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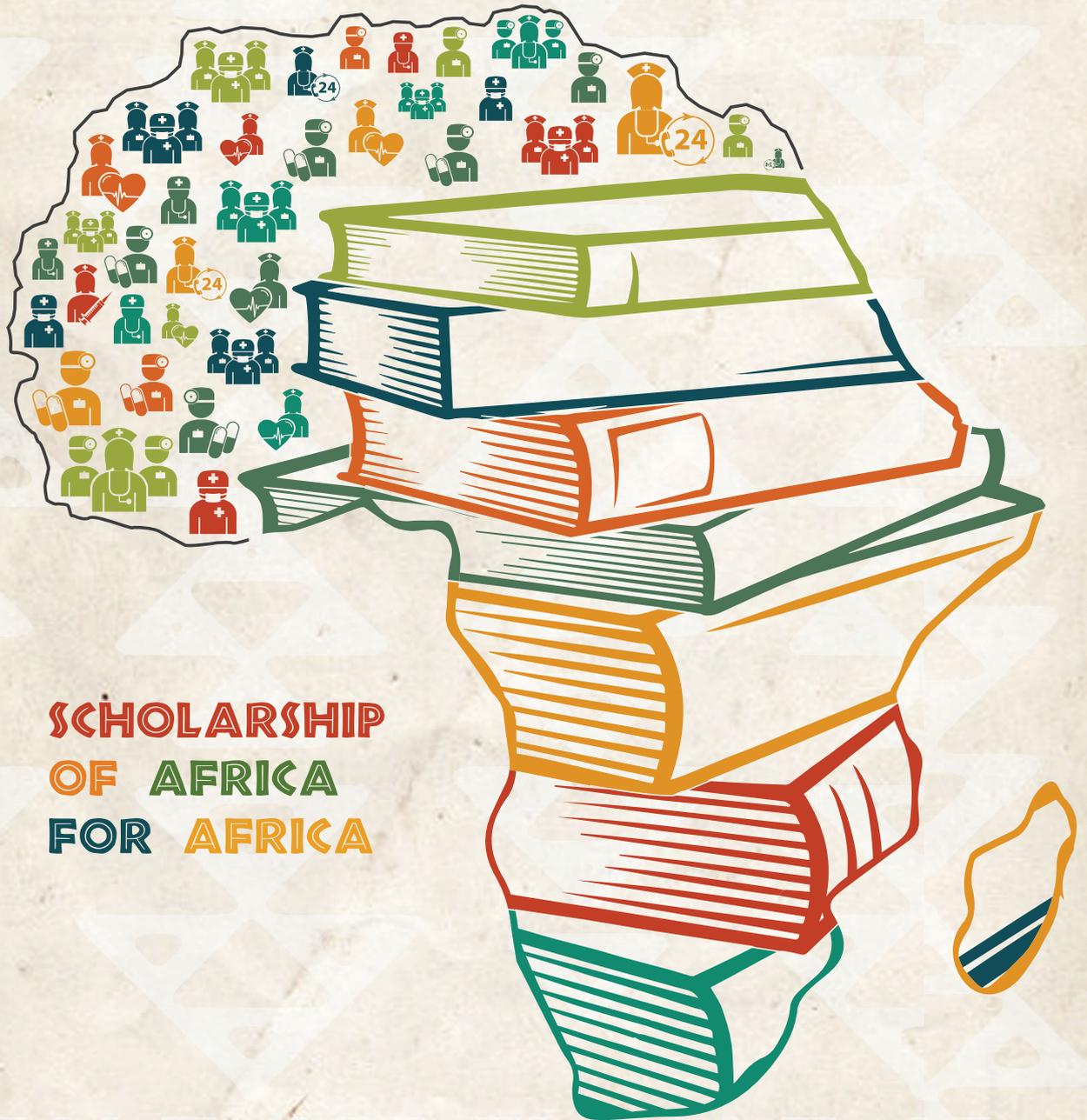
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## CPD questionnaire

# Short Report

# Pathology Lexicon A-Z: A multilingual glossary app

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Pathology, or the study of disease, is fundamental knowledge for the healthcare practitioner.[1] Health sciences students are typically required to describe and interpret gross pathology specimens. These specimens are organs or tissues displaying key features of a disease. Description of their pathological features requires proficiency in unique terminology. This terminology includes precisely tailored adjectives or metaphors (particularly food terms) with which the novice may be unfamiliar – for example, the 'verrucous' appearance of certain tumours and the 'bread-and-butter' appearance of fibrinous pericarditis. In the South African context where many students are second-language speakers of English,[2] pathology terms may be particularly challenging.[3]

The University of Cape Town (UCT) Pathology Learning Centre is a facility holding more than 4 000 pathology specimens, and is an integral part of 'practical' pathology teaching for health sciences students. To support teaching and learning, we sought to develop a tool to clarify terminology for macroscopic pathology.

## Approach

We developed a pathology glossary in the form of a mobile application (app), as our students tend to have continual access to their cellular phones, and when on campus have free internet access via international roaming service, Eduroam. Pathology Lexicon A-Z (PathLex) offers definitions, photographs and multilingual translations intended to make the terminology as accessible as possible. It contains an expanding alphabetical list of descriptive terms. Each term is explained in non-technical English, alongside a high-quality photograph of a specimen to which the term is correctly applied. Image sizes have been carefully chosen to create the best balance between image size and quality. Additionally, an audio clip is available for users to hear the English term spoken. With the assistance of subject specialist and language specialist translators, each term in PathLex has been translated into Afrikaans and isiXhosa (Fig. 1). These languages align with those taught in the health sciences undergraduate programmes at UCT, and represent the most prevalent non-English languages of the region.

Linguistic challenges during the development of PathLex have been complex, beginning with discerning which terms to include and which likely did not need clarification. The precise descriptive terms used in pathology often reflect subtle differences in tissue appearance, and translation into everyday language required careful thought. Furthermore, translations were especially problematic where particular terms were not known to exist in isiXhosa. In such instances, it was necessary to replace single-word pathology terms with phrases.

The app is available as a free download on Android and iOS platforms, with no mobile network operator partnerships.

## Outcomes

The work of PathLex is in alignment with ongoing work in multilingualism, glossary development and learning, as outlined in UCT's language plan.[2] In developing PathLex, we encountered both linguistic and technical challenges. Technical challenges included acquiring the necessary knowledge and skills for app-building on both the Android and iOS platforms.

The app was launched in 2020, and this was timely due to, but also hindered by, the move to remote teaching brought about by the COVID-19 pandemic. Moving forward, we intend to actively promote PathLex to our students, and conduct formal research on this project. The research that we envision will unpack the design, development and implementation of the app, and how it may shape student learning. App sustainability has been conceived in terms of ongoing refinements to isiXhosa translations, through review by an isiXhosa first-language pathologist now on staff. In addition, we have updated teaching material to direct students to make use of the app. It is a non-exhaustive lexicon at this stage, and we will be looking to add new macroscopy terms and a microscopy glossary, if feasible.
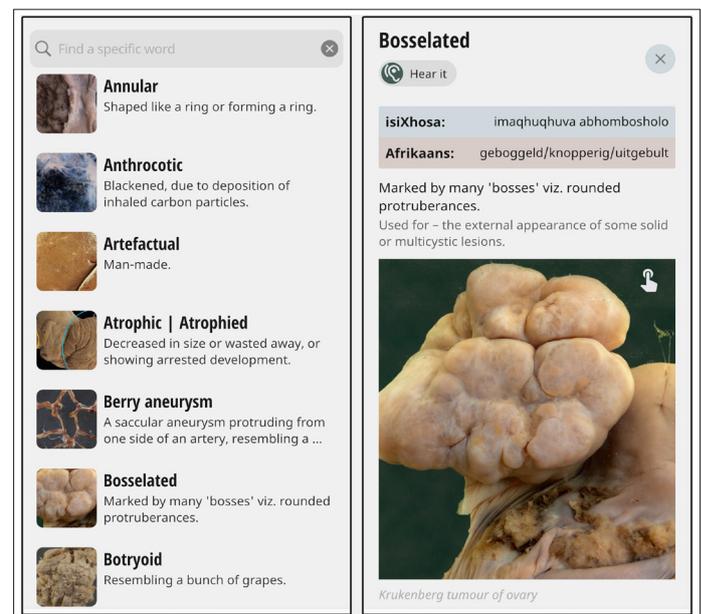


*Fig. 1. Representative screenshots from Pathology Lexicon A-Z mobile application. Note that for the sample word shown at right, 'bosselated', no direct translation exists in isiXhosa or in Afrikaans. In IsiXhosa the phrase 'maqhuqhuva abhombosholo' (rough surface with small knobs around) has been used to explain the term, and in Afrikaans three similar adjectives are employed – 'geboggeld/knopperig/uitgebult' (humped/knobbly/bulging).*

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# Short Report

# Features of the research proposal genre made easy for undergraduate occupational therapy students

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Undergraduate occupational therapy programmes in South Africa require students to demonstrate competence in developing a research proposal and conducting the proposed research using appropriate methodologies.[1] Research methods, therefore, form a significant part of the curriculum. Groups of students are assigned a supervisor and research topic, and then embark on the research process. However, students generally perceive research as a daunting process. Some of the difficulties that the author has observed over the years resonate with those reported in the literature, such as limited understanding of the research process,[2] working in a group and handling group dynamics.[2,3] Students have also reported feeling overwhelmed by the increased workload associated with the research process, particularly when coupled with other course and life demands.[3] The research proposal is a genre, with specific textual features. Elements of the introduction part of the proposal that are often challenging for students are: (*i*) the focus of the research, which informs the background; (*ii*) the research problem; (*iii*) the rationale; and (*iv*) the significance of the research.

## Approach
In preparation for the initial supervision meeting with the group assigned to the author, the students had to individually submit a written task. The task comprised questions outlined in Table 1.

## Outcomes
Using accessible language made it easier for students to handle the textual features that define the structural form of an introduction to a research proposal. The supervisor facilitated a process of aligning students' responses with relevant textual features of the introduction. For instance, question 1 established the students' interpretation of the research focus. In the initial meeting, perspectives were shared, and through discussion, the group reached a common understanding. Responses to question 2 indicated the students' views of the importance and relevance/significance of the study, which motivated them to invest in the research process. Question 3 enabled refining of the research problem and differentiating between the broader societal problem and the specific problem that necessitated the research. Lastly, the assumptions shared for question 4 shed light on the researchers' positionality.

As an innovation in teaching, the task demonstrates a scaffolding approach that uses everyday language to facilitate handling of textual

| Table 1. Research introduction task | |
|---|---|
| **Task question** | **Genre feature** |
| 1. What is the research trying to establish? | Focus of research |
| 2. Why is this topic important for:<br>• occupational therapy in South Africa?<br>• occupational therapy as a profession? | Rationale and significance |
| 3. What problem exists, that motivated this research?<br>• the societal problem<br>• the research problem | Research problem and background |
| 4. What assumptions do you have about the topic or focus of this research? | Assumptions |

features of genre. Through this task, the supervisor introduced the proposal development process in a non-threatening manner that drew on students' prior knowledge. The outcome was early completion of the introduction of the proposal. Students stated that the task increased their confidence and facilitated group cohesion, and feedback from assessors of the proposal presentations indicated that the students were more eloquent about their research, and answered questions with greater ease.

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# Learn-teach-learn: Evaluating a South African near-peer teaching programme

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**Background.** Near-peer teaching (NPT) programmes may benefit both student learners (SLs) and near-peer tutors (NTs). However, data evaluating NPT programmes in developing countries such as South Africa are lacking.

**Objectives.** To evaluate the efficacy of an NPT programme in improving the knowledge and confidence of SLs and NTs, and to evaluate student perceptions of the NPT programme.

**Methods.** An NPT programme in which clinical year students provided tutorials to pre-clinical year students was developed. Participants completed a knowledge-assessing multiple-choice questionnaire (MCQ) and a confidence-assessing questionnaire at commencement and conclusion of the programme. Participants also completed an evaluation at the end of the programme.

