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Experience of Distance Learning of Medical Science Disciplines as a Result of the Global Pandemic COVID-19 in Ukraine and South Africa

Küresel Pandemi COVID-19'un Bir Sonucu Olarak Ukrayna ve Güney Afrika'da Tıp Bilimi Disiplinlerinin Uzaktan Eğitim Deneyimi

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ABSTRACT

Aim: This study discusses the historical background of distance learning and its pros and cons from the perspective of students and teachers. This study aimed to conduct a comparison of the effectiveness of distance learning during the quarantine period at Kharkiv National Medical University (KNMU), and the national lockdown at the University of Cape Town (UCT).
Material and Methods: A survey was used to investigate student's perspectives about distance education. An online survey consisting of 19 questions was conducted on Google Forms platform among 395 students at KNMU and among 124 students of UCT obtained from Vula site statistics. Individuals' learning progress during histological and anatomical classes using different methods such as virtual aggregators of slides and 3D programs were also observed.
Results: At KNMU, most students (72.2%, n=285) agreed that the main advantages of distance education were the extra time they had to prepare for classes and revise study materials whereas the major challenge they faced while having distance education was the lack of clinical approach to patients (69.1%, n=273). At UCT, students found that the most helpful aspect of distance learning was pre-recorded lecture videos (66.9%, n=83).
Conclusion: The pandemic has shown that distance learning is possible, but the question remains: has it proved to be efficient, and is it an inseparable part of the education system today? The role of distance education in the twenty-first century can be summarized as distance education programs catching huge popularity in the educational world with having and spreading discussable sides.
Keywords: e-learning; education; anatomy teaching; histology.

ÖZ

Amaç: Bu çalışma, öğrencilerin ve öğretmenlerin bakış açısıyla uzaktan eğitimin tarihsel arka planını ve artılarını ve eksilerini tartışmaktadır. Bu çalışmanın amacı, karantina döneminde Kharkiv Ulusal Tıp Üniversitesi (Kharkiv National Medical University, KNMU)'ndeki ve ulusal kapanma döneminde Cape Town Üniversitesi (the University of Cape Town, UCT)'ndeki uzaktan eğitimin etkinliği bakımından bir karşılaştırma yapmaktır.
Gereç ve Yöntemler: Öğrencilerin uzaktan eğitime bakış açılarını araştırmak için bir anket formu kullanıldı. Google Forms platformunda oluşturulan ve 19 sorudan oluşan çevrimiçi anket KNMU'daki 395 öğrenciye uygulandı ve 124 UCT öğrencisinde Vula site istatistiklerinden elde edilen veriler uygulandı. Bireylerin, sanal slayt toplayıcıları ve 3D programlar gibi farklı yöntemler kullanarak histoloji ve anatomi dersleri sırasında öğrenme ilerlemeleri de gözlemlendi.
Bulgular: KNMU'daki öğrenci çoğunluğu uzaktan eğitimin temel avantajlarının derslere hazırlanmak ve çalışma materyallerini gözden geçirmek için fazladan zaman ayırması olduğunu belirtirken (%72,2, n=285), uzaktan eğitim alırken karşılaştıkları en büyük zorluğun hastaya klinik yaklaşımın eksikliği olduğu konusunda hemfikirlerdi (%69,1, n=273). UCT'de öğrenciler uzaktan eğitimin en yararlı yönünün önceden kaydedilmiş ders videoları olduğunu belirtmişlerdi (%66,9, n=83).
Sonuç: Pandemi, uzaktan eğitimin mümkün olduğunu gösterdi, ancak soru şu: verimli olduğu kanıtlandı mı ve bugün eğitim sisteminin ayrılmaz bir parçası mı? Uzaktan eğitimin yirmi birinci yüzyıldaki rolü, tartışılabilir yönleri olan ve yaygınlaşan uzaktan eğitim programlarının eğitim dünyasında büyük bir popülerlik kazanması olarak özetlenebilir.
Anahtar kelimeler: e-öğrenim; eğitim; anatomi öğretimi; histoloji.

INTRODUCTION

For the first time in history, unexpectedly and abruptly, the world has been transferred to remote learning. This has caused an increased need to change the way of teaching and assessing students' knowledge in medical higher education establishments in a short time. Some universities were more prepared for it than others. Nevertheless, distance education can be as efficient as traditional indoor education when there are appropriate methods and technologies used toward its realization.

