ANALYSIS OF THE FINANCIAL IMPACT OF ONLINE LEARNING

Yasen Sabev
Medical University – Sofia, Bulgaria, y.subev@mc.mu-sofia.bg
Tihomira Zlatanova
Medical University – Sofia, Bulgaria, t.zlatanova@foz.mu-sofia.bg
Nikolay Popov
Medical University – Sofia, Bulgaria, n.popov@foz.mu-sofia.bg

Abstract: The transition to online learning in higher education, accelerated by the COVID-19 pandemic and subsequent technological developments, has significantly influenced the financial burden of students across the globe. In Bulgaria, where healthcare-related academic programs often require on-site clinical training and presence, the aforementioned shift has introduced notable changes in student's expenses. In this work we investigated the economic implications of distance learning by analyzing self-reported data from students in health-related fields. The survey was conducted in the period April-July 2024 and encompassed 734 respondents across various specialties, educational levels, and academic years across different universities in the country. Around 63% of the students in the survey experienced a decrease in training-related expenses, primarily due to reduced transportation costs (54.52%) and lower spending on daily sustenance such as food and beverages. In contrast, a smaller minority reported increased expenses, attributed mainly to higher internet costs and the purchase of new hardware. Interestingly, 64% of respondents answered that online learning did not demand more preparation time; some even found the workload to be lighter. This counters the common perception that digital formats increase academic strain and instead points to a potential for balancing educational efficiency with reduced expenses. Beyond financial metrics, our findings also point to the role of digital education in shaping broader aspects such as access, time use, and institutional practices.This shows how important it is to think about the financial side of education, especially with rising costs. A purely technological solution is insufficient if not accompanied by inclusive policies and adequate training for both students and academic staff. The paper concludes with practical recommendations for academic institutions: to develop targeted digital support programs, invest in centralized infrastructure, promote digital literacy, and incorporate economic considerations into curriculum planning. Equal access to digital tools and respect for the time students invest in their studies should become key considerations in designing long-term strategies for online education.
Keywords: online education, financial impact, higher education, medical students, education costs

1. INTRODUCTION

The accelerated integration of digital technologies in education, particularly during the COVID-19 pandemic, has significantly reshaped the structure and delivery of academic programs. Online learning, which was initially considered a supplementary tool, became the primary mode of instruction for many and continues to be a significant component of academic programs worldwide, influencing not only pedagogical practices but also the economic conditions under which students pursue their studies.

While the educational effectiveness of online learning has been widely discussed, its financial implications remain underexplored, especially in healthcare related fields, where academic training typically includes clinical practice, laboratory work, and face-to-face instructions. In these disciplines, the transition to remote education may impact both direct expenses (e.g., transportation, food, textbooks) and indirect costs (e.g., digital infrastructure, time management, learning efficiency).

This paper addresses the gap by investigating how online learning has affected students' personal expenses.

2. MATERIALS AND METHODS

This study follows a quantitative, descriptive research design and uses a structured online questionnaire as the primary data collection instrument. The survey targeted students enrolled in medical and health-related programs at higher education institutions in Bulgaria. Participation was voluntary and anonymous, with informed consent obtained prior to completion.

The questionnaire included closed-ended and multiple-choice questions, covering sociodemographic variables (e.g., gender, age), academic profile (e.g., specialty, degree, year of study), perceived preparation time during online learning, and changes in study-related expenses following the transition to distance education.

A total of 734 valid responses were analyzed using descriptive statistical methods, including frequency and percentage distribution. All results are presented as figures in the order referenced and appropriately labeled.

4. RESULTS

The demographic structure of the respondents (Figure 1) reveals a clear predominance of female participants, accounting for 81.6% (n=599) of the sample, compared to 18.4% (n=135) male respondents. This distribution reflects the gender profile of many health-related academic programs, where women traditionally represent the majority.

