

ORIGINAL ARTICLE
ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

The impact of COVID-19 on medical education A small-scale cross-sectional survey of medical students' perspectives

OBJECTIVE To investigate undergraduate medical students' perspectives of the impact of emergency online education due to the COVID-19 pandemic lockdowns on medical training in Greece and abroad. **METHOD** A self-administered online questionnaire was addressed to undergraduate medical students, assessing their pre-COVID digital literacy, access to technological facilities, clinics, lectures, exam provision and attitudes towards the disruption of their education and their role in managing the health crisis. **RESULTS** A total of 140 medical students responded to the questionnaire. Greek medical students seemed more familiar with online learning pre-COVID compared to their fellow students abroad, while technological facilities appeared generally accessible at the start of the pandemic. A hybrid online-learning model was employed for remote teaching with e-lectures rated as highly effective by the Greeks, but unrewarding by foreign students. Online exams were conducted with inadequate invigilation and allocated time. Medical students' clinical and lab skills, stress levels and productivity appeared negatively affected, while technological skills were enhanced. Students' eagerness to educate themselves and voluntarily contribute to the health crisis was recorded, although curriculum updates to include COVID-19 issues were found insufficient. **CONCLUSIONS** An overview of the effects of the ongoing pandemic on medical education was provided. This shift to emergency online teaching can help us build effective teaching approaches for future crises. The long-term impact of the pandemic on medical education remains to be seen when the pandemic subsides.

As 2019 came to an end, COVID-19 virus outbreak, first identified in Wuhan, China, shook humanity. In March 2020, the Director-General of the World Health Organization (WHO) declared COVID-19 outbreak a global pandemic due to its severity and alarming spread.¹ Up to the moment of writing, more than 500 million confirmed cases and over 6 million deaths have been reported globally.²

Undoubtedly, the COVID-19 pandemic has had unprecedented repercussions in higher education (HE). As a result of the strict measures imposed to minimize the virus transmission, including complete lockdowns, curfews and social distancing, the vast majority of medical schools were forced to rapidly switch to distance online learning environments, suspending traditional face-to-face course

delivery, lab sessions, key examinations and even clinical training and placements.³⁻⁵ This abrupt transition has been shown to be detrimental to the quality of medical education, owing to the loss of in-class interactive and collaborative experiences,⁶ the significant restriction of clinical activity and the cancellation of in-person medical conferences and clinical rotations, resulting in a lack of interaction with patients.^{7,8} Increased psychological distress, anxiety, burnout, concern about becoming infected and mental health problems –including depression symptoms– have been widely recorded among the college population.^{5,9}

On the other hand, online learning has not been without its advantages, particularly among preclinical medical students, who have expressed high levels of satisfaction

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2023, 40(4):500–508

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Η επίδραση της COVID-19
στην ιατρική εκπαίδευση:
Μια μικρής κλίμακας έρευνα
των αντιλήψεων φοιτητών Ιατρικής

Περίληψη στο τέλος του άρθρου

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with the distance learning experience due to the ease and flexibility of access to the educational material.^{8,10} Concurrently, studies amid the pandemic have revealed that the flexibility afforded by watching pre-recorded lecture videos in comfortable surroundings, while having continuous access to digital materials was greatly appreciated by medical students.^{4,8}

The exponential spread of the virus reached Greece in February 2020, when the first confirmed case in the country was recorded by the National Public Health Organization (NPHO).¹¹ On March 10th 2020, Hellenic medical institutions, responding to the emerging health crisis, suspended all in-person classes and activities, whether at an educational or a clinical setting.¹² Shortly after that, distance online courses were initiated with the use of synchronous and asynchronous platforms and lasted up until the end of spring semester 2021. Greek students and professors had to familiarize themselves with the remote education models, commonly practiced in other European countries in the context of blended and distance learning methods, but so uncommon and utopian for Greece,¹³ where the only public online-learning university is the Hellenic Open University.

Initial reports show that Greek medical students were affected by the surge of COVID pandemic, having to cope with technical issues, lack of motivation and stamina to attend long hours of consecutive e-lectures and increased pressure and anxiety due to the uncertain future and the disruption of their daily routine.¹⁴ This is in line with studies contending that medical training might prove insufficient if acquired exclusively through e-learning, lacking the potential to substitute or simulate clinical exposure.¹⁵ Conversely, it has also been observed that Gen Z students embraced the emergency educational practices with the kind of natural fluency that comes with having grown up in a digital world, and their attitudes towards learning new skills and having new experiences seemed positive.¹⁶

While broad research has been conducted in the field of COVID-19 in Greece, there seems to be a paucity of studies on its impact on medical education. Admittedly, the Greek medical education system, with its long-standing history, constitutes an interesting case to be studied, particularly as it is still typified by an overemphasis on theoretical teacher-centered training and a limited recourse to digital tools and distant learning approaches (prior to the pandemic). To the best of our knowledge, this is the first study to examine Greek medical students' perspectives of emergency online education during the lockdown and compare them to medical students' respective views from foreign universities.