Complex unexpected events that occasionally arise in our life encourage people to search for solutions, thus, providing adaptation to new living conditions. Recently, a respiratory system-related infectious disease, coronavirus disease 2019 (COVID-19) has been declared a pandemic and has caused society to redeploy essential roles straightaway at a pace and scale without precedent. The pandemic is imposing a heavy burden on individuals and society as a whole, not only on people's health but also on the quality of education offered to students and putting the world economy under severe strain.

The COVID-19 pandemic has served as a catalyst for the shift in teaching approach at Kharkiv National Medical University (KNMU) and the University of Cape Town (UCT) Medical School because traditionally these universities have not used correspondence courses preferring classic indoor learning. In the current unforeseen situation, distance learning is basically a way of disseminating knowledge, where the educators and students are separated in distance and communicate by different technical means. As schools and universities close and people have no choice than to stay home, online learning seems to be growing exponentially. The widespread implementation of distance education aimed at the utilization of educational technologies of all sorts to provide complex remote learning opportunities for students.

Individual students have their own methods to manage study time during this current pandemic to achieve their goals. Each also has their own perspective on the effectiveness of distance learning in all terms. Understanding medical students' perspectives help teachers and medical staff to conduct a more productive teaching approach and get better results in the educational process.

Although many people believe distance education began with the invention of the internet, this is not so. Distance education is not a new concept. Its history could be classified under the stages at a macro level and under five generations at the micro level. Such classification is based on the dominant communication technologies adopted by distance education.

The earliest evidence of the origin of distance education can be traced to 1728 when Caleb Phillips advertised shorthand lessons by mail in the Boston Gazette (1). In the late 1800s, at the University of Chicago, the first major correspondence program in the United States was established in which the teacher and learner were at different locations. This way became available because of the invention of new technology - cheap and reliable postal services. In 1840, in Great Britain, Isaac Pitman implemented a system of shorthand by mailing texts transcribed into shorthand on postcards and received transcriptions from his students in return for correction. The presence of student feedback was a crucial innovation of Pitman's system. The University of London claims to be the first university to offer distance learning degrees, establishing its External Program in 1858 (2).

It should be taken into account that similar experiments in using the mail to deliver teaching occurred in other countries. During the same time, language courses were carried out in Germany via correspondence. In 1873, in the USA, Anna Ticknor created a society that provided learning opportunities to women in their homes (3).

The introduction of new technologies such as radio and television marked a new stage for the progressive development of distance education. Audio and video materials became a part of education along with printed pages. It was a significant breakthrough; the learning audience had grown enormously. All the above has improved the perception of information, thereby, increasing the degree of assimilation of knowledge. However, television and radio had a significant drawback - the student was not able to get appropriate feedback (4).

In the twenty-first century, the availability of computers and the internet makes distance learning even easier and faster. The internet has become a huge breakthrough, turning into a convenient vehicle for the rapid sharing and transfer of information on a worldwide basis, much larger than radio and television. All of that has led to a worldwide explosion of interest in distance learning and the convergence of text, audio, and video on a common virtual platform.

The COVID-19 pandemic resulted in the closure of the vast majority of educational institutions worldwide, therefore, more than 1.5 billion students in schools and universities transferred to distance learning, for the first time in history.

In this regard, the purpose of the current study is to examine the nature of distance learning, as well as to explore the possible advantages and disadvantages compared to traditional education by deliberating over the experiences of students at two universities.

MATERIAL AND METHODS

Concept and Definitions

While exploring the nature of distance learning, specific features were identified:

Flexibility: distance education provides the flexibility to complete coursework from anywhere, at any time, at its own pace. Students are able to find a healthy balance between working, studying, and family obligations.

Individuality: the teacher may choose suitable technologies individually for each specific student.

Accessibility: many students that are unable to go to a traditional school setting because of disabilities may be able to study. Distance education may help in these cases and provide opportunities for distance learners to be successful (5).

Distance education requires an alternative learning process and roles of teachers and students (6). The main roles in distance education can be classified into four subtitles:

Students: in distance education, students have a role to learn. From passive participants in the educational

process, they take a central position in distance learning. Self-control and self-motivation are crucial components of a successful process.

Teacher: the main role of the teacher is to guide the students in a virtual educational environment, and provide valuable information. Part of the supervisory obligations that a teacher usually has in traditional education is taken over by a student of a distance course.

