

The Transformation of Health Education in A Pandemic Era

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The Transformation of Health Education in A Pandemic Era¹

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Abstract

Higher education was interrupted in many countries due to the COVID-19 outbreak. In countries with infrastructure, distance and remote learning was initiated. While theoretical trainings and lectures are carried out relatively successfully, problems related to applied trainings continue to be discussed. Practical training, clinical internships, and field practices in almost all health programs, especially in medical education, have been suspended in many countries. Not only associate and undergraduate education, but also studies of doctoral students who continue postgraduate education, specialty education and clinical research have been affected by the pandemic. Fast track graduation can be discussed, especially in countries where additional postgraduate measures exist: if healthcare personnel are required to pass applied proficiency exams or attend supervised study that are mandatory after graduation. As a matter of fact, obligations such as post-graduation hands-on internships, supervised work phases or a master's degree in certain health programs provide additional education and experience.

In countries where health programs graduates can take part in the provision of health services without any secondary filter or educational processes, as in our country, the subject should be handled differently. Our medical graduates start their compulsory service directly, and our graduate nurses, midwives and dentists can also participate directly in the provision of health services. The primary issue here is not to ignore the competencies and achievements of the relevant program, to correctly evaluate the authorities given by the diploma and to decide accordingly. Therefore, while evaluating the measures and decisions taken in health education during and after the COVID-19 pandemic, issues such as the type of education and post-diploma processes of the relevant country, whether there are secondary processes for competencies and achievements, and the presence of state/board exams or not should also be taken into consideration. Alternative methods need to be developed on how to make compensatory training to fulfill the gaps occurred during the epidemic, for gaining competencies of the health training... The use of artificial intelligence in training and diagnosis, digital education, virtual reality applications in surgical practices, virtual patient interviews... All in digital environment... But physical distance and digital transformation cannot be the only solution or transformation we need. Still the digital transformation that are currently underway will reveal many innovations and expansions and may enable us to adapt them in our routine life soon, while it could take almost 10 years to achieve the same level in a normal evolution.

Keywords

Universities, education, virus, pandemic

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Introduction

Education was interrupted in many countries due to the new Coronavirus disease-2019 (COVID-19) pandemic. In countries with infrastructure, remote and distance learning was initiated (Distance Learning Solutions, 2020). While theoretical trainings are carried out relatively successfully, problems related to applied trainings continue to be discussed. Practical training, clinical clerkships/internships and field practices in almost all health programs, especially medical education, are suspended in many countries (Kocak Tufan & Kayaaslan, 2020). Not only associate or undergraduate education, but also studies of doctoral students who continue postgraduate education, specialty training and clinical research have been affected by the epidemic processes. Although clinical clerkships and internships to be held in hospitals and on the field are interrupted all over the world, early graduation of students in the last year is also among the topics that come to the agenda, especially in areas where healthcare personnel are in need. Early graduation can be discussed more easily in countries where postgraduate hands-on internships, post-grad applied proficiency exams and/or supervised study stages are compulsory. As a matter of fact, obligations such as post-graduation hands-on internships, supervised work phases or a master's degree in certain health programs provide additional education and experience. But in Turkey, the general practitioners can start their compulsory service duty as soon as they graduate without any secondary obligations after the license. So, in countries where medicine, dentistry, nursing and other health programs graduates can work directly, the subject has to be handled differently. The primary issue here is not to ignore the competencies and achievements of the relevant program, and to correctly evaluate the powers given by the diploma and to decide accordingly. Therefore, while evaluating the measures and decisions taken in health education during and after the COVID-19 pandemic, issues such as the type of education and post-diploma processes of the relevant country, whether there are secondary processes for competencies and achievements, and the

presence of state exams should also be considered. To discuss where the post-pandemic education will evolve, the current effects of the outbreak should be reviewed first. In this article, the current COVID-19 pandemic and its impact on higher education will be discussed first, then we will focus on the measures taken in different countries. The effect of the pandemic on the future of health education will also be evaluated. It is also worth remembering past outbreaks and their effects before proceeding.

Major Outbreaks in Recent History

The medieval plague epidemic is perhaps the most famous outbreaks in the last millennium. The plague has been the subject of hundreds of novels and books; also, many films have been made about it. So much that it can still be seen in Europe in daily life. For example, the famous Glockenspiel at Marienplatz in Munich still shares the joy of getting rid of the plague twice a day, with 43 bells and 32 real-size figures. While the upper floor figures are depicting a Bavarian wedding, the dancing figures downstairs describe the workers who celebrate the good news and joy of getting rid of the plague epidemic days in Munich in 1517 (Radiustours, 2020) (Photo 1).