MATERIAL AND METHOD

A cross-sectional survey was conducted from December 5th, 2020 to December 27th, 2020. A self-administered online questionnaire created by the authors was used as a research tool.

Questionnaire

The questionnaire form included close-ended (multiple choice, checkboxes, linear scales) and some open-ended questions (short and long answer). It was originally designed in English for foreign students, and then translated into Greek, for Greek students. After being pretested with Greek fellow students for the response latency and to ensure that the questions were all clearly articulated and relevant, both versions of the questionnaire (English and Greek) were distributed via e-mail, social media, and direct message to undergraduate medical students in Greece, in other European countries (Germany, Spain, Portugal, Romania, Croatia, Hungary, Ukraine, Finland, United Kingdom) and in America (United States and Mexico). We relied on simple random probability sampling. In order to reduce self-selection bias, the study was forwarded to students via student enrollment lists (e.g. in Moodle) wherever those were available. Students who had attended at least one online class were included in the study.

The questionnaire solicited information about respondents' demographics (gender, location), the year and stage (clinical/preclinical) of their studies. Medical students were also asked about their pre-pandemic online-learning experience and their access to technological equipment, on a 5-point Likert scale ranging from a minimum (0%) to a maximum (100%). Close-ended questions sought information about the realization of classes and clinical rotations after the COVID-19 outbreak, the teaching methods used, online exams and students' involvement in medical issues beyond their university courses through participation in conferences, training sessions and seminars. Several questions pertained to the respondents' attitude towards the impact of the pandemic on their medical education (on a 5-point Likert scale), including the effect on their specialty choice. An open-ended question garnered medical students' views about their role in handling the pandemic, and their comment on their medical studies experience at that time.

The questionnaire was anonymous, no identifying data was collected, and the respondents were assured of the confidentiality of their responses.

Statistical analysis

Collected data were analyzed with Microsoft Office Excel 365 and Google sheets. Welch's t-test was used instead of t-test to compare the means of sample groups, as it tends to be more robust for unequal sample sizes. Reliability of the survey was tested using Chronbach's alpha both for the full scale and the subscales of effectiveness, interactions, effectiveness in clinical years, and changes in medical education. The effectiveness subscale consisted of five items (i.e. effectiveness of asynchronous teaching, online lectures,

project assignments, clinical cases virtual discussions, and online simulations on a scale from 1=very little to 5=a lot). The interaction subscale consisted of two items (i.e. interaction with professors during online classes compared to in-class, and interaction with classmates during online classes compared to in-class interaction on a scale from 1=poorer to 5=better). The effectiveness in clinical years subscale consisted of four items with regard to online exams (i.e. effectiveness of online exams, difficulty, adequate allocated time to complete the online exams, appropriate monitoring/invigilation on a scale from 0% to 100%). The changes in medical education subscale consisted of eight items (i.e. theoretical knowledge, self-study, lab skills, clinical skills, ability to perform under pressure, productivity, anxiety/stress, technological skills marked as positively affected, negatively affected or not affected).

RESULTS

The questionnaire was completed by a total of 140 medical students, 91 of whom were enrolled in Greek medical faculties (National and Kapodistrian University of Athens; Aristotle University of Thessaloniki; University of Patras; University of Ioannina; University of Thessaly; University of Crete; Democritus University of Thrace) and 49 in medical schools abroad (Romania, Bucharest, Carol Davila University of Medicine and Pharmacy [UMFCD]); Spain, Seville, University of Seville; Croatia, Zagreb, University of Zagreb; UK, Coventry, University of Warwick; USA, Winston-Salem, NC, Wake Forest University School of Medicine; USA, California, Los Angeles, UCLA; Ukraine, Lviv, Danylo Halysky Lviv National Medical University [LNMU]; Germany, Munich, LMU Munich Faculty of Medicine; Germany, Munich, Technical University of Munich). The response rate of foreign medical students was lower, which could probably give rise to sampling bias. The unequal sample sizes between the group of Greek and the group of foreign medical students could also result in loss of statistical power in the analysis. Table 1 sums up the respondents' gender and medical studies status.