Figure 1. Gender distribution

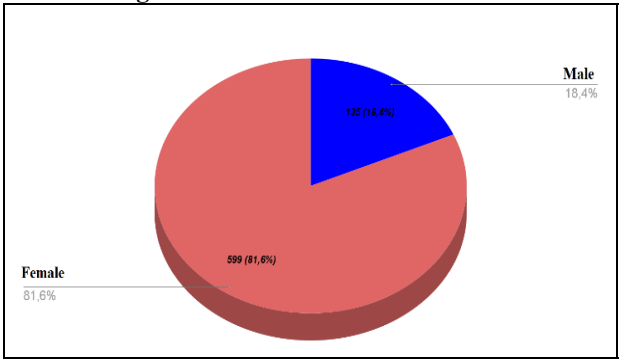
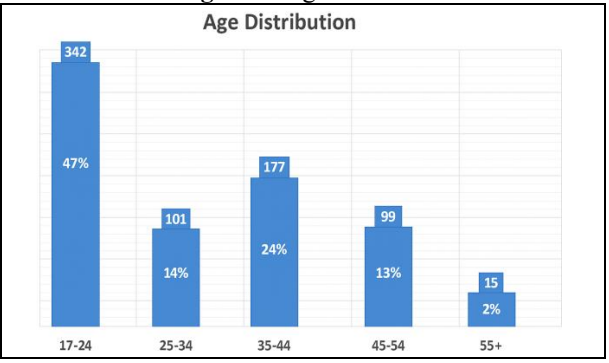


Figure 2. Age distribution



Source: Survey data collected by the authors for the purposes of this study. (2024)

In terms of age (Figure 2), the largest group of respondents is aged 17–24 years (47%, n=342), followed by those aged 35–44 years (24%, n=177) and 25–34 years (14%, n=101). Only a small percentage of respondents are aged 45–54 years (13%, n=99) or over 55 years (2%, n=15). This distribution shows that the majority of respondents are either traditional undergraduate students or adult learners returning to education. Educational and qualification degrees are shown in Figure 3. The majority of students are pursuing a Bachelor's Degree (39%, n=287), followed by Master's Degree students (33%, n=241) and Professional Bachelor's Degree students (28%, n=206). This confirms the presence of both undergraduate and graduate learners in the sample.

Figure 3. Educational degree of respondents

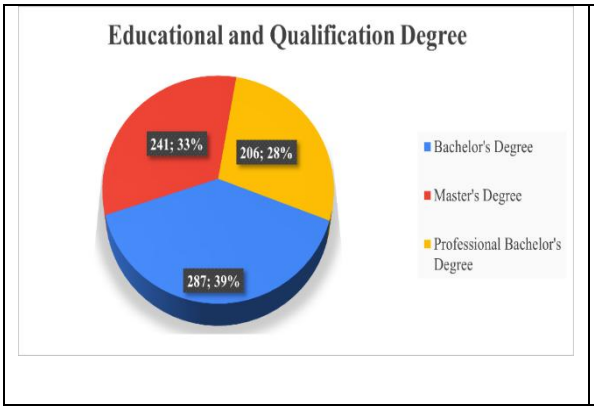
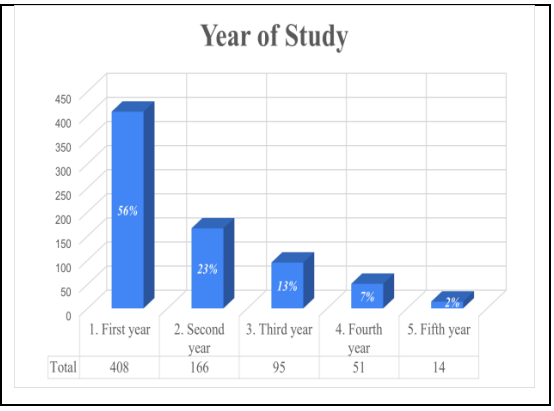


Figure 4. Distribution by year of study



Source: Survey data collected by the authors for the purposes of this study. (2024)

The respondents represent a wide range of academic specialties (Figure 5). The most common are Nursing (21.4%, n=157), Medicine (12.7%, n=93), and Physician Assistant (9.8%, n=72), followed closely by Pharmacy (9.5%, n=70) and Medical Cosmetology (6.8%, n=50). Other specialties such as Dental Medicine, Rehabilitation Therapy, and Radiologic Technology are also well represented, which gave us a diverse academic sample within the health sciences.

Figure 5. Distribution by academic specialty

Specialty	Number	Percentage
Nursing	157	21,4%
Medicine	93	12,7%
Physician Assistant	72	9,8%
Pharmacy	70	9,5%
Medical cosmetology	50	6,8%
Dental Medicine	45	6,1%
Rehabilitation Therapist	44	6,0%
Pharmacy assistant	43	5,9%
Radiologic Technologist	31	4,2%
Public Health and Health Management	30	4,1%
Midwifery	27	3,7%
Medical laboratory assistant	23	3,1%
Public Health Inspector	18	2,5%
Dental Technician	15	2,0%
Paramedic	8	1,1%
Healthcare Management	7	1,0%

Source: Survey data collected by the authors for the purposes of this study.

