakened.

Table 3. Results of student survey by the theory of human values.

Effective Practices	Students of the specialty “nursing”		Students of the specialty “physical therapy and ergotherapy”	
	Mean	SD	Mean	SD
Portrait values questionnaire				
Conformity (CO)				
CO 1 It is important to him to avoid upsetting other people	4.56	0.85	5.23	0.65
CO 2 He thinks it is crucial never to be annoying to anyone	3.65	1.12	3.68	1.05
CO 3 He tries to be tactful and avoid irritating people	4.58	0.69	4.85	0.77
Tradition (TR)				
TR 1 It is important to him to maintain traditional values or beliefs	4.35	0.65	4.28	0.83
TR 2 Following his family’s customs or a religious custom is important to him	4.85	0.98	4.96	0.95
TR 3 He strongly values the traditional practices of his culture	4.11	0.74	4.32	0.66
Security (SEP, SES)				
SEP 2 His personal security is extremely important to him	3.85	1.12	4.06	0.98
SEP 3 It is important to him to live in secure surroundings	3.35	0.96	3.58	0.88
SES 2 He wants the state to be strong so it can defend its citizens	3.25	0.96	3.24	0.73
SES 3 Having order and stability in society is important to him	3.23	0.85	3.63	0.85
Power (POR, POD)				
POR 1 Having the feeling of power that money can bring is important to him	2.36	0.74	3.85	0.77
POR 2 Being wealthy is important to him	4.52	0.74	3.85	1.02
POR 3 He pursues high power and status	3.25	0.85	3.41	0.78
POD 3 It is important to him to be the one who tells others what to do	2.65	0.74	3.85	0.98
Achievement (AC)				
AC 2 Being successful is important to him	3.35	1.05	4.11	0.78
AC 3 He wants people to admire his achievements	2.89	0.87	3.21	0.88
Hedonism (HED)				
HED 1 Having a good time is important to him	3.25	0.89	3.85	0.78
HED 2 Enjoying life’s pleasures is important to him	2.78	1.21	2.96	1.11
HED 3 He takes advantage of every opportunity to have fun	2.14	0.89	2.14	1.21
HED 4 Excitement life is important to him	3.63	0.87	4.11	0.85

Note: COR 1 – 3, SEP 1 SES 1 POD 1 POD 2 AC 1 were removed from the model due to loading below 0.6 across both country groups in the results of Mehta et al. (2019).

Table 4. Survey results on additional questions items that contribute to the efficient training of future health professionals.

No	Do the following items help or will help you study better in a distance format?	Students of the specialty "nursing"		Students of the specialty "physical therapy and ergotherapy"	
		Mean	SD	Mean	SD
I	Technical, structural and regulatory items				
1.	Additional small group activities	4.26	0.10	5.01	0.14
2.	Tools for self-monitoring, digital applications with a learning plan and deadlines for specific tasks	4.05	0.17	4.25	0.43
3.	Being provided with guidebooks and resource materials	3.98	0.12	4.12	0.21
4.	Deadlines for completion of control tests/assignments set out by an instructor	3.97	0.14	4.03	0.41
5.	Instructors' timely checks and assessment of the completion of a work/Assignment	4.39	0.16	3.85	0.57
6.	Individual written answers are given by an instructor to written tests and the possibility to compare them with my answers	4.44	0.13	4.39	0.25
7.	A face-to-face dialogue with an instructor during ZOOM seminars, with the subsequent fulfilment of individual written tasks on the covered topic;	4.31	0.12	4.38	0.47
8.	Structural-and-logical schemes, tables (Structured information)	4.27	0.14	4.25	0.32
9.	Systematization of the content and regular revision during lessons	4.12	0.21	4.08	0.35
10.	Utilizing the option of using color, highlighting, and underlining the material	4.02	0.17	4.32	0.25
11.	Printed workbooks for learning	4.21	0.11	4.39	0.35
II	Values of the medical professional				
12.	Awareness of the importance of medical work	5.36	0.23	5.32	0.45
13.	Desire to have quality knowledge to work effectively and help people in the future	5.28	0.85	5.22	0.63
14.	Desire for self-development	4.89	0.36	5.23	0.55
15.	Desire to be no worse than the doctors they know and respect	5.32	0.47	5.21	0.35
16.	Desire to have better knowledge than others	5.11	0.42	5.23	0.74