All respondents stated that they had access to a personal computer and internet facilities. However, a small number of Greek students did not have Wi-Fi access at home at the start of the academic year. Prior to the pandemic, Greek medical students appeared to be more familiar (p -value <0.05) with online learning compared to foreign students, whose level of experience seemed less advanced (fig. 1). In the clinical stage, both groups were more familiar with online-learning tools (17.4% expert level compared to 6.0% of pre-clinical students). Data showed that since the beginning of the pandemic more than half of the classes were implemented in a virtual environment both in Greece and abroad. Interestingly, a lower percentage of clinical

Table 1. Characteristics of the survey respondents.

Characteristics	Country of studies		
	Greece	Rest of Europe and the US	Total
<i>Gender n (%)</i>			
Male	28 (30.8)	10 (20.4)	38 (27.1)
Female	63 (69.2)	39 (79.6)	102 (72.9)
<i>Stage of studies n (%)</i>			
Pre-clinical	76 (83.5)	41 (83.7)	117 (83.6)
Clinical	15 (16.5)	8 (16.3)	23 (16.4)

US: United States of America

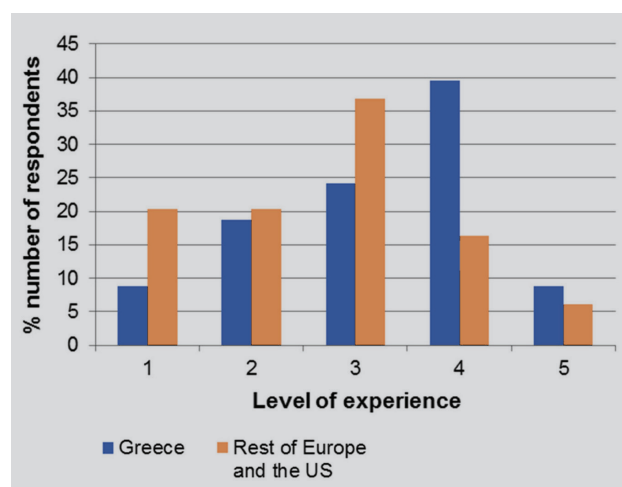


Figure 1. Pre-pandemic familiarity with online learning. US: United States.

placements cancellation was observed in Greek students' responses compared to international students' clinical activity (tab. 2).

Table 2. Medical students' pre-COVID digital literacy, the extent of the switch to online teaching and the clinical rotations setting after the virus outbreak in Greece compared to the rest of Europe and the United States (US).

Variables (% average)	Greece	Rest of Europe and the US	p-value (Welch's t-test)
Pre-COVID familiarity with online-learning	64	54	0.009
Online classes after the COVID-19 outbreak	64	60	0.910
Cancelled clinics after the COVID-19 outbreak	22	48	0.012
In-person clinics after the COVID-19 outbreak	58	66	0.477

The survey indicated live online lectures as the most common teaching method during lockdown, both for clinical and pre-clinical students, followed by asynchronous teaching and project assignments. In most cases, a hybrid online-learning model was used, including a combination of methods (fig. 2). Not surprisingly, a case-based approach with clinical cases virtual discussions was co-employed predominantly for clinical students (60.9% compared to 3.4% of pre-clinical students), since case-based learning is traditionally a favored methodology in clinical years.

As regards the effectiveness of the educational methods used, the level of satisfaction was above average for all of them. The Greek students rated the quality of online lectures with an average of 3.1 out of 5, marking it as the online-teaching method with the highest level of satisfaction, while foreign medical students rated online lectures with an average of 2.6, ranking it as the least effective method employed (tab. 3).

Further, analysis showed that medical students' interaction with their professors and fellows in the online environ-

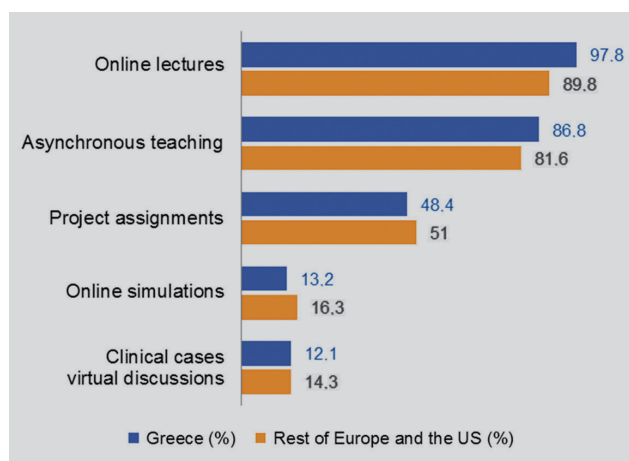


Figure 2. Methods used for online teaching. US: United States.