Photo 1. Glockenspiel at Marienplatz in Munich. It continues to remind curious viewers about the plague epidemic in 1517, with its real-sized figures. The figures resemble the workers dancing on the streets to report the salvation of the plague epidemic



Photo: (Zeliha K. Tufan)

The pandemic comes suddenly. It turns the course of life upside down, not only for the days when it is seen, but also afterwards. The most devastating pandemic we know in our recent history is the Spanish flu in 1918 (“Spanish” influenza, Influenza A H1N1). According to CDC sources, it is estimated that approximately 500 million people, a third of the world’s population at that time, are infected with the virus. The number of dead is estimated to be around 40 to 50 million according to different sources. Interestingly, the course of the disease was more severe in those three groups: below 5 years old, 20-40 years old and over 65 years old. It is the only pandemic known to have a high

mortality rate in healthy patients, including 20 to 40 years old. The reasons such as the absence of vaccine against influenza at that time and the absence of antibiotics to treat secondary bacterial infections affected the number of the deaths. The fight against pandemic had been tried to be ensured by isolation, quarantine, personal hygiene, and preventing communities from coming together (physical distance).

Afterwards, Asian Flu (“Asian” influenza, Influenza A H2N2) was seen in 1957 and Hong Kong Flu (“Hong Kong” influenza, Influenza A H3N2) was seen in 1968. Asian Flu, which first appeared in Singapore in February 1957, reached Hong Kong in April 1957 and the American shores in summer. Asian Flu, which was also common in our country, lasted until 1958 and caused the death of an estimated 1.1 million people worldwide. The Hong Kong flu has also killed more than 1 million people worldwide. The majority of deaths were 65 years old or older. Even in our days, seasonal Influenza A H3N2 viruses, undergoing regular antigenic changes, continue to cause severe disease in older people. All of them are linked to influenza. H5N1, which later spread in Asia in 1997 and 2003, and H7N7 viruses that caused epidemics in the Netherlands in 2007 were influenza viruses; however, they remained more limited despite their high pathogenicity. Before the current one, the last pandemic in the last century was swine flu (Influenza A (H1N1) pdm09), which was also linked to an influenza in 2009. According to CDC Sources, in its first year, it is estimated that there were 61 million cases, 274,304 hospitalizations and 12,469 deaths in America from April 12, 2009 to April 2010 due to this virus. The number of deaths throughout the world due to Influenza A (H1N1) pdm09, which was appeared first in 2009, was estimated to be 151,700-575,400 (Past Pandemics, 2020) (Kocak Tufan, COVID-19, 2020).

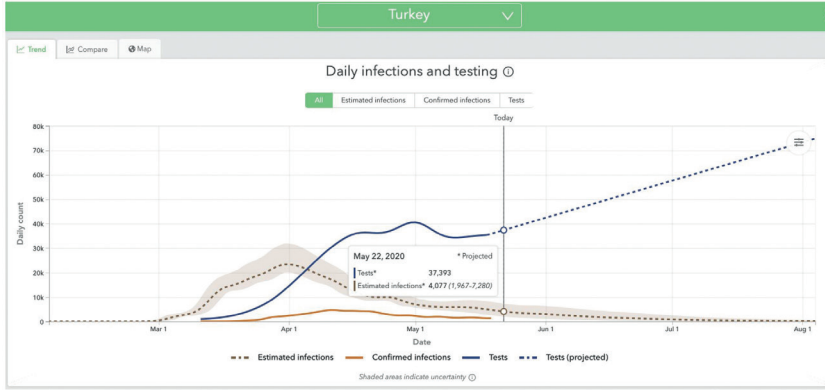
The current pandemic was first appeared in Wuhan, China in late December 2019. The disease caused by SARS CoV2 was not named as Wuhan Flu, where it is first originated, as in the case of other outbreaks, but as COVID-19 (CO: Corona, VI: Virus, D: Disease, 19: 2019). First it was thought that, it is originated from the Seafood City Market, which is a wholesale fish and livestock market in the south of Wuhan. It soon transmitted to other cities in the Hubei Province and to the World. World Health Organization (WHO) declared COVID-19 epidemic as a pandemic on March 11, 2020 (Kocak Tufan & Kayaaslan, Crushing the curve, the role of national and international institutions and policy makers in COVID-19 pandemic. , 2020). Until May 22, 2020, when this article was written, 153.548 COVID-19 cases with 4249 deaths were reported from Turkey and 5.107.572 cases and 333.032 deaths were reported from the World (John Hopkins Coronavirus Resource Center, 2020)

Effects of the Outbreaks

The COVID-19 outbreak spread to the whole world and affected all aspects of life: trade, travel, tourism, economy, social life, education... Different measures were implemented in many countries to prevent the raise of the number of

the cases; schools and shopping centers were closed, flights were suspended, borders were closed (Kocak Tufan & Kayaaslan, 2020). COVID-19 Scientific Advisory Board, which consists of academics from different fields such as public health, emergency medicine, infectious diseases and clinical microbiology was established by the Ministry of Health in Turkey. Following the scientific developments and academic publications around the world, the Advisory Board has developed guidelines for health care delivery for prevention, diagnosis and treatment of the outbreak. They also made recommendations about daily life during pandemic. A continuous consultancy has been provided and continues to be provided for the measures to be taken by various institutions and organizations in relation to the problems in the field. The fact that the epidemic is a dynamic process also makes immediate and rapid decision processes essential. As the measures for the delivery of health care became clear over time, the need for the acute period of the outbreak was met and the Community Science Board was created, measures were diversified, especially for the needs arising during the process of *renormalization* or so-called *new normalization* (COVID-19, New Coronavirus Disease, 2020).