Designer Groups: usually are represented as a team of educators, programmers, and web designers who design digital environments for beneficial teaching and learning, create content delivery systems, interaction, and evaluation.

Directors: there are people who direct the planning, implementation, and evaluation of the education process.

Data Collection

The methodology employed in the present study was based on a survey questionnaire and comparison model. The researchers at KNMU developed survey questions that were disseminated to students to complete via Google Forms. The survey included 19 questions prepared by researchers about the advantages and disadvantages of distance learning, effectiveness, activities, opinions, and time-spending. The effectiveness of distance education in terms of increasing their theoretical knowledge and clinical skills was also questioned with a Likert-type scale. Additionally, communicating with classmates, discussing with their teachers, self-studying, and their preferences about online classes, offline classes, and face-to-face education were included in the survey form. The survey was conducted among 395 international medical students at KNMU from 1st (spring uptake) to 6th academic course. The researchers at UCT had developed general course evaluation questions which were posed to 124 first-year health and rehabilitation students via the Vula (learning management system) platform.

Ethical principles were strictly adhered to, and approval was obtained from the students participating in the study. This study was approved by the Ethics Committee of Kharkiv National Medical University (10.05.2021, protocol number 5/2021).

Statistical Analysis

Data analysis was performed on a Google Sheet statistical platform. All responses from the survey were saved on docs.google.com, then the results were compared. Responses were also filtered, and students were divided into two groups according to their courses, students from the 1st to 3rd course were put into group-1 and group-2 contained students from the 4th to 6th course. The data from both cohorts were interpreted using descriptive statistics, as well as frequency and percentage.

RESULTS

Experience of Teaching Basic Sciences during the Pandemic at Kharkiv National Medical University

The introduction of quarantine restrictions and the replacement of traditional indoor learning with full distance education in March 2020 imposed a huge burden on the administration and staff of our university, which was not ready for such a sharp transition due to the lack of distance education experience earlier. The threat posed by COVID-19 is driving teachers around the world to look for the best ways to continue to support student learning outside the traditional system of learning. However, the ability to adapt to changing environmental conditions is inherent in humans, which happened this time as well. After a certain amount of time, we can conclude that the transition to distance learning was generally not as painful as it seemed at the beginning of the quarantine.

The aim of teaching a course in histology, cytology and embryology at a medical university is to form students' scientific ideas about the microscopic functional morphology of tissues, organs and systems of a healthy individual, the ways and nature of their development, and the dynamics of age-related changes in the organism. This provides a solid scientific foundation for the further study of clinical disciplines. The classic lesson in histology at KNMU is a combination of theory (discussion of the topic of the lesson, analysis of material), practice (work with a microscope and histological slides and scanning electron microphotographs) and control questions (MCQ, oral answer etc.).

The importance of anatomy and its mastering is undeniable for the formation of the future clinical thinking of the student. The classic lesson at the Human Anatomy Department of KNMU includes theoretical material (discussion of body structures and topography using anatomical terminology) and practical approach (prosections, dissections, work with a synthetic cadaver, observation of museum specimens, and virtual dissection on Anatomage table).

In accordance with the Decree of the Government of Ukraine and the Letter of the Ministry of Education and Science of Ukraine, quarantine was introduced in all the educational establishments of the country from 12 March 2020. Since then, we were compelled to hold practical classes remotely according to the existing schedule. Distance learning was carried out via the following software: powered by the Moodle platform using BigBlueButton and Zoom cloud meeting. Interaction with the departments was carried out via the monitors of the academic groups by corporative emails.

As well as before the quarantine, the first part of the online lesson consisted of a discussion of the educational material. Dynamic, interactive discussions are essential for establishing relationships between teachers and students. Such discussions took place on online platforms during the quarantine training.

As we already mentioned in our online survey above, in order to investigate students' perspectives on distance education, we got several significant figures afterward. There were 395 medical students in total at KNMU who had sent us their responses. Nine (2.3%) of responders were in 1st course, 146 (37.0%) of them were in 2nd course, 43 (10.9%) were in 3rd course, 87 (22.0%) were in 4th course, 67 (17.0%) were in 5th course while 43 (10.9%) of participants were in 6th academic course. According to their answers, 70.1% (n=277) of them had their first experience with distance education when the current pandemic started. Participants agreed that the main advantages of distance education were the extra time they had to prepare for classes and revise study materials (72.2%, n=285), more comfortable space to study at home (69.1%, n=273), more convenient access to online materials (62.0%, n=245) and the ability to watch recorded lectures repeatedly (59.2%, n=234), the higher

promotion of self-controlled study (51.1%, n=202), more time staying at home (48.1%, n=190), the higher ability to concentrate on studying (42.0%, n=166), easier to ask questions (37.2%, n=147) and the higher effectiveness of studying due to virtual explanation (32.1%, n=127).

