

Development and implementation of the online undergraduate surgical teaching module at the University of KwaZulu-Natal during COVID-19

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Background: The COVID-19 pandemic prompted the transition of all teaching and learning of final-year General Surgery students to an online platform.

Methods: A document review was conducted to determine the essential aspects of the teaching and learning programme that needed to be retained, and proposed modifications and implementation of an online surgical module. We followed the "READ" approach to analyse the documents, and the steps included readying the materials, extracting and analysing the data, and distilling the findings.

Results: Thirty-three curriculum and policy documents were reviewed, including General Surgery module templates, assessment policies, and institutional and external stakeholder guidance on the transition to remote learning and implementation plans. The main online instructional methods comprised video-based instruction on core surgical topics, including lectures, case-based discussion, pre-recorded clinical and procedural skills videos delivered via the Moodle Learning Management System (LMS) and an assessment of knowledge and skills (weekly quizzes on Moodle). The assessment format for the clinical component also changed from a clinical case examination and oral viva voce examination pre-COVID-19 to a written, structured clinical case scenario examination.

Conclusions: This document review provided a comprehensive understanding of the existing General Surgery curriculum at our institution and the events and policies that influenced the changes implemented due to the COVID-19 pandemic. It does not reflect the teaching and learning experiences of faculty and students; however, it provides a valuable point of departure for further studies to understand the teaching and learning experiences better.

Keywords: e-learning, online learning, implementation, surgery, medical students

Introduction

Before COVID-19, the traditional curriculum for teaching final-year medical students in the Department of General Surgery at the University of KwaZulu-Natal (UKZN) comprised a 6-week rotation at a regional or tertiary level hospital in the eThekweni district, and the format of delivery involved bedside teaching, tutorials, small group discussions, service learning on intakes and ward rounds.¹ The final year integrated surgical module is an exit-level module that builds on and reinforces knowledge, skills and attitudes acquired during the first five years of the Bachelor of Medicine and Bachelor of Surgery degree (MBChB) programme. It is one of a series of clinical modules extending over the last two years of study (MBChB 5th and 6th years) during which the student develops adequate competence across all the domains of professional medical practice. In this module, the knowledge, skills and behaviours are linked from earlier modules in a spiral curriculum² and further consolidated

to prepare the student for registration with the Health Professions Council of South Africa (HPCSA) as an intern.

Due to COVID-19-related limitations that were placed on gatherings, the need for social distancing, and challenges with procurement of personal protective equipment (PPE), all teaching and learning of final-year General Surgery students were transitioned to an online/virtual teaching platform from May 2020 until December 2021.¹ This consisted of synchronous and asynchronous activities to reinforce theoretical concepts, case-based learning, and skills teaching of a core number of surgical topics.¹

E-learning is defined as the "use of the Internet and multimedia technology to deliver instruction and facilitate learning."³ The foundation of this approach is rooted in educational theories derived from three primary theoretical frameworks: behaviourism, cognitivism, and constructivism.³ The advantages of e-learning include its inherent flexibility, accessibility, and the ability to distribute and easily update learning resources.³ However, challenges persist, such as

issues with internet connectivity, the availability and cost of electronic devices to access content, the potential for this mode to encourage impersonal learning experiences, and difficulties in student-teacher engagement.^{3,4} A specific challenge within online medical education is replicating clinical encounter experiences.⁵ Various technologies, including videos, podcasts, and computer simulations, can enhance student learning.⁵ In surgical education, the curriculum should encompass knowledge development alongside the transference of technical and non-technical skills and attitudes.⁶ An effective e-learning curriculum should incorporate appropriate tools and reliable assessment methods to meet these educational outcomes.

Educators adapting to online teaching can follow Kern's six-step approach to curriculum design that includes, i) problem identification and general needs assessment, ii) needs assessment of targeted learners, iii) goals and objectives, iv) educational strategies, v) implementation, and vi) evaluation and feedback.⁷ We also considered the community of inquiry (CoI) framework for e-learning developed by Garrison et al.,⁸ based on three core interrelated elements that include cognitive, social, and teaching presence (Figure 1). Cognitive presence is the "extent to which students can construct meaning through sustained communication" and is a fundamental critical thinking component.⁸ Social presence refers to the ability of students to "project themselves socially and emotionally, thereby being perceived as 'real people' in mediated communication."⁸ The last element, teaching presence, relates to the "design, facilitation, and direction of cognitive and social processes to realise personally meaningful and educationally worthwhile learning outcomes."⁹ Thus, the online CoI framework provides a collaborative constructivist model of teaching and learning that encourages collaboration and engagement in the online setting.¹⁰

The COVID-19 pandemic presented unique challenges, such as the need for a rapid transition to virtual teaching and learning methods. Being a middle-income country in Africa, we had little experience with online teaching in undergraduate Surgery. A document review of the MBChB curriculum, particularly the General Surgery module at UKZN, was conducted to determine the critical aspects of the teaching and learning programme that had to be retained to inform the modifications and implementation in the transition to offering the undergraduate surgical module in an online format and the impact of this transition on student performance in assessments compared to the previous contact-based teaching approach.

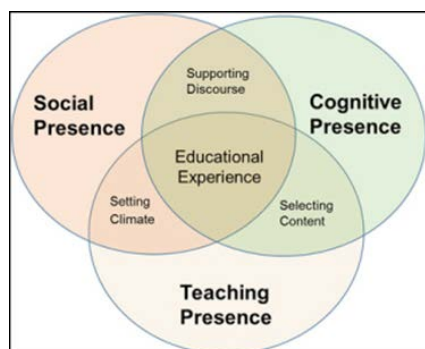


Figure 1: Community of inquiry framework for e-learning⁸

Methods

A document review was conducted. Document analysis is a "systematic procedure for reviewing or evaluating documents, which can provide context, generate questions, supplement other types of research data, track change over time, and corroborate other sources."¹¹ It is often used with other quantitative and qualitative research methods to cross-validate (i.e. triangulate), corroborate findings from different data sources, and deepen the value of insights obtained.^{11,12}

Research questions to be answered

- What were the essential components of the final-year undergraduate surgical module at UKZN?
- What processes were followed in developing and implementing the online teaching and learning curriculum?
- How were students performing in assessments since the implementation of the online teaching programme compared to performance in the previous year, where teaching was contact-based/face-to-face on the clinical platform?

We followed the "READ" approach to document analysis as described by Dalglish et al.¹² A systematic procedure for collecting documents and gaining information from them was used. The steps included (i) readying the materials, (ii) extracting the data, (iii) analysing the data, and (iv) distilling the findings.¹²

Readying the materials

Documents were collated from email correspondence to course conveners and staff members received from the School of Clinical Medicine (SCM) Teaching and Learning office. The documents considered for inclusion were curriculum guides relating to the General Surgery module, such as the module templates, assessment policies, institutional reports, the UKZN SCM resources on transition to remote learning and implementation plans, and external stakeholder guidance. We also reviewed the overall performance of students (spreadsheets of pass rates) in the surgical module pre-COVID-19 (2019) and during the pandemic period (2020–2021).

The documents were scanned, and only the relevant documents required to answer the specific research questions were selected for further review. The selected documents were assessed for authenticity by confirming the authorship, date, publication location, credibility, or the extent to which the source is free from errors and distortion.¹³ Other criteria used to select documents were their representativeness and meaning, i.e. the significance of the document's content and whether the evidence was clear and understandable.¹³

Extracting the data

The selected documents were categorised according to content (Figure 2). In this phase, relevant information aligned with the research objectives or questions was systematically extracted from the records using a document review tool (Supplementary Table I). The dates of documents sourced ranged from 2014–2023, i.e. pre-COVID-19, COVID-19 and post-COVID-19 periods.

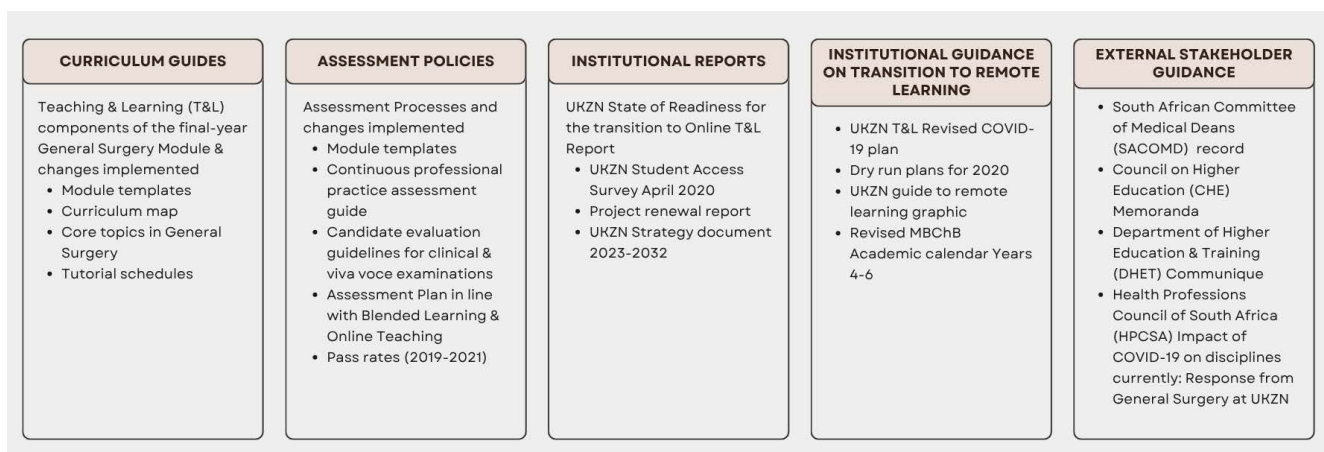


Figure 2: Core document groups included in the review

Analysing the data

The initial screening of relevant documents was followed by critical and thorough reading – an iterative process combining content and thematic analysis.¹¹ Content analysis is the process of “organising information into categories related to the central questions of the research, and thematic analysis is a form of pattern recognition within the data, with emerging themes becoming the categories for analysis.”¹¹

Distilling the findings

The extracted data were summarised, interpreted, and presented in a narrative report using the above categories. A timeline of events was also created.

Results

A total of 33 documents were reviewed. Documents that were included in the review were curriculum guides such as General Surgery module templates, assessment policies, institutional reports, the UKZN SCM resources and guidance on the transition to remote learning and implementation plans, external stakeholder guidance documents from the Department of Higher Education and Training (DHET), etc.

The main findings from the documents are summarised in Supplementary Table I. The documents were also used to compile a timeline of events leading up to the COVID-19 pandemic, the pandemic, and the post-pandemic period.

Timeline

Figure 3 shows the timeline of the teaching, learning and assessment events during the COVID-19 pandemic period and beyond.