Table 3. Online-teaching methods average rating (out of 5).

Online-teaching methods	Greece	Rest of Europe and the US	p-value (Welch's t-test)
Asynchronous teaching	2.9	3.6	0.121
Online live lectures	3.1	2.6	0.011
Project assignments	2.8	2.9	0.963
Clinical cases virtual discussions	2.8	3.7	0.622
Online simulations	2.6	2.8	0.732

US: United States of America

ment was rather poor (around 2.1 out of 5) compared to classroom interaction, both in Greece and abroad.

With respect to the exam format, two-thirds of the Greek respondents answered that their exams took place online, while the majority of the surveyed foreign medical students sat in-person exams. On the whole, respondents evaluated online exams as an effective way to test knowledge, as illustrated in figure 3, and considered them of medium difficulty, although the allocated time to complete the exam and the corresponding monitoring seemed inadequate.

A significant 85.7% of the foreign respondents affirmed having participated in online medical education programs during the pandemic, while the corresponding percentage of Greek respondents was 69.2%.

As illustrated in figures 4a and 4b, the changes in medical education enhanced the theoretical knowledge of 46% of the Greek students, while, on the contrary, they had a negative impact on an equal percentage of foreign students. However, both groups affirmed the negative impact on their clinical and lab skills. Similarly, half of the surveyed students experienced increased stress levels, and more than half noted reduced productivity. Nonetheless, the changes in the learning practices helped 80–90% of the students build their technological skills. Also, only 8% of the total number of respondents reported that the pandemic would affect their medical specialty choice, with clinical students being less influenced compared to pre-clinical ones.

At the time of the survey, only 4% of the Greek respondents felt well-educated on COVID-19 issues and health crisis management, when the corresponding percentage of foreign respondents was 18%. Around 50% of the surveyed participants agreed that their curriculum was not sufficiently updated to educate them on such topics and a relatively high percentage of participants responded that

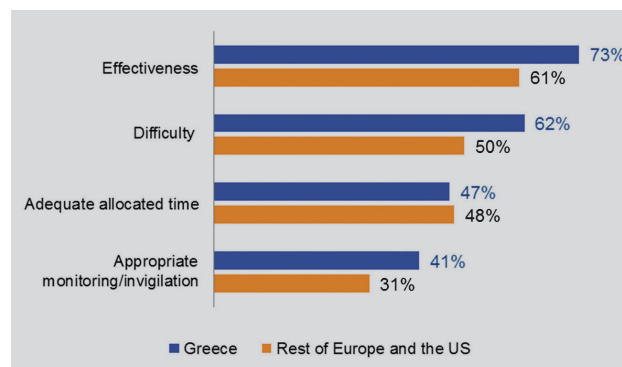


Figure 3. Online-exams average rating by medical students. US: United States.