When asked whether online learning requires more time for preparation and study (Figure 6), the majority of respondents 64% (n=466) answered "No", while 22% (n=157) were undecided, and only 14% (n=104) stated that it requires more time. This suggests that for most students, the transition to online learning did not result in a significant increase in cognitive or time-related burden.

Figure 6.

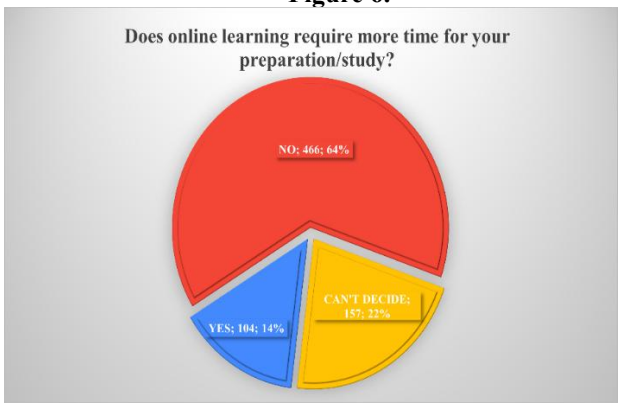
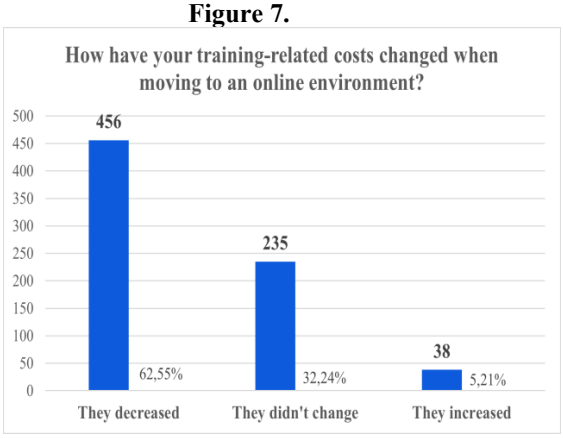


Figure 7.

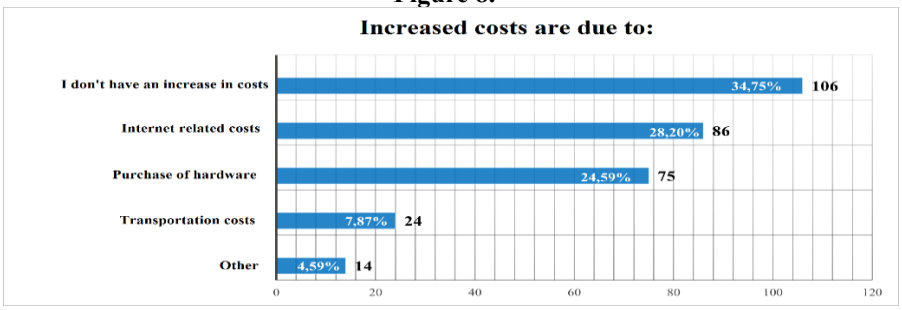


Source: Survey data collected by the authors for the purposes of this study. (2024)

Regarding financial implications, 62.55% (n=456) of respondents reported a decrease in study-related expenses after switching to online learning (Figure 7), while 32.24% (n=235) saw no change, and only 5.21% (n=38) experienced an increase in costs.

Among those who reported increased expenses, the most cited reasons (Figure 8) were internet-related costs (28.2%, n=86) and purchase of hardware (24.59%, n=75). Interestingly, 34.75% (n=106) stated that they did not experience any increase in expenses, suggesting that for a portion of respondents the cost structure remained stable or manageable despite the shift to online learning.