On the other hand, students also claimed some major challenges they had faced while having distance education such as the lack of clinical approach to patients, technical problems with IT devices and internet connection, and the lack of interaction with teachers, which has a ratio of 69.1% (n=273), 45.1% (n=178), and 42.0% (n=166), respectively. Other disadvantages of distance learning were marked as the lack of group discussion (37.2%, n=147), less motivation to prepare for classes (29.1%, n=115), difficulty to concentrate (22.0%, n=87), lack of self-discipline (21.0%, n=83), difficulty to ask questions (18.2%, n=72) and the disability to afford to buy laptops or tablets to attend online lectures (9.1%, n=36).

Additionally, 61.0% (n=241) of responders stated that they considered themselves more active in online classes than in traditional face-to-face classes. 53.2% (n=210) of responders had tried online virtual platforms to practice clinical skills which were insufficient at normal online classes provided by teachers. It also showed that there were 61.0% (n=241) of total students managed their time effectively to prepare for important medical licensing examinations like KROK, IFOM, and USMLE.

Furthermore, there were 59.2% (n=234) of responders said that the lack of clinical practice was the main factor that made them frustrated, which led to the reduction in students' interest in online classes. Besides that, 54.4% (n=215) chose the lack of doctor-patient face-to-face interactions, 49.1% (n=194) picked the bad internet connection, while 23.3% (n=92) chose the teachers' lack of proper and informative explanations as factors making them distracted from the online learning process.

In every online class, 55.2% (n=218) of students usually kept their discussions going on with their groupmates, while 66.1% (n=261) stated that they often communicated with their teachers.

In addition, 64.8% (n=256) of participants said that they spent from 1 to 5 hours a day on online classes while 71.9% (n=284) of them spent the same amount of time on self-studying daily, which was a significantly high amount of time showing that students tried to manage their personal time to study or to prepare for classes by themselves apart from online academic programs (Table 1).

At the end of the survey, 30.4% (n=120) of the participants stated that distance education was extremely effective in terms of increasing their theoretical knowledge while others (9.1%, n=36) rated the effectiveness as extremely ineffective. On the other hand, in terms of improving clinical skills, there was a large number of students claiming that distance education was extremely ineffective (34.2%, n=135) compared to 12.2% (n=48) of them rating this term as extremely effective.

There were not a lot of students who felt stressed during the period of distance learning, which was proved when there were 34.2% (n=135) of participants choosing not at all to describe their stress level during this current pandemic while 14.2% (n=56) of them chose extreme.

Based on statistics that we got from our online survey, we divided responders into two main groups, group-1 included 1st to 3rd year students, and group-2 consisted of 4th to 6th academic course students. Among group-1, only 34.9% (n=69) of participants stated that they preferred the traditional form of education. This figure was higher in group-2 (38.1%, n=75, Table 2). While group-1 had 52.0% (n=103) of them who were positive about the continuation of distance education in the future, group-2 showed only 48.2% (n=95, Table 3). This result can be explained by the higher prominence of clinical knowledge and practice in the syllabus of group-2 compared to group-1 so that students from the 4th to 6th course would like to practice their skills clinically more compared to students of 1st to 3rd academic course.