5. DISCUSSION

The shift to online education has had a considerable impact on medical specialty students' learning (Kaul et al., 2021). The incapability to conduct clinical practice from a distance has negatively affected medical students' education, evaluation methods, and the absence of guidance that is unheard of to them (Pires, 2022). A number of recent studies on the effectiveness of university learning under pandemic conditions have shown an improvement in student performance through various methods that complement either traditional or online pedagogical practices. (Barabash et al., 2021; Lapitan Jr et al., 2021). Franchi (2020) proposes the necessity of additional practical training as COVID-19 is expected to have various long-term impacts on students. The learning environment for the year 2020-2021 might not be optimal. The lack of face-to-face interaction and direct communication with peers and mentors could hinder medical specialty students' development in particular. Despite the achievements in implementing technologies in an educational process that ensures the efficiency of online learning, obtaining practical medical knowledge in laboratories is often regarded as a traditional practice and the most effective method (Ghosh, 2017). Medical students identified negative factors such as Internet bandwidth and connection restrictions, inadequate knowledge about e-learning system principles, constraints concerning technical support, lack of flexibility when dealing with technical problems during online exams and absence of personal interaction (Gismalla et al., 2021). Gopal, Singh, and Aggarwal (2021) delineate four distinct factors that augment online learning - the quality of lecturing, course structure, prompt feedback, and student expectations have an affirmative impact on student contentment. Alternatively, the study by Fatoni et al. (2020) found that the environment, students'

autonomous organization of their free time, network instability, communication with instructors, and teaching materials were not synchronized (in fact, they were not complementary) in their study of the advantages and disadvantages of online learning among Indonesian students. As a result, student attendance decreased, and their focus on course material deteriorated, leading to ineffective online learning during the pandemic (Fatoni et al., 2020). Mehta et al. (2019) assessment was employed to determine the quality of medical students' learning, as it enables the evaluation of their online learning capabilities. An evaluation was conducted on medical specialty students' values, alongside proposed items to enhance online education during the pandemic. The experts supplemented the developmental questions to enable assessment of specific elements of the interaction between pharmacy students and instructors for the purpose of learning, memory retention, and knowledge enhancement. They also identified other potential educational resources, including workbooks, small group activities, tools for self-monitoring, digital applications with customized learning plans, and deadlines for specified tasks. The assessment of values revealed no statistically significant differences between the students of nursing, physical therapy, and ergotherapy, as well as between students from Ukraine and Kazakhstan. Therefore, the students acknowledged the vital significance of the ethics of future professionals, along with the technical, structural, regulatory, and medical matters that aid in enhancing the efficiency of online education. The findings from the research questionnaire facilitated the discovery of practical measures to augment the quality of online learning. The pandemic has impeded students' acquisition of communication skills, feedback, and practical know-how. As a substitute for the dearth of meaningful hands-on experience available to medical HEI students, multi-faceted digital pedagogies have been implemented to guarantee the efficacy of tertiary education. Efficient solutions should be sought for the study process under the conditions of online learning and the emergence of new opportunities.

Simamora (2020) highlighted the importance of providing students with various teacher-guided synchronous instructions (communication when participants interact in the same time space as in video conferencing, Google Meet, and WebEx). As demonstrated in this study, synchronous face-to-face interaction is the most efficient method for communication and feedback provision. Communication with instructors is essential for students to learn new content and to improve their self-discipline. This information and data were obtained by Dost et al. (2020). The authors established various levels of HEI's adaptivity to fully online learning, the need to develop new platforms for online learning, and the use of multiple methods and tools in pedagogical practice. The cross-sectional survey conducted by Yekefallah, Namdar, Panahi, and Dehghankar (2021) highlights the significance of in-person communication and diverse teaching methods to enhance learning outcomes. The study investigates the influence of values on online learning, which is critical for healthcare workers, and serves as a valuable addition to the current body of research on the efficacy of learning resources. Developing materials with an eye towards future medical students, fostering values, and building the educational process should aid in effectively teaching medical students remotely and in blended learning scenarios. Students with desirable satisfaction have higher scores in teaching and learning, feedback and evaluation, flexibility and appropriateness, and learning workload (Yekefallah et al., 2021). Despite a lack of communication skills, online learning facilitates access to unlimited learning materials and develops the ability to work independently. Nevertheless, it requires high motivation and the desire to learn independently. Fostering values in future medical professionals is one of the components of a complete sense of learning, the formation of personal characteristics, and the essential qualities of future professionals. Students who understand the ideals and values they want to aspire to are more motivated to study.