To assess the impact of the epidemic on health and to various sectors, and to take measures by making the necessary planning, it is essential to predict the upcoming stages of the outbreak. Over time, applications and indices were developed to compare the measures of the countries and to predict the number of cases. While some teams monitor 170 interventions, from small-scale measures to restrictive policies such as school closures, have developed an indicator for following fifty-two countries; another team from Oxford developed a single stringency index that follows 13 measures (then calculates 7 out of 13) in more than 100 countries, as they try to make predictions about the outbreak (Gibney, 2020). Many of the models routinely used to predict the course of the outbreak in the future were already failed, with the diversification of the measures taken and the change in compliance with the measures. Still, many universities improved themselves with new models for predictions. The Institute for Health Metrics and Evaluation (IHME), which monitors health indicators at the University of Washington, is one of them, and is already making successful predictions (COVID-19 Projections, 2020) (Figure 1). Such modellings, as well as epidemiological studies, are thought to be further enhanced by post-epidemic data.

Figure 1. Predictions for Turkey based on current data by The University of Washington IHME

Source: (COVID-19 Projections, 2020)

Although the outbreak has many different effects from tourism to trade, we will stop with an introduction here and mainly its effects on higher education will be emphasized in the upcoming pages.

Higher Education in Pandemic Era

One of the areas affected by the pandemic is undoubtedly higher education. Many universities around the world have suspended face-to-face training, meetings and research plans. Many closed their laboratories. Many universities are trying to survive on digital platforms. So the distance education infrastructure has become extremely important. While theoretical courses could be survived on digital platforms with online courses, problems with applied and hands-on training continue in many countries (Science in the time of coronavirus, 2020). It is thought that the pandemic will cause profound effects and changes in the higher education system around the world in terms of education methods, research, internationalization and mobility (Sarac, 2020).

Remote and distance learning systems have many advantages and disadvantages. As it is experienced worldwide now, many different topics seem to be raised and will widely discussed about the online learning. The most common problem in different geographical areas is students living in rural areas with limited internet access (The Chronicle of Higher Education, 2020). International students also form a separate discussion: in homeland, their internet access could be different from their schools, which are in another country with different facilities. It is also an enigma for international students if they can return to their school for this fall or not. Those who dare to stay in the country they study, this time health insurance is a problem. In many countries outside of Turkey, foreign students, who were not able to go their home country, are removed from their campuses.

Since pandemic coincides with the spring holidays of some universities, different stories are also encountered, such as international students who left the campus and left their belongings at dorms without being aware of the upcoming epidemic (Those who left, those who continue 2020). There were also students whose life depends on their part-time job on campuses and have difficulties holding onto life after the campuses are closed (Patel, 2020).

The response of Turkish universities to the global pandemic was rapid. New Coronavirus Outbreak Advisory Commissions (COVCOMs) were established at all universities to create dynamic solutions for distance learning and to keep campuses safe and healthy for the staff (Kocak Tufan, COVID-19 Diaries of Higher Education during the Shocking Pandemic, 2020). When the country's first case was reported on March 10, face-to-face education was suspended directly. Distance education was started immediately one week later, on March, 23. According to a survey conducted by Council of Higher Education of Turkey (YÖK), 121 (64%) of the 189 universities participating the survey were switched to distance education on March, 23, a week after the formal education was suspended, while 41 (21.6%) started on March, 30; and 25 (% 13.2) on April, 6. (YÖK Distance Education Survey, 2020). Currently, universities use synchronous and/or asynchronous distance training methods in almost all theoretical courses of formal education programs. Normally in the spring semester, the total number of courses in Turkish Universities is 736,341. In this context, approximately 90% of the courses were opened to education remotely by higher education institutions.

Universities are closed nationwide not only in Turkey but in about 180 countries, while in some countries local closures are also tried (Distance learning solutions, 2020) (National learning platforms and tools, 2020). While the data on remote teaching of theoretical training seemed to be relatively successful, the practical/applied part of the training was largely interrupted worldwide. Especially those programs which have high proportion of applied trainings were affected more: workplace training, field practices and applications of engineering programs, civil aviation and ground services programs; flight training; internships of education programs; clinical practices of medicine, dentistry, nursing, midwifery, physiotherapy and field practices of pharmacy...