The practical part of the histology classes, which includes work with histological preparations, was carried out on the basis of virtual aggregators of slides and their photographs (Figure 1). The use of high-resolution scanned

Table 1. The time students spend on online classes and self-studying every day

	Online Class	Self-study
Rarely	32 (8.1%)	20 (5.1%)
1-5 hours	256 (64.8%)	284 (71.9%)
5-7 hours	87 (22.0%)	59 (14.9%)
7+ hours	20 (5.1%)	32 (8.1%)

Table 2. Attitudes of the students in each group towards traditional education and online education

	Group-1 (n=198)	Group-2 (n=197)
Traditional Education	69 (34.9%)	75 (38.1%)
Online Education	129 (65.1%)	122 (61.9%)

Table 3. Attitudes of the students in each group towards continuation of distance learning

	Group-1 (n=198)	Group-2 (n=197)
Definitely positive	103 (52.0%)	95 (48.2%)
Definitely negative	34 (17.2%)	41 (20.8%)
Prefer combined form	61 (30.8%)	61 (31.0%)

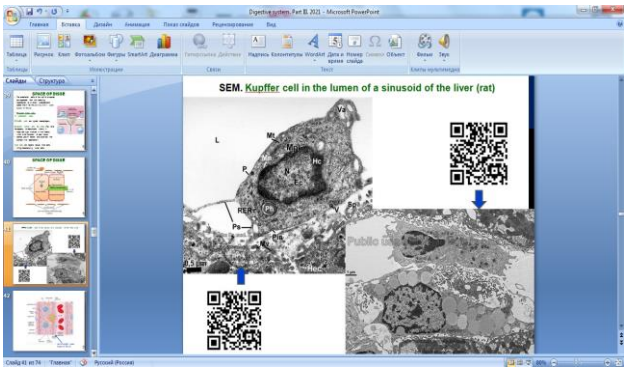

Figure 1. Online histology lecture in Moodle platform using QR code of liver ultrastructure to provide easy and comfortable access to the website with scanning electron micrograph

digital images, which can be stored in virtual archives on local or distant servers, has resulted in novel approaches to e-learning; both in the classroom and also for distance learning (4). This is leading to major changes in the way practical histology and histopathology classes are taught. There is no longer a need for individual student microscopes, technical staff for microscope maintenance or repair, or worries about the loss of valuable specimens. There is no longer a need for individual histological slide sets or to prepare new samples. It is a win-win situation that medical university administrators, teachers, and students appreciate, which has led to the widespread adoption of virtual microscopy systems in life sciences studies. View of anatomical structures was achieved via 3D programs, virtual labs, and pictures of cadaveric material (7). Virtual education may eliminate the need of preserving cadaveric material and formalin specimens, but on the other hand, the students take the opportunity to see and discover this valuable material. Moreover, the Human Anatomy Department obtained a SynDaver Anatomy model which is an ideal alternative to using human cadavers in basic anatomy classes. For some classes of Arthrology, Myology, and Splanchnology chapters were carried out while showing its structures through live sessions. Also, access to the Anatomage table data has shown enormous progress in students learning (8), and during online classes, it was possible to show structures of central nervous, peripheral nervous, and vascular systems connecting through the main department server. (Figure 2) At the World Anatomy Day symposium 2020, Prof. C Kreb's virtual anatomy lab was presented, which was successfully implemented into the educational process of our department. During the pandemic, KNMU obtained 3D Organon license keys access to access virtual anatomical atlas data. (Figure 3) Also teaching staff have developed special drawings during online teaching, to ease understanding of the material.

Assessment of knowledge was carried out with the help of oral polls, and test controls (Google forms, MCQ platforms, Kahoot). This all required a great deal of time to develop a new concept of educational approach and to make it effective without real interaction with students. The effectiveness of online assessment still remains questionable as it is quite hard to develop and achieve productive control of students' knowledge at a distance (9). In addition to lectures, practical and final classes conducted online at the Department of Human Anatomy and Department of Histology, Cytology, and Embryology, there was a need to develop and implement the technology of taking the exam under new conditions. The main task was to ensure transparency, objectivity, and efficiency of the process, taking into account the mandatory requirements and providing equal opportunities for every student. The final exams at the Morphological Sciences Departments were taken according to the same structural principle, this allowed us to achieve maximum success and effectiveness. The exam questions list was showcased in all possible electronic recourses of the department (university website, Moodle platform). The effectiveness of the process was a combination of two components. The first component included online consultations regarding the exam procedure, and the second component was the examination itself. Each academic group received invitations