Components of the General Surgery module and changes implemented due to COVID-19

Pre-COVID-19, teaching and learning occurred in the clinical, hospital-based environment through self-directed and experiential learning supported by bedside tutorials, ward rounds, and clinic sessions. The academic coordinator assigned students to teams and/or units, and the students worked alongside hospital staff during their clinical duties. Students were directly supervised by senior ward staff, including registrars and consultants, who were guided by the information in the logbook to foster work-based integrated learning according to the learning outcomes for

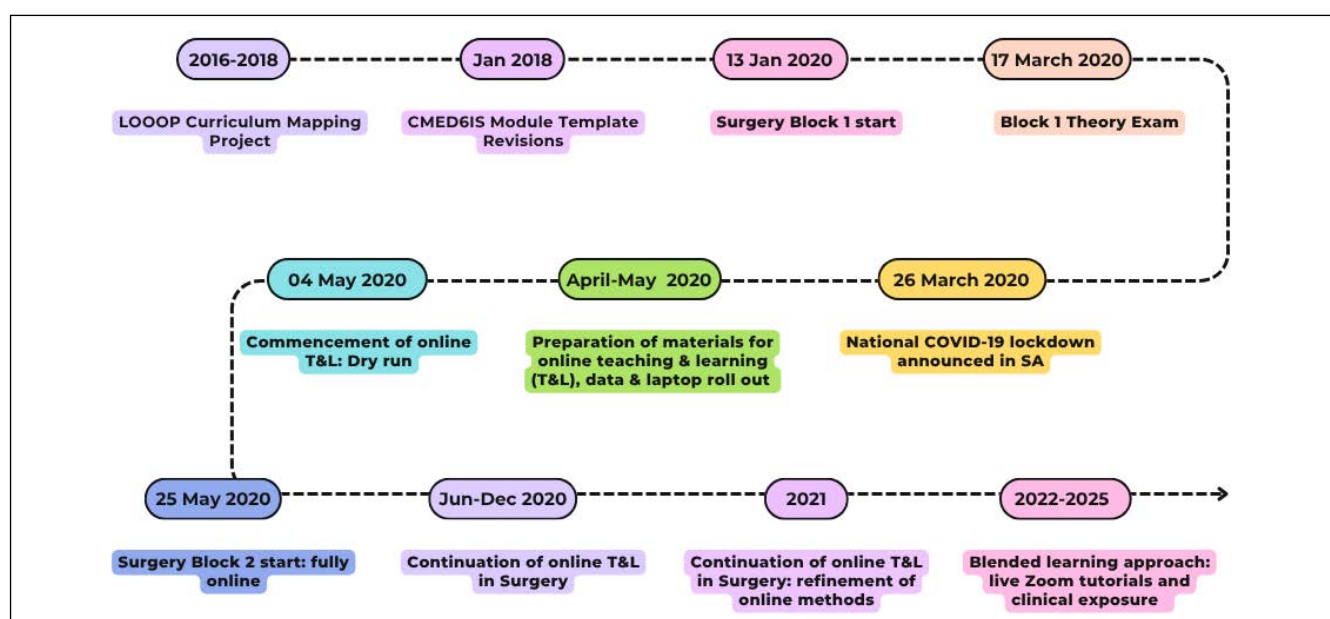


Figure 3: Timeline of teaching and learning events

the module (Supplementary Table I). The assessment criteria were formulated based on Miller's pyramid.¹⁴ This allowed students to demonstrate essential core competencies in general surgical practice and as a longitudinal assessment of knowledge and skills acquired through their medical training. In terms of the levels of proficiency proposed by Miller, this module stressed the highest level; that of "does", in addition to the levels of "knows", "knows how", and "shows how" stressed in the preceding years of study.¹⁴ Assessment criteria were linked to the learning outcomes. The end-of-block assessment comprised a written theory examination (short answer question format) and a clinical assessment (long case and viva voce on the surgical portfolio).

The details of the online surgical module developed for final-year General Surgery students at the UKZN during the COVID-19 pandemic have been described elsewhere.¹ Briefly, the 6-week online surgical module included a flipped-classroom approach with synchronous activities, i.e. daily live tutorials delivered via the Zoom platform, focusing on case-based teaching to develop students' clinical reasoning skills.¹ Asynchronous activities comprised "videos on clinical examination and procedural skills, interactive video quizzes, PowerPoint presentations, and text resources uploaded onto the university's online learning management system (Moodle)", together with weekly multiple-choice question (MCQ) quizzes on course content.¹ The end-of-module assessment in the seventh week comprised a theory-

based MCQ paper and a paper case of a clinical vignette in place of the clinical assessment.¹ Supplementary File 2 shows the core topics covered during the module, and Table I shows the alignment between learning outcomes, teaching and assessment strategies.¹

Institutional reports: readiness for transitioning to online teaching and learning

A survey was conducted among undergraduate and postgraduate students across the colleges and schools at UKZN.¹⁵ Responses were received from every campus, school, and study year ($n = 18\,426$).¹⁰ Most students were South African (97.3%), and there were more females, ~60%; 80% had access to a smartphone, and 60% had access to a laptop.¹⁵ Eighty-four per cent of the students reported that they would be able to download reading material, 80% would be able to log on to Moodle, 65% would be able to search and download materials, and 52% would be able to download a lecture.¹⁵

UKZN College of Health Sciences (CHS) and SCM guidance on the transition to remote learning

The College of Health Sciences (CHS) adopted a blended teaching and learning approach, including remote online teaching, learning, and assessment methods. Roll-out of data and laptops for staff and students were prioritised from 27 April to 01 May 2020. There was a strong emphasis on

Table I: Constructive alignment of learning outcomes, teaching and assessment methods in the study

Pre-COVID-19 (2019)		
Learning outcomes related to the healthcare practitioner HPCSA Core Competency	Teaching methods	Assessment methods
Take a detailed history to explore the presenting condition, prevention, promotion and diagnosis management	Teaching and learning occurred in the authentic clinical, hospital-based environment through self-directed and experiential learning supported by bedside tutorials, service learning on intakes, surgical outpatient clinic sessions and ward rounds.	Formative (continuous) assessment: clinical portfolio (in-block satisfactory presentation of cases clerked) and satisfactory performance in the professional practice assessment. Summative assessment: the end-of-block assessment comprised a written theory paper (short answer question format) and clinical assessment (long case and viva voce on the surgical portfolio).
Identify issues to be explored in the consultation, including the patients' context and preferences		
Carry out an appropriate clinical examination		
Elicit and interpret all clinical signs		
Formulate a reasonable diagnosis and establish an appropriate differential diagnosis		
Present the patients' condition in a problem-oriented manner		
Demonstrate an ability to make appropriate clinical records		
Use and interpret laboratory investigations rationally and cost-effectively to accurately diagnose and assess the severity and complications of the disease		
Be able to institute the management of common conditions		
Plan and institute ambulatory (outpatient) and inpatient management of common acute and chronic conditions		
Observe and/or perform common surgical procedures such as inserting an intercostal chest drain, fine needle aspiration, cytology, etc.		
COVID-19 (2020–2021)		
Learning outcomes	Teaching methods	Assessment methods
Take a detailed clinical history	Online resources, case-based tutorials	Formative (continuous) assessment: weekly quiz (multiple choice questions (MCQ)) with immediate feedback Summative assessment: mid-block quiz (MCQ), end-of-block theory MCQ examination and paper case of a clinical vignette (short answer question format)
Carry out an appropriate clinical examination	Online video resources	
Formulate an appropriate differential diagnosis	Online resources, case-based tutorials	
Use and interpret laboratory investigations rationally	Online resources, case-based tutorials	
Be able to institute the management of common conditions	Online resources, case-based tutorials	
Explain common surgical procedures such as inserting an intercostal chest drain, fine needle aspiration, cytology, etc.	Online video resources	

equitable access to online methods for all students, and these were complemented by student computer literacy training and staff training on the use of information and communication technology (ICT) tools and curation of online materials. Other facilitators of access to remote teaching and learning included securing technology software licenses, partnering with network service providers to zero-rate websites and providing low-cost data bundles.

The content for the Surgical module was uploaded onto Moodle by 04 May 2020 to facilitate the migration to the online teaching and learning plan. The return of students was a phased-in, risk-adjusted approach with a staggered intake of final-year students who had to meet the clinical requirements of the Health Professional Councils first, followed by the rest. Table II summarises the teaching and learning plan that was implemented at UKZN.

External stakeholder guidance on the transition to remote learning

Seven documents were reviewed from the South African Committee of Medical Deans (SACOMD), the DHET in South Africa, the Council on Higher Education (CHE), and the HPCSA. The issues discussed in these documents included the need to ensure that medical students could complete their academic year successfully, the overlap of the academic year with the next, which would put further pressure on trainers, and delays in returning students to the clinical training platform for several months which would delay the annual delivery of interns and trained doctors to the country's human resources.

In 2020, the DHET published the Students' Access to and Use of Learning Materials Survey Report.¹⁶ The primary challenges identified were related to student engagement with remote learning, precisely issues around network connectivity and the lack of appropriate devices for studying.¹⁶ Additional challenges included electricity

outages, insufficient study spaces, inadequate knowledge and skills for effectively utilising devices and new study platforms, and feelings of isolation from lecturers and peers.¹⁶ Conversely, students reported several benefits, such as the convenience of asynchronous learning, reduced transportation costs and time, the development of various skills and knowledge regarding devices and educational technology, increased self-direction and independence in learning, improved communication with lecturers and peers, and an appreciation for the efforts made by lecturers and institutions to support continuity of teaching and learning.¹⁶

Due to COVID-19-related lockdown measures and restrictions on travel and mobility between provinces, the need for an external examiner was waived by the CHS at UKZN for exit-level modules, i.e., final-year surgical module. During the pandemic period (2020–2021), to ensure oversight of the quality of assessment processes, the end-of-block papers were moderated by senior department members who had served as external examiners for undergraduate examinations and as postgraduate examiners.

Student performance in assessments since the implementation of the online teaching programme

Table III shows the pass rates from 2019 to 2021 for the integrated surgical module. Most students passed each year, and pass rates were maintained throughout the pandemic.

Discussion

Thirty-three documents were reviewed and provided a good overview of the components and structure of the General Surgery module, core topics, and aspects of the teaching and learning programme that needed to be retained when transitioning to the virtual platform.

The main online instructional methods comprised video-based instruction on core surgical topics, including lectures, case-based discussion, pre-recorded clinical and

Table II: Teaching and learning plan implemented at UKZN

Mode of delivery	Flexible blended learning
Modes of assessment	Flexible continuous assessment
Student engagement	Ongoing
Practical teaching and learning	Preliminary online, remainder on return, when environments are safe enough for students/staff
Work integrated learning	Preliminary online, remainder on return, when environments are safe enough for students/staff
Sessional dates	Adapted as necessary
Academic rules	Request the Senate for a temporary waiver or relaxation of rules where there is a need to do so
Academic governance	Deputy Vice-Chancellor (Teaching and Learning), College Deans, Academic Leaders
Quality assurance	Quality Promotion and Assurance (QPA) to advise on standard practices adapted
Communities of practice	UKZN Digital Teaching Portal (UTOP), College, Schools
Academic monitoring and support	Adapted to online/remote learning
Student support services	Adapted to online/remote learning, study,
Student engagement	The President of the Student Representative Council (SRC) and the Student Governance (SG) are members of the Task Team.