Universities are autonomous in Turkey, still CoHE made gradual transfer of its authority after the transition to distance education to make universities more flexible and dynamic in pandemic era. So that the universities were able to use different methods of training practices. The dynamic of the epidemic in their region, the number of the students of each faculty, the number and distribution of academics are all different for each university. That is why *one size fits all* decisions never work for universities, especially in a pandemic. So they have the authority to plan their applied education and to use different methods also for exams in digital platforms (YÖK COVID-19 Information, 2020).

Turkey's higher education area is huge with about 8 million students and 209 higher education institutions. It would be wrong to compare the responses to the pandemic directly with the measures of other countries. Indeed, the number of students is already much larger than many other countries. Nevertheless, when we interpreted the first data and compared it to applications in various countries around the world (Gibney, 2020), we see that with dedicated academics, Turkey's higher education gave a successful test from the beginning of the pandemic with its fast adaptability, quick responses and dynamic processes (YÖK COVID-19 Information, 2020)(Sarac, 2020) (Gibney, 2020)

Pandemic and Transformation of the Universities

The social, cultural and economic consequences of the outbreak will affect the HEIs and their work for the future. Beside the conveniences it has provided, distance teaching requires a serious investment as well. Still the infrastructure of many Turkish universities was relatively ready for the outbreak: 128 had remote education centers before the pandemic emerged. Under the leadership of Prof. M. A. Yekta Saraç, CoHE launched the Digital Transformation Project two years ago which implemented intensive digital education programs for academics and students at universities in relatively underdeveloped or developing regions: 6,000 faculty members of 16 universities were given digital course material preparation courses (Sarac, 2020). About the pandemic, Mr. Saraç, underlined the following in his article published in *University World News*:... *economy, public administration, health policies and international relations will be affected, and different social structures will inevitably emerge in the future as the paradigm changes in education.*

With digitalization, various needs will show up, but the economic situation will be the determining factor in how the process will continue. For private universities around the world with no government support, COVID-19 may also be the beginning of the decline. Still, the 2020-2021 academic year may be a period where we will encounter important modelling for solutions for theoretical trainings as well as applied training.

Universities are also the places of innovation and research center's that can serve to stop the spread of the pandemic. Drug studies, clinical research, vaccine development, personnel protective equipment design... All of these issues are of interest of the academy. We can discuss the role of universities in the epidemic under 4 topics:

1. *Health education*
2. *Health care delivery*
3. *Academic counseling*
4. *Research and development*

At the end of the outbreak, we will surely face many innovations in all four titles. But thousands, millions of people are no longer in their laboratories or research centers. Still we have already observed that universities and academics

are playing active role in the field during the pandemic, they work with local health authorities, develop guidelines for the control of the pandemic, give advices and decisions on health care delivery. University-industry cooperation about research on drugs and potential vaccines are also increased. It seems that universities, which play an informative role by organizing online meetings and seminars for the society during pandemic, will engage in many more university-industry and university-public collaborations after the pandemic as well. As a matter of fact, in an article published in the journal *Nature*, it is said that new collaborations are being established between Universities and researchers from different fields and different specialties to examine, treat and prevent the virus already (Science in the time of coronavirus, 2020).

Health Education in the Pandemic Era: International Examples

Medicine and other health programs are among the programs most affected by the outbreak. While some countries in need of health care staff have called on last year health students to join the workforce, others, such as United States, prefer to suspend the clinical education and practices. Since the concern about the lack of infection control practices of the students, the likelihood of spreading the disease, with the concerns for difficulties in providing personal protective equipment (PPE) outweigh the benefits of continuing education (Lacobucci, 2020) (Interim guidance on medical students' participation in direct patient contact activities: principles and guidelines, 2020) (Farber, 2020). The American Medical Schools Association initially recommended that member schools suspend clinical rotations for medical students for several weeks (Interim guidance on medical students' participation in direct patient contact activities: principles and guidelines, 2020). In America, especially when the websites of Harvard University, the Association of American Colleges and Universities (AACU) and the American Medical Association (AMA) are examined, the highlights are:

- *Continuous updates and briefings*
- *Stay in touch with academic, administrative staff and students through regular meetings, interviews and online meetings*
- *Giving information about distance learning and teaching, keeping these quick facts accessible*