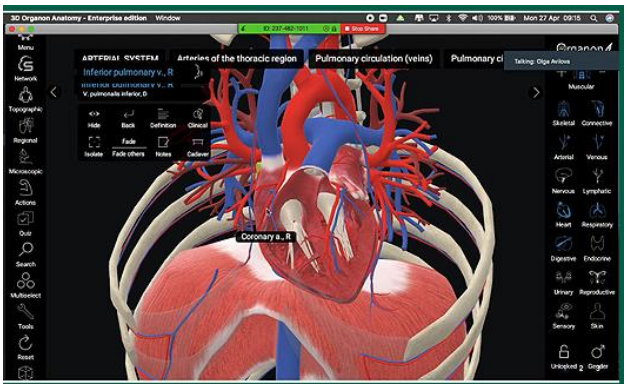

Figure 2. Practical class of human anatomy on Zoom platform. The teacher is using the 3DOrganon virtual reality platform Human Anatomy Atlas to explore the details of the human heart structure and its vasculature

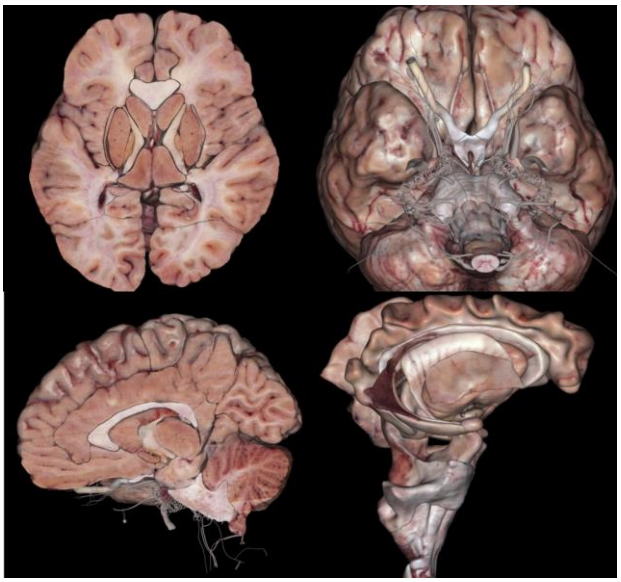

Figure 3. Set of human brain structures obtained from Anatomage table data to showcase in online class using Moodle platform

with allocated time, in which they had joined the moderator's room on Moodle platform. After the student's identification, one was given permission to proceed to the "Exam" section, where they had the opportunity to get exam questions. Four questions and the slides and diagrams with morphological structures were generated automatically by a computer program, which was also one of the main requirements for the exam. Another important point is that access to questions in the Moodle system was strictly controlled and provided to each group only at the time of the exam. After receiving the questions, the student had time to prepare, under the video surveillance of a separate moderator. Then the student was invited to the examiner's room and answered the questions by sharing his screen.

Despite the difficult conditions we all found ourselves in during the pandemic, there were quite positive results showing high knowledge acquisition during quarantine. Also, there was positive feedback from students regarding the organization of online exams, as there were no

technical failures during the session and all the examiners supported the students in this difficult time.

Experience of Teaching Human Anatomy during the Pandemic at the University of Cape Town

Teaching anatomy at the UCT includes a combination of theoretical material presented through lectures and practical sessions (anatomical prosections, body dissections, anatomical models), tutorials, and facilitated small group discussions among students (student problem-based learning (SPBL) in which students are given clinical cases to guide the sessions). Since the beginning of higher education, from the time of colonization to the era of decolonization, almost all universities in South Africa have been dependent on face-to-face learning (10).

In South Africa, the president called on all universities to shut down and find alternative ways to deliver lectures online as of 18 March 2020 as a precautionary measure (11). Following that, the country entered a national lockdown in response to the world COVID-19 pandemic from 27 March 2020 after the first confirmed case on 5 March 2020. Due to the lockdown in South Africa, all non-essential workers had to work from home, and students were also forced to be quarantined in their homes (12). The aim of the lockdown was to flatten the curve and consequently the spread of the virus by enforcing social distancing which was all over 109 countries across the world (13). These abrupt implementations led to the interruption of the academic year with all pre-clinical activities having to be moved online and with no campus access for both the academic staff members and students. The 2020 academic year had to be continued on the online platform through emergency remote teaching (ERT) by delivering the lectures, tutorials, and practical sessions remotely with new academic schedules that had to be drawn. The main goal of the ERT was to ensure that students could still access the learning material and get to catch up while staying at home. The adoption and use of online learning in universities in developing countries like South Africa show a critical need to serve students (14). Therefore, as the ERT had to be digital, all measures were taken by the university centrally to ensure a smooth transition into the process for the students by providing the data (internet bundles) and resources such as laptops and structures for students with needs i.e., interruptions at home due to the structure set up. Further to this, some students without gadgets to access the internet or who were in areas with less internet connectivity were provided with paper-based material. Both the students and academics had to undergo training in order to ensure effective readiness for the teaching modality.