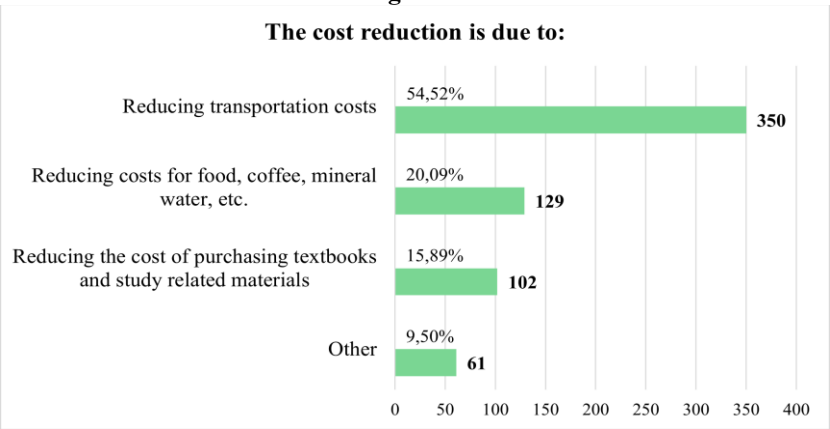
Figure 8.



Source: Survey data collected by the authors for the purposes of this study. (2024)

On the other hand, the main drivers of cost reduction (Figure 9) include a significant drop in transportation costs (54.52%, n=350), as well as reduced spending on food, coffee, and beverages (20.09%, n=129) and learning materials such as textbooks (15.89%, n=102). The results demonstrate that online education can effectively reduce students' financial burden, especially by cutting daily transportation and food-related costs.

Figure 9.



Source: Survey data collected by the authors for the purposes of this study. (2024)

5. DISCUSSION

The findings of this study provide meaningful insights into the financial impact of online learning on students in health and medical sciences. Contrary to widespread concerns, the transition to online education appears to reduce rather than increase financial burdens for the majority of students. This can be attributed to the elimination of transportation and daily expenses, a result consistent with existing research on digital affordability.

Nevertheless, financial effects extend beyond direct costs. Some students incur indirect or hidden expenses—such as investing in better internet, upgrading devices, or reorganizing their home environments. We also found that the cost implications of online learning are highly context-dependent.

Regarding workload, 64% of students reported no increase in preparation time. This challenges the assumption that online learning inherently intensifies academic effort. One possible reason is that students in health-related programs are already adapted to high demands and may benefit from the time flexibility of digital formats.

Demographic factors also play a role. The predominance of young and female students reflects the profile of health sciences education. Interestingly, younger students—despite lower financial independence—were among those who benefited most from reduced expenses, leading us to the idea that online formats may be especially effective for early-stage learners.

While the data originate from Bulgaria, the implications are relevant to broader educational contexts, especially in transitional economies. When properly implemented, online learning can be a sustainable, cost-effective model without compromising academic outcomes.

Our study has some limitations. It relies on self-reported data and focuses exclusively on medical and health sciences students. Further research could include cross-disciplinary comparisons and longitudinal tracking of financial and academic outcomes.

6. CONCLUSIONS

The present study explored the financial implications of online learning for students in medical and healthcare-related academic programs. Our survey showed that the transition to distance education led to a reduction in training-related expenses for most students, primarily through decreased transportation and daily subsistence costs. While a minority of respondents reported increased financial burdens, these were generally attributed to internet service improvements and one-time hardware investments.

Contrary to concerns that online learning may demand more time for preparation, the results showed us that most students did not perceive a significant increase in workload. This indicates that digital learning formats—when appropriately implemented—can support students' academic engagement without exacerbating time-related pressures.

We also noticed that online education can be more affordable, which is important particularly for younger students. These insights are of particular relevance for academic institutions aiming to develop economically sustainable

hybrid or fully online models, especially in the context of rising living expenses and post-pandemic educational restructuring.

Based on these insights, the following recommendations are proposed for universities and educational institutions:

- Develop student digital support programs – Provide hardware subsidies, internet stipends, access to licensed software, and open educational resources to ensure digital equity.
- Establish standardized digital infrastructure – Create centralized platforms that are well organized in communication, content delivery, and evaluation, ensuring consistency across programs.
- Integrate cost analysis into academic planning – Regularly monitor the financial impact of teaching formats on students and use the data to inform curricular and policy decisions.
- Promote digital literacy and self-regulated learning – Offer structured training for students and faculty on managing time, using digital tools effectively, and navigating online environments confidently.
- Acknowledge time as an economic asset – Recognize that the time saved through online learning has value, both academically and personally, and factor it into evaluations of learning formats.

Online education changes more than just how much students spend. It reshapes their access to education, their sense of inclusion, and their ability to succeed in diverse environments. These dimensions should guide how digital formats are planned and improved.

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