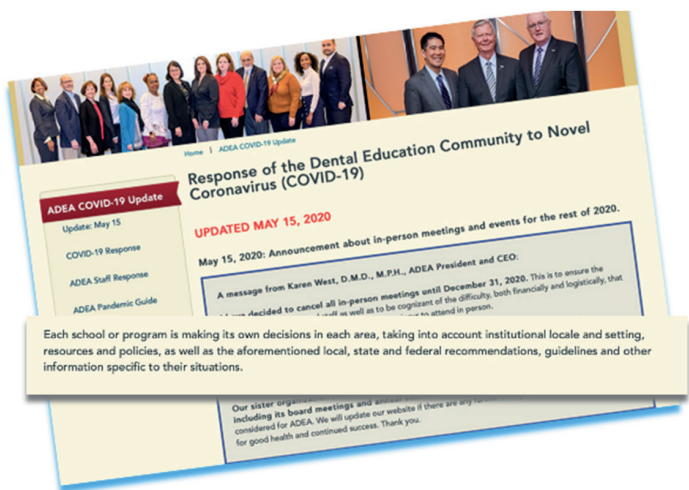
When these information sites and meetings are examined, recommendations for protecting body and mental health are seem intense, referring to the health of students and academics. But concrete, alternative recommendations for health programs' education and clinical practices are rarely encountered (Figure 1,2). Campuses and hospitals are usually discussed separately. Campuses are generally closed to face-to-face training. Most of the work in the research centers of universities are also suspended, only limited access to labs are allowed for the maintenance of microbiology or cell cultures, feeding lab animals. For ongoing thesis studies, students are referred to their academic counsellors (Harvard University, 2020; AAMC, 2020)

Figure 1. Examples from the Harvard University’s announcements to dentistry students. The clinical practices are suspended during the outbreak



Source: (Coronavirus Response, 2020)

Figure 2. Examples of the American Dental Association’s announcements on dentistry education. With the recommendations of national and local authorities, each school will make its own decisions considering its own resources



Source: (A Pandemic Resource Guide for Dental Education, 2020)

Many universities in the United States try to open in the fall, but whether all campuses can be opened, when they can open, how to complete clinical internships in health programs are seen as a complete mystery. The hospitals do not provide concrete and clear statements for the internships of medicine, dentistry and other health programs, just they say AMA's recommendations are taken into account (The Chronicle of Higher Education, 2020) (AACU, 2020). On the one hand, it is stated that health programs that require internships in hospitals are not being made and the process is closely followed, while on the other hand, it is stated that each student should make their program by interviewing the relevant program directors (Statement on clinical placements , 2020) (Harvard University, 2020). Nevertheless, there are examples of continuing internships by conducting patient interviews in digital platforms. There are also examples that medical and health students can continue their internships in outpatient clinics that accept patients other than COVID patients. When the website of some other hospitals and health centers are examined, it is also stated that although internships are suspended for a short period of time, graduation processes of those who have completed compulsory internships will be made, and those who have not completed will be worked to raise their graduation dates without sacrificing competence (Medical Education Guide, 2020) (AAMC, 2020) (Harvard University, 2020). There are also few advocates that students in medicine and other health programs are part of the health system and that they should continue internships and clinical practices by taking the necessary measures (Farber, 2020) (Smith, 2020). Indeed, three principles are mentioned in an article published in the AMA (Smith, 2020).:

... Dr. Mangrulkar and his colleagues at University of Michigan convened a work group to draft a set of principles based on input from stakeholders throughout the medical school. What resulted was a five-part statement, teed up with a preamble declaring, in part, "Medical students are, and always have been, considered essential members of the health care team ..." and followed by three principles:

"The care of patients is our primary concern, and we must have students actively involved in our care environment. ..."

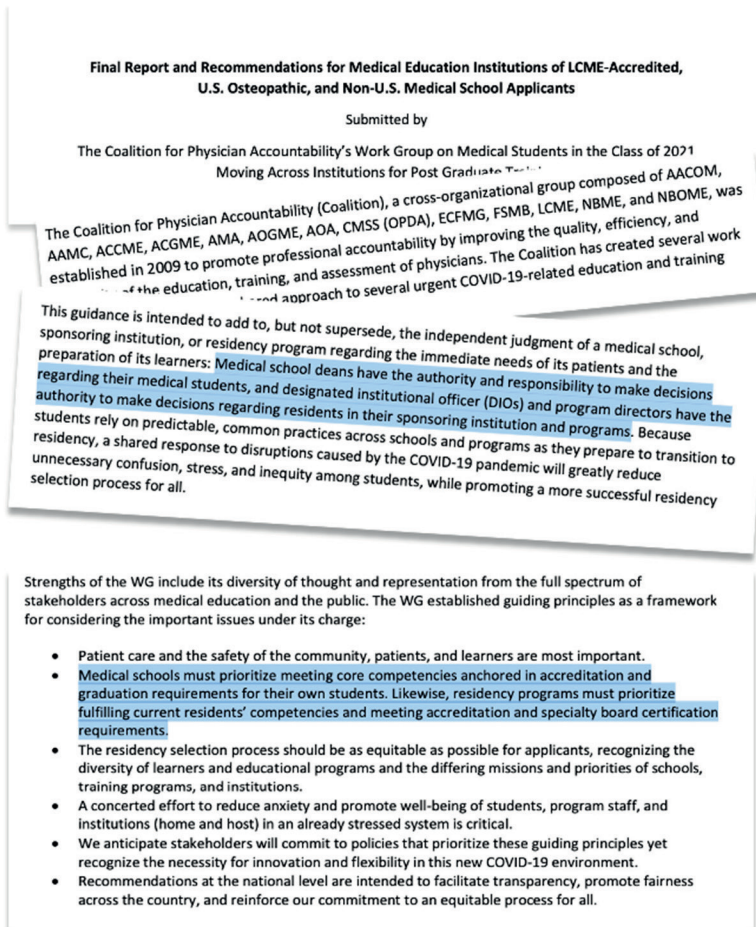
"Students must be safe and maximize the health of those with whom they work. ..."