Table III: Pass rates in the pre-COVID-19 pandemic (2019) and pandemic periods (2020–2021)

Year	Enrolled <i>n</i>	Wrote <i>n</i>	Passed <i>n</i>	Pass rate	Pass rate
2019	295	279	279	94.6%	100%
2020	256	247	241	94.1%	97.6%
2021	252	250	246	97.6%	98.4%

procedural skills videos delivered via the Moodle LMS and an assessment of knowledge and skills (weekly quizzes on Moodle). There was standardisation of teaching and avoidance of duplication of work, as all students were being taught simultaneously. The content was uploaded onto Moodle and was accessible before the live Zoom session; thus, this process facilitated the use of a flipped classroom approach. Tutors used case-based scenarios to develop students' clinical reasoning skills. The assessment format for the clinical component also changed from a clinical case examination and an oral viva pre-COVID-19 to a written, structured clinical case-based examination. This format was found to be more objective and easily administered via Moodle.

The COVID-19 pandemic prompted the transition from contact teaching and learning to online methods at UKZN. Rapid implementation uncovered problems related to IT infrastructure, broadband capacity, and limitations associated with remote teaching and learning methodologies. Shortly after implementing the country's initial lockdown, the SACOMD acknowledged that training health professional students must continue even at the risk of doing so during a pandemic. The return of students was a phased-in, risk-adjusted approach with a staggered intake of final-year students first, i.e. those who had to meet the clinical requirements of Health Professional Councils, followed by the rest.

Impact on teaching and learning

The students' access to emergency remote learning was strongly linked to their ability to access these resources. The university provided devices and data to students; however, this did not mean that all students could use the online academic resources equally and had the required computer literacy. The school supported the view that no student should be left behind. In a South African study, students (60%) experienced challenges with access to remote teaching and learning measures due to a "lack of electricity, internet and electronic or smart devices."¹⁷

The challenges in transitioning to remote learning included training staff for their online teaching and assessment roles and ensuring a safe transition back to the clinical platforms while maintaining social distancing. Many clinical staff members were also dealing with the COVID-19 crisis while adapting to the online teaching environment. The SCM did not migrate all assessments to the online platforms due to questions about the quality and integrity of online examinations and the absence of proctoring software at the time. It is reassuring to note that despite the challenges encountered during the pandemic, most students passed each year, and pass rates were maintained throughout the pandemic and were comparable to the pre-pandemic period in 2019. On review of the literature, student performance in online assessments was similar to, or in some cases better than, performance in traditional pre-pandemic assessment formats.^{18,19} This improvement may be attributed to reduced examination-related anxiety associated with open-book examination formats and additional time at home to study theoretical content, enhancing knowledge-based assessment outcomes.^{20,21} However, challenges such as unreliable internet connectivity and environmental distractions at home were also noted.²⁰ Furthermore, the adoption of online assessments in resource-constrained low- to middle-income

countries (LMICs) was hindered by the high costs of virtual proctoring software and the additional expense of purchasing hardware such as microphones, speakers, and headphones required to minimise distractions.^{18,20}

Studies in resource-constrained settings

LMICs faced challenges including inadequate ICT infrastructure,²⁰ the absence of institutional strategies to integrate e-learning into curricula,²⁰ limited access to affordable internet,²² poor internet connectivity,²²⁻²⁴ and unreliable power supply.²² Additional barriers include the lack of familiarity among faculty and students with novel technologies,^{22,23} distractions at home, and the lack of dedicated spaces to engage in remote learning.²⁰ Furthermore, skilled personnel, such as instructional designers and technologists, are scarce in these settings.²⁵

Clinical training challenges

The infrastructure of the clinical training platform, except intensive care units, was not suited for the levels of infection control required during a pandemic, as much of the current clinical training occurred in open-plan wards and clinics with high volumes of patient turnover, compounded by the lack of adequate ventilation. Fewer students could attend the clinical training platform to adhere to social distancing. With these factors in mind, as well as the reduction in inpatient numbers in the surgical wards and outpatients presenting for surgical services due to lockdown measures and restriction of movement of people, all teaching and learning of final-year students was transitioned to a fully online platform between 2020 and 2021.¹

The COVID-19 pandemic necessitated a rapid adaptation within the higher education sector, a circumstance largely unprecedented for many stakeholders. Student feedback indicated that South African institutions successfully engaged with technology to establish new modalities for teaching and learning. While this does not suggest that technology should replace traditional forms of instruction, it does indicate a readiness within the sector to embrace technology to enhance education. Additionally, the HPCSA sought feedback from universities and clinical disciplines regarding the measures and mechanisms implemented to ensure the quality of education and training during the various lockdown levels and restrictions imposed by the COVID-19 pandemic – this feedback aimed to assess compliance with minimum standards while ensuring patient safety and identify any challenges encountered.

A systematic review showed that while various online resources, such as teleconferences, webinars, video libraries, social media, telemedicine, and virtual reality technology, were employed to sustain medical education during this period, these methods could not fully substitute for direct patient engagement.²⁶ In particular, they were insufficient for developing and refining physical examination skills and procedural and non-technical competencies essential to medical training.²⁶ Thus, a major disadvantage of e-learning was the loss of clinical teaching and direct engagement of students with patients, which could affect medical students' clinical competency and preparedness for clinical work post-graduation.²⁶ In a previous quantitative study, 59% (54/91) of students agreed that they had been adequately prepared to apply their knowledge and skills in a clinical setting but, on analysis of open-ended responses, expressed concerns about

the lack of clinical exposure to reinforce their application of the theoretical knowledge in an appropriate clinical setting.¹ Thus, at our institution, faculty were cognisant of these challenges and were willing to provide further clinical supervision and training to interns during the two-year-long internship period to consolidate on-the-job learning in a supervised environment.

For the past three and a half years (2022–2025), the department has used a blended model of instruction comprising large group teaching daily via Zoom, thus maintaining standardisation of teaching. Students have returned to the clinical training platform, where they interact with patients, attend surgical intakes, observe and/or perform certain procedures under supervision. Students have access to all video resources, including weekly quizzes on the Moodle LMS; thus, resources were reused and easily updated as needed. Positive aspects of e-learning, such as convenience, flexibility of learning, accessibility of resources, and an opportunity for self-paced and independent learning, have been retained with the added advantage of clinical exposure, skills training and experiential learning on the clinical training platform.

Limitations of the study

Document review forms an essential component of educational research; it is convenient and less costly to undertake than other qualitative research methods;¹² however, a recognised limitation is that not all documents may have been retrieved, leading to selection bias.¹¹ Other study limitations relate to the lack of a curriculum content validation process, such as the Delphi technique, a structured communication approach used in curriculum development to gather expert opinions and achieve consensus on curriculum-related issues.²⁷ Due to the rapid shift to the remote delivery of the final-year surgical module necessitated by the COVID-19 pandemic (2 months), as faculty, we did not have the time or resources to evaluate the targeted needs of our students, develop *a priori* processes, and detailed action plans to achieve planned outcomes and provide continuous monitoring of the online module implemented.⁷

Videos were used as a substitute for clinical examination and procedural skills training in our study, and these skills were assessed by testing the students' knowledge of how to perform them. However, these methods were not a substitute for direct patient engagement, and this was a recognised limitation of the online surgical module implemented. Furthermore, the assessment processes used in the study were primarily limited to the knowledge acquisition domain and not practical competence; thus, there was an observed potential misalignment between specific learning outcomes, such as demonstration/performance of clinical examination skills ("shows how" or "does") and their assessment methods ("knows" or "knows how"). A priority was placed on developing and assessing students' clinical reasoning skills through case-based teaching, and assessment of this was done using a paper case of a clinical vignette as the end-of-module assessment.

Similarly, as the assessment formats changed during the pandemic, comparing the formative and summative components used pre-COVID-19 to those used in the pandemic period was difficult. Thus, we acknowledge that comparison of pass rates alone is a study limitation. The lack

of validation of assessments by an external examiner is also a recognised limitation of the study.

Conclusion

The online methods described in this study were novel and facilitated continued teaching and learning activities during the COVID-19 pandemic. However, it cannot replace clinical exposure, and blended modes of instruction should be explored going forward. This document review provided a comprehensive understanding of the existing surgical curriculum at UKZN and the events and policies that influenced the changes implemented due to the COVID-19 pandemic. It does not reflect the teaching and learning experiences of faculty and students; however, it provides a valuable point of departure. As such, it was combined with a scoping review²⁸ that mapped the evidence on the use of online teaching methods in undergraduate surgical education, surveys conducted with students¹ and focus group discussions held with the faculty involved in final-year teaching and the students themselves about their perceptions of the online surgical module implemented.

Supplementary information

Supplementary Table I. Document review tool, list of documents reviewed and their summary.

Supplementary File 2. Core topics in General Surgery.

Conflict of interest

The authors declare no conflict of interest.

Funding source

No funding was required.

Ethical approval

This study was approved by the Biomedical Research Ethics Committee of University of KwaZulu-Natal (Ref: BREC/00002686/2021).

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REFERENCES

1. Ebrahim S, Singh B, Van Wyk J. Student perceptions of an online surgical teaching programme during the COVID-19 pandemic at the University of KwaZulu-Natal: A short report. *Afr J Health Prof Educ*. 2022;14(4):152-4. <https://doi.org/10.7196/AJHPE.2022.v14i4.1562>.
2. Harden RM. What is a spiral curriculum? *Med Teach*. 1999;21(2):141-3. <https://doi.org/10.1080/01421599979752>.
3. Evgeniou E, Loizou P. The theoretical base of e-learning and its role in surgical education. *J Surg Educ*. 2012;69(5):665-9. <https://doi.org/10.1016/j.jsurg.2012.06.005>.
4. Jayakumar N, Brunckhorst O, Dasgupta P, Khan MS, Ahmed K. e-Learning in surgical education: A systematic review. *J Surg Educ*. 2015;72(6):1145-57. <https://doi.org/10.1016/j.jsurg.2015.05.008>.
5. Goh PS, Sandars J. A vision of the use of technology in medical education after the COVID-19 pandemic. *MedEdPublish*. 2020;9(49):49. <https://doi.org/10.15694/mep.2020.000049.1>.