**Results.** For 38 SLs, the median MCQ score improved from 58.9% at baseline to 78.6% at completion of the programme ($p<0.001$; $d=1.3$). The mean overall confidence score improved from 2.6/5 at baseline to 3.6/5 at completion ($p<0.001$; $d=1.3$). All SLs agreed that the NPT programme was a useful addition to the standard curriculum and that they would recommend the programme to other students at developmental level. The effect of the NPT programme was less pronounced for the 16 NTs, with median MCQ scores of 87.5% and 89.3% at baseline and completion of the programme, respectively ($p=0.179$; $d=0.4$). The mean overall confidence score improved from 3.8/5 at baseline to 4.2/5 at completion ($p=0.004$; $d=1$). Ninety-four percent of NTs agreed that their role as NTs reinforced their existing knowledge.

**Conclusion.** NPT programmes may improve the knowledge and confidence of SLs, while consolidating the knowledge of NTs. The NTP programme was well received by medical students. In resource-limited settings, the effectiveness and acceptability of NPT make it an attractive adjunct to traditional teaching.

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Near-peer teaching (NPT) is an education modality in which a more senior student provides teaching to junior students within the same curriculum.[1]

Previous studies have demonstrated the benefits of NPT programmes, with student learners (SLs) reporting subjectively improved confidence, knowledge and skills following NPT interventions.[2] Near-peer tutors (NTs) also report benefits from involvement in NPT programmes, attributing these to the reinforcement of previously learnt concepts and improved time management, leadership and teaching skills.[3]

Teaching is a key competency for undergraduate students identified by the Medical and Dental Professions Board of the Health Professions Council of South Africa (SA).[4] However, opportunities to formally develop teaching skills are rare in undergraduate medical training, despite the expectation for junior doctors, registrars and consultants to ultimately fulfil teaching roles. NPT programmes may offer students an opportunity to better prepare for these roles.

The literature reveals that the existing data on NPT are exclusively sourced from the developed world. SA is a unique educational environment and findings from the developed world should be extrapolated to the SA context with caution.

We aimed to study whether NPT programmes are effective as an adjunct to traditional undergraduate medical training in SA by evaluating the utility of an NPT programme in improving the knowledge and confidence of medical students, for both SLs and NTs.

## Methods

We used a non-randomised, uncontrolled experimental study design to measure the outcomes − 'knowledge' and 'confidence' − in participants before and after completion of an NPT programme.

### The near-peer teaching programme

In 2018, the Internal Medicine Society, a student-run society based at the University of Cape Town (UCT), established an extracurricular NPT programme. Clinical students (years 4 - 6) served as NTs, while pre-clinical students (years 1 - 3) received tuition as SLs. Each tutorial group consisted of 1 NT and 3 or 4 SLs. Four tutorials, discussing heart failure, pneumonia, liver failure and stroke, were held between March and November 2018. Each tutorial consisted of a theoretical discussion and a clinical approach at the patient's bedside. NTs were provided with consultant-approved information sheets to guide the discussion. Consent for bedside tutorials was obtained from patients and approval for the programme was granted by Groote Schuur Hospital, Cape Town, SA.

### Evaluation

We invited all participants in the NPT programme to enrol as participants in a study of the programme. We obtained consent for all data collected and we preserved anonymity. Ethical approval was granted by the Human Research Ethics Committee, UCT (ref. no. HREC 251/2018).

We administered a 28-question multiple choice questionnaire (MCQ), approved by consultants from the Department of Medicine, UCT, to NTs and SLs as a measure of their explicit knowledge at baseline and completion stages of the NPT programme. This outcome was labelled 'knowledge'. Explicit knowledge refers to facts that can be readily articulated and stored. It is complementary to tacit knowledge, which refers to intuition and the kind of knowledge that is not easily expressed. We chose to measure knowledge through an MCQ, as this allowed for an objective assessment of participant performance and yielded data that were amenable to statistical analysis and comparison, both pre- and post-intervention.

We assessed self-reported confidence through a Likert scale, i.e. the overall confidence score, which we developed. This outcome was labelled 'confidence'. Participants responded to questions using a 5-point scale (1 = very unconfident, 2 = unconfident, 3 = neutral, 4 = confident, 5 = very confident). The mean value of the responses was recorded as the overall confidence score. Although the scale was not previously validated, it was only used with the aim of comparing scores at the baseline and completion stages of the NPT programme.

We evaluated participant perceptions upon completion of the programme through the completion of a survey, adapted from a survey previously used by Doumouras *et al.*[5]

### Statistical analysis
We used Stata 14 (StataCorp., USA) to analyse the data. Median values were used to measure MCQ scores, as these data were non-parametric, while mean values were used to measure overall confidence scores, as these data were parametric. We used the Wilcoxon rank-sum test to compare MCQ scores between groups, while paired *t*-tests were used to compare overall confidence scores. We determined effect size through the calculation of Cohen's *d*.

## Results
### Student learners
Of the 71 SLs in the NPT programme, 38 (54%) participated in the study. SLs demonstrated a significant improvement in both the knowledge and confidence scores. The median MCQ score was 58.9% at baseline and 78.6% at completion ($p<0.001$; $d=1.3$), while the mean overall confidence score rose from 2.6 at baseline to 3.6 at completion ($p<0.001$; $d=1.3$) (Table 1). All SLs agreed that the NPT programme was a useful addition to the standard curriculum and that they would recommend the programme to other students at developmental level (Supplementary material 5).

### Near-peer tutors
Of the 21 NTs in the NPT programme, 16 (76%) participated in the study. There was marginal improvement in knowledge, with median MCQ scores of 87.5% at baseline and 89.3% at completion ($p=0.17$; $d=0.4$). However, NTs demonstrated a significant improvement in overall confidence, with scores of 3.8 and 4.2 at baseline and completion, respectively ($p=0.001$; $d=1$) (Table 1). Ninety-four percent of tutors agreed that their role as NTs reinforced their existing knowledge, and 81% of tutors felt that the NPT programme would be a useful addition to the standard curriculum (Supplementary material 6).

## Discussion
### Student learners
Upon completion of the NPT programme, SLs demonstrated a significant improvement in knowledge scores and in the score measuring SL's confidence in their knowledge.

The theoretical advantages of NPT are explained by the concepts 'cognitive congruence' and 'social congruence', which hypothesise that an approximate equivalence in knowledge, skill level and social role enhances the transmission of knowledge between NTs and SLs.[6] In the traditional educational hierarchy, the gap between the student and teacher's comprehension of a subject may be so vast that the teacher cannot effectively communicate the subject at a cognitive level, which is optimal for the student's understanding. NTs, who more closely approximate the cognitive levels of those they are teaching, may be better suited to using techniques such as simplification, which may allow for more efficient and effective transfer of information. NTs also occupy social roles, which approximate the social role of the SL more closely than that of the traditional teacher, allowing for the exploration of concepts in an environment that is perceived as less threatening than the traditional educational environment.[6]

Our study is among few that demonstrate improvement in objective measures, such as knowledge scores after an NPT programme.[7,8] Evaluation of the NPT programme was exceptionally positive, with all SLs responding that the programme was a useful addition to the standard curriculum and recommending involvement in the programme to someone at developmental level. These findings are in keeping with those from the literature on the perceived usefulness of NPT.[2]

### Near-peer tutors
Our study suggests that serving as an NT may allow for knowledge retention. However, our findings do not suggest that serving as an NT leads to knowledge improvement. Improvement in NTs' knowledge may have been masked by the high baseline MCQ scores in the cohort, which left little room for improvement. All of the NTs in our study volunteered to teach other students, which may have resulted in the selection of a non-representative sample of clinical year students. It is reasonable to postulate that students at the higher end of the academic performance scale may have been more likely to volunteer as tutors, as they may have greater confidence in their knowledge and ability to transfer the knowledge through teaching. Furthermore, the MCQ consisted of questions at a difficulty level most appropriate for students at completion of their third year of medical school (in a 6-year undergraduate medical training programme). The questions may, therefore, not have been at a difficulty level appropriate for the assessment of clinical year students.

The increase in the overall confidence of knowledge may reflect the reinforcement of previously learnt knowledge. The consolidation of prior learning is often cited as one of the perceived benefits of NPT programmes.[3] Our findings link this subjective perception to more objective measures of knowledge and confidence, and although the magnitude of the effect is difficult to measure, it supports the hypothesis that NPTs promote the consolidation of tutors' prior knowledge.

### Study limitations and directions for future work
Our study was not without limitations. The sample size was small and the study vulnerable to confounding, as SLs continued to receive traditional curriculum teaching from faculty during the study period. It is also possible that cognitive maturation over the course of the year may have contributed to increased confidence. The precise strength of this association cannot be determined with the design of this study, and follow-up research should compare SLs with randomised control groups.

**Table 1. MCQ and overall confidence scores for student learners and near-peer tutors, at baseline and completion**

| | Student learners, $n$=38 | Near-peer tutors, $n$=16 | Between-group difference, $p$-value |
|---|---|---|---|
| MCQ score, % (IQR) | | | |
|     Baseline | 58.9 (46.4 - 68.8) | 87.5 (82.1 - 92.9) | <0.001 |
|     Completion | 78.6 (67.9 - 85.7) | 89.3 (86.6 - 92.9) | 0.001 |
|     Within-group change | | | |
|         $p$-value | <0.001 | 0.172 | |
|         Cohen's $d$ | 1.3 | 0.4 | |
| Overall confidence score (SD) | | | |
|     Baseline | 2.6 (0.8) | 3.8 (0.7) | 0.006 |
|     Completion | 3.6 (0.7) | 4.2 (0.5) | 0.016 |
|     Within-group change | | | |
|         $p$-value | <0.001 | 0.001 | |
|         Cohen's $d$ | 1.3 | 1 | |

MCQ = multiple choice questionnaire; IQR = interquartile range; SD = standard deviation.

Recruitment in our study may have resulted in selection bias, as participants were not randomly sampled, but volunteered for the programme. It is difficult to ascertain how this may have led to bias in the study sample. Better-performing students may have been more likely to commit extracurricular time to academic-related activities, while worse-performing students may have sought academic support from the programme. Finally, our measures of knowledge and confidence may not have sufficiently addressed all the competencies required for the practice of medicine. Future work should consider including objective structured clinical examination (OSCE) measures for a more holistic evaluation of competency.

## Conclusion

This study is the first description of an NPT programme in SA – run for students by students. Its findings suggest that NPT may result in improved knowledge and confidence in SLs, while consolidating the knowledge of NTs. It also suggests that both SLs and NTs perceive benefit from involvement in NPT and that medical students are receptive to NPT as an educational modality. In a resource-limited setting, the effectiveness and acceptability of NPT make it an attractive adjuvant to traditional teaching.

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# Is blended learning the way forward? Students' perceptions and attitudes at a South African university

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**Background.** The COVID-19 pandemic has forced higher education institutions to rethink delivery of education. Blended learning (BL), particularly online/eLearning, has become the life support for continued education. BL is a pedagogical approach that combines online asynchronous and/or synchronous and face-to-face (F2F) interaction between lecturers and students, enabling learning to occur independently of time or place. Perceptions and attitudes of students towards BL are important predictors of success.
**Objective.** To determine the attitudes and perceptions of audiology and speech-language pathology students towards BL at the University of KwaZulu-Natal (UKZN), Durban, South Africa.
**Methods.** A descriptive survey design with quantitative methods of analysis was used. Eighty-six participants completed an online questionnaire through Google forms. The tool demonstrated good internal consistency, with a Cronbach $\alpha$ score of 0.82.
**Results.** Most participants agreed that combining traditional and eLearning – BL – improves learning skills and enables more student involvement in learning. Comparisons between attitudes and year of study yielded a statistically significant association, with senior students having a more positive attitude towards BL than second-year students ($p$=0.003). Attitudes between male and female participants were generally similar; however, females felt that BL helped them to understand lecture material better and to increase interaction (statistically significant; $p$=0.021). While 93% perceived the online platform, Moodle, which is used by UKZN, as being useful, only 51% indicated that it improved efficiency of learning to a great extent.
**Conclusion.** Despite the challenges around connectivity, computer illiteracy, system and technical problems, students concluded that BL enhanced the learning experience and fostered a student-centred approach to teaching and learning.