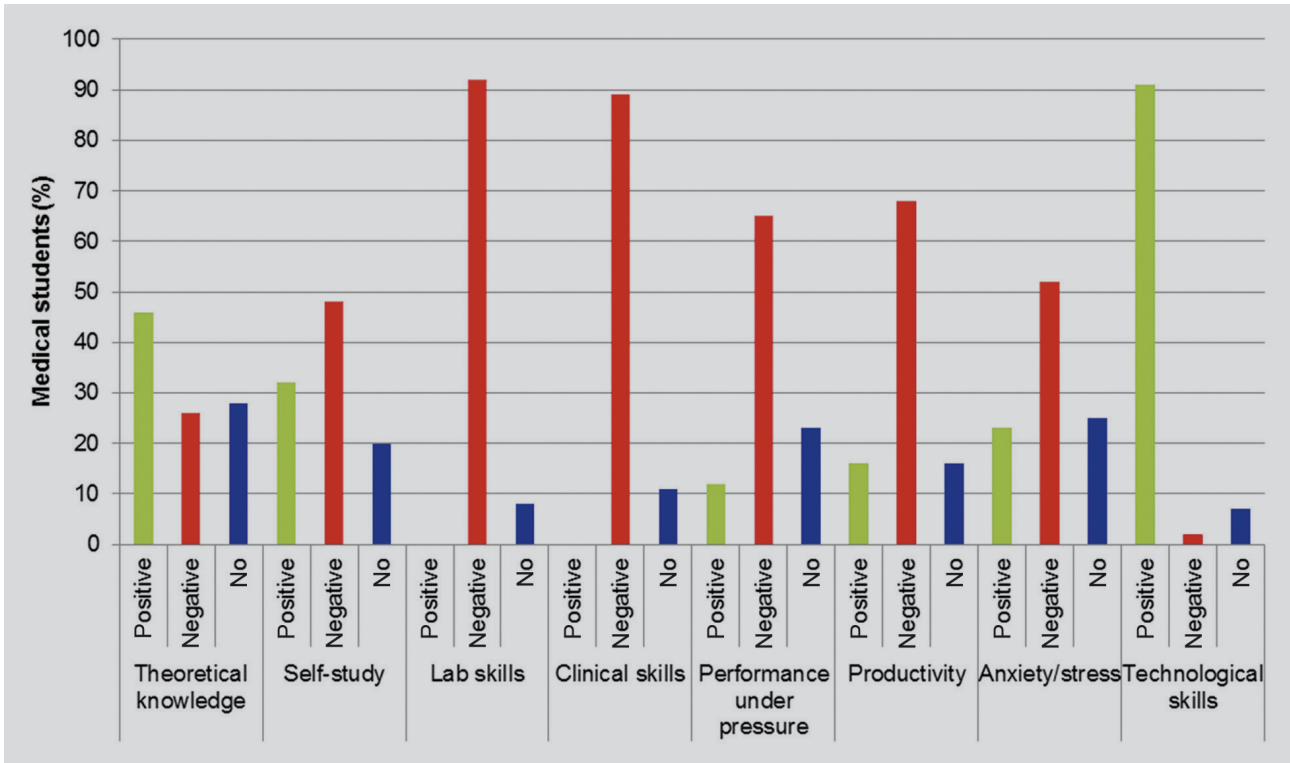


Figure 4a. Effects of the changes in medical education during the pandemic on Greek medical students.

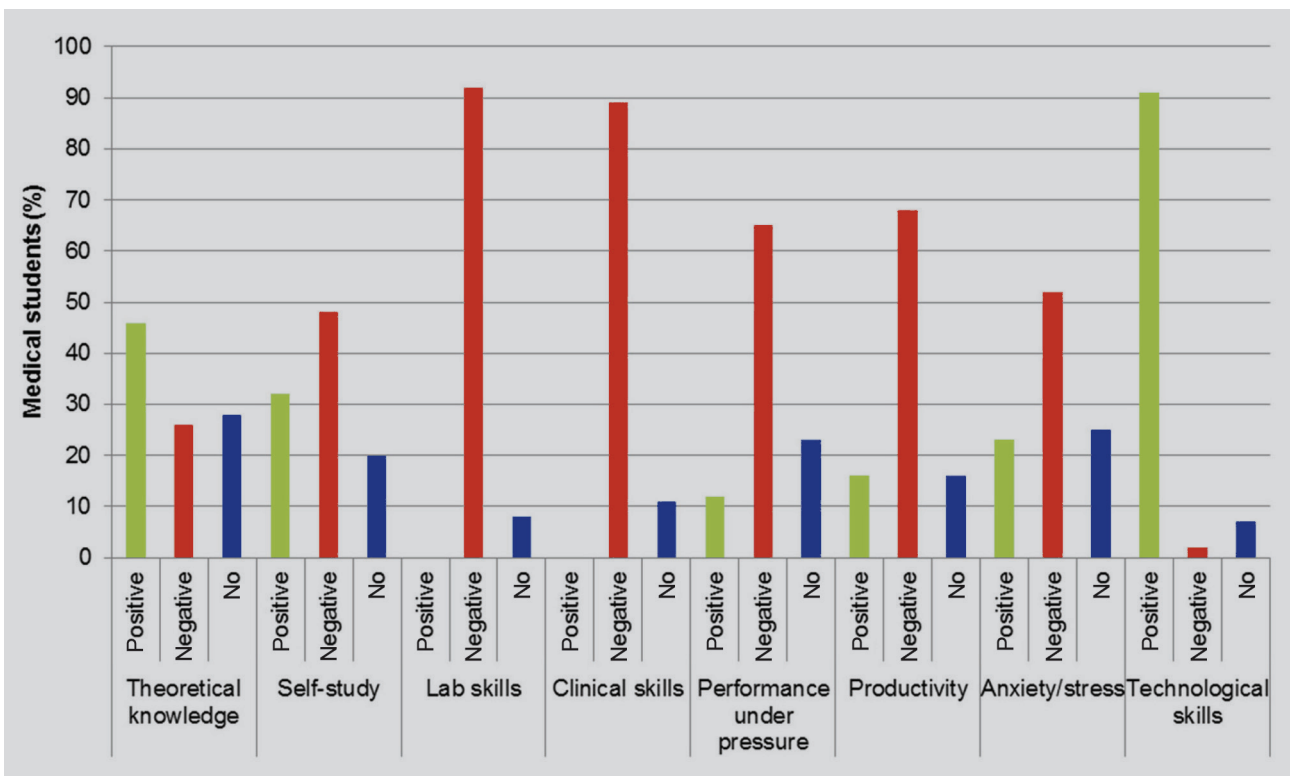


Figure 4b. Effects of the changes in medical education during the pandemic on medical students in Europe (except for Greece) and the United States.

their curriculum was not updated at all after the pandemic outbreak (fig. 5).