However, not all students are motivated to study the educational material, and those who study independently require live communication with their instructors. Therefore, educators ought to encourage the exploration of the learning process in a socio-emotional manner while mastering learning management in online conditions (Purwanto, 2020). During interpersonal interactions with instructors, students accumulate experience and undertake a detailed study of an academic course (Chang, Wang, Lin, Cheng, & Chiang, 2021; Lee & Ihm, 2021). Therefore, despite the advancement of online learning technologies and the limitless potential of educational

materials, the importance of instructors in facilitating effective learning cannot be overstated. As evidenced by the results of this study, future medical professionals' professional values were highly valued by students, making it imperative to take this into account when designing the educational material and the process as a whole. Practical solutions for improving distance format learning can be the creation of educational workbooks that students can order for themselves, which still require careful preparation and constant updating of the content of such materials.

Considering the results mentioned above, this research material could be helpful for further study on larger samples of students.

6. CONCLUSION

The study analyzed the effects of specific practices employed by medical students in online learning, as well as identifying potential avenues to enhance the effectiveness of medical students' education. Based on the survey results, the study found that there is a significant link between academic activities provided by instructors, and the promotion of student encouragement and motivation:

- Classical online guidebooks, resource materials, and learning materials.
- Digital structural-and-logical schemes and tables.
- Monitoring of the deadlines for completion of assignments, instructor-maintained performance, and attendance at online classes.
- Instructors' timely checking and assessing of the work made by students.
- ZOOM seminars and video lectures containing presentations.
- Doing individual written tasks.
- And a live instructor conversation with explanations.

The study results prove the need for increased real-life communication and feedback in a combination of various teaching methods in the completely digital environment through the decline in students' practical academic activity. A stimulating solution can be the creation of printed educational workbooks that students can order for learning. The impact of medical students' values on online learning was also studied. Students highly appreciate the need to develop some values they respect. So, this should be considered when developing educational material and curricula and in the academic process between instructors and students.

Further scientific research should identify the impact of different forms of work on the students and instructors, creating and using printed workbooks for training medical students in the online learning format, which can include various materials to develop the internal values of students – future medical professionals. It is worth developing the topic of cultural and professional education values in the process of teaching medical students (the specialties “nursing” and “physical therapy and ergotherapy” and other medical specialties) to improve their awareness of the need for quality education, self-learning, and lifelong learning in the future. Creation and studying the impact of educational materials concerning the development of future medical professionals' values also requires further development and study of the effect on the quality of learning in online and blended learning formats.

7. RECOMMENDATIONS

As a result of COVID-19, an online learning system was needed. Research such as this is essential for developing training programs for students studying nursing physical therapy and ergotherapy online, as well as other medical specialties. It is possible to introduce a training programme that concentrates on enhancing the learning experience for isolated students. This can be done by gathering responses from respondents on aspects such as self-discipline, time management, elements that contribute to the timely completion of the training course, and moral values. As instructors require more supervision, the process of gaining the required knowledge can be hindered as learning gaps are identified. Producing printed workbooks allows for a more comprehensive assessment of the quantity of knowledge that necessitates processing. Furthermore, students who frequently attend educational

sessions and those who are unable to connect during scheduled hours may benefit from the option to choose their educational material's format. Multiple inquiries must be established, and tools for assessing the quality of distance education should be developed for further investigation into local studies of online learning for students of diverse specializations, taking into account the progress of distance education tools. In order to improve the educational standard of medical students, study materials addressing the development of medical workers' values should be created. This study proposes potential techniques for enhancing the caliber of remote learning for pupils from distinct areas of expertise with the employment of the provided questionnaire.