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The adoption of blended learning (BL) to support higher education has been slowly introduced over the past few decades in the majority of universities in Africa and other developing contexts. The COVID-19 pandemic has, however, radically revolutionised the manner in which education is delivered. The adoption of online teaching and learning is unprecedented and presents a unique opportunity for the delivery of education in the future. Technology has been used to deliver learning material, and to enhance communication and administration to stimulate and promote an effective learning environment.[1] eLearning tools have been integrated into the classroom, which has resulted in BL. BL includes activities that involve combining traditional face-to-face (F2F) and technology-facilitated online interaction between teachers and students.[2] Enhanced access to the internet and local area network connections, inclusive of information technology support, has increasingly advanced the application of eLearning in some parts of many developing countries. The rapid development and wide application of eLearning, online and in-class teaching methods complement each other and are beneficial for students and teachers.[3] From a pedagogical viewpoint the intention of health science education is to prepare students with essential knowledge, skills, strategies and techniques to develop solutions and resolve problems.[1] Overall, students demonstrate increased retention rates, better utilisation of content, increased collaboration and engagement, resulting in improvement of knowledge, skills and attitudes.[4]

However, online learning tools can be costly and difficult to accept for educators and students who are resistant to change, are apprehensive about new technology and have literacy limitations.[5] Other difficulties include insufficient technical/user support, poor network capacity/stability, limited access and infrastructure capacity, inadequate organisation and co-ordination.[5] Perceptions and attitudes towards higher education may differ among students of contrasting educational and cultural backgrounds regarding teaching and learning, thus affecting their academic decisions, expectations and performance. Several other variables influence students' attitudes and perceptions towards BL, including but not limited to age, gender, learning styles, prior experience with computers and technology acceptance.[6] Many students accessing higher education in the South African (SA) context come from underprivileged schools and disadvantaged socioeconomic environments. They have limited or no access to school or community libraries, computers and essential services, such as electricity.[7]

Similarly, in other African countries, such as Ghana[8] and Nigeria,[9] poor infrastructure development and connectivity at universities, especially in rural communities, pose significant challenges to online learning. All students may therefore not be familiar with various types of technology and may not have positive perceptions, particularly towards eLearning. Yet, this method is largely being promoted in higher education institutions. As the University of KwaZulu-Natal (UKZN) incorporates BL in forms of online lecture materials and other electronic sources to supplement traditional F2F methods of learning, it is important to understand students' perceptions and attitudes to BL.

## Methods

This study aimed to determine the attitudes and perceptions of audiology and speech-language pathology (SLP) students towards BL. A descriptive survey design with quantitative methods of analysis was implemented. The study population comprised all 178 audiology and SLP students from year 2 to year 4 at UKZN. There were 6 participants in the pilot study. Of the remaining 172, 86 completed a structured self-administered questionnaire, yielding a response rate of 50%. Most of the participants (80%; $n$=68) were female; 59% ($n$=50) were from the Discipline of Audiology and 53% ($n$=45) from the third year of study. Most (60%; $n$=52) of the students came from quintile 4 and 5 schools (quintile 1 represents the poorest schools and quintile 5 the most affluent schools), 50% ($n$=43) indicated that their homes were in urban areas, and 55% ($n$=47) lived at a university residence while studying. For most participants (54%; $n$=46) isiZulu was their home language. The questionnaire was developed by adapting questions from a study conducted by Aladwan et al.[10] and consulting the relevant research articles. The questions related to participants' exposure to and understanding and acceptance of BL; frequency of online activities; attitude and perceptions towards BL-enabling learning activities and outcomes; and ease of use of the online platform, its functionality and challenges encountered. It comprised closed-ended and open-ended questions, where participants could elaborate on or explain their perceptions and attitudes, as well as Likert scales. Data were collected online using Google forms. To ensure that the questionnaire and online system were appropriate for the main study, a pilot study was conducted with 6 students. Information obtained revealed that the length of the questionnaire was appropriate, the questions were not ambiguous, and it took students ~10 - 15 minutes to complete. The documents made available to participants on Google forms included an information document, the consent form and the questionnaire.

For the purpose of this research study, both descriptive and inferential statistics were used. Non-numerical data were coded and entered on Excel (Microsoft Corp., USA) and then exported to SPSS version 26 (IBM Corp., USA) for analysis. The descriptive statistics were displayed in the form of frequencies and percentages. Pearson's $\chi^2$ tests were used to determine associations between gender and attitudes; discipline and attitudes; and levels of students and attitudes. Fisher's exact test was used if any column had <5 entries. Non-parametric tests, i.e. the Wilcoxon rank-sum test and Kruskal-Wallis test, were used for data that did not follow the normal distribution to make comparisons between the two groups of continuous measures. The one-way analysis of variance (ANOVA) was used to compare the group means. The confidence level was set at 95%, with a significance level of 0.05. The data analysis was done in consultation with a statistician.

### Ethical approval

Ethical approval to conduct the study was obtained from the Humanities and Social Sciences Research Ethics Committee (HSSREC), UKZN (ref. no. HSS/0314/0194). Gatekeeper access was provided by the registrar of the university and academic leaders of the respective disciplines.

## Results

About 74% ($n$=64) of participants had access to the internet outside of the main university premises, with 95% ($n$=82) accessing the internet daily. However, only 40% ($n$=34) accessed the Moodle online system on a daily basis – 61% ($n$=52) accessing it for ≤20 hours per month, mainly for quizzes, uploaded videos and assignments. Most participants (89%; $n$=77) agreed that a combination of traditional and eLearning is effective; improves learning skills (83%; $n$=71); enables students to be more involved in learning (84%; $n$=72); and encourages participation (84%; $n$=72). However, 38% ($n$=33) indicated that BL can be challenging. Participants had to rank the learning method in order of preference: 79% ($n$=68) indicated the F2F learning method, followed by 63.3% ($n$=57) BL and 46.5% ($n$=40) the eLearning method. There was a statistically significant association between

**Table 1. Challenges experienced with the Moodle online platform and recommendations for improvement**

| Challenges, $n$=58 | $n$ (%) | Recommendations, $n$=48 | $n$ (%) |
|---|---|---|---|
| No difficulties | 9 (16) | No suggestions | 10 (21) |
|   User friendly | |   No concerns | |
| Connectivity and access issues | 13 (22) | Training of staff and students | 5 (10) |
|   Poor internet connection/network issues/bandwidth speed/limited | |   Training of staff | |
|   Wi-Fi/no internet | |   Orientation for computer-illiterate students | |
| | |   Tutorials on Moodle use | |
| System and technical difficulties | 11 (19) | Lecturers | 16 (33) |
|   Issues with uploading and downloading lecture material/takes too long | |   Better organisation of material | |
|   Several restrictions on the system | |   Upload lectures prior to lecture time | |
| | |   Add appropriate captions to lecture notes | |
| | |   Display content notifications | |
| Lecturer issues | 13 (22) | Improve Moodle platform | 11 (23) |
|   Quizzes are confusing | |   Efficiency | |
|   Lecture notes not uploaded in time | |   Effectiveness | |
|   No content notifications | |   Organisation | |
| Personal factors | 6 (10) | Technical accessibility | 6 (13) |
|   Computer illiteracy leads to frustration | |   Improve system capacity | |
|   Not adequately interactive | |   Increase uploading document size | |
| Training and orientation regarding Moodle | 6 (10) | | |
|   Little guidance given to students about how to use Moodle | | | |

the year of study and whether there was a preference for BL or F2F learning. Third- and fourth-year students had a more positive attitude towards BL than F2F learning than second-year students, which was statistically significant ($p$=0.003) (Fisher's exact test). Students from urban and rural areas preferred F2F learning to the other methods; however, more students from rural areas indicated this as a preference (statistically significant; $p$=0.037) (Fisher's exact test). Male and female participants' attitudes towards BL were similar; however, more females agreed/strongly agreed that BL reinforces interaction ($p$=0.021) (Fisher's exact test). Pearson's $\chi^2$ test revealed that IsiZulu-speaking participants were more likely to agree that BL improves learning skills ($p$=0.042); allows for joint participation ($p$≤0.001); allows for more reading for assignment preparation ($p$≤0.001); and that the material was well organised on Moodle ($p$=0.035). The Wilcoxon's rank-sum test showed that there was a slight mean difference between the disciplines. Audiology students had a more positive attitude (mean (standard deviation (SD)) 1.94 (0.818)) than SLP students (2.33 (0.645)), and for the former BL was more meaningful than F2F learning, as it incorporated online discussions (statistically significant; $p$=0.023). The ANOVA test showed that with regard to perceptions, significant differences were noted between disciplines, with SLP students perceiving that BL was more convenient than F2F learning ($F_{(1, 84)}$=4.53; $p$=0.036) and that BL contributes towards in-depth thought about a module ($F_{(1, 84)}$=5.81; $p$=0.018). Participants were asked to rate the Moodle platform as either useful, not useful or unsure. The majority of participants (93%; $n$=80) described it as useful, but only 51% ($n$=44) perceived it as improving the efficiency of learning greatly. Pearson's $\chi^2$ test revealed that there was a statistically significant relationship between those who had access to the internet and found BL to be more convenient than those who did not have access and found F2F learning more convenient ($p$=0.025).

An open-ended question was administered, which was related to the challenges experienced with the online learning platform Moodle and recommendations for improvement. Fifty-eight participants responded to the question on challenges experienced with 16% ($n$=9) reporting no difficulties, while the other participants provided 5 key areas of concerns. Of the 48 that responded to recommendations, 21% ($n$=10) stated that they had no suggestions or concerns for the Moodle online platform and the other participants provided 4 main areas of recommendations (Table 1).

## Discussion

The majority of participants in the current study had access to the internet on the university premises and at off-campus residences, while >80% of the 250 students in 3 universities in north-eastern Nigeria did not have access outside of the university.[9] Access to the internet in various developing contexts is known to be problematic given the inadequate infrastructure and connectivity, especially for students residing in rural areas, even in the SA context. There therefore needs to be a concerted effort by all stakeholders to ensure access in rural communities, perhaps starting at the level of schools. Having adequate access to the internet on campus, in campus residences and private access could be one of the reasons that students in the current study had a more positive attitude towards BL. It was encouraging that most students preferred F2F learning and were also positive regarding BL. A study of medical students in India found an increasingly positive attitude to BL in fourth-year students, who were more prepared to be independent learners than first-year students, who have a preference for educator-directed

learning.[6] This could also be due to the familiarity with the system, its functionality and having gained more computer literacy and self-directed learning skills.[11] In constructing successful BL, course organisers must decide in advance which parts of the curriculum are to be delivered F2F and which can be delivered online or by another modality of eLearning. The balance between F2F education and eLearning is delicate, depending on factors such as learning outcomes, student level, electronic resources and trainer's experience. Measures should be taken to prevent students who lack computer skills from becoming disadvantaged or frustrated and developing computer-hostile attitudes. A study was conducted at an SA university in the Western Cape Province of students who did not have prior access to technology in their home or community, who did not feel proficient with computers, and who were not comfortable with online tasks.[7] Their limited knowledge of computers and BL also had an impact on how frequently they used BL.[7] It is suggested that all students entering university need to complete a compulsory computer literacy-certificated short course to ensure that they are proficient regarding online learning activities. Moreover, lecturer training in pedagogy and technology, administrative and technical support to ensure better organisation of course material, uploading material on time and verification of the uploaded material play an important role in the success of BL programmes. Continuous feedback from students about electronically delivered material is therefore important and should be included in the course evaluation. Future research to determine how the effects of BL translate to clinical audiology and SLP practice should be undertaken. The results of the current study are in agreement with those of other studies on the effectiveness of eLearning as part of BL, which showed that students' engagement was increased and their perception of the educational environment was improved. However, further research in this area is still necessary before lecturers can make assumptions regarding the long-term effects of BL in clinical education. The current study was based on attitudes and perceptions of benefit. Perhaps future studies could measure actual benefit and outcome using different methods, and determine responses related to preferences. A limitation of our study was that it was conducted at one university and had a small sample size, thereby limiting generalisability.