The medical students were also asked to openly comment on the role they could play in managing the pandemic. Many suggested that senior students with clinical experience could volunteer as medical assistants in hospitals in under-staffed COVID and non-COVID clinics, or by performing rapid tests and facilitating in COVID-19 research and call centers. Some responded that they did not feel ready to contribute, noting that they would be a burden to the healthcare staff. Almost all surveyed students agreed that they should act as role models for society by following the protective measures and combating fake news with awareness-raising campaigns about symptoms, protocols, masks, and vaccination.

In the extra-comments section, students mentioned experiencing “headaches, eye pain and increased distraction issues” due to extended use of electronic devices for online lessons. “Long online lectures tire me out and leave no time to go through my notes and consolidate what I have learned” pointed out a first-year medical student from Greece, who had not yet had the chance to attend any classes in the university campus. Some senior students complained about on-time graduation prioritization over studies extension and others highlighted that the latter might well prove a financial burden. Other students noted:

“I believe that learning cannot be replaced by distance learning” and “Distance learning deprives us of experiencing the essence of medicine as a hands-on craftsmanship”, expressing strong desire for return to in-person classes.

The full survey showed an alpha of 0.78, and the alphas for the sub-scales of effectiveness, interactions, effectiveness in clinical years, and changes in medical education were 0.83, 0.61, 0.67, and 0.65, respectively.

DISCUSSION

The present research findings provide an initial picture of the effects of the ongoing pandemic on different aspects of medical education in Greece and abroad, tracing medical students’ attitudes towards the unprecedented changes in their education. However, the generalizability of the results is limited by the medium sample size.

The higher response rate of Greek medical students may result from providing them with a translated version of the questionnaire in their native language, as has been argued by other researchers.¹⁷ The access of all surveyed students to PC and internet facilities may reflect the greater availability of advanced technology today or may alternatively indicate a general medium/medium-high standard of living across the sample. Clinical students’ greater familiarity with online learning tools prior to the pandemic could be consequent to their longer study period. Moreover, the survey showed a good reliability based on the Chronbach’s alpha both for the full scale and the subscales.

In line with the International Federation of Medical Students’ Associations’ (IFMSA) survey findings, our results showed that live online lectures predominated among other educational tools used for online teaching.¹⁸ This is not surprising if we consider that the shift to this emergency remote teaching (ERT) mode¹⁹ was so abrupt and overwhelming that resorting to synchronous lectures with the use of an online platform (e.g. Zoom, MsTeams, Skype) was the easiest and safest way to ensure continuity of academic education. However, effective online learning, which has long been integrated in many medical schools around the world,^{20,21} requires careful planning, systematic development, and meticulous design decisions with specific affordances, all of which demand considerable time and effort.¹⁹ The latter were admittedly at a premium in such crisis-driven times. Regarding students’ mounting concerns about the negative impact on their clinical skills, we could infer that e-learning does not seem to efficiently substitute bedside teaching. Clinical students’ participation in clinical cases virtual discussions during lockdown appears not to

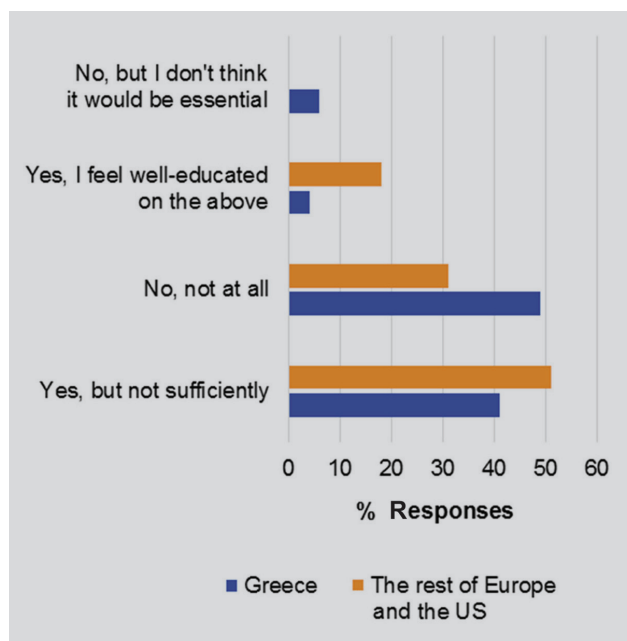


Figure 5. Level of satisfaction with curriculum updates to educate on COVID-19 and health crisis management in Greek and foreign medical schools. US: United States.