6. Bamford R, Coulston J. Effective e-learning in surgical education: The core values underpinning effective e-learning environments and how these may be enhanced for future surgical education. *Ecancermedalscience*. 2016;10:ed53. <https://doi.org/10.3332/ecancer.2016.ed53>.
7. Kern DE. Curriculum development for medical education. A six-step approach. In: Thomas PA, Kern DE, Hughes MT, Tackett SA, Chen BY, editors. *Curriculum Development for Medical Education*. United States of America: Johns Hopkins University Press; 1998. p. 8-13.
8. Garrison, DR Anderson T, Archer W. Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*. 1999;2(2-3):87-105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6).
9. Anderson T, Liam R, Garrison DR, Archer W. Assessing teaching presence in a computer conferencing context. *Journal of the Asynchronous Learning Network*. 2001;5(2):1-17. <https://doi.org/10.24059/olj.v5i2.1875>.
10. Swan K, Garrison DR, Richardson JC. A constructivist approach to online learning: The community of inquiry framework. In: Payne CR, editor. *Information technology and constructivism in higher education: Progressive learning frameworks*. Hershey, Pennsylvania: IGI Global. 2009;43-57. <https://doi.org/10.4018/978-1-60566-654-9.ch004>.
11. Bowen GA. Document analysis as a qualitative research method. *Qual Res J*. 2009;9(2):27-40. <https://doi.org/10.3316/QRJ0902027>.
12. Dalglish SL, Khalid H, McMahon SA. Document analysis in health policy research: The READ approach. *Health Policy Plan*. 2020;35(10):1424-31. <https://doi.org/10.1093/heapol/czaa064>.
13. Morgan H. Conducting a qualitative document analysis. *The Qualitative Report*. 2022;27(1):64-77. <https://doi.org/10.46743/2160-3715/2022.5044>.
14. Miller GE. The assessment of clinical skills/competence/performance. *Academic Medicine*. 1990;65(9):S63-7. <https://doi.org/10.1097/00001888-199009000-00045>.
15. University of KwaZulu-Natal (UKZN). Student access survey - April 2020. Durban: University of KwaZulu-Natal; 2020.
16. Department of Higher Education and Training. Students' access to and use of learning materials: Survey report 2020. Pretoria: Department of Higher Education and Training; 2020. Available from: https://www.usaf.ac.za/wp-content/uploads/2021/02/DHET_SAULM-Report-2020.pdf.
17. Govender P, Naidoo D, Wyk JM. A 3Ts (teaching in troubled times) response to COVID-19 in South Africa. *Clinical Teacher*. 2020;17(4). <https://doi.org/10.1111/tct.13213>.
18. Eurboonyanun C, Wittayapairoch J, Aphinives P, et al. Adaptation to open-book online examination during the COVID-19 Pandemic. *J Surg Educ*. 2021;78(3):737-9. <https://doi.org/10.1016/j.jsurg.2020.08.046>.
19. Prigoff J, Hunter M, Nowygrod R. Medical student assessment in the time of COVID-19. *J Surg Educ*. 2021;78(2):370-4. <https://doi.org/10.1016/j.jsurg.2020.07.040>.
20. Ray I, Agarwal V, Agarwal T, Pande A. Medical student's perspective regarding undergraduate surgical education with special reference to pandemic. *Indian J Surg*. 2021;1:5. <https://doi.org/10.1007/s12262-021-02904-0>.
21. Kronenfeld JP, Ryon EL, Kronenfeld DS, et al. Medical student education during COVID-19: electronic education does not decrease examination scores. *Am Surg*. 2021;87(12):1946-52. <https://doi.org/10.1177/0003134820983194>.
22. Ekenze SO, Okafor CI, Ekenze OS, Nwosu JN, Ezepeue UF. The value of internet tools in undergraduate surgical education: Perspective of medical students in a developing country. *World J Surg*. 2017;41(3):672-80. <https://doi.org/10.1007/s00268-016-3781-x>.
23. Agarwal PK. A combined approach in prolonged COVID-19 pandemic to teach undergraduate surgery students - future primary care physicians. *J Family Med Prim Care*. 2020;9(11):5480-3. https://doi.org/10.4103/jfmpe.jfmpe_1129_20.
24. Chandrasinghe PC, Siriwardana RC, Kumarage SK, et al. A novel structure for online surgical undergraduate teaching during the COVID-19 pandemic. *BMC Med Educ*. 2020;20(1):324. <https://doi.org/10.1186/s12909-020-02236-9>.
25. Frehywot S, Vovides Y, Talib Z, et al. E-learning in medical education in resource constrained low-and middle-income countries. *Hum Resour Health*. 2013;11:1-15. <https://doi.org/10.1186/1478-4491-11-4>.
26. Dedeilia A, Sotiropoulos MG, Hanrahan JG, Janga D, Dedeilias P, Sideris M. Medical and surgical education challenges and innovations in the COVID-19 Era: A systematic review. *In Vivo*. 2020;34(3 Suppl):1603-11. <https://doi.org/10.21873/invivo.11950>.
27. Sitlington H, Coetzer A. Using the Delphi technique to support curriculum development. *Education+ Training*. 2015;57(3):306-21. <https://doi.org/10.1108/ET-02-2014-0010>.
28. Ebrahim S, Dorsamy E, Phillip JL, Naidoo R, Van Wyk JM. A scoping review of online teaching in undergraduate surgical training. *Indian J Surg*. 2024;86(4):696-705. <https://doi.org/10.1007/s12262-023-03962-2>.

Supplementary Table I: list of documents reviewed and summary

Document/s	Document date	Reviewer/s	Pre-COVID-19	Proposed COVID-19 changes
Teaching and Learning components of the final-year General Surgery Module and changes implemented a) Exit level Outcomes (ELO): MBChB b) King Edward VIII Hospital tutorial list c) Surgical Pathology tutorial list d) CMED6IS Module Template 2018 e) LOOOP f) Curriculum Map: General Surgery Example of minimum module components (to be retained during COVID-19) g) Core Topics in General Surgery 2020 h) Template Work Integrated Learning (WIL) details of programme: CMED6IS i) Calendar for Block 2 2020 (live Zoom tutorial schedule)	a) January 2014 b) 03 May 2016 c) 28 June 2016 d) January 2018 e) 20 February 2018 f) 20 May 2020 g) 20 May 2020 h) 21 May 2020 i) May 2020	S Ebrahim/M Motala	Main module aims: To give the student practical experience in the comprehensive management of the patient and community in the discipline of Surgery, by participating in the provision of health care as an integral member of the health care team, leading to consolidation of the knowledge, skills, and behaviours required of the graduating student entering medical practice. In terms of the levels of proficiency proposed by Miller (Miller GE: The assessment of clinical skills/competence/performance. Academic Medicine 1990;65:S63-S67), this module stresses the highest level, that of Does, in addition to the levels of Knows, Knows How and Shows How emphasised in the preceding years of study. Module content: The student must demonstrate knowledge of the basic investigations and management of all patients presenting with surgical conditions. History taking, examination of patients, investigations, and management, with specific attention to trauma and emergency care, gastrointestinal and nutritional problems, critical care, and acute and chronic vascular pathology, interpreting special investigations, e.g., X-rays, CT scans, ultrasound examinations, common investigative techniques should be witnessed and if possible, performed under supervision (upper endoscopy, colonoscopy, barium studies, etc.). This module consists almost entirely of clinical work under expert supervision (at least 180 hours), which includes assisting with operations. In addition, students will acquire skills in basic surgical procedures and post-surgery rehabilitative patient care. Orthopaedics: Fractures and dislocations, soft tissue injuries (nerves, ligaments, tendons), nerve injuries, infections of bone and joint, inflammatory disease, metabolic diseases, dysplasias of bone, congenital abnormalities, malalignment problems, degenerative disorders, spinal disorders, foot deformities, neurological disorders, tumours of bone. Module duration (in weeks): 7 weeks • 4 weeks – General Surgery • 2 weeks – Orthopaedics • 1 week – Examinations Learning outcomes: Knowledge, attitudes, skills, and values to be learned. At the end of the module, the student should attain the following core competencies in the discipline of Surgery: <i>Health Care Practitioner</i>	All content will be delivered in the form of online video lectures, daily live tutorial sessions, and links to useful websites to review examination and procedural skills. Core Topics General Surgery: 1. Obstructive jaundice and diseases of the biliary tract 2. Approach to abdominal pain and the acute abdomen, including pancreatitis 3. Gallstones and acute cholecystitis 4. Approach to dysphagia 5. Approach to a neck mass and thyroid disease 6. Benign and malignant breast disease 7. Bowel Obstruction, Colorectal Cancer, including Perianal Disease 8. Approach to GI bleed 9. Skin and soft tissue pathology (cellulitis, diabetic foot sepsis, melanoma) 10. Peripheral vascular disease, including acute arterial occlusion 11. Venous disease 12. Burns 13. Head, chest, and abdominal trauma 14. Vascular trauma 15. Principles of resuscitation, including fluid management General Surgery resources uploaded onto Moodle Learning Management System (LMS): Video lectures PowerPoint presentations on all the above core topics Links to online resources Approach to clinical cases (algorithms)

Supplementary Table 1: list of documents reviewed and summary

Document/s	Document date	Reviewer/s	Pre-COVID-19	Proposed COVID-19 changes
			• Take a detailed history to explore presenting condition, prevention, promotion and diagnosis management. • Identify issues to be explored in the consultation, including the patient's context and preferences. • Carry out an appropriate clinical examination. • Elicit and interpret all clinical signs. • Formulate a reasonable diagnosis and establish an appropriate differential diagnosis. • Present the patient's condition in a problem-oriented manner. • Demonstrate an ability to make appropriate clinical records. • Use and interpret laboratory investigations rationally and cost-effectively to accurately diagnose and assess the severity and complications of the disease. • Be able to institute management of common conditions. • Plan and institute ambulatory (outpatient) and inpatient management of common acute and chronic conditions. <i>Collaborator</i> • To describe their roles and responsibilities in relation to other practitioners. • To recognise and respect the roles of others within an interdisciplinary team. • To demonstrate an ability to share tasks when appropriate. • To participate in inter-professional team meetings. <i>Professional</i> • Exhibit and promote appropriate professional behaviours in practice and conduct. • Recognise and respond to issues around ethics, legal and human rights. • Demonstrate appropriate and professional behaviour at the bedside as well as in all interactions with medical and nursing personnel and with patients. <i>Communicator</i> • Gather information about the nature of the consultation, which may include information on beliefs, concerns, expectations and illness experiences. • Establish a therapeutic relationship with a patient and their family.	