8. LIMITATIONS

The study was limited to investigate methods of improving online learning in only two medical specialties namely, nursing and physical therapy and ergotherapy, during the COVID-19 pandemic in 2020-2021. Hence, this study was confined to students of these two disciplines only at Higher Education Institutions in Kazakhstan and Ukraine. Moreover, due to the authors' ability to conduct surveys in these locations, the research was more localized, focusing on indicators to enhance the effectiveness of medical student education.

Funding: This study received no specific financial support.

Institutional Review Board Statement: The Ethical Committee of the Zhytomyr Medical Institute of Zhytomyr Regional Council, Zhytomyr, Ukraine has granted approval for this study on 29 September 2021 (Ref. No. 1).

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

REFERENCES

- Abdallah, S. L., Mohamed Abd El-Monem, O., & Mohamed Osman, B. (2020). E-learning experiences and stressors of nursing students during COVID-19 pandemic: A phenomenological study. *Egyptian Journal of Health Care*, 11(4), 1094-1105.
- Alsuraihi, A. A. (2022). The effect of implementing mind maps for online learning and assessment on students during COVID-19 pandemic: A cross sectional study. *BMC Medical Education*, 22(1), 1-16. <https://doi.org/10.1186/s12909-022-03211-2>
- Bahasoan, A. N., Ayuandiani, W., Mukhram, M., & Rahmat, A. (2020). Effectiveness of online learning in pandemic COVID-19. *International Journal of Science, Technology & Management*, 1(2), 100-106. <https://doi.org/10.46729/ijstm.v1i2.30>
- Barabash, O., Musienko, A., Hohoniants, S., Laptiev, O., Salash, O., Rudenko, Y., & Klochko, A. (2021). Comprehensive methods of evaluation of efficiency of distance learning system functioning. *International Journal of Computer Network and Information Security*, 13(1), 16-28. <https://doi.org/10.5815/ijcnis.2021.01.02>
- Cacayan, E. B., Baua, M. E. C., & Alvarado, A. E. (2020). Challenges in nursing education in the new normal: Basis for faculty enhancement program. *Health Notions*, 4(8), 234-247. <https://doi.org/10.33846/hn40801>
- Chang, J. Y.-F., Wang, L.-H., Lin, T.-C., Cheng, F.-C., & Chiang, C.-P. (2021). Comparison of learning effectiveness between physical classroom and online learning for dental education during the COVID-19 pandemic. *Journal of Dental Sciences*, 16(4), 1281-1289. <https://doi.org/10.1016/j.jds.2021.07.016>
- Dost, S., Hossain, A., Shehab, M., Abdelwahed, A., & Al-Nusair, L. (2020). Perceptions of medical students towards online teaching during the COVID-19 pandemic: A national cross-sectional survey of 2721 UK medical students. *BMJ Open*, 10(11), e042378. <http://dx.doi.org/10.1136/bmjopen-2020-042378>
- Fatoni, Arifiati, N., Nurkhayati, E., Nurdiawati, E., Fidziah, Pamungkas, G., . . . Azizi, E. (2020). University students online learning system during Covid-19 pandemic: Advantages, constraints and solutions. *Systematic Reviews in Pharmacy*, 11(7), 570-576.
- Franchi, T. (2020). The impact of the Covid-19 pandemic on current anatomy education and future careers: A student's perspective. *Anatomical Sciences Education*, 13(3), 309-312. <https://doi.org/10.1002/ase.1966>