## Conclusion

BL is effective in improving students' skills, enhancing the learning experience and fostering a student-centred approach to teaching and learning. It can help students develop 21st century skills, such as communication, information literacy and the use of digital technologies, for a range of purposes. A blended approach to clinical education does have potential in addressing the highly contextual and complex health needs that are essential to perform competently in clinical practice. Although eLearning is an established and effective approach in health science, as demonstrated in other research studies, it should not replace traditional learning, as students in this study showed a preference for contact teaching. BL is probably a better approach than purely web-based/online teaching. All educational formats have strengths and limitations, BL being no exception, necessitating careful design, training, implementation and evaluation.

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# Evaluation of assessment marks in the clinical years of an undergraduate medical training programme: Where are we and how can we improve?

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**Background.** In high-stakes assessments, the accuracy and consistency of the decision to pass or fail a student is as important as the reliability of the assessment.

**Objective.** To evaluate the reliability of results of high-stakes assessments in the clinical phase of the undergraduate medical programme at the University of the Free State, as a step to make recommendations for improving quality assessment.

**Methods.** A cohort analytical study design was used. The final, end-of-block marks and the end-of-year assessment marks of both fourth-year and final-year medical students over 3 years were compared for decision reliability, test-retest reliability, stability and reproducibility.

**Results.** 1 380 marks in 26 assessments were evaluated. The G-index of agreement for decision reliability ranged from 0.86 to 0.98. In 88.9% of assessments, the test-retest correlation coefficient was <0.7. Mean marks for end-of-block and end-of-year assessments were similar. However, the standard deviations of differences between end-of-block and end-of-year assessment marks were high. Multiple-choice questions (MCQs) and objective structured clinical examinations (OSCEs) yielded good reliability results.

**Conclusion.** The reliability of pass/fail outcome decisions was good. The test reliability, as well as stability and reproducibility of individual student marks, could not be accurately replicated. The use of MCQs and OSCEs are practical examples of where the number of assessments can be increased to improve reliability. In order to increase the number of assessments and to reduce the stress of high-stake assessments, more workplace-based assessment with observed clinical cases is recommended.

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The pass/fail decision in summative assessment for medicine and other professional qualifications holds many consequences for the various stakeholders.[1-3] Failure, and having to repeat modules, has financial and emotional implications for students, while they may lose trust in the training institution.[4] Student failure may affect throughput rates, as well as the reputation of the faculty or university.[4] However, passing an incompetent student may affect both patients and the healthcare system, e.g. through loss of life and avoidable expenses. It could also lead to misconduct claims against individuals or institutions.[5,6] Miller[7] emphasises this important responsibility relating to assessment:

> 'If we are to be faithful to the charge placed upon us by society to certify the adequacy of clinical performance … then we can no longer evade the responsibility for finding a method that will allow us to do so.'

If we are to be able to defend the outcome of high-stakes examinations, where the outcome has major consequences,[8,9] the assessment must meet the basic requirements of validity, reliability and fairness.[10,11] From a theoretical perspective, it is possible to improve the quality of assessment by addressing criteria such as validity, reliability and fairness.[12]

An assessment is considered valid when it measures what it is supposed to measure.[13,14] In the case of clinical medicine, competence must be measured. Validity in clinical assessment is usually evaluated using Miller's assessment framework.[15] According to this model, a valid assessment for competence must be on the 'show how' and 'does' levels. However, when validity is increased by assessing in real-life situations, the reliability of the assessment may decline, owing to subjective judgements and the lack of standardisation.[16] Before the validity of an assessment can be evaluated, its reliability must be established.[1,4]

The reliability of a clinical assessment is defined as the degree to which a test measures the same concept in different assessments and obtains stable or reproducible results.[17,18] Reproducibility, a synonym for reliability, is described as the closeness of or variation in results of successive measurements of the same assessment carried out under the same or nearly the same conditions.[19] With any assessment, some form of 'measurement error' will occur. This error should be as low as possible to ensure accurate assessment. The calculation of this error determines the reliability of an assessment.[18] Reliability can be evaluated using various measures, depending on the data that are available and what one wants to establish.[20]

From a theoretical viewpoint, an assessment can be considered fair if everybody is subjected to the same assessment, under the same conditions, and all are marked by the same assessors using the same mark sheets.[21] In practice, an assessment is fair when the interpretation of the results is transparent and just, and when nobody is disadvantaged in the process.[22]

One of the aims of assessment evaluation should always be to improve the quality of assessment for all stakeholders.[2] A fine balance should exist between traditional and innovative assessment methods, by selecting judiciously sound assessment methods above tradition or convenience.[9] The decision to change or improve assessment practices or to move towards more innovative assessments should be based on facts rather than preferences.[9]

Pass/fail decisions are made based on predetermined criteria. In high-stakes assessments, the accuracy and consistency of the decision to pass or fail a student are as important as the reliability of the test or assessment.[3,7,23,24] Decision reliability is a term used to measure the consistency with which pass/fail decisions are made.[3]

The best way to evaluate the reliability of a clinical assessment is to assess the same participants under similar circumstances on more than one occasion,[25] which is almost impossible in real-life situations. The reliability of an assessment can be improved by using standardised questions and mark sheets, and multiple and trained markers, and by increasing the number of questions.[20] A high correlation between the different test scores ($r>0.7$) is indicative of test-retest reliability.[26]

The undergraduate medical programme at the University of the Free State (UFS) is a 5-year, outcomes-based programme that runs over 10 semesters. The clinical phase is presented from semesters 6 - 10. In the clinical phase of the programme, students are assessed in different disciplines. Some disciplines are grouped together to form a module. For example, in the fourth year, the surgery module consists of general surgery, orthopaedics, ophthalmology and otorhinolaryngology. Modules are presented in blocks. Students rotate between different blocks to cover all modules presented in the specific year. At the end of each rotation (block), students are assessed by the end-of-block assessment. In the fourth year, students must pass all disciplines to progress to the fifth year. If students meet minimum requirements in the fifth year, but fail certain disciplines, they are required to repeat only the failed disciplines. Admission to the final end-of-year assessment in the fourth and final year requires that students meet end-of-block academic as well as attendance requirements. Students in the fourth and final years must pass all disciplines in all the modules, including each of the clinical and theoretical components individually (if applicable), to pass the final end-of-year assessment.[27] Regarding clinical cases, students must also pass more than 50% of the cases, irrespective of the overall clinical mark obtained. If a student fails the end-of-year assessment (in either fourth or final year), but meets minimum requirements for reassessment, the student is allowed to do a reassessment within 1 week of the end-of-year assessment.[27] The pass mark for assessments is predetermined at 50%, as per university regulations. No formal standard-setting process exits. Assessments are blueprinted, and assessment rubrics or memoranda are moderated before assessments. Fig. 1 shows a flow diagram of the assessment process.

The end-of-block assessment and the end-of year assessment cover the same content, and are generally conducted by the same assessors (academic staff in clinical departments). Both these assessments consist of theoretical as well as clinical assessments. Different disciplines structure their assessments differently, which makes comparison between disciplines

not feasible. No regulation or specific reason was found for conducting an end-of-year assessment after the end-of-block assessments, and it is possibly more traditional than evidence based.

Despite the implications of high-stakes assessment results – such as in the undergraduate medical programme – there are no guidelines for educational institutions to measure the quality of their assessments. Therefore, educational institutions should institute quality assurance measures to ensure quality assessment, and be able to defend these results.

The aim of this study was to evaluate the assessment results of high-stakes assessments in the clinical phase of the undergraduate medical programme. As a first step to improve the quality of assessment in the clinical years of undergraduate medical training, the reliability of current assessments was established. This will assist to make recommendations for improving the quality of current assessments in the undergraduate medical programme, with validity, reliability and fairness in mind.

The objectives were as follows:
(*i*) to determine the decision reliability of the current summative assessments, and whether pass/fail decisions can be defended
(*ii*) to determine the test-retest correlation between different assessments
(*iii*) to compare the reliability results of different assessment methods.

## Methods

A cohort analytical study design was used. The study population consisted of all the fourth-year and fifth (final)-year undergraduate medical students at UFS who participated in the last end-of-block and end-of-year assessments of 2016, 2017 and 2018. The last end-of-block marks (obtained during the last rotation of the year) and the end-of-year assessment marks obtained during the final assessment at the end of the academic year were used for data analysis. Data were collected retrospectively. Between the last end-of-block assessment and the end-of-year assessment, no formal training and very little learning takes place, which makes these assessments comparable, but not identical.

The authors used an aggregated approach to look at the reliability of assessments, as an individual approach was impossible owing to the variability in the way each discipline designs multiple choice questions (MCQs), clinical cases and objective structured clinical evaluations (OSCEs) and/or objective
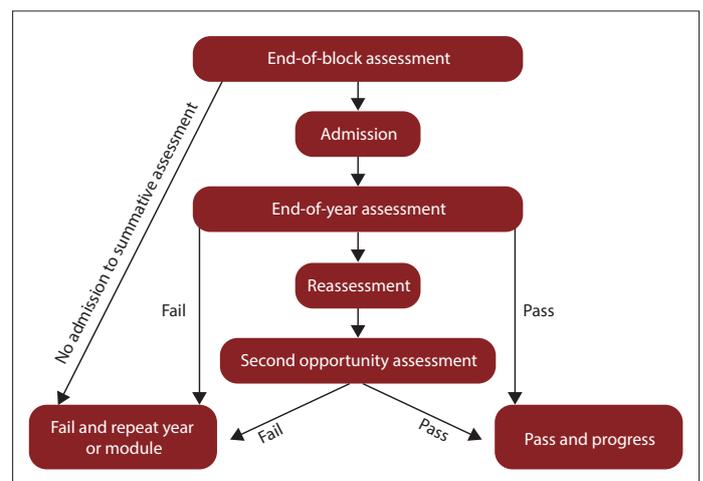


*Fig. 1. Flow diagram of assessment process and outcome in fourth and final years of the undergraduate medical programme, University of the Free State.*

structured practical evaluations (OSPEs). The reliability of the theoretical and clinical assessments was determined separately. Theoretical assessments consisted of papers with MCQs only, and papers with a combination of MCQs and mostly short written questions. Clinical assessments included clinical cases, OSCEs and OSPEs. In clinical cases, the student assesses a patient unobserved and then reports on findings while the assessors clarify findings and ask predetermined questions. The term OSCE is used for assessments in the form of clinical stations with patients or simulated patients. Students were directly observed at these clinical stations. The term OSPE was used for assessment involving unmanned stations, where students had to interpret diagnostic investigations, e.g. X-rays or laboratory results. Different disciplines use different combinations of assessments; however disciplines use the same combinations during end-of-block and end-of-year assessments.

Table 1 categorises the disciplines as either surgical or medical, indicates the study year(s) in which a discipline is presented and lists the different assessment methods used for each discipline. General surgery, orthopaedics, urology, otorhinolaryngology, ophthalmology, anaesthetics and obstetrics and gynaecology are classified as surgical disciplines ($n$=7). Internal medicine, paediatrics, family medicine, oncology and psychiatry are classified as medical disciplines ($n$=5).

### Data collection

Student marks, corresponding with respective student numbers, were obtained from the official marks database used by the Faculty of Health Sciences. This is an extensive database with numerous datasets, available in Excel (Microsoft, USA) spreadsheets for each student per discipline and per assessment. It is a secure database with password protection – only authorised access is permitted. All marks, including of reassessments, were used to compare final pass/fail outcome decisions.

### Data management and analysis

The Department of Biostatistics performed data analysis using SAS version 9.4 (SAS, USA). Calculations were done per discipline for fourth-year and fifth-year students separately.