Supplementary Table 1: list of documents reviewed and summary

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			• Respect patient confidentiality, privacy, and autonomy. • Deliver information to a patient and their family. <i>Manager</i> • Demonstrate awareness of referral mechanisms. • When appropriate, participate in quality processes, including looking at errors, practice-audit. <i>Health advocate</i> • Identify the health needs of a patient, taking culture into consideration. • Identify and use opportunities for advocacy, health promotion, and disease prevention. <i>Scholar</i> • Reflect on and acknowledge strengths and limitations of knowledge and skills. LOOOP (Learning Opportunities, Objectives, and Outcomes Platform) is a web-based curriculum mapping system that ensures alignment of learning objectives with the intended outcomes/competencies, assessment, and lectures/courses/ units/modules. Between 2016 and 2018, module coordinators worked on creating a comprehensive learning guide for students that included each topic/learning event to be studied in the final year regarding the learning objectives, outcomes, and assessment methods. Exit Level Outcomes MBChB Programme (same for both pre- and during COVID-19 periods): 1. Make the holistic care of their patients, their families and communities their first concern. 2. Communicate effectively and sensitively with patients and their relatives. 3. Acquire from the individual patient the necessary information to formulate and test diagnostic hypotheses by: a) Taking a history, considering the physical, social, cultural and psychological aspects. b) Eliciting selectively normal and abnormal signs. c) Using investigations selectively and appropriately. 4. Formulate appropriate diagnostic hypotheses based on a sound, scientific understanding of the normal and abnormal structure and function, disease processes, an appreciation of the social and psychological aspects of illness, and an understanding of the environmental, occupational, and social factors in the causation of disease and the effects of illness. 5. Formulate cost-effective management plans for the	

Supplementary Table 1: list of documents reviewed and summary

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			care of patients with common and uncommon but serious conditions. 6. Implement management plans by negotiating with patients and their relatives and other healthcare professionals. 7. Recognise personal limitations and seek help appropriately. 8. Continue their professional development by self-directed learning with an approach based on curiosity. 9. Perform self-audit and participate in peer review. 10. Act within a legal and ethical framework. 11. Function effectively as a member of the health care team in South Africa.		
Assessment processes and changes implemented a) Continuous professional practice (CPP) assessment Year 6 b) Candidate evaluation guidelines for clinical and viva voce examinations c) CMED6IS module template 2018 d) Assessment plan in line with blended learning and online teaching e) Proposed module template changes CMED6IS Integrated Surgery f) Pass rates CMED6IS 2019–2021	a) 03 Mar 2016 b) 21 April 2016 c) December 2018 d) 21 May 2020 e) 20 January 2021 f) 24 January 2022	S Ebrahim/M Motala	The assessments used in this module may be viewed as conforming to the four levels of Miller's Pyramid: - Does – this is measured by a comprehensive continuous assessment in the clinical environment, focusing on applying knowledge, skills, and behaviours, including the extended competencies, supported by clinical and oral assessment centred on patients in whose care the student has participated. - Shows How – this is measured using modalities, which include clinical assessment, Objective Structured Clinical Examination (OSCE), and Objective Structured Practical Examination (OSPE). - Knows, Knows How – this is measured by an MCQ written examination Assessment criteria set out what the student will do to demonstrate that s/he has achieved the learning objective. Students will be expected to display basic Core Competencies related to general Surgical practice. Assessment criteria are linked to the learning outcomes. Sometimes, an assessment criterion may be linked to one specific learning outcome. Still, more often, assessment criteria will be used to assess several differing learning outcomes in an integrated way. The assessor in the clinical component of the examination will have a set of blueprints/rubrics to assess more subjective learning outcomes (such as communication and collaboration). In such subjective examinations, two examiners will assess the student using a blueprint/rubric to assess if learning outcomes have been met. The written assessment will assess more theoretical components of the learning outcomes. Duly Performed (DP) requirements:	DP requirements: For the Surgical component of the module, students will be granted DP if they: - Have at least 80% attendance at all scheduled teaching and training events, including small group teaching and other learning activities (including online lectures, tutorials and seminars). - Completion of all online quizzes and assignments on Moodle. Continuous assessment (in block): General Surgery: Attendance and participation at scheduled live Zoom teaching sessions, online MCQ quiz in week 4 of the block: completed and submitted Orthopaedics: Formative: Online assignments and quizzes - Osteology quiz - Examination technique quiz - Orthopaedic trauma assignments (3) - Orthopaedic subdisciplines 5th year revision quiz - Orthopaedic subdisciplines quiz - POP technique quiz 6th year assignments - DP: Completion of online assignments and quizzes - Summative: MCQ (as per usual) and Case-based clinical Viva End of block: Written assessment 30%: General Surgery OSCE + 1 hour (50 mark), Orthopaedics MCQ test General Surgery: Orthopaedics = 70:30 Clinical assessment 40% (General Surgery paper case, Viva on General Surgery portfolio, Orthopaedic clinical assessment = 3 x short cases) General Surgery: Orthopaedics = 70:30	
Comparison of pass rates: 2019–2021					
Year	Enrolled <i>n</i>	Wrote <i>n</i>	Passed <i>n</i>	Pass rate (Passed <i>n</i> / Enrolled <i>n</i>)	Pass rate (Passed <i>n</i> / Wrote <i>n</i>)
2019	295	279	279	94.6%	100%
2020	256	247	241	94.1%	97.6%

Supplementary Table 1: list of documents reviewed and summary

Document/s	Document date	Reviewer/s	Pre-COVID-19	Proposed COVID-19 changes				
				2021	252	250	246	97.6%
			Satisfactory attendance and performance in the block are essential for a DP certificate. Students will be granted a DP certificate if they: • Have at least 80% attendance at all scheduled small group teaching and learning activities per discipline. • Have 100% attendance at clinical duties. These are scheduled and unscheduled patient encounters and include attendance and participation at intakes, the complete management of patients in the ward or outpatient departments, and collaboration with healthcare professionals concerning patient management. • Duly complete and fulfil all requirements of the logbook and return the completed logbook on the stipulated date. • Pass the continuous assessment with at least 50%. Continuous assessment (in block): 30% = clinical evaluation (must pass 2 out of 3 surgical cases and Orthopaedic portfolio judged satisfactory) and professional practice assessment. Contribution to professional practice assessment – General Surgery: Orthopaedics 70:30 End of block: Clinical assessment 40% (General Surgery long case, Viva on General Surgery portfolio, Orthopaedic clinical assessment = 3 x short cases) General Surgery: Orthopaedics = 70:30 Written assessment 30%: General Surgery OSCE + 1 hour (50 mark), Orthopaedics MCQ test General Surgery: Orthopaedics = 70:30 Final mark: • Continuous assessment (in block): 30% • Clinical assessments: (Long case, Viva on Surgical Portfolio, Orthopaedic clinical assessment): 40% • Written assessments: OSCE (General Surgery) + Orthopaedics MCQ: 30%					98.4%

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Document/s	Document date	Reviewer/s	Pre-COVID-19	Proposed COVID-19 changes
UKZN/CHS State of Readiness for Transitioning to Online T&L Reports: a) UKZN Student Access Survey April 2020 b) SCM Project Renewal Report c) UKZN Strategy Document 2023–2032	a) April 2020 b) July 2022 c) March 2023	S Ebrahim	N/A	a) UKZN Student Access Survey April 2020 <i>Executive Summary: Institutional Trends</i> • Responses were received from every campus, school, and study year ($n = 18,426$). • Most students were South African, 97.3% vs 2.7% of international students. • There were more females, ~60%. • Nearly 70% of all students were 1st, 2nd, and 3rd year. • During the lockdown, the top 6 areas, where students were based, were in central Durban, Pinetown, Umlazi, Pietermaritzburg, Ladysmith, and Newcastle. • 50% of students had between four and six people living in their homes, while 32% had more than seven. • 33% of students lived at home while studying, 41% in a university residence, 20% in private accommodation, and 7% in university - leased accommodation. • 80% of students had access to a smartphone, 60% had access to a laptop, and only 4% had no access to any devices. • Off campus, 73% of students reported having mobile data, 17% had Wi-Fi, and 15% had no internet access. • Post lockdown: 53% would have access to paid internet, 20% to free Wi-Fi, and 40% would have access to a full-time laptop or desktop. This all assumes various degrees of complexity around how the lifting of the lockdown will be. • 53% of students said they would have three to five hours per day to learn online in a focused way. 8%, mostly postgraduate students, had 8 hours or more. • 84% of students said that they would be able to download reading notes; 80% would be able to log on to Moodle; 65% would be able to search and download materials, and 52% would be able to download a lecture. • Overall, students felt that UKZN handled the COVID-19 communication well. b) SCM Project Renewal Report <i>Section 18: Consider the pedagogical ideologies of current offerings and their impacts on resources (both human and financial)</i> We note, too, that the COVID-19 pandemic has introduced us to the possibilities inherent in distance and electronic teaching. The implications of this for cost control in the longer term have not yet been studied. Though it can replace some face-to-face sessions, it cannot replace immersion in a clinical environment where clinical education is grounded. A priority is to develop a library of online resources, including recorded lectures, which will relieve clinical staff of the need to provide the same lectures repetitively and concentrate on bedside and interactive clinical teaching.

Supplementary Table 1: list of documents reviewed and summary

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				Section 23: Assess the effectiveness of the adoption of online learning and share strategies for embedding a more blended mode of delivery in the future was reviewed Adoption of online learning strategies enabled SCM to weather the COVID-19 pandemic satisfactorily, using a combination of formal online teaching and in-person, hospital-based practical teaching, which is critical to training in the clinical programmes and cannot be replaced by any form of online teaching. It generally works well within our disciplines. We have not yet conducted any formal study to determine whether there has been any effect on the quality of our graduates, and this would be a useful area for study. Virtual teaching was primarily introduced to replace traditional in-person teaching. Now that we are familiar with its potential, it is appropriate to look at our modules to redesign them to make the most of blended learning opportunities, even when this is not forced on us by COVID-19. The mandate for this has been handed over to a task team, and we agree that virtual learning, as part of a blended learning package, will henceforth be a permanent part of our programmes. UKZN Strategy document COVID-19 forced the institution to focus on planning and implementing emergency remote teaching and learning. During the pandemic, the University leveraged large-scale Information and Communication Technologies (ICTs) in teaching and learning and established a robust remote online learning to mitigate the impact of COVID-19 on academic programmes and enrich student experiences. UKZN will provide extended online education and other programmes for experiential learning to meet the needs of communities far from our campuses.
SCM/CHS guidance a) Towards a game-changer: UKZN T&L Revised COVID-19 plan b) SCM input: CHS state of readiness for transitioning to online teaching c) Teaching and learning (T&L) online implementation plan d) CHS dry run plans for 2020 e) T&L Project Plan during the COVID-19 related restrictions	a) 03 April 2020 b) 16 April 2020 c) 18 April 2020 d) 30 April 2020 e) 03 May 2020 f) 11 May 2020 g) 18 May 2020 h) 25 May 2020	S Ebrahim/M Motala	a) SCM input: CHS state of readiness for transitioning to online teaching Teaching of the School occurs in the form of formal lectures and tutorials (20%), 80% is based on problem-based, practical ward rounds/work-based and clinical internships. The teaching structure is semesterised, and students have to rotate between 3 modules and at the end of each rotation, the norm is that the students have to be assessed. The maximum modules a student can register for is six, except for the CMED31C module and the NMFCC (Cuban Collaboration cohort) with only four modules. The duration of each rotation is between 6 and 9 weeks.	a) Towards a game-changer: UKZN T&L revised COVID-19 plan challenges and interventions Lost time - Compress Semester 2 - Block offerings (teach a few, exams, next few, done all) - Extend teaching time (afternoons and weekends) - Remove winter holidays (no break this year) - Extend exams/results into January 2021 Sessional dates/academic rules - Maintain within reasonable timeframes - Explore hitherto-ignored policy flexibilities Contact university - Blended/online teaching (mix of contact and online) - Continuous assessment → final decision (tests; no exams) - Consider DHET/Accreditation rules Complexity – multidimensional - Broad interconnecting UKZN plan (all Colleges, one view) - Managed internal and external dynamics between and within the Colleges, external stakeholders, etc.) Student satisfaction – democratic and quality access