- Ghosh, S. K. (2017). Cadaveric dissection as an educational tool for anatomical sciences in the 21st century. *Anatomical Sciences Education*, 10(3), 286-299. <https://doi.org/10.1002/ase.1649>
- Gismalla, M. D.-A., Mohamed, M. S., Ibrahim, O. S. O., Elhassan, M. M. A., & Mohamed, M. N. (2021). Medical students' perception towards E-learning during COVID 19 pandemic in a high burden developing country. *BMC Medical Education*, 21(1), 1-7. <https://doi.org/10.1186/s12909-021-02811-8>
- Goni-Fuste, B., Wennberg, L., Martin-Delgado, L., Alfonso-Arias, C., Martin-Ferreres, M. L., & Monforte-Royo, C. (2021). Experiences and needs of nursing students during pandemic outbreaks: A systematic overview of the literature. *Journal of Professional Nursing*, 37(1), 53-64. <https://doi.org/10.1016/j.profnurs.2020.12.004>
- Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, 26(6), 6923-6947. <https://doi.org/10.1007/s10639-021-10523-1>
- Gulley, T., Hall, T., Newsome, A., Sidle, M. W., & Simpson, M. R. (2021). Perceived self-efficacy among nursing students during a pandemic: A pilot study. *Teaching and Learning in Nursing*, 16(3), 215-219. <https://doi.org/10.1016/j.teln.2021.03.001>
- Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., AL-Habashneh, S., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*, 35(3), 713-725. <https://doi.org/10.1108/ijem-11-2020-0513>
- Hasan, N., & Bao, Y. (2020). Impact of "e-Learning crack-up" perception on psychological distress among college students during COVID-19 pandemic: A mediating role of "fear of academic year loss". *Children and Youth Services Review*, 118, 105355. <https://doi.org/10.1016/j.chilyouth.2020.105355>
- Hilburg, R., Patel, N., Ambruso, S., Biewald, M. A., & Farouk, S. S. (2020). Medical education during the coronavirus disease-2019 pandemic: Learning from a distance. *Advances in Chronic Kidney Disease*, 27(5), 412-417. <https://doi.org/10.1053/j.ackd.2020.05.017>
- Kaul, V., de Moraes, A. G., Khateeb, D., Greenstein, Y., Winter, G., Chae, J., . . . Dangayach, N. S. (2021). Medical education during the COVID-19 pandemic. *Chest*, 159(5), 1949-1960. <https://doi.org/10.1016/j.chest.2020.12.026>
- Kaur, N., Dwivedi, D., Arora, J., & Gandhi, A. (2020). Study of the effectiveness of e-learning to conventional teaching in medical undergraduates amid COVID-19 pandemic. *National Journal of Physiology, Pharmacy and Pharmacology*, 10(7), 563-567. <https://doi.org/10.5455/njppp.2020.10.04096202028042020>
- Lapitan Jr, L. D., Tiangco, C. E., Sumalinog, D. A. G., Sabarillo, N. S., & Diaz, J. M. (2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. *Education for Chemical Engineers*, 35, 116-131. <https://doi.org/10.1016/j.ece.2021.01.012>
- Lee, M., & Ihm, J. (2021). Empathy and attitude toward communication skill learning as a predictor of patient-centered attitude: A cross-sectional study of dental students in Korea. *BMC Medical Education*, 21(1), 1-11. <https://doi.org/10.1186/s12909-021-02674-z>
- Lim, L. T. S., Regencia, Z. J. G., Dela Cruz, J. R. C., Ho, F. D. V., Rodolfo, M. S., Ly-Uson, J., & Baja, E. S. (2022). Assessing the effect of the COVID-19 pandemic, shift to online learning, and social media use on the mental health of college students in the Philippines: A mixed-method study protocol. *Plos One*, 17(5), e0267555. <https://doi.org/10.1371/journal.pone.0267555>
- Mahande, R. D., Akram, A., & Rahman, E. S. (2022). A PLS-SEM approach to understand ARCS, McClellands, and SDT for The motivational design of online learning system usage in higher education. *Turkish Online Journal of Distance Education*, 23(1), 97-112. <https://dergipark.org.tr/en/pub/tojde/issue/67387/1048549>
- Masalimova, A. R., Ryazanova, E. L., Tararina, L. I., Sokolova, E. G., Ikrennikova, Y. B., Efimushkina, S. V., & Shulga, T. I. (2021). Distance learning hybrid format for university students in post-pandemic perspective: Collaborative technologies aspect. *Cypriot Journal of Educational Sciences*, 16(1), 389-395. <https://doi.org/10.18844/cjes.v16i1.5536>