The decision reliability between the final end-of-block and end-of-year assessment was calculated using 2 × 2 tables. Due to the skewed data, kappa

values could not be calculated[28] and a value ≥0.7 on Holley and Guilford's[29] G-index of agreement (as an alternative for categorical judgement) was considered as reliable. Holley and Gilford's G-index of agreement allows for correlation in the presence of skewed data. As a final step to evaluate the pass/fail outcome decisions, the reassessment outcome decision was compared with the final end-of-block and end-of-year assessment outcome decisions.

To determine test-retest reliability between final end-of-block and end-of-year assessment marks, Pearson correlation coefficients were calculated. A correlation coefficient ≥0.7 was considered as reliable.[26]

The mean and standard deviation (SD) of differences between end-of-block and end-of-year assessment marks were calculated. This mean is used as an indication of assessment stability. The percentage of students whose marks for the end-of-block and end-of-year assessments differed by <10% for the two assessments was calculated to assess reproducibility. The assessment was considered reliable if the reproducibility was ≥80%.

For clinical cases, the individual student marks obtained in consecutive assessments performed on the same day were also compared. The means of the different cases were compared to determine test consistency, and the variance in marks (SD) obtained by individual students was calculated to determine reproducibility.

### Ethical considerations, quality and rigour of data management

Ethical approval to conduct the study was obtained from the Health Sciences Research Ethics Committee of UFS (ref. no. UFS-HSD 2019/0001/2304), and permission to use student data was granted by the relevant university authorities. All data were managed confidentially and only student numbers were used. No student or discipline is identified in the published results.

## Results

A total of 1 380 marks in a total of 26 administered assessments were evaluated. In Table 2, the numbers of students included in the study per discipline are indicated for the different years. Some disciplines are presented in only one of the study years (Table 1). The study used the marks of 12 disciplines within the medical programme.

### Decision reliability of pass/fail decisions

In 2 of the 12 fourth-year assessments, and 7 of the 14 fifth-year assessments, the pass/fail decisions in the final end-of-block concurred with the end-of-year assessments, and all students passed. In the remaining disciplines, there were between 92.5% and 98.9% agreement of the same pass/fail decision outcome between the end-of-block and end-of-year assessments. The G-index of agreement values ranged from 0.86 to 0.98.

Three fourth-year students obtained marks <50% in the final end-of-block assessment. They subsequently failed the end-of-year assessment too, as well as the reassessment, and therefore had to repeat the year. No fifth-year students obtained marks <50% in the final end-of-block assessment, or failed the year. Three fourth-year students and two fifth-year students passed the final end-of-block assessments, and then failed a subcomponent of a discipline/module in the end-of-year assessment. All these students qualified for reassessment, according to the rules, and all passed the reassessment and, therefore, passed the year.

**Table 1. Classification of disciplines, study years of presentation and types of assessment per discipline**

| Discipline | Classification | Study year | Assessment types |
|---|---|---|---|
| A | Surgical | 4 and 5 | Theory, clinical |
| B | Surgical | 4 and 5 | Theory, clinical |
| C | Surgical | 4 and 5 | Theory, clinical |
| D | Surgical | 4 | Theory |
| E | Surgical | 4 | Theory |
| F | Surgical | 5 | Theory, clinical |
| G | Surgical | 5 | Theory |
| H | Medical | 4 and 5 | Theory, clinical |
| I | Medical | 4 and 5 | Theory, clinical |
| J | Medical | 4 and 5 | Combined |
| K | Medical | 4 | Theory |
| L | Medical | 5 | Combined |

## Research

### Test-retest correlation of end-of-block and end-of-year results

In the fourth and fifth years, respectively, 12 and 15 assessments were compared for test-retest correlation. Three assessments in the fourth year had correlation coefficients ≥0.70. None of the assessments in the fifth year had correlation coefficients ≥0.70. These results are displayed in Table 3.

### Stability of assessment marks per discipline

Table 4 summarises the differences between the final end-of-block and the end-of-year assessment marks per discipline and per study year. The mean differences between marks obtained in the final end-of-block and end-of-year assessments varied between –11.4% (discipline K, fourth-year group) and 7.5% (discipline F, fifth-year group), with discipline K emerging as a clear outlier.

### Reproducibility and assessment methods

The percentage of students whose final end-of-block and end-of-year assessment marks were within a 10% range varied between 33.3% (discipline K fourth year) and 98.9% (discipline I fifth year). The individual marks of students varied considerably, as indicated by the high SD, particularly for the fourth-year group. In Table 5 these percentages are given for the different assessment methods.

### Differences between marks for consecutive clinical cases

In three disciplines, students were assessed on two or three clinical cases on the same day. The mean marks obtained per discipline were within 4.5% of each other. The marks that individual students obtained varied by between 0 and 45% for different cases in the same discipline. In Table 6, the mean, SD, minimum and maximum of differences in student marks obtained for consecutive cases are indicated per discipline.

## Discussion

The results presented here may be considered representative of the selected study population, as all the student marks were available, in a usable format, in the database.

The aim when evaluating the quality of an assessment should be to identify areas that can be improved in the assessment.[30] Data for this study were obtained with this aim in mind rather than to pronounce judgement on the reliability of current assessment methods and practices.

Calculating the reliability of pass/fail outcome decisions using a kappa coefficient is described in the literature.[9,31] In this study, very few students failed, and the small numbers made the kappa statistic inappropriate for this measurement.[32] A G-index of agreement was, therefore, calculated.[28] In almost half (45.2%) the disciplines investigated, the agreement between the outcomes obtained in assessments was 100%. For the remaining disciplines, the G-index of agreement was >0.85. The decision reliability on pass/fail outcome decisions for clinical assessments in the undergraduate medical programme at UFS can, therefore, be considered excellent. The comprehensive end-of-block assessments, the strict admission requirements to the end-of-year assessment and the reassessment opportunity may be reasons for this finding. Each individual student result, as well as discipline-specific results, are discussed at the examination admission and final

### Table 2. Students per discipline for different study years, *n*

| Discipline | 4th year | | |
| | 2016 | 2017 | 2018 |
| --- | --- | --- | --- |
| A | 30 | 37 | 26 |
| B | 30 | 37 | 26 |
| C | 30 | 37 | 26 |
| D | 30 | 37 | 26 |
| E | 28 | 37 | 27 |
| F | 21 | 22 | 17 |
| G | 21 | 22 | 17 |
| H | 21 | 19 | 19 |
| I | 22 | 22 | 16 |
| | 5th year | | |
| A | 23 | 29 | 35 |
| B | 23 | 29 | 35 |
| C | 14 | 20 | 18 |
| F | 23 | 29 | 35 |
| G | 31 | 28 | 37 |
| H | 19 | 19 | 19 |
| I | 31 | 28 | 37 |
| J | 19 | 18 | 21 |
| L | 18 | 18 | 21 |

### Table 3. Correlation between final end-of-block and end-of-year assessment marks, per discipline, study year and type of assessment

| Discipline | 4th year | | | 5th year | | |
| | Theory* | Clinical* | Combined* | Theory* | Clinical* | Combined* |
| --- | --- | --- | --- | --- | --- | --- |
| A | 0.39*(*p*<0.01) | 0.47 (*p*<0.01) | - | 0.61 (*p*<0.01) | 0.34 (*p*<0.01) | - |
| B | 0.32 (*p*<0.01) | 0.48 (*p*<0.01) | - | 0.23 (*p*<0.01) | 0.24 (*p*=0.03) | - |
| C | - | - | 0.60 (*p*<0.01) | 0.34 (*p*=0.01) | 0.67 (*p*<0.01) | - |
| D | 0.80 (*p*<0.01) | - | - | - | - | - |
| E | 0.50 (*p*<0.01) | - | - | - | - | - |
| F | - | - | - | 0.57 (*p*<0.01) | 0.40 (*p*<0.01) | - |
| G | - | - | - | 0.25 (*p*=0.01) | | - |
| H | 0.61 (*p*<0.01) | - | - | 0.62 (*p*<0.01) | 0.35 (*p*<0.01) | - |
| I | 0.78 (*p*<0.01) | 0.93 (*p*<0.01) | - | 0.64 (*p*<0.01) | 0.32 (*p*<0.01) | - |
| J | - | - | 0.23 (*p*=0.7) | - | - | 0.66 (*p*<0.01) |
| K | 0.43 (*p*<0.01) | - | - | - | - | - |
| L | - | - | - | - | - | 0.46 (*p*<0.01) |

*Correlation coefficient.

**Table 4. Differences between the end-of-block and end-of-year assessment marks, per discipline and study year**

| Discipline | 4th year Mean (SD)* | 5th year Mean (SD)* |
|---|---|---|
| A Theoretical | 3.29 (11.04) | −0.87 (7.25) |
| A Clinical | −3.44 (9.21) | −4.51 (7.63) |
| B Theoretical | 1.90 (10.67) | −0.06 (9.82) |
| B Clinical | −1.22 (10.89) | −0.64 (7.63) |
| C Theoretical | 2.05 (6.81) | 2.06 (8.62) |
| C Clinical | - | 0.79 (6.12) |
| D Theoretical | −1.91 (4.94) | - |
| E Theoretical | −1.51 (6.27) | - |
| F Theoretical | - | −2.29 (9.10) |
| F Clinical | - | 7.45 (8.59) |
| G Theoretical | - | −4.16 (10.63) |
| H Combined | −0.78 (5.69) | 1.11 (4.68) |
| I Theoretical | 4.43 (4.75) | 4.08 (6.01) |
| I Clinical | −1.36 (2.10) | −7.27 (7.36) |
| J Combined | 2.65 (12.38) | 0.97 (5.55) |
| K Theoretical | −11.42 (12.84) | - |
| L Combined | - | -1.44 (5.30) |

SD = standard deviation.
*A positive mean indicates that end-of-year marks were higher than end-of-block marks, while a negative mean indicates that end-of-year marks were lower than end-of-block marks.

**Table 5. Percentage of students whose final end-of-block assessment and end-of-year marks were within a 10% range, by discipline, year group and assessment method**

| | Theory | | Clinical | | |
|---|---|---|---|---|---|
| | MCQ | Combined paper | Clinical case | OSCE | OSPE |
| **4th year, discipline** | | | | | |
| A | 67.7* | - | - | - | 74.2 |
| B | 65.6† | - | - | - | 64.5 |
| C | 88.3 | - | - | - | - |
| D | | 95.7 | - | - | - |
| E | | 91.4 | - | - | - |
| H | 91.5 | - | - | - | - |
| I | 90.2 | - | - | 98.9 | - |
| J | - | - | - | - | 56.7 |
| K | - | 33.3 | - | - | - |
| **5th year, discipline** | | | | | |
| A | 88.5 | - | 71.3 | - | - |
| B | 72.4† | - | - | - | 81.6 |
| C | - | 75.0 | - | 90.4 | - |
| F | 69.0† | - | - | - | 62.1 |
| G | - | 64.6 | - | - | - |
| H | 98.3 | - | 60.3 | - | - |
| I | 87.5 | - | 63.5 | - | - |
| J | - | - | - | 94.8 | - |
| L | - | - | - | 96.5 | - |

MCQ = multiple choice question; OSCE = objective structured clinical examination; OSPE = objective structured practical evaluation.
*This assessment originally consisted of 30 questions, but the number of questions increased in 2017.
†These assessments consisted of ≤30 or fewer questions per assessment.

**Table 6. Differences in marks obtained for consecutive cases per discipline**

| Discipline | Case | Mean difference | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| A | 1 and 2 | 1.99 | 12.21 | −32 | 45 |
| | 1 and 3 | 1.85 | 12.78 | −35 | 37 |
| | 2 and 3 | −0.15 | 12.98 | −37 | 30 |
| H | 1 and 2 | −2.32 | 14.99 | −45 | 38 |
| | 1 and 3 | −4.36 | 14.55 | −44 | 35 |
| | 2 and 3 | −2.04 | 13.20 | −36 | 43 |
| I | 1 and 2 | 1.67 | 11.44 | −25 | 30 |

SD = standard deviation.

examination meeting to ensure defensible outcomes. With the current measures in place, and the addition of standard-setting to ensure accurate pass/fail decisions during end-of-block assessments, the necessity of an end-of-year assessment may be reconsidered.