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Document/s	Document date	Reviewer/s	Pre-COVID-19	Proposed COVID-19 changes
f) UKZN guide to remote learning graphic UKZN g) Comprehensive plan for phasing in of final year clinical programme (in response to DHET request dated 15 May 2020 h) MBChB academic calendar Years 4-6 revised				• Maximum use of internal (UKZN) online facilities • Additional online options (external options) • Improved access to ICT (ICS reliance) Action Plan UKZN leadership: finalise and share the university plan of action – working document as finality depends on full knowledge of what is happening on the ground, including unknown opportunities and constraints. <i>Academic and professional staff:</i> • Do everything possible to convert teaching material for amenable use of online teaching – consult and interact with ICS. • Provide relevant information about the pros and cons and strengthen the UKZN plan. • Staff survey. <i>Students:</i> Receive relevant awareness information about the UKZN plans for online teaching (Corporate Relations; Colleges' SRCs) as required. <i>Scenario Planning:</i> • Students return after the "lockdown", arriving in the week of 20 April for the effective start of teaching in the first week of May 2020. • Students return anytime from May to the beginning of August – extended lockdown. • Student return is delayed well into the 3rd term of the year - virtual loss of the Semester 2 contact period. • <i>Note: Possible effect on "Sessional dates"</i> b) SCM input: CHS state of readiness for transitioning to the online teaching mode of delivery opted • Presentations, lecture notes, logbooks, and any material are currently uploaded onto the Moodle site, and teaching is scheduled to begin on 20 April, depending on the readiness of licenses and disciplines. • SCM has opted to use Zoom and Amboss for online teaching lectures. Start date: 28 April 2020. • Each discipline is to be allocated at least a week of Zoom teaching/ tutorials/ or feedback group sessions highlighting any important points. • Instead of block lectures, the school needs to shift teaching to semesterised teaching where the formal teachings are incorporated into integrated Zoom classes for the remaining rotations, split into weeks. • Clinical teaching commences in the first week of June or whenever students are set to return. This means rotations will be extended to 2021. • Disciplines stress the use of textbooks and interaction via online tools.
Uploading of modules on Moodle for online teaching and learning				

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				- The deadline for uploading all materials was 20 April 2020. Because the modules are available in 2 semesters, information has to be uploaded for students who are registered for the modules in semester 2. - Modules have uploaded recorded lectures and logbooks as a guideline of what content students should cover. Voice-over presentations and videos in certain disciplines have been uploaded. Assessments, proposal - Assessments have been shifted for the second semester; most disciplines are considering integrating assessments across all the modules rather than having end-of-block assessments. - Assessments MCQ: Conducted in a LAN setup where MCQ sheets are used - Change clinical to oral clinical-based assessments or an OSCE examination - Use of simulated patients for clinical cases - Use of dummies for years 3 and 4 - Portfolio assessments remain unchanged; oral portfolio assessments have no patient contact, but examiner contact - Reduced the number of portfolio submissions in the block by adding a block mark for portfolios, and have removed portfolios from clinical assessment to reduce the load on students and examiners - Mid-block assessments are to be conducted during clinical rotations, and disciplines can compromise on the cases. - Attendance for lectures can be monitored on the Zoom sessions. Teaching practicals - The school caters to 250–380 students per year, and the class size is split (120–160 per semester) to allow students to rotate accordingly in the relevant disciplines. - It will be impossible to continue clinical teaching without DOH, and the school must assess all students' risks and safety. - The dean has already planned to supply personal protective equipment (PPE) kits; students will also need some time to be trained in how best to apply PPE before being introduced to the hospital setup. - These rotations will be reduced to 4–7 weeks to complete the year in January 2021. Challenges - The Clinical setup will now have to accommodate several 250–380 students in one semester, which is a huge overload on clinical staff. The capacity of the hospitals to handle these numbers remains unknown as HPCSA guidelines and accreditation for teaching ratio are limited between students and consultants.

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				- The effects of COVID-19 and how many hospitals will be affected when students return also remain unknown, as more and more hospitals close down. Challenges experienced and solutions Reduced teaching time due to lockdown and university closure, March–May 2020: Teaching time reduced to 6 weeks for mainstream final years. Proposed allocation: 3.5 weeks contact time for General Surgery and 1.5 weeks for Orthopaedics for mainstream final years. Clinical teaching was reduced to 8 weeks for the NMFCC final years; 5 weeks for the NMFCC final years; 5 weeks of contact time for General Surgery, and 2 weeks for Orthopaedics. c) T&L online implementation plan Teaching: Content uploaded onto Moodle; 2 weeks of content uploaded by 4 May 2020 Train teachers: Started and ongoing, a large proportion that doesn't require basic training, 30% completed for Health Sciences Assessment: Blended/Continuous 30 May 2020 - Planning phase – basic structure (formative and summative, including weightings) to be in place by 30 May 2020 for each module - Engage moderators/ examiners - Evaluating the pass/fail option 2020 Academic year: Academic programme, awaiting information – re-assess mid-May: Target to end semester 1 at the end of July 2020 Technology: Technology implementation complete, data roll-out plan 27 April–1 May 2020. Laptop roll-out plan 27 April–1 May 2020. Awaiting the final decision from MTN. Student engagement: Consult SRC on approach to online learning, 21 April 2020 Train students from 4–8 May 2020. Planning phase – dependency on data and laptop rollout d) CHS dry run plans for 2020 Background All Schools want to participate in the dry run/pilot. Most Disciplines have identified specific modules per year level for a dry run. Staff responsible for dry runs need to be included in the roll-out of data. Disciplines are currently working on the timetable for the dry run. This will ensure that students are not bombarded with work all at once. Although assessments are mentioned, this still needs unpacking and will not necessarily be done during the dry run week. Implications Class attendance will be kept by monitoring those students who can participate in all online forums. A list of those who do not participate will be kept for recording, and follow-up will be provided to ascertain the reason for the lack of participation. Such data will be analysed as part of a pilot. Internet connectivity, engagement quality and related challenges will be recorded and shared for future planning. This data will also be shared in the CHS Virtual Community of Practice (when launched).

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				All MBChB programmes offered by the School of Clinical Medicine, including the 4th to 6th year. The block system of teaching allows this. Both full-time and part-time staff will need a roll-out of data to facilitate online teaching. All have undergone UTLO online teaching training. Students will need data to access online material. Online teaching will be facilitated by using online teaching and learning platforms like Amboss and Elsevier, formative assessments, questions during Zoom lectures, and formative quizzes. e) T&L Project plan during the COVID-19 related restrictions This document outlines in detail the rationale for virtual teaching during the COVID-19 pandemic and lockdown periods. Introduction: The outbreak of COVID-19 has led to the declaration of a national state of emergency and the announcement of a lockdown, which has had a considerable impact on the academic project at the University. UKZN has embarked on alternative means of tuition involving mainly blended learning, with learning content made available to all students means. Offline means include preloaded flash drives, laptops or paper-based interactive learning content. Our duty and obligation are to provide full support to our students so that they can continue to learn and complete the academic year, and to our staff so that they can deliver a quality education to our students. Consequently, we have moved the educational content of our courses onto virtual platforms so that the maximum benefit for students and staff is realised – staff can deliver their mandates while students can learn. This decision was not taken lightly and is not without complications, but it is a requirement to address the pandemic's challenges and drive us forward as an institution. Principles underpinning the remote learning approach: • Students are at the centre of all decisions and are consulted on the proposed solution. • There must be equitable access for all students. • Any solution proposed should not be a one-size-fits-all approach. • Moodle is the official Learning Management Solution of UKZN, and all content should be uploaded onto the platform. • Statutory body requirements for clinical teaching and similar professional teaching should be adhered to. • Students with disabilities are to be managed following existing policies. • Staff and students should be encouraged to contribute and bring forward any ideas to enhance the solution. Student challenges: • Students funded by NSFAS for the first time in 2020 but have not yet received their laptops. • Logistical challenges in getting laptops and digital/hardcopy materials to students distributed across the province and beyond. • Data costs of streaming/downloading content at home. • There is a lack of quality network coverage across the province and beyond.

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				• Computer literacy issues, mainly amongst first-year students. • Student orientation on Moodle and other virtual platforms utilised. Staff challenges: • Capacity in terms of using ICT tools for curation of online materials. • The pedagogical approach to teaching and learning must be adapted for online teaching and learning. This includes the teaching and learning course for staff. • Data restrictions curtail the uploading of materials from home. • Support for curation, editing, and uploading videos is necessary. • Modes of delivery in specific modules and programmes do not lend themselves easily to online delivery. • Practical teaching and learning need face-to-face contact in laboratories. • Work experience and in-service training requirements. Implications <i>Information Technology</i> Enablers identified for this plan include technology software licences, student and staff gadgets, zero-rated sites, and low-cost data bundles. In addition, the central hardware has been upgraded to cater for the expected increase in online traffic and storage requirements. Further technology responses will be effected as M&E data is collected. <i>Training/Orientation</i> Academic and professional staff Ongoing, UTLO, ICS, vendors, champions, Project Resources UKZN, UCDP Student training strategy The principle of no student and no staff member left behind is vital in the plan; it implies that staff training is underway and is now meeting demand through the UTLO, ICS, Schools and Colleges. On the other hand, student training depends on the laptop and data distribution. The curriculum for training students in online learning consists of computer usage for online learning and self-directed learning skills modules, monitored and evaluated by a system that comprises academic staff-administered student surveys. Students are taken through a flexible series of tutorials provided through online instruction manuals. Online learning strategy Interactive technologies such as Zoom, Microsoft Teams, and Skype enable students to participate in live classes, supplemented by live webinars and podcasts. Student-staff consultations may also occur via less data-intensive email, short message services, WhatsApp, and social media. Simulated practical and work-integrated learning prepares students for real experiences when environments are safe for staff and students. Group work and student collaboration provide peer learning experiences assessed using group presentations and related tasks. Desktop studies are recommended