The ERT was carried through the following digital platforms and software: uploading of lecture slides (which included voiceover recordings or videos), setting up of digital forums and chatrooms (for interactions between students and lecturers and also for the tutorial sessions) on the university online learning platform (Vula), and the use of software Zoom cloud meeting and the Microsoft Teams software for small group interactions.

The cadaveric specimens were electronised and included in the teaching material, the anatomy software packages (Anatomedia and Primal Pictures) were used to demonstrate the dissections and also show the anatomical structures and different body systems.

Added benefits of distance learning are that; i) teaching and learning sessions can be conducted anywhere with no demand of students and teachers coming together; ii) immediate feedback of assessments will be available to students.

In a diverse and developing country such as ours, we find a chasm between the socioeconomic backgrounds of the students in the classroom. Some arrive with Apple MacBook while some have never owned a smartphone. When the lockdown was implemented across South Africa, UCT's residences closed, and all students were forced to go home where this chasm was somewhat mirrored. Some went home to conducive study spaces while some returned to rural homesteads with poor connectivity, sharing a room with others and having to resume household chores, caring for elderly parents and children.

We had to take these factors into consideration when redesigning our courses for ERT, particularly assessments. For example, in the first year Health and Rehabilitation Science Anatomy course, the continuous assessment was traditionally in the form of weekly practical quizzes which would be completed at the end of a 3-hour practical session. However, now that these practical sessions were being held online, it is not fair nor practical to expect the students to complete the quiz at the same time as some may have to walk a distance to get to an internet café or someplace with a better network in order to complete the quiz. Therefore, the quiz was made accessible to students over 7 days and they could complete it at any time. This was the most equitable solution in a difficult circumstance. When it came to formative assessment, although we were considerate of the students' different situations, maintaining the integrity of the assessment was integral. Formative assessments were traditionally 3-hour long invigilated online exams. During ERT, for this course, these were converted to online assessments which were available to students for a period of 24 hours but timed for 3 hours, only 1 submission was allowed, and the questions could only be accessed in a linear fashion (the student could not revisit a question once they had completed it). Having the assessment available for students to take over a 24-hour period catered to the needs of vulnerable students in areas of low connectivity etc. Table 4 displays the number of students who accessed the assessment during the different time periods within the 24-hour window in which the assessment was available. It is notable that students accessed the assessment in each time period. The students had taken advantage of the flexibility that online assessments offer.

The move to ERT from traditional teaching was an unplanned but necessary action in order for the university

Table 4. Final formative assessment submission times*

Time Interval	n (%)
00:00 - 03:00	3 (2.4%)
03:00 - 06:00	3 (2.4%)
06:00 - 09:00	7 (5.6%)
09:00 - 12:00	36 (29.0%)
12:00 - 15:00	28 (22.6%)
15:00 - 18:00	22 (17.7%)
18:00 - 21:00	15 (12.1%)
21:00 - 23:59	10 (8.1%)

*: Adapted from Vula, University of Cape Town

to continue to function. There are obvious infrastructural, social, and mental disadvantages that students faced. However, there are aspects of the ERT which work well, and it is worth considering incorporating these into traditional teaching when it resumes. As a part of a course evaluation, 124 students were asked to express their opinions on the most helpful aspects of ERT (Table 5).

Lecture videos were voted the most helpful aspect of ERT by 66.9% (n=83) of the class. This may be due to the students being able to re-watch sections that they find difficult, pause the video for note-taking, and watch at the pace which is most suitable for their style of learning. Weekly quizzes on lecture content were the second most helpful aspect of ERT as students appreciated being able to consolidate their knowledge weekly. This can easily be adapted to the traditional setting in the future. Students also valued the forums in which they could ask questions, the support from lecturers, lecture slides, textbooks, and the lessons page on the learning management system which organized all the learning material. When the threat of the COVID-19 pandemic is no longer around and universities are able to resume the 'pre-COVID' way of teaching, there will be much reflection on how lecturers, course conveners, and faculties handled the situation and facilitated distance learning. By taking the opinions of the students, as in Table 5 coupled with the expertise and experiences of faculty members it is possible to create an environment that cultivates learning in an unprecedented time. Putting the student first and ensuring that they receive a quality education is key despite the challenges it poses to us as facilitators, especially in our field of anatomy which is heavily reliant on laboratory-based teaching.