- Mehta, A., Morris, N. P., Swinnerton, B., & Homer, M. (2019). The influence of values on E-learning adoption. *Computers & Education*, 141, 103617. <https://doi.org/10.1016/j.compedu.2019.103617>
- Meirbekov, A., Maslova, I., & Gallyamova, Z. (2022). Digital education tools for critical thinking development. *Thinking Skills and Creativity*, 44, 101023. <https://doi.org/10.1016/j.tsc.2022.101023>
- Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences & Humanities Open*, 3(1), 100101. <https://doi.org/10.1016/j.ssaho.2020.100101>
- Pham, T. T. T., Le, H. A., & Do, D. T. (2021). The factors affecting students' online learning outcomes during the COVID-19 pandemic: A Bayesian exploratory factor analysis. *Education Research International*, 2021, 1-13. <https://doi.org/10.1155/2021/2669098>
- Pires, C. (2022). Perceptions of pharmacy students on the E-learning strategies adopted during the COVID-19 pandemic: A systematic review. *Pharmacy*, 10(1), 31. <https://doi.org/10.3390/pharmacy10010031>
- Purwanto, A. (2020). COVID-19 pandemic and home online learning system: Does it affect the quality of pharmacy school learning? *Systematic Reviews in Pharmacy*, 11(8), 524-530.
- Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, A. (2020). E-Learning during lockdown of Covid-19 pandemic: A global perspective. *International Journal of Control and Automation*, 13(4), 1088-1099.
- Rasiah, R., Kaur, H., & Guptan, V. (2020). Business continuity plan in the higher education industry: University students' perceptions of the effectiveness of academic continuity plans during COVID-19 pandemic. *Applied System Innovation*, 3(4), 51. <https://doi.org/10.3390/asi3040051>
- Rohanai, R., Ahmad, M. F., Rameli, M. R. M., Azrul, W., Hassan, S. W., & Abd Mutalib, N. N. (2022). The attitudes of MTUN students towards m-learning usage during COVID-19 pandemic. *International Journal of Information and Education Technology*, 12(5), 406-413. <http://doi.org/10.18178/ijiet.2022.12.5.1634>
- Senft, B., Liebhauser, A., Tremschnig, I., Ferrijanz, E., & Wladika, W. (2022). Effects of the COVID-19 pandemic on children and adolescents from the perspective of teachers. *Frontiers in Education*, 7, 808015. <https://doi.org/10.3389/feduc.2022.808015>
- Simamora, R. M. (2020). The Challenges of online learning during the COVID-19 pandemic: An essay analysis of performing arts education students. *Studies in Learning and Teaching*, 1(2), 86-103. <https://doi.org/10.46627/silet.v1i2.38>
- Valdez, J. P. M., Datu, J. A. D., & Chu, S. K. W. (2022). Gratitude intervention optimizes effective learning outcomes in Filipino high school students: A mixed-methods study. *Computers & Education*, 176, 104268. <https://doi.org/10.1016/j.compedu.2021.104268>
- Wargadinata, W., Maimunah, I., Dewi, E., & Rofiq, Z. (2020). Student's responses on learning in the early COVID-19 pandemic. *Tadris: Journal of Education and Teacher Training*, 5(1), 141-153. <https://doi.org/10.24042/tadris.v5i1.6153>
- Yekefallah, L., Namdar, P., Panahi, R., & Dehghankar, L. (2021). Factors related to students' satisfaction with holding e-learning during the Covid-19 pandemic based on the dimensions of e-learning. *Heliyon*, 7(7), e07628. <https://doi.org/10.1016/j.heliyon.2021.e07628>
- Yu, Z. (2021). The effects of gender, educational level, and personality on online learning outcomes during the COVID-19 pandemic. *International Journal of Educational Technology in Higher Education*, 18(1), 14. <https://doi.org/10.1186/s41239-021-00252-3>

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Education and Practice shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.