"The school will continuously adapt to prepare the next generation of physicians. ..."

The Coalition Physician for Accountability Coalition, founded in 2009, consisting of representatives of various associations, institutions and organizations (AACOM, AAMC, ACCME, ACGME, AMA, AOGME, AOA, CMSS (OPDA), ECFMG, FSMB, LCME, NBME and NBOME) has also published a report on medical education during the outbreak (Final Report and Recommendations for Medical Education Institutions of LCME-Accredited, U.S. Osteopathic, and Non-U.S. Medical School Applicants , 2020). This report also states that there is no *single solution to suit all* and underlines that the responsibility and authority belongs to the medical school deans for their own schools. However, it is also stated in the same report that a consistent policy should be followed for

all students in order to meet the expectations. Among the published proposals for the students are suspending the exchange programs and internships or rotations other than their own schools for 2020-2021 or taking into account the possibilities of quarantine. Many times, it is underlined and recommended to focus primarily on the requirements of core education in medical education practices during the pandemic process (Figure 4).

Figure 4. The Coalition for Physician Accountability Coalition underlined the prioritization of core education in undergraduate and also in specialization training during the epidemic process

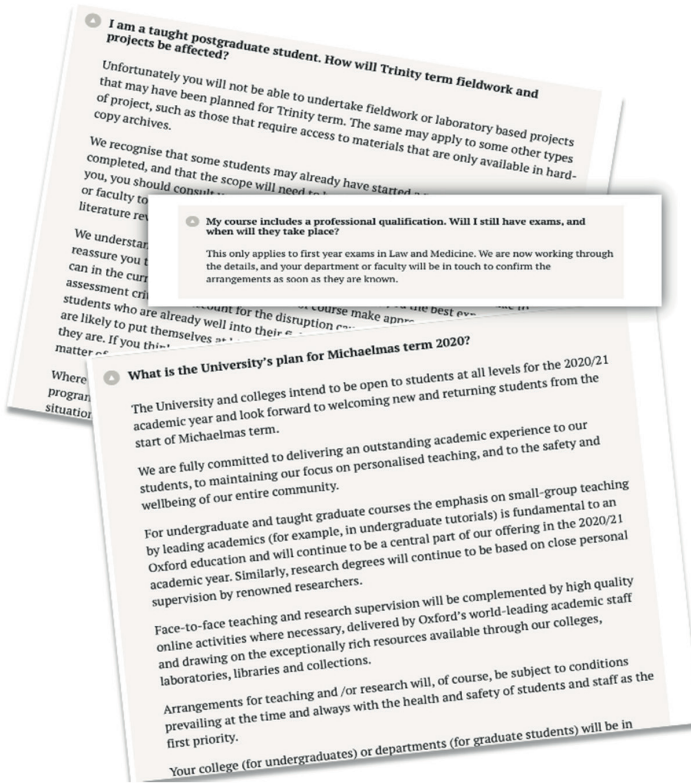


Source: (Final Report and Recommendations for Medical Education Institutions of LCME-Accredited, U.S. Osteopathic, and Non-U.S. Medical School Applicants, 2020)

In the United Kingdom, especially when the websites of universities and institutions such as the General Medical Council (GMC), the Medical Schools Council (MSC), the London School of Hygiene and Tropical Medicine, and Oxford University are examined, the highlights can be listed as follows (Oxford Medical Students Step Support Fight Against COVID-19, 2020) (London School of Hygiene and Tropical Medicine, 2020) (General Medical Council, 2020) (Coronavirus (COVID-19): advice and support for students, 2020).

- In the statements of GMC, each school will decide according to its own conditions; plans will be made for the students who do not graduate, and the procedures for placement of graduates will be initiated and will be completed when they officially graduate from their schools; students can work voluntarily but their education is prioritized, they can volunteer in different centers close to their schools but they will not be employed like a doctor even if they work voluntarily.
- There are also comments that, students are also a natural part and employee of the health delivery system, and they have to take part in the pandemic process with different formulas and continue their education... *The Medical Schools Council welcomes the confirmation from the Department for Health and Social Care in England that medical students are deemed to be “essential workers”...*
- It is also stated in the explanations that, while medical students stay at home to prevent COVID-19 spreading, they miss important clinical internships, so the faculties should compensate this duration by finding their own solutions.
- As a concrete proposal, it is also suggested that some related internships can be combined later on: such as pediatrics and obstetric and gynecology internships. However, it is still a suggestion. It is also underlined that each faculty should make its own decisions, but it would be rational to focus on compulsory internships by making concessions from elective internships. Starting programs earlier for the next term is also seen to be on the agenda.