have made up for the cancellation of clinical placements both in Greece and abroad. Medical students in other countries have equally expressed their anxiety and insecurity as to how well-equipped they will be in the future regarding the required clinical skills, since they fear they have lacked adequate hands-on practice and workload.^{4,22}

In the case of online exams, the difficulty level and the inadequate time allocation could be a result of the observed lack of monitoring. As indicated recently, institutes that implemented remote online exams during the pandemic tried to counterbalance the increased opportunities for cheating,²³ and the complexity/inability of using remote proctoring by opting for time-limited testing and presenting the questions in a random order to individual candidates.²⁴ In other studies, students have attributed the feeling of an inadequate time allocation in online exams to their perceived low-speed typing in open-ended questions.²⁵ Also, back-tracking prevention in multiple-choice questions has been commonly used by faculty members to maintain the integrity of online exams, though it seems to have impeded those students who prefer coming back to unanswered questions later, or those in the habit of reviewing their answers once they have completed the exam.²⁵ This –along with the discomfort caused by the blurring of boundaries resulting from sitting a high-stakes exam in their personal space–²⁴ might well have swayed students who judged e-assessment to be more difficult.

The lack of in-person learning during online classes, resulting in poorer interaction between medical students and their professors might account for students' increased stress levels and decreased productivity. Similarly, a recent study has foregrounded that "attenuated relationships (of students) with medical teachers" have resulted in increased feelings of depression, distress and anxiety, typically prevalent in a significant percentage of medical students even before the pandemic.²⁶ Decreased motivation to study and a negative impact on the students' mental health and general welfare have also been affirmed in a relevant study where medical students attested their strong preference to resume in-person classes despite the precarious pandemic situation.²⁷

Greek and foreign students inversely responded about the impact of the pandemic on their theoretical knowledge. These answers may be explained by the inverse rating given to online lectures, as already presented in the results section. It might be the case that, since Greek medical students in their pre-clinical years (who constituted the greatest sample in this survey) are typically focused on acquiring theoretical knowledge and are only minimally exposed

to practical sessions,²⁸ they perceived this transition as an opportunity to further delve into theoretical studying, a finding supported by other researchers.²²

Most of the surveyed students asserted that they attended online conferences, webinars and online training sessions throughout the lockdown period. This seems to refute some concerns about medical students' lack of opportunities during the pandemic to attend conferences that could better prepare them to become accomplished future healthcare professionals.⁷ The observed high engagement in online conferences concurs with the vast majority's responses that the changes in their education improved their technological skills, since involvement in such virtual events admittedly requires digitally-savvy participants.

Compared to previous research, a lower percentage of students thought that the pandemic would affect their medical specialty choice.²⁹ As our sample comprised primarily pre-clinical students, their answers might have been confounded due to inadequate information and exposure to the clinical environment. Conversely, clinical students' responses (i.e. 77.3% stated that the pandemic will not affect their specialty choice), reflected their experience in clinical setting, resulting in a better-conceived idea of the specialty they will pursue, irrespective of the pandemic situation at the time of the survey.²⁹

Frustratingly, below 20% of the respondents were content with the changes in their curriculum to include COVID-19-related issues, noting that further updates are required for their safe and effective contribution to the health crisis management. Thus, most students responded that they are not fully equipped to play an active role in the pandemic management, but appeared willing to educate themselves and help as clinician volunteers, healthcare assistants and participants in awareness campaigns. Reviews of relevant studies emphasize a widely documented eagerness on behalf of medical students all around the world to volunteer in the frontline during the pandemic; yet, careful management is required in order to equip them with the appropriate knowledge, attitude and skills so as to effectively assist and gain invaluable experience, without compromising their own or their patients' safety.³⁰