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				for research projects. Continuous assessment plans that blend the various formative assessment methods are audited, approved by schools, and reported through the UTLC (Figure 2). Dry run We shall perform a dry run as a risk management exercise to test the system, technology, and academic arrangements. The dry run will conduct tests on readiness information and communication, scheduling, availability, type and functionality of devices used by students and staff, adequacy of the data and connectivity, functionality of the continuous and other assessments. The dry run will also be used to survey staff and students on several online learning-related issues, including collecting, monitoring and evaluation data. The dry run will involve all students in all modules. The dry run is now set to run from 18 May 2020. Our online learning pedagogy A blended learning and flipped classroom pedagogy involving a methodology with multiple iterations of the basic cycle of student learning engagements with learning resources as individuals or collaborative groups, and flexible intervention by the teaching teams or consultation by students with the teaching teams. This is presented in a conceptual seven-point learning cycle underpinned by ten key online learning principles (Figure 1). Once again, the principle of flexibility on how this plays out at the different subjects, specialisations, and areas of expertise allows for much discretion at the school level. Monitoring and evaluation Running a new mode of teaching and learning requires monitoring and evaluation to effect continuous improvement and provide data for official reporting to structures. A 360-degree approach to monitoring and evaluation is recommended, including self-evaluation, student evaluation, peer evaluation and overall evaluation by relevant academic line managers. How shall we approach assessments in this plan? The plan provides for continuous assessment. The traditional three-hour-long final sit-down form of assessment is not used. The plan also provides for catch-up assessments in the continuous assessment mode. The catch-up assessment serves the same purpose as the traditional UKZN supplementary and special examinations. All assessments are quality-assured using the approved policies and procedures. f) UKZN guide to remote learning graphic Preparation for remote learning principles: • Remote learning code of conduct • Create your learning space • Lessen the distraction • Preparing your lessons • Well-being and support • Manage your data • Manage your time, prepare your lessons • Continuous assessment – blended learning approach g) UKZN Comprehensive plan for phasing-in of final year clinical

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				programme Introduction and purpose of the plan: This document outlines the controls and preparation for the effective phasing-in return of all Health Sciences students of the College of Health Sciences (CHS) to the KwaZulu-Natal Department of Health Clinical Facilities which are used as the clinical training platforms, to ensure the completion of the academic year and the achievement of the prescribed clinical learning outcomes while at the same time ensuring the health and safety of students and staff. Approach to clinical teaching and assessment: The College of Health Sciences has adopted blended teaching and learning for all its programmes. In this regard, remote online teaching and learning and assessment approaches, including simulation in its broad sense, will be used as allowed by the various Health Professional Councils. In addition, clinical teaching and learning will be enhanced by the use of simulated patients, clinical supervisors and clinicians in the clinical areas. The clinical placement of undergraduate students in clinical teaching facilities that are hugely affected by COVID-19 will be avoided as much as possible. Postgraduate students will be allocated according to their area of specialisation and their clinical needs as identified in partnership with the Department of Health clinical facilities where they are allocated. The return of students will be a phased-in, risk-adjusted approach with a staggered intake of final-year students who must meet the clinical requirements of the Health Professional Councils first, followed by the rest of the students. This will be kick-started by a dry run of virtual and online teaching and learning during the week of 18–30 May 2020 in preparation for the final controlled phase in return of students in different levels (from most senior to junior) to both campus and clinical teaching platform, which will begin in June and August 2020 or until lockdown is fully uplifted. Individual programmes and disciplines will prepare schedules for theoretical and clinical teaching and learning for all year levels of their programmes. These shall be communicated to the students to facilitate their return to the clinical teaching platform and campus. Continuous clinical assessments will be used for all programmes, except where summative clinical assessment is required by the Health Professional Councils. Strict record keeping of clinical hours and acquisition of clinical competencies will be adhered to to maintain the educational and professional integrity of clinical programmes and achieve required clinical competencies. The College of Health Sciences will release a communiqué with the return dates for students in different programmes as outlined in the gazetted regulations by DHET and/or the Health Professional Council communiqué. Guiding principles: The plan is aligned with the guidelines from the South African National Department of Health and the NICD, which outline the basic principles for mitigating the risks of COVID-19 infection. These include the following: • Hygiene (hand and respiratory) • Physical distancing

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				• Screening and testing • Contact tracing • Isolation for those who test positive • Quarantine for those who are exposed • Personal protective equipment Details were provided on infection control measures, use of face masks, hand hygiene and physical distancing. Guidelines for students and staff returning to UKZN campuses: All staff, students and visitors are to use the single-entry point designated on all campuses. All individuals entering the campus are to complete the UKZN screening app and show results of the screening to the guard at the gate. Anyone displaying any symptom of COVID-19 or an acute respiratory illness should not enter UKZN facilities. A COVID-19 care prevention kit will be made available to UKZN students. This will include a pocket-sized hand sanitiser with a leaflet on the correct hand sanitiser technique. It will also include two locally made cloth masks with instructions on how to don, doff and clean the mask. All procurements are to go through the UKZN Central Finance Office. UKZN requires that all classes and meetings take place remotely, where possible. Budget: A comprehensive budget, which involves software for online clinical teaching, learning and assessments, preparation and adoption of simulated patients and additional clinical supervision of students in clinical areas, has been prepared and presented to the University Executive Management. Ensuring students' health and safety: CHS, in addition to the general cleaning and disinfection, will conduct an extensive deep cleaning and disinfection of all buildings, offices, campus residential facilities, and water and sanitation facilities within the campuses before reopening. Physical distancing will be promoted with markings of 1.5 m where necessary.

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External stakeholder guidance documents				
a) South African Committee of Medical Deans (SACOMD) special record	a) 09 April 2020 b) 17 April 2020 c) 17 April 2020	S Ebrahim/M Motala	N/A	a) South African Committee of Medical Deans (SACOMD) special summary record All universities, except Walter Sisulu University (WSU), were represented. <i>How can medical students finish the academic year successfully, and how can they handle clinical training during the COVID-19 pandemic?</i> At the request of the chair of SACOMD, this item was introduced by a report on a proposal Wits had made to the National Department of Health (NDoH) and the Department of Higher Education and Training (DHET) to return the final-year students to the clinical training platform as soon as possible, the response to it and a proposal on further action that could be taken: - Given that a significant amount of clinical training time had already been lost and that the clinical training platform was being realigned to focus on responding to the COVID-19 pandemic, Wits had argued that COVID-19 presented a unique training opportunity and that students could also be of value to the platform. - The NDoH expressed strong support for Wits' proposal. Still, the DHET and the Minister of Higher Education, Science and Technology did not support it, citing reasons such as there being concern about this amongst the Vice-Chancellors (VCs), difficulty in managing social distance in a clinical setting, the risk of the pandemic worsening with concurrent increased risk to students, and the fact that there wasn't a uniform view about this amongst Medical Faculties/Schools. - Emphasising that sector-wide agreement on the way forward was ideal, it was proposed that the authorities be approached again, indicating the consequences if the students are not returned to the clinical training platform in good time. The main issue is that this academic year would overlap with the next, which would put further pressure on trainers and if the return of the students to the clinical training platform were delayed for several months, this would have a knock-on effect for several years as well as an annual delay in the delivery of interns and trained doctors for the country. A delay in completing this and subsequent academic years would also have serious financial consequences, particularly regarding student funding and the cost to government related to students on the Nelson Mandela-Castro programme. - The comments that followed the introduction included the following concerning returning students to the clinical training platform: - Arguments for and against a swift return - An indication of universities' plans in this regard - Issues that needed to be taken into consideration in returning students to the clinical training platform, including the following: - The safety of students, trainers and patients - Reintegrating students into residences - Insurance
b) Council on Higher Education (CHE)	d) 15 May 2020			
c) Memorandum to DVCS	e) 20 Nov 2020			
d) CHE	f) December 2020			
Memorandum to Heads of Professional Bodies	g) 31 Aug 2021			
DHET: Phase in programme for final year programmes containing clinical training (letter)				
Communiqué of Public Universities				
Students' Access to and Use of Learning Materials Survey Report 2020 (DHET)				
Health Professions Council of South Africa (HPCSA) impact of COVID-19 on disciplines currently: Response from General Surgery at UKZN				

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				- The capacity of trainers on the clinical training platform, while the focus is on responding to the COVID-19 pandemic - The kinds of activities students could participate in safely - The perspectives of parents and guardians - Given that most universities were planning to return students to the clinical training platform around 20 April, in line with an agreement reached by the VCs to consider 20 April as a planning horizon for resuming academic activities, it was agreed that the SACOMD chair would engage with an individual with appropriate political influence as a matter of urgency on the return of students to the clinical training platform as soon as possible with due consideration to the issues indicated above. - Actions: - To assist the chair in engaging with the authorities as indicated above, all universities should send the institution's approach to completing the academic year successfully to the secretariat in writing as soon as possible. - SU and UCT should share feedback from their engagement on Thursday, 9 April, with the Western Cape DoH on returning students to the clinical training platform as appropriate. b) Council on Higher Education (CHE) Memorandum Addressed to all DVCs, academic, teaching, and learning at public higher education institutions, and all heads of academic, teaching, and learning at private higher education institutions. Re: COVID-19 CRISIS – actions aimed at completing the academic year The CHE has been closely monitoring the impact of the COVID-19 crisis nationally, particularly on the higher education and training sector. It has kept abreast of developments at individual universities and institutions and sector-wide, especially insofar as they impact the quality of educational provision. We have taken note of the many proactive initiatives at individual institutions and sector-wide ones led by the Ministry and Universities of South Africa (USAF) to address the many immediate challenges associated with completing the academic year (centred on reshaping the academic year according to different scenarios), as well as enabling remote learning through technologies at our disposal. Capacities, infrastructure, access to devices, and access to the internet are unevenly distributed across the sector and among the student population. These pose a tremendous challenge to institutions to ensure that whatever remote teaching, learning, support and assessment technologies are utilised should not disadvantage those without devices and internet access. <i>Concerns that have been brought to our attention include the following:</i> - USAF estimates that between 30 and 40 per cent of students have no access to devices or the internet. Some of those with their own devices do not have access to the internet. A proportion of students live in areas with weak or no internet connectivity.