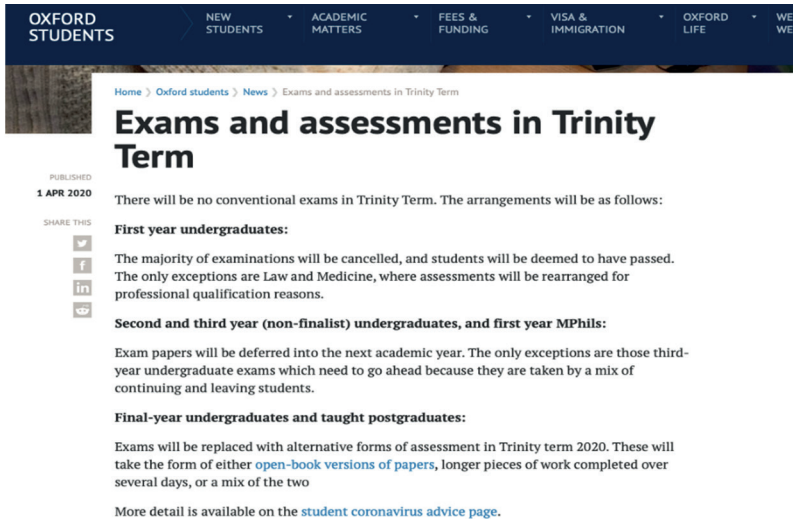
Figure 5. Oxford University also informs its students that it cannot provide face-to-face teaching in many programs, stating that safety is first priority. Laboratory and field work have been suspended



Source: (Coronavirus (COVID-19): advice and support for students, 2020).

As in other schools, Oxford University's website has several pages of Q&A, providing information on many topics for students. Many universities in both the United States and the United Kingdom are constantly informing their academics and students. However, as mentioned earlier, there is no exact alternative proposals for the hands-on parts of health education. Repetitively they say they cannot provide face-to-face training in many areas, laboratory and field studies are disrupted, and they continue to work on the problems caused by the unfinished projects and researches (Figure 5). Interestingly, the University of Oxford states that in some programs, except for medicine and law, it accepts first year students will be deemed to have passed, without an examination. Exams will be replaced with alternative forms of assessment in Trinity term 2020 (Figure 6). It is noteworthy that many problems have not yet been answered due to the uncertainties in the pandemic.

Figure 6. The University of Oxford states that in some programs, except for medicine and law, it accepts first year students will be deemed to have passed, without an examination. Exams will be replaced with alternative forms of assessment in Trinity term 2020.



It is possible to assess that universities are often substituted for theoretical courses with distance teaching, suspend hands-on courses, and focus on various research and development activities related to the pandemic and the social management of the epidemic, rather than continuing education during the pandemic process (London School of Hygiene and Tropical Medicine, 2020).

Transformation of Health Education

The outbreak is already there. Pandemic is a very dynamic process and decisions may have changed even on the day these lines were written. Nevertheless, while many universities around the world can pursue theoretical courses digitally with distance learning infrastructure, they have been caught unprepared in terms of hands-on practical courses. Many never think about alternative methods for clinical practice applications. However, even 100 years ago, there was a shortage of medical personnel in the 1918 pandemic and they try to train nurses by catalogues prepared for distance education (Figure 7). After that, this issue has been forgotten for many years, and new and common models have not been developed for maintaining the practical practices of health education with distance teaching. Rather, studies have focused on virtual reality and artificial intelligence in education, especially in diagnostic processes in recent years. The alternative methods that are created and released today during the COVID-19 outbreak process will perhaps even be a rescue rope for countries that do not have adequate health education in the future.

Figure 7. The ad of the Chicago Nursing School for distance education in 1918 (CDC Image Gallery). There was a shortage of medical staff during Spanish flu pandemic. But since then, advanced and widely accepted models in distance education for practical applications of health programs have not been introduced.



To maintain the applied courses of health education and to create new alternatives, the following should be taken into account:

1. *Emphasis on the development of alternative methods by keeping the administrators in constant contact with academics, students, hospitals, and local authorities*
2. *Working on alternative measurement and evaluation methods*
3. *Taking advantage of the different possibilities of the digital platforms, creating clinical practical environments with virtual reality tools,*
4. *Examining distance learning systems that enable existing synchronous and asynchronous training, try to find user friendly and multi-purpose service applications: instant bilateral and collective communication opportunities, facilities for file uploading, accessibility for students with disabilities, reporting feedbacks and revealing aspects that are open to development.*

The changes that can be discussed for the transformation of health education along with the changes in healthcare service delivery are summarized in Table 1.