The test-retest correlations were low, and did not reach a value ≥0.7 for any of the fifth-year students' assessments. This indicates poor reliability for individual assessments. The reliability of an assessment can be affected by the students, the test and the markers.[17,20] Student factors that could contribute to the low test-retest correlations include the fact that students who had passed the recent final end-of-block assessment might be confident about passing the end-of-year assessment, and then opt to study for disciplines/modules in which they had passed the end-of-block assessment some time ago. The added stress of high-stakes assessment, together with uncertainty about future work and placement, could also influence students' performance. Performance stress during high-stakes assessments is well described.[33,34] The effect of additional stress is unpredictable – it can have a positive or negative effect on academic performance.[35] More and regular low-stakes assessments may address the student factors described above. Test factors that could have played a role in this study include the fact that even though the same content was assessed in both the final end-of-block and end-of-year assessments, the questions differed, and no formal standard-setting was performed. Furthermore, not all competencies can be tested in all assessments, and very few assessments performing summative assessments. Competency in one case has poor reproducibility for another case.[1] Finally, the markers stayed the same during both assessments, with the exception of a few additional external assessors. By increasing the number of assessments during rotations, the reliability of overall assessment can also be improved.

The mean marks obtained in the end-of-block compared to end-of-year assessments did not differ much. The exception was the theoretical assessment in one discipline in the fourth year, where the end-of-year mark obtained was 11.4% lower than the final end-of-block module mark. The reason for this difference is not clear, though moderation reports of these assessments could provide some insight. The small variation in the mean marks (end-of-block v. end-of-year) per discipline may be an indication that the assessments were of the same standard. However, the SD was high for all assessments, indicating large differences in the marks obtained by individual students in the two assessments. These differences occurred in theoretical as well as clinical assessments. Poor validity of the assessments, or the student factors discussed above, may be reasons for these differences.

Assessment methods varied across disciplines, and therefore, direct comparisons could not be made between different assessment methods. For theoretical assessments, MCQ papers with >30 questions produced student marks within a 10% range, indicating reproducibility. Reproducibility could not be proved for assessments with <30 questions. The reproducibility of assessments can be improved by increasing the number of questions.[20] Clinical OSCEs yielded good reproducibility results, while OSPEs and clinical cases did not. Patrício et al.[36] analysed the results of 366 articles on OSCEs performed in undergraduate medical education, and concluded that OSCEs produce reliable results and are feasible for assessing competence. An OSCE in itself is not reliable, but can produce reliable results if adequate sampling, good-quality questions and mark sheets, time allocation per station and trained assessors are used.[19,20,37] OSPEs lack clinical interaction and demonstration of competence, making OSPEs almost equivalent to written questions.[38]

Clinical cases or long cases are renowned for their poor validity and reliability.[39] Evaluation of the marks obtained for consecutive clinical cases revealed a high SD, despite a stable mean mark. A difference of up to 45% was observed in marks obtained for different clinical cases performed by the same student. A possible reason may be patient selection and reuse of patients for the assessment. It is difficult to find enough suitable, similar and stable patients to use in clinical cases, making long cases less practical and reliable for summative assessment.[40] Assessors also need to make subjective judgements of competence, which may influence reliability. Nevertheless, clinical cases have a definite role to play in low-stakes and formative assessment in which the aim is learning.[1] An advantage of using long cases is that a student can be assessed holistically on an actual case.[40] This advantage is lost when the student's examination of the patient is unobserved, and is followed by the student reporting his/her findings.[41] It has been calculated that 10 clinical cases are necessary to achieve acceptable reliability with clinical cases.[42] These numbers are only possible when workplace-based assessments are used.[9] Based on the above, it is recommended that clinical cases only be used for formative assessment.

Although these results are setting-specific, the recommendations and conclusion can be applied to other settings as they are supported by the latest literature. Reliability is only one aspect of quality assessment to ensure clinical competence. To achieve quality assessment of clinical competence, students should be assessed in real life, or in near-real-life situations. Assessing clinical competence is a complex procedure, with many dimensions requiring different assessment methods.[1,30,43] The highest level of competence, according to Miller's[7] framework for assessment, is 'does'. To ensure the competence of future medical professionals, we should assess them frequently, and in the workplace, and move away from overemphasis on high-stakes assessments.[44] Miller[7] states that:

> 'No single assessment method can provide all the data required for judgment of anything so complex as the delivery of professional services by a successful physician.'

However, real-life situations are not stable and reproducible. This poses challenges in ensuring the reliability of assessments.[45] It is important to take the quality of the assessment process as a whole into account, and to avoid merely focusing on validity, reliability or fairness as individual components to improve the assessment.

## Study limitations
The quality of pass/fail decisions for the individual assessments (end-of-block and end-of-year) were not formally established before these assessments were compared with each other. However, the outcome of each assessment per student is discussed during the examination admission meeting and the examination results meeting to ensure accurate decisions.

The validity and fairness of the assessments were not assessed in the present article. This article is only a step in the process to assess the quality of assessment.

The end-of-block and end-of-year assessments that were compared are not identical, but comparable. It is almost impossible to get identical assessments in clinical medicine, as it is performed in real-life situations.

Results of students were grouped together per discipline, and not displayed per individual student per discipline. The aim of this article was not, however, to look at individual students or assessments, but at a collective.

## Conclusion
The reliability of pass/fail outcome decisions in clinical assessments in the undergraduate medical programme involved in this study was found to be good. The necessity of end-of-year assessment after comprehensive end-of-block assessments may be questioned. The test reliability, as well as stability and reproducibility of individual student marks, were less acceptable. The use of MCQs and OSCEs are practical examples where the number of assessments can be increased to improve reliability. In order to increase the number of assessments and to reduce the stress of high-stakes assessment, more workplace-based assessment with observed clinical cases can be recommended.

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# Medical students' perceptions of global health at the University of Cape Town, South Africa: The gap between interest and education

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**Background.** Global health competencies are an increasingly important part of medical training; however, there is currently no integrated formal global health curriculum at South African (SA) medical schools, and perceptions of medical students towards global health have not been reported.
**Objectives.** To describe SA medical students': (*i*) perceptions of global health; (*ii*) access to global health education (GHE); (*iii*) awareness of global surgery as a global health priority; and (*iv*) perceived relevance of select medical specialties to global health.
**Methods.** Medical students at the University of Cape Town (UCT), SA, were invited to complete a 35-item survey over 2 months in 2018. The survey was designed on REDCap (Research Electronic Data Capture) and distributed by email. All responses were anonymised and self-reported.
**Results.** Of 1 640 medical students, 245 (18%) completed the survey. Only 66 (27%) reported GHE in medical school, whereas 213 (87%) reported a career interest in global health. Childhood in a rural setting was a positive predictor of a career interest in global health, while lack of medical resources and infrastructure in resource-limited communities was the most commonly cited barrier to a career in global health. Most students identified family medicine and infectious diseases as the two most important specialties in global health delivery. The majority of students had limited insight into global surgery, which ranked low as a past and future global health priority.
**Conclusion.** UCT medical students are interested in global health careers, but lack formalised GHE or global surgery education during their medical studies to support and encourage integrating global health into their future careers.

Global health is the study and practice of improving health equity worldwide.[1] The academic field of global health is developing rapidly, leading to the establishment of global health departments and dedicated centres at universities worldwide. This situation is mirrored with global surgery, or the equitable access to timely and quality surgical care, which was identified as a key global health priority in 2015.[2] There is increasing recognition that global health competencies should be formally incorporated into medical school curricula, especially in low- to middle-income countries (LMICs), where many global health conditions, such as HIV/AIDS and tuberculosis, as well as maternal mortality and equitable surgical access, have a disproportionate footprint.[3]

Since its inaugural meeting in 2008, the Consortium of Universities for Global Health (CUGH) set out to identify and describe 11 core domains of competency in global health to address the rapid expansion of global health programmes without a standardised curriculum to guide them. The domains described by CUGH focus on interprofessional knowledge and skills for working within the field and are intended to be applicable across disciplines at four levels of competency.[4] These competencies serve as important tools for setting assessable standards for knowledge and performance in medical school training, and are critical to curriculum development and evaluation.[4] With ongoing research to identify perspectives of global health competencies needed in undergraduate training in settings outside of North America, many of the core competency domains remain relevant while other discipline-specific competencies have emerged.[4]

Addressing healthcare disparities through the lens of global health requires local perspective and ownership to bring about sustainable change.[1] SA, an upper middle-income country, has one of the most inequitable healthcare systems in the world, with a fractured health system and resource distribution between the public and private health sectors.[5] The incoming National Health Insurance (NHI) proposes a substantial reorganisation of the current healthcare system to achieve health equity and, as such, adopts many of the same core principles espoused by CUGH[4] and the Sustainable Development Goals (SDGs) 1, 2, 3, 5 and 10.[6] SA medical schools provide formal education in public health, a discipline from which 7 of the CUGH principles were adapted.[4] Students may gain indirect exposure to global health concepts and competencies through public health curricular activities, or directly through self-directed extracurricular involvement (such as student societies and research). Nevertheless, global health education (GHE) is yet to be widely implemented in SA medical schools and, to date, the University of Cape Town (UCT) does not include CUGH domains in its curriculum. While student perceptions of global health have been well described in several high-income country (HIC) settings,[3,7,8] CUGH competencies were developed with a focus on students in North

America; hence, there is a paucity of literature describing perceptions held by medical students from LMICs and SA, in particular.

Surgical care is a key component of universal health coverage and is recognised as a core specialty in the global health agenda.[2] However, a previous study conducted in the USA demonstrated little knowledge of global surgery concepts.[9]

Determining SA medical students' perceptions of global health may assist in identifying gaps in knowledge related to CUGH domains of global health competency, and may inform the development of context-relevant GHE. The objectives of this study were to describe SA medical students': (*i*) perceptions of global health; (*ii*) access to GHE; (*iii*) awareness of global surgery as a global health priority; and (*iv*) perceived relevance and contribution of select medical specialties to global health.

## Methods

### Setting
This study was conducted at the Faculty of Health Sciences, UCT.

### Study design
A 35-item survey was adapted from a survey administered to US medical students,[9] eliciting an interest in global health, as well as knowledge of global health definitions and competencies under CUGH domain 1 (global burden of disease) and domain 2 (globalisation of health and healthcare).[4] Additional questions added in our adapted survey included further demographic and global surgery-specific questions. Our survey was designed on REDCap (Research Electronic Data Capture) version 8.4.3 (Vanderbilt University, USA) and distributed by email to all 1 640 medical students (first - sixth year) at UCT. The survey was voluntary, and all responses were self-reported and anonymised. The survey included basic demographic information, including place of birth, rurality of childhood setting and previous residence in another LMIC. Participants were asked if they had received any form of GHE, which was defined as any formal (curriculum based) or informal class/workshop/course (online or offline) that provided teaching of global health concepts and/or competencies.

Global health knowledge and career interest were ascertained. Interest in a career was reported as a percentage of a participant's career dedicated to global health work; a threshold of 50% was used to model predictors of interest in a career in global health. Self-reported perceptions of disciplines within global health were included. Respondents were allowed to select up to five statements that they perceived as being appropriate definitions of global health. Knowledge of global surgery as a global health priority was assessed, with specific questions on key global surgery publications. The perceived relevance and contribution of medical specialties to global health were also ascertained: participants selected 2 medical specialties that they perceived to have had the greatest impact on global health in the past 25 years; the 2 medical specialties that they perceived as potentially having the greatest impact on global health in the next 25 years; the 2 medical specialties that should be global health priorities, but are not currently prioritised by national or international agendas; and the single medical specialty that serves as the best indicator of a robust health system in terms of its contribution towards achieving universal health coverage, which is embodied by the World Health Organization (WHO)-defined objectives of equity in access, quality and cost-effectiveness of the specific medical specialty.[10]

The options for these questions were limited and included emergency medicine (EM), family medicine (FM), infectious diseases (ID), obstetrics and gynaecology (OBGYN), paediatrics, psychiatry, surgery and 'other' (for which respondents provided a specific medical specialty not listed above). Participants were also asked to compare 5 medical specialties – FM, OBGYN, ID, EM and surgery – regarding several characteristics, using a 5-point Likert scale.