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				- The particular plight of students who have work-integrated learning, service learning, practical, and internship requirements, especially if they are in their final year and have to fulfil prescribed professional as well as summative assessment requirements in these regards, which are stipulated by institutions and the various statutory and non-statutory bodies. - Whether programmes accredited for the contact mode and restricted to that mode of delivery and now impelled by the current crisis to shift to online, virtual and blended modes of teaching, learning and assessment during the lockdown period will continue to be restricted in the same way, or afforded flexibility. <i>After deliberations by the HEQC and the CHE EXCO on the critical matters outlined above, the CHE provides the following clarity:</i> - We are aware of initiatives at the national level from the Ministry and USAf to negotiate for zero-rated cost access to the internet for students for learning purposes. We have urged the Minister to widen the net in these negotiations to include students at both public and private higher education institutions. - For students with service learning, practical, WIL, internship and related requirements, we will urge the statutory and non-statutory bodies to approach these with flexibility so that the registration requirements are revised to prevent prejudice to graduating students, in particular, who are affected by circumstances beyond their control. The CHE will recommend this to all the relevant professional bodies. Individual institutions are urged to make practical proposals to the professional bodies on alternative means of addressing the prescribed requirements and to share these in the sector so that there is consistency in the sector and in the approach by each of the professional bodies. - The restrictions on all programmes accredited for contact delivery are lifted. All programmes accredited by the CHE for contact only can also be offered, supported and assessed through virtual and online delivery and blended learning approaches. - Finally, all institutions are urged to utilise the online and blended learning resources that are already compiled and available in the sector, such as the University of Cape Town (http://www.cilt.uct.ac.za/cilt/teaching-resources); the University of Johannesburg, University of Pretoria and the University of Free State (available on https://blendedlearningresources.co.za/blended-learning-resources-home/). The CHE is in the process of developing a national repository in which instances of good practice, innovations, materials, etc., developed by individual institutions can be shared with the rest of the sector. A further communiqué on the matter will be sent with the relevant details once the vehicle has been set up.

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				c) CHE: Memorandum Addressed to the Heads of all Professional Bodies <i>Re: COVID-19 crisis – alternatives to service learning, work-integrated learning, practicals, internships, and related requirements for assessment and professional registration by professional boards</i> The CHE has urged institutions to establish which programmes are affected and develop a composite picture that can be communicated to the relevant professional bodies. The CHE also urges each professional body to consider the practical proposals of institutions to provide alternatives to the service learning, WIL, practical, internship and related requirements prescribed as part of the assessment and professional registration requirements. Each professional body is also urged to issue clear practical guidelines so that individual institutions can respond proactively and decisively in the steps they take to meet each programme's requirements satisfactorily. d) DHET: Phase in programme for final year programmes containing clinical training Request from the DHET for universities to submit plans for the phase-in of other programmes that include clinical training in the final year of study, i.e., qualifications in the health sciences, dental, veterinary sciences and animal health fields. The plans will inform a proposal that the Minister will present at the National Command Council for consideration. The plan should identify all controls and preparations that should be in place for the effective phasing-in of students onto the clinical training platforms in a manner that will enable the completion of the academic year while at the same time ensuring the health and safety of students and staff. Components to be included: <i>Overall approach</i> Resource requirements: • Number of students • Staffing • Clinical training platform • Student accommodation • Health, safety, and campus readiness e) CHE: Communiqué Public Universities Addressed to Deputy Vice-Chancellors: Teaching and Learning All Public Universities in the Republic of South Africa From: Council of Higher Education (CHE) <i>Subject: Extension of the Concession for Programmes Accredited for the Contact Mode of Provisioning to Continue to be Offered through Remote Online Distance/Blended Modes of Provisioning Reference is made to the communiqué dated 17 April 2020, which communicated to higher education institutions the decision of the Higher Education Quality Committee (HEQC) to grant a concession allowing higher education institutions to take the programmes that were accredited by the HEQC for the contact mode of provisioning and offer them through online</i>

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				<i>distance/blended modes of provisioning during the period of the nationwide lockdown owing to the COVID-19 pandemic.</i> At its meeting on 5 November 2020, the HEQC considered the continuing uncertainty regarding the COVID-19 pandemic and its effect on planning for enrolments and programme provisioning for the 2021 academic year. After due consideration, the HEQC resolved to extend the concession, allowing higher education institutions to take the programmes that were accredited by the HEQC for the contact mode of provisioning and offer them through online distance/blended modes of provisioning during the 2021 academic year. f) Students' Access to and Use of Learning Materials Survey Report 2020 (DHET) This report shared the findings of a national survey requested by the Department of Higher Education and Training (DHET) to explore how students access and use learning materials. The study was conceptualised and administered at an opportune time, five months into the national lockdown as a response to the COVID-19 pandemic. Twenty-four out of the 26 public universities participated. • Twenty-four out of the 26 public universities participated, and data were collected from 48 981 respondents. • 77% of student respondents had modules moved to remote learning. • 20% of students were not able to charge their devices as needed, more than half (54%) did not have a quiet place to study, and only half (50%) indicated that they had an appropriate network connection. • Most students (92%) submitted assignments, 78% downloaded learning materials. • 76% wrote tests online, 73% used email as a communication channel, 71% accessed learning materials online, and 65% took quizzes. • While 70% of respondents engaged with classmates through online chats, only 45% formally engaged in online group work. • The most significant obstacles to students' engagement with remote learning are network connectivity, data, and not having appropriate devices for studying. • Some other challenges students faced during this time include problems with electricity, a lack of study space, not having adequate knowledge and skills to make use of devices and new study platforms optimally, and feeling isolated or disconnected from lecturers and peers. • Appreciation was expressed for the convenience of asynchronous learning, saving time and money on transportation costs, developing a range of skills and knowledge about devices and educational technology, becoming more self-directed and independent learners, reporting increased and easier communication with lecturers and peers, and recognising the efforts lecturers and institutions put in to help save the academic

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				year. - Implications for policy and practice: The COVID-19 pandemic pushed the sector to rapidly adapt to circumstances that very few in the sector have experienced before. Students' responses testify to the fact that South African institutions are able to adapt and engage with technologies to create a new way of offering teaching and learning. That does not mean that technology should replace teaching and learning, but it does imply that the sector is ready to embrace technology as an education enhancer. For a more technologically enabled teaching and learning environment to flourish, the findings of the Students' Access to and Use of Learning Materials (SAULM) survey could contribute to policy and practice by making a case for: - Ensuring that all staff and students have access to basic learning infrastructure, which includes appropriate devices, data and connectivity, to address the digital divide - Prioritising digital skills development on a national and institutional level that will empower staff and students to succeed - Developing or investing in flexible content delivery platform(s) that would allow more affordable use of textbooks, institutionally developed materials, as well as Open Education - Resources (OERs) across a range of devices - Enhancing financial aid needs by reconsidering and providing more guidance on NSFAS allowance expenditure and supporting innovative funding solutions for the "missing middle" students - Investing in developing technologically enhanced pedagogical practices that are flexible and adaptable to the disruptions (socio-economic, political and technological) that characterise the 21st-century workplace and world - Embarking on collaborative initiatives to consider the implications of a "new normal" for subsidy, quality assurance and quality enhancement - Implications for future research: The findings of this report identify several key questions that need further research attention: - How has teaching and learning changed due to the pandemic, and what are the implications? - What would an optimal and inclusive blended learning and teaching environment look like in a 'new normal' era? - What national and institutional policy changes are needed to guide the development and sustainability of such blended environments? - In what ways could lecturers be supported to drive the inclusion of technology as an educational enhancement?
g) HPCSA impact of COVID-19 on disciplines currently: Response from				

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				General Surgery at UKZN <i>What measures and mechanisms have been put in place by your discipline to ensure quality education and training of students/interns when adapting to the various levels of lockdown and restrictions due to the COVID-19 pandemic, so that minimum standards can be met while patient safety is ensured?</i> - All teaching engagements with final-year surgery students transitioned to an online/virtual teaching platform. This consisted of a flipped classroom approach with synchronous and asynchronous activities offered to reinforce theoretical concepts, case-based learning and the acquisition of skills on core surgical topics. - DP requirements were adjusted as per below: - At least 80% attendance at all scheduled teaching and training events, including small group teaching and other learning activities (including online lectures, tutorials and seminars) - Completion of all online quizzes and assignments on Moodle/Learn2021. - Continuous assessment: The student achieves a mark of 50% for class participation in live online lectures and achieves a mark of 50% for the online Mid-block MCQ quiz on Moodle/Learn2021. - End-of-block LAN-based assessments: - General Surgery OSCE (MCQ format, 80 points, 2 hours) - Written Paper case of a clinical vignette (short answer questions, 40 marks, 1 hour). <i>Explain the use of internal and external moderators for modules in your discipline currently and for exit-level modules</i> - Internal moderators are senior members of the department who review the end-of-block papers. They have served as external examiners for undergraduate examinations and as Colleges of Medicine of South Africa (CMSA) examiners. - Due to COVID-19-related lockdown measures and restrictions on travel and mobility between provinces, the CHS waived the need for an external examiner at UKZN for exit-level modules, i.e., final-year Surgery students. <i>What were the primary challenges you experienced and are still experiencing during the pandemic?</i> - Lack of resources to ensure, at the very least, a hybrid clinical exposure model. - These include pandemic-related staffing constraints. - Limited surgical ward/bed availability at the peak of COVID-19 infection. - Lack/sporadic availability of PPE for students. - Inability to modify spaces in hospitals and teaching venues to accommodate large student groups safely.

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				• Unpredictability of the pandemic with curtailment of elective and emergency surgeries, thus affecting the spectrum of pathology and 'compromised teaching subjects' in a clinical setting. • Need to maintain standardised teaching across all groups of final-year students; thus, the online model was chosen. Standardisation of teaching objective assessment methods ensured. • Despite the best efforts by UKZN, students may aggregate and act as vectors of COVID-19 transmission in the community. <i>Advise on other measures implemented to provide additional support and guidance to the students/ interns.</i> • Restructuring tutorials to case-based discussions on core topics in General Surgery, students will be expected to encounter in internship/community service, and to address the deficit in the lack of direct clinical exposure . • 3-4 students assigned per tutorial to engage with tutors and students. • Resource materials uploaded on Moodle/Learn 2021 on examination techniques, common surgical procedures and basic skills with interactive PowerPoint and videos to help with student engagement of content. • Weekly quizzes to test content and consolidate learning material. • Revision sessions for end-of-block assessments.

A document review of the development and implementation of the online undergraduate surgical teaching module at the university of KwaZulu-Natal due to COVID-19

Supplementary File 2

Core topics in General Surgery

1. Obstructive jaundice and diseases of the biliary tract
2. Approach to abdominal pain and the acute abdomen, including pancreatitis
3. Peptic ulcer disease
4. Approach to dysphagia
5. Approach to a neck mass and thyroid disease
6. Benign and malignant breast disease
7. Bowel obstruction
8. Colorectal cancer
9. Perianal disease
10. Approach to GI bleeding, including portal hypertension
11. Skin and soft tissue pathology (cellulitis, diabetic foot sepsis, soft tissue tumours, melanoma)

Vascular

1. Peripheral vascular disease, including acute limb ischaemia
2. Venous and lymphatic diseases (approach to unilateral limb swelling and varicose veins)

Trauma

1. Principles of resuscitation, including fluid management
2. Burns
3. Soft tissue injury
4. Head, chest, abdominal trauma
5. Polytrauma
6. Vascular trauma