Table 1. Main factors in the transformation of health education during and after the pandemic

<i>Change in health education due to the impact of the pandemic on education</i>	Addressing ethical and moral values in new systems and applications
	Development of skills of academics for digital transformation
	Simulation of applied courses and clinical practices with virtual reality
	Developing new alternative methods for measurement and evaluation, expansion of essays, manuscripts, homework and projects in evaluation
	Developing strategies for improving the student's self-discipline for consistency with the digital courses
	Developing alternative on-line or distance models for the activities to be done to increase the experience of campus life, focusing on personal capacity development, knowledge and manners.
<i>Change in health education due to the impact of the pandemic on health care</i>	Using the artificial intelligence in diagnosis and treatment. Also training the staff for AI.
	Conducting patient interviews in digital environment, ensuring the participation of students
	Providing longer and more active training in undergraduate education on infection control measures, public health and field practices and combating epidemic in hospital and community
	Improving the curriculum of different health sciences with emerging/re-emerging topics such as pharmaco-economics, legacy of clinical trials etc.
	Development of a culture or ecosystem of work and research in collaboration with basic sciences; dissemination of master's and doctorate programs (MD-MSc, MD-PhD) programs together with undergraduate education.

As a matter of fact, when analyzed through the examples of the United States and the United Kingdom, it is stated that the new and widely accepted alternatives for the practical applications of health education during the epidemic process are not developed, but the solution suggestions will develop when continuous communication is maintained (AACU, 2020). The measures taken since the beginning of the epidemic in the Council of Higher Education and the Turkish higher education system have been much more concrete and faster than in many countries. Continuous communication was established with the rectorate and deanships, dynamic processes were carried out through the established Coronavirus Commissions, the decisions taken by both the Ministry of Health and the relevant institutions of the state were followed, and collaborations with local governments were also made.

Taking into account the competencies and achievements of the relevant health program, continuing theoretical courses at all levels through distance education, using online exams as well as alternative ways such as homework and projects, making plans for applied courses according to the university's own location, infrastructure facilities and resources... The solutions suggested from the universities on all these issues during the pandemic era will hopefully improve their ability to provide a kind of different intensive education and will bring different and successful models to the agenda in the future.

Undoubtedly, new models for implementation of health education in the world will develop during the epidemic. Due to the pandemic, many last year students of health programs did not have a chance to see enough range of patients in different clinics. Still many countries let them graduate. But in those countries usually additional measures exist: a master's degree, board exam or additional hands-on courses are mandatory to practice their professional area. However, in countries like Turkey that do not have postgraduate requirements, additional education or board exams for practicing professional area after graduation, alternative supervised health practices could be considered. In Turkey, there is no mandatory board exam for health programs and many health programs' graduates have a right to practice directly after graduation. Supervised health practices can also be considered as a post-graduate period of juniors: Instead of being appointed to the first-line health services with direct compulsory service appointment of medical graduates different alternatives could be suggested: a period of study that will be defined in various tertiary hospitals, together with other physicians, in the clinics such as emergency room, internal diseases, child health, and infectious diseases, as well as family medicine, at least 6 months or more.. Alternatives for nurses and midwives, who will directly contact with the patient after graduation, may also be suggested: such as completing the period of junior term with supervised health practices in certain centers. It is emphasized by pioneering universities like Harvard University that medical students must complete rotations and patient examinations that are missing due to the epidemic in order to meet the graduation requirements. It is important that graduation is not delayed, but of course, in such a global epidemic, the health of students, patients and staff is much more a priority. Completion of medical and other health students' internships without including COVID-19 verified or suspected patients in the care and support of training with digital patient interviews, field practices by providing personal protective equipment and virtual reality can be evaluated to compensate for the gap in the education (Farber, 2020). Still there are many important issues to be solved for different universities regarding the participation of students in the care of COVID-19 patients.

The epidemic is an experience that will lead us to question the recent trends in higher education, resembling of a crazy race that prioritizes economic concerns in the higher education, research project budgets, lists of ranking agencies, and the number of foreign students. Perhaps it will also provide serious expansions that will change the direction of our perspectives on higher education. The pandemic reminded us all that the most important think is the human being and we need people around. We need people in the campuses to talk, to collaborate, to share ideas, to raise questions... Along with the importance of ethical and moral values in health education, the widespread use of digital opportunities in health service points to brand new horizons. Alternatives need to be developed on how to carry out health education and compensatory training during and after the pandemic era.

While allowing us to bring different possibilities of digital education in our daily life, the ongoing pandemic process will reveal many solutions along with many problems every day.

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