### Study population
Preclinical students were defined as those in the first, second or third year and clinical students as those in the fourth, fifth or sixth year of the Bachelor of Medicine and Surgery (MB ChB) degree programme.

### Data analysis
Data were exported from REDCap and all analyses were performed on RStudio version 1.1.442 for Apple (RStudio Inc., USA). Descriptive statistics were used to characterise Likert-type questions. Continuous variables were expressed as means (with standard deviation (SD)) or medians (with interquartile range (IQR)). Categorical data were presented as frequencies and percentages. Continuous variables were compared using either Student's *t*-test (for normally distributed data) or Wilcoxon's rank-sum test (for skewed data). Depending on the distribution of data, either $\chi^2$ or Fisher's exact test was applied to compare categorical data. Logistic regression was used to identify associations with interest in a global health career. Several factors were evaluated through univariate regression and those with $p<1.0$ were included in the multivariate analysis. A *p*-value of <0.05 was considered statistically significant.

### Ethical approval
Ethical approval was given by the UCT Human Research Ethics Committee (ref. no. HREC 2018/111). Participant consent was obtained electronically; there was no benefit or risk to participants.

## Results

### Demographics
The survey was emailed to 1 640 UCT medical students and completed by 245 (18% response rate). Of these, 150 (61%) were preclinical and 95 (39%) were clinical students. One hundred and sixty-four (67%) identified as female and 81 (33%) as male. The majority of respondents (*n*=228; 93%) were born in SA, and 34 (14%) had lived in another LMIC for at least 1 year. Two hundred and nine (85%) reported childhood in an urban setting and 36 (15%) in a rural setting (Table 1).

### Global health education
The majority of respondents (*n*=170; 73%) reported no previous formal or informal GHE. There was no significant difference between preclinical and clinical students (*p*=0.1).

### Perception of global health concepts
Respondents perceived the following to be in line with the concept of global health (Fig. 1): equitable access to healthcare (*n*=151; 62%); free healthcare (*n*=126; 52%); healthcare in other countries (*n*=106; 43%); healthcare in poor countries (*n*=104; 42%); and the proposed NHI in SA (*n*=38; 16%).

## Knowledge of global surgery as a global health priority

One hundred and twenty (49%) respondents accurately identified that more than a quarter of the global burden of disease are from surgical conditions. One hundred and forty-five (59%) respondents were aware that the majority of surgical conditions worldwide occur in LMICs. Twenty-two percent (*n*=54) accurately identified trauma as the greatest cause of annual mortality in persons <45 years of age worldwide.[1] Fifty (20%) respondents were

aware of the *Lancet* Commission on Global Surgery, while 86 (35%) had knowledge of the World Health Assembly (WHA) declaration on essential and emergency surgical procedures – two landmark publications in the field of global surgery (Fig. 2).

## Global health career interest

A total of 213 (87%) participants expressed interest in incorporating global health into their career. The mean (SD) of desired career time and effort for global health endeavours was 41 (27)%. There was no significant difference between preclinical and clinical students (*p*=0.67). The most commonly perceived barrier to a career in global health (Table 2) was *available medical resources and infrastructure in resource-limited communities* (*n*=156; 72.6%), followed by *lack of exposure to global health training in early career* (*n*=145; 67.4%). Sixty-seven (25%) participants perceived *a lack of role models* as a barrier to incorporating global health into their careers.

## Predictors of global health career interest

Logistic regression was used to model factors associated with global health career interest (Table 3). On univariate analysis, the following factors were associated with an increased likelihood of global health career interest: being born in a foreign country (odds ratio (OR) 3.6; *p*=0.02); being raised in a low- to middle-income household (OR 2.1; *p*=0.05); and a childhood in a rural setting (OR 2.16; *p*=0.04). On multivariate analysis, there were

### Table 1. Demographic characteristics of surveyed UCT medical students

| Characteristic | *n* (%)* |
|---|---|
| Students | 245 |
| Age (years), median (IQR) | 21.14 (2) |
| Gender | |
| Female | 164 (67) |
| Male | 81 (33) |
| Place of birth | |
| South Africa | 228 (93) |
| International | 17 (7) |
| LMIC† | 13 (5) |
| HIC‡ | 5 (2) |
| Experience living in other LMIC | |
| Yes§ | 34 (14) |
| Community of origin | |
| Urban | 209 (85) |
| Rural | 36 (15) |
| Clinical volunteer experience in underserved communities | |
| Yes | 124 (51) |
| No | 121 (49) |

UCT = University of Cape Town; IQR = interquartile range; LMIC = low- to middle-income country; HIC = high-income country.
*Unless otherwise specified.
†Botswana, China, Democratic Republic of the Congo (DRC), Malawi, Nigeria, Tanzania, Togo, Zambia, Zimbabwe.
‡Canada, UK, Germany, Hong Kong, South Korea.
§Angola, Botswana, China, DRC, Kenya, Malawi, Mozambique, Nigeria, Tanzania, Togo, Zambia, Zimbabwe.



Fig. 1. Student perceptions of global health definitions. (SA = South Africa; NHI = National Health Insurance.)

### Table 2. Global health perceptions among UCT medical students

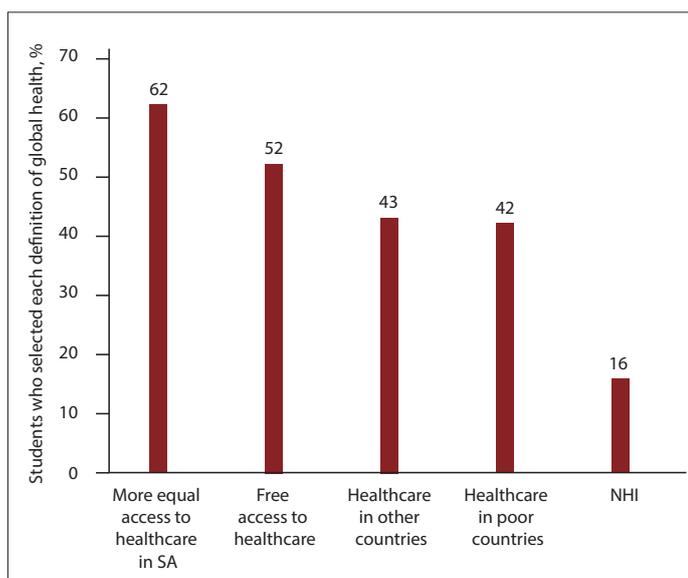| Current career interest | *n* (%) |
|---|---|
| Surgical field | 107 (44) |
| Surgery (any) | 80 (33) |
| Obstetrics | 24 (10) |
| Anaesthetics | 3 (1) |
| Non-surgical field | 138 (56) |
| Internal medicine (any) | 58 (24) |
| Public health | 21 (9) |
| Emergency medicine | 18 (7) |
| Psychiatry | 15 (6) |
| Paediatrics | 14 (6) |
| Family medicine | 4 (2) |
| Unspecified | 9 (2) |
| Interest in career in global health | |
| Yes | 213 (87) |
| Received global health teaching | |
| Yes | 67 (27) |
| Barriers to pursuing a career in global health | |
| Lack of resources in South Africa | 145 (59.2) |
| Exposure | 132 (54) |
| Length of training | 100 (41) |
| Inability to travel abroad | 79 (32.2) |
| Lack of longitudinal care | 77 (31.4) |
| Ethical issues | 72 (29.4) |
| Lack of training programmes | 71 (29) |
| Lack of role models | 65 (27) |
| Other | 3 (1.2) |

UCT = University of Cape Town.

no significant associations with an interest in a global health career. Previous GHE (*n*=66; 27%) was not associated with a career interest in global health (OR 1.21; *p*=0.51), nor was there a significant association with having a specific career choice and wanting to work in global health practice. Other predictors assessed included gender, year of study and student society involvement, but these were not found to be significantly associated (Table 3).



*Fig. 2. Global surgery knowledge of medical students. (LMICs = low- to middle-income countries.)*

**Table 3. Associations with global health career interest by UCT medical students**

| Predictor of global health career interest | Univariate analysis | | | Multivariate analysis | | |
|---|---|---|---|---|---|---|
| | OR | CI | *p*-value | OR | CI | *p*-value |
| Gender | | | | | | |
|   Female | 1.59 | 0.89 - 2.89 | 0.10 | 0.60 | 0.33 - 1.03 | 0.06 |
|   Male | (ref.) | | | - | - | - |
| Year of study | | | | - | - | - |
|   Preclinical | 1.07 | 0.62 - 1.87 | 0.79 | - | - | - |
|   Clinical | (ref.) | | | - | - | - |
| Country of birth | | | | | | |
|   Foreign | 3.60 | 1.13 - 13.47 | 0.02 | 1.67 | 0.79 - 3.53 | 0.17 |
|   South Africa | (ref.) | | | - | - | - |
| Previously lived in another LMIC | | | | | | |
|   Yes | 1.45 | 0.65 - 3.21 | 0.35 | - | - | - |
|   No | (ref.) | | | - | - | - |
| Level of household income | | | | | | |
|   LMI | 2.10 | 1.84 - 2.36 | 0.05 | 1.57 | 0.91 - 2.71 | 0.07 |
|   HMI | (ref.) | | | - | - | - |
| Childhood setting type | | | | | | |
|   Rural | 2.16 | 1.00 - 4.79 | 0.04 | 2.05 | 0.95 - 4.40 | 0.06 |
|   Urban | (ref.) | | | - | - | - |
| Previous GH-related volunteer work | | | | | | |
|   Yes | 1.21 | 0.70 - 2.1 | 0.51 | - | - | - |
|   No | (ref.) | | | - | - | - |

UCT = University of Cape Town; OR = odds ratio; CI = confidence interval; ref. = reference; LMIC = low- to middle-income country; LMI = low to middle income; HMI = high to middle income; GH = global health.

## Perceptions of contributions by specific medical specialties to global health

Perceptions of the contribution of various medical specialties to global health are shown in Fig. 3. ID was the most common response (*n*=171; 70%), followed by OBGYN (*n*=107; 44%) and FM (*n*=98; 40%). ID (*n*=111; 45%), FM (*n*=99; 40%) and OBGYN (*n*=68; 28%) were also perceived as the medical specialties that would have the highest global health impact during the next 25 years. Surgery ranked low for both its perceived impact on global health delivery in the past 25 years and in the next 25 years (*n*=28; 11% and *n*=41; 17%, respectively). Psychiatry (*n*=125; 62%) and surgery (*n*=51; 21%) were considered the top two specialties that respondents believed should be global health priorities, but that are not currently prioritised by national or international agendas. FM (*n*=172; 70%) was the most commonly selected medical specialty as the best indicator for a robust health system in terms of universal health coverage, while surgery was the least common (*n*=1; <1%).

ID was regarded as having the largest focus on preventive care and being the most likely medical specialty in which to integrate a career in global health. FM was regarded as the most cost-effective specialty to address global health in resource-limited settings. Surgery ranked lowest in all fields.

## Discussion

The current study found that the majority of UCT medical students reported no formal or informal GHE. Nonetheless, most students were interested in incorporating global health in their future careers; this interest should be leveraged. The knowledge and perceptions of students towards global health help to inform the contextual discourse around the field; however, with such limited exposure to GHE, factors contributing to these perceptions should be explored and approaches for addressing misperceptions through focused GHE prioritised.