In conclusion, the results of the survey demonstrate that the pandemic has had a significant impact on medical students' training in Greece and abroad, seriously disrupting their studies and affecting their skillset in various ways. Further research is required to determine the effects of the pandemic on medical education after medical faculties have welcomed new and returning students back to campus. As classes and clinical placements have started to resume, with

an increasing number of students being vaccinated, it is essential to investigate both quantitatively and qualitatively (i.e. with face-to-face interviews) students' present personal and academic well-being in order to counterbalance and reduce possible deficiencies in terms of skills, competences, training and meaningful educational experiences from the previous years. In fact, understanding the full extent of the changes and the long-term impact of the pandemic on medical education will take years of close investigation and study of medical students' behavior once COVID-19 belongs

to the past and is no longer the present threat it continues to be. The lessons learnt from such a rapid transformation of medical education at a worldwide level provide unparalleled opportunity to reflect on emerging challenges and design proper curricular adaptations for the future. Presently, the focus should be on tackling methodological, technological and policy barriers in medical education and developing effective teaching and learning approaches that will, also, lay the foundation for solid education in times of future health crises and beyond.

ΠΕΡΙΛΗΨΗ

Η επίδραση της COVID-19 στην ιατρική εκπαίδευση: Μια μικρής κλίμακας έρευνα των αντιλήψεων φοιτητών Ιατρικής

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Αρχεία Ελληνικής Ιατρικής 2023, 40(4):500–508

ΣΚΟΠΟΣ Η διερεύνηση των αντιλήψεων προπτυχιακών φοιτητών Ιατρικής για την έκτακτη εφαρμογή διαδικτυακής εκπαίδευσης λόγω της πανδημίας COVID-19 στην Ελλάδα και στο εξωτερικό. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Ένα αυτοδιαχειριζόμενο ηλεκτρονικό ερωτηματολόγιο απευθύνθηκε σε προπτυχιακούς φοιτητές Ιατρικής ώστε να αξιολογηθεί η εξοικείωσή τους με ψηφιακά εργαλεία πριν από την πανδημία, η πρόσβασή τους στην τεχνολογία, η διεξαγωγή κλινικών και διαλέξεων μετά την εμφάνιση της πανδημίας, η εμπειρία τους με τις εξετάσεις και η γενικότερη στάση τους μετά τη διακοπή της εκπαίδευσής τους, καθώς και ο ρόλος τους στη διαχείριση της υγειονομικής κρίσης. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Στο ερωτηματολόγιο απάντησαν συνολικά 140 φοιτητές Ιατρικής. Οι Έλληνες φοιτητές Ιατρικής φάνηκαν περισσότερο εξοικειωμένοι με τη διαδικτυακή μάθηση πριν από την πανδημία COVID-19 σε σύγκριση με τους συμφοιτητές τους στο εξωτερικό, ενώ τα τεχνολογικά εργαλεία φάνηκαν ότι ήταν γενικά προσβάσιμα από την αρχή της πανδημίας. Ένα υβριδικό μοντέλο διαδικτυακής εκπαίδευσης χρησιμοποιήθηκε για την εξ αποστάσεως διδασκαλία με ηλεκτρονικές διαλέξεις, που αξιολογήθηκαν ως εξαιρετικά αποτελεσματικές από τους Έλληνες, αλλά ως λιγότερο αποδοτικές από ξένους φοιτητές. Οι διαδικτυακές εξετάσεις διεξήχθησαν με ανεπαρκή επιτήρηση και περιορισμένο χρόνο. Οι κλινικές και εργαστηριακές δεξιότητες, τα επίπεδα άγχους και η παραγωγικότητα των φοιτητών Ιατρικής φάνηκαν να επηρεάζονται αρνητικά, ενώ οι τεχνολογικές τους δεξιότητες ενισχύθηκαν. Καταγράφηκε ακόμη προθυμία των φοιτητών να εκπαιδευτούν κατάλληλα ώστε να συμβάλλουν εθελοντικά στην υγειονομική κρίση, αν και η επικαιροποίηση του προγράμματος σπουδών για ζητήματα σχετικά με την πανδημία COVID-19 κρίθηκε γενικά ανεπαρκής. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Δόθηκε μια επισκόπηση των επιπτώσεων της εν εξελίξει πανδημίας στην ιατρική εκπαίδευση. Η επείγουσα στροφή στη διαδικτυακή διδασκαλία μπορεί να συνδράμει στον σχεδιασμό αποτελεσματικών διδακτικών προσεγγίσεων για μελλοντικές κρίσεις. Ο μακροπρόθεσμος αντίκτυπος της πανδημίας στην ιατρική εκπαίδευση μένει να φανεί όταν υποχωρήσει η πανδημία.

Λέξεις ευρητηρίου: Εξ αποστάσεως εκπαίδευση, Ιατρική εκπαίδευση, Ιατρική εκπαίδευση προπτυχιακών φοιτητών, COVID-19

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