DISCUSSION

In the current research, the practical experience of the two universities, in terms of the course of adaptation to distance education and students' perspectives of this, was compared. Basically, students have been divided into two camps, those who prefer online (taking into account significant advantages that have been discussed previously) and those who prefer offline education (as they are still followers of the traditional way of education and expressed a number of cons they experienced during online studies). Mostly the choice of one or another educational mode depends on the self-organization of the learner (15,16). Students who want to obtain knowledge will do it no matter what circumstances they are put in by adjusting their time to practice online on virtual platforms or to prepare for important medical exams while having extra time staying at home.

There were trace similarities in advantages and disadvantages of distance learning expressed by students of both institutions from both continents. Students enjoyed the extra time to prepare for classes (absence of necessity to commute to university at KNMU) and the flexibility given for the online submission time (access to quizzes for students over 7 days at UCT). Students found it convenient to access online material constantly (Moodle platform at KNMU and Vula Learning Management System at UCT). Students found the possibility to rewatch recorded lectures very helpful at both institutions. Also, students found it more comfortable to study at home (due to the comfortable space and ability to manage the time efficiently).

Analyzing the disadvantages of distance learning in both establishments we observed the same types of troubles students have faced and, thus, tried to find the most efficient solution. For example, the main problem was internet access and common technical problems with the devices (it was resolved by giving extra time for the assignment submission). In order to compensate for the lack of face-to-face communication with teachers and lack of group discussions in both institutions the access to online resources was constant and, thus, we were trying to provide the possibility of discussions in online forums and maximum knowledge acquisition possible in the occurred situation (17). Questioned senior students of KNMU reported a lack of clinical approach and students in 1st year of the Health and Rehabilitation course at UCT expressed a lack of laboratory-based teaching. The solution to this situation was the implementation of 3D visualization programs into educational curriculum use.

Despite the challenges of distance learning, KNMU medical students' perspectives about distance learning were positive. They adapted to the new teaching method by managing their time more productively. However, it is necessary to implement more interaction with clinical knowledge to improve the effectiveness of distance learning.

Students of UCT stated that despite the lack of proper internet access they could have completed assignments in time due to the flexibility of the submission times of online assessments. Though the lack of face-to-face interaction with educators in distance learning was a disadvantage, students could get support from lecturers in online forums. Overall, the experience of online education at UCT is positive, but students noted the lack of laboratory-based teaching as a disadvantage of distance learning.

Lecturers at higher educational institutions can deliver effective materials in both forms, the only question which remains unanswered is how to approach hands on the material in anatomy (cadaveric material, access to labs) and in histology -histological samples (peering through microscopes). Will digital programs like 3D4 Medical or virtual platforms like 3DOrganon replace the traditional work in anatomy labs? Or, maybe, we have already found the balance of blended learning -online lectures for big groups of students and offline practical classes for smaller groups of learners (18).

On the one hand, there is a need to change the paradigm of the educational process in a rapidly changing environment (19). On the other hand, distance education directly depends on the development of information and communication technologies. All in all, we suppose, distance learning will not replace traditional education models but provide a flexible alternative to many who lead hectic lives.

Table 5. Most helpful aspects of ERT according to students*

Aspects	n (%)
Lecture videos	83 (66.9%)
Quizzes	15 (12.1%
Forums	7 (5.7%)
Support from lecturers	7 (5.7%)
Lecture slides	4 (3.2%)
Textbook	4 (3.2%)
Lessons page	4 (3.2%)

ERT: emergency remote teaching, *: Adapted from Vula, University of Cape Town

CONCLUSION

COVID-19 pandemic has brought significantly major challenges to educational systems around the world. Distance learning has become one of the most effective and possible teaching methods that keep medical students and teachers on the same track of education. Sharing experiences between educational establishments in two countries helped us understand that the advantages and disadvantages of the online mode of education expressed by students during the survey are similar in both institutions. While exchanging this data we could find solutions in order to reach the main objective -efficient knowledge acquisition. We have short-term experience with distance learning in comparison with traditional indoor education, but one thing is not in dispute: it's here to stay and will continue to grow. Needless to say, the world is moving towards global changes in the educational field.

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