The HIV/AIDS epidemic, which has affected southern Africa disproportionately compared with other regions, defined the field of global health as uniting international funders, scientists and civil society to work together to reduce new infections and decrease mortality.[11] Due to its infectious disease origins, general perceptions of global health are often narrow and not inclusive of other essential fields. In addition, because global health is historically derived from public health,[11] as well having a strong focus on health access and equity, it is often limited to more traditionally 'primary healthcare' specialties such as FM and OBGYN.[12] This limitation may account for the perceptions held by UCT students and their prioritisation of medical fields within global health.

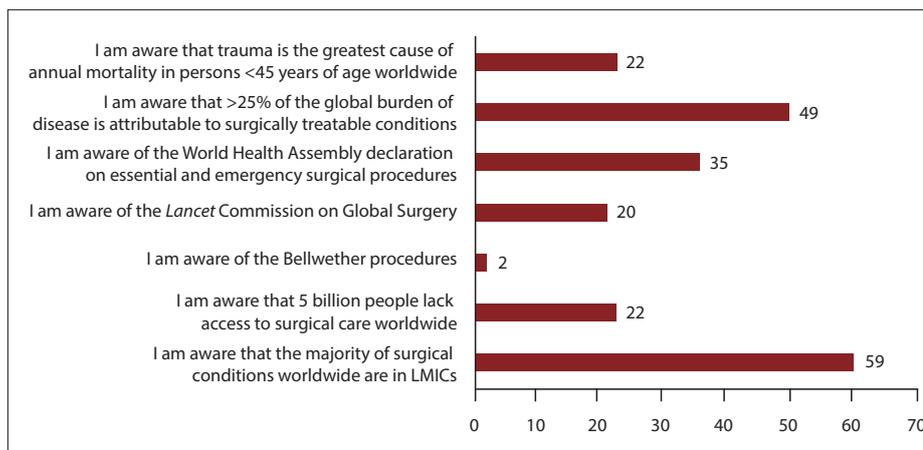Today, global health examines health priorities transnationally and espouses a multifaceted,

interdisciplinary approach to addressing health challenges that are no longer restricted to disease-based and clinical interventions.[12] Global health leaders and advocates have imperatively called for the inclusion of medical school curricula to improve the preparation of medical students to engage with and understand the tenets of global health.[4,12]

Students' knowledge of global surgery was very limited. Surgery was consistently ranked low in terms of its contribution across various perceived aspects of global health. Furthermore, it was considered as the medical field that was least amenable to a career in global health. Recently, however, surgery has been shown to be an indispensable field within the scope of global health.[13] Surgery requires strong infrastructure with regard to training, interdisciplinary co-operation and cost-effectiveness, and has been proposed as the best indicator of a robust healthcare system.[2] However, <1% of medical students agreed with this statement. This undervaluing of global surgery was also found in a comparable US study,[3] recapitulating the existing global misperception that surgery is a costly and inefficacious component of healthcare and has historically been neglected on the global health agenda.[14]

Our study also provides invaluable insights into how students prioritise other fields within global health. Notably, unlike surgery, where participants demonstrated limited insight into its significant contribution towards global health, the majority of students held an astute perception of current underservice of mental health and its warranted inclusion in the global health agenda, exemplified by its inclusion in the SDGs.[6]

Much of global health should be prioritised in LMICs; therefore, formal GHE in Africa is imperative. However, global health centres and training programmes are unintuitively concentrated in HICs.[1] In 2017, UGHE was launched in Rwanda, marking the first African dedicated global health centre that incorporated global health concepts throughout the medical school curriculum. It defined a new type of educational system in healthcare with an African identity – restructuring curricula to equip medical students to deliver equitable health services.[15] As far as we are aware, this is the only African medical school that has incorporated specific global health competencies into their formal curriculum, and not formally using CUGH domains. SA medical schools should consider restructuring their medical school curricula to incorporate formal global health competencies using the CUGH framework.[16]

With the increasing view that health between countries is inter-related, it has been argued that all medical students should be provided dynamic training in core global health competencies that can be applied across all medical fields, and to address perceived gaps in GHE.[17] To amend inaccurate perceptions of global health and to improve the preparation of medical students, specific global health learning outcomes, including global surgery, have been proposed.[18] Nevertheless, there is no consensus on standardisation in GHE.[1,9] Moreover, redefining the global health agenda in SA also provides an opportunity to address key misperceptions highlighted by this study and to integrate previously neglected fields, particularly global surgery. The perceptions highlighted in this study may help to inform key gaps in knowledge and areas of focus for a context-specific global health curriculum. We suggest that formal global health competencies be incorporated into SA medical school curricula, guided by the CUGH framework.

In the past, GHE of HIC students has largely hinged on the provision of a clinical or research rotation in LMICs.[9] These elective experiences not only have a significant impact on student development in clinical skills and cultural competencies,[19,20] but are also an independent predictor of interest in a global health career and future practice in underserved communities.[21-23] As is the case at many other universities, students spend the major part of their training in the resource-limited public sector health system, often working in health facilities in extremely poor neighbourhoods and witnessing health inequities. Notably, students from a perceived rural childhood setting were more interested in pursuing a career in global health. Mirroring global trends, SA rural communities are typically poorer and experience greater barriers in accessing quality healthcare.[24] This exposure to learning in resource-poor settings is uniquely positioned to engage SA students in a global health curriculum. SA has the capacity to harness the benefits of training in resource-poor settings and integrate this training into a global health curriculum to foster future global health leaders.

Developing a comprehensive global health medical school curriculum for the SA context requires interdisciplinary input and collaboration. Furthermore, a wider variety of skills and knowledge training is required to analyse the impact of major social, economic, political, cultural and environmental factors that influence healthcare.[12]

## Study limitations

We acknowledge that this study has several limitations. This was a single-institution study
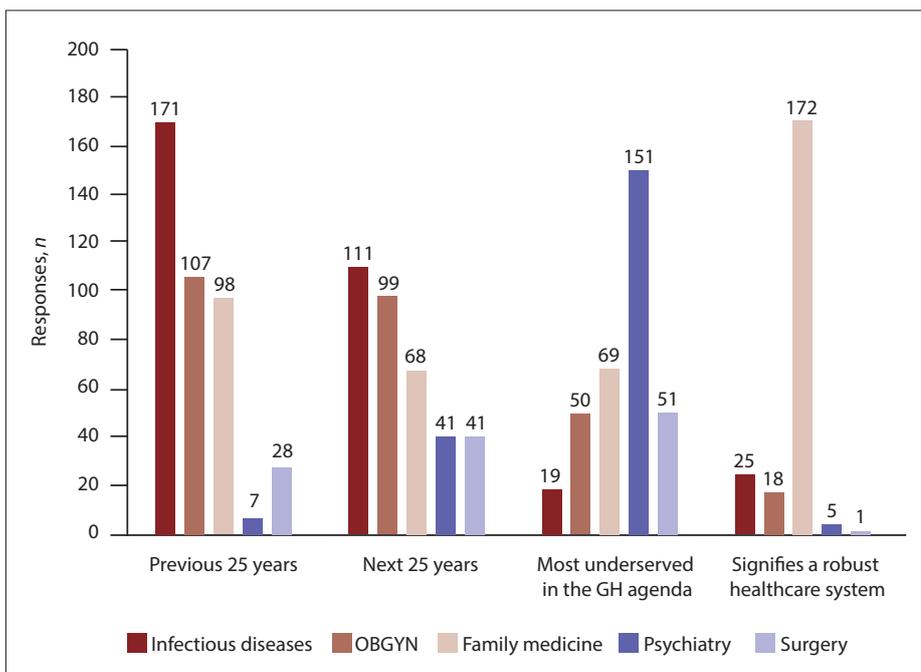


*Fig. 3. Medical student perceptions of medical fields as global health priorities. (GH = global health; OBGYN = obstetrics and gynaecology.)*

and may not be representative of the perceptions of students of other SA institutions; there was a relatively low response rate; and the responses were self-reported (as opposed to validated or standardised questions), which are subject to bias owing to varying interpretation of the questions by different participants. While the survey highlighted some key perceptions, the response options limited the depth of response interpretation, potentially warranting future qualitative interview- and focus group-based research. Further research should be undertaken to evaluate students' perceptions of what should be included in a future global health curriculum.

## Conclusion

GHE is gaining traction as a potentially influential tool for achieving health equity and for broadening the scope of future health professionals, particularly in LMICs.[25] This study suggests that while the majority of UCT medical students are interested in a career involving global health, they need a more formalised education curriculum. Interpreting students' attitudes towards and perceptions of global health may help to inform an appropriate curriculum in SA. Incorporating specific GHE into medical curricula may serve to amend the misperceptions and encourage future leaders in global health. CUGH's 11 global health competency domains could be a useful framework.

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# Research

# The knowledge and attitudes of final-year medical students regarding care of older patients

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**Background.** South African (SA) studies indicate that elderly patients receive poor-quality and inadequate medical care at primary care level. Medical schools must be responsive to the needs of the communities they serve. This article reviews medical students' knowledge of and attitudes towards caring for older patients to identify areas to enhance their learning.
**Objective.** To evaluate the knowledge and attitudes of final-year medical students regarding the care of older patients at the University of KwaZulu-Natal (UKZN), Durban, SA.
**Methods.** All final-year medical students were invited to complete a self-administered questionnaire that evaluated their geriatric knowledge and attitudes. Geriatric knowledge was assessed with a modified Palmore's Facts on Aging Quiz, and the UCLA geriatric attitudes scale was used to assess their attitudes. Ethical approval was obtained from the UKZN Biomedical Research Ethics Committee and data were collected from September to November 2019.
**Results.** There was a 79% (*n*=173) response rate. The average age of participants was 24 (interquartile range (IQR) 23 - 24) years. The mean geriatric knowledge score was 56.8% (standard deviation 10.4). The mean attitude score was 3.67 out of 5, indicating mildly positive attitudes towards caring for older patients. The majority of students expressed difficulties in communicating with older patients.
**Conclusion.** The poor knowledge and mildly positive attitudes of students necessitate educational interventions to stimulate student interest in geriatrics and improve learning in this field, including increased attention to communication skills training relevant to the care of older patients.

Medical graduates in South Africa (SA), in almost all disciplines, encounter older adults in their professional lives owing to the rapid ageing of the population.[1] The number of people aged ≥60 years in SA is predicted to double from 7.8% of the total population in 2012 to 14.8% in 2050.[2] This will result in an increased demand for health services that are responsive to the health needs of older adults. Studies in SA indicate that older patients receive poor-quality and inadequate medical care at primary care level.[3,4] This situation is partly due to the limited geriatric training and perceived ageist attitudes of health professionals.[3,5] The planned implementation of a National Health Insurance (NHI) scheme in SA is dependent on primary care providers' ability to deliver quality health services to all, including elderly patients. However, it is unclear whether medical graduates possess an appropriate level of knowledge and positive attitudes towards caring for older patients.

A recent systematic review indicated that medical students have little interest in geriatric medicine.[6] This field of medicine, which focuses on healthcare of the elderly, is a relatively new and neglected area in medical education, and is often perceived as unimportant by medical students.[7] The pensionable age in SA is 60 years, and geriatric medicine is therefore directed at people aged ≥60 years.[8] There is a scarcity of geriatric teaching faculty in SA, often resulting in limited geriatric teaching in the undergraduate (UG) medical curriculum.[9] Lack of exposure to geriatric teaching may contribute to students' lack of interest in caring for older patients. Furthermore, due to a lack of interest, student learning in geriatrics may be poor.[10]

Apart from the formal curriculum, students' geriatric knowledge and attitudes towards their elderly patients are influenced by cultural factors, experiences with older adults and the hidden curriculum.[11] Meiboom *et al.*'s[6] investigation into the hidden curriculum in the Netherlands revealed that medical students were influenced by negative attitudes of their role models towards caring for elderly patients. This finding is supported by evidence indicating that students' attitudes towards the care for older people became increasingly negative as they progressed through medical school.[12] This phenomenon could also be due to students' exposure to high levels of morbidity and mortality among geriatric patients, resulting in their perceived futility of caring for the aged. While most studies indicate that medical students possess negative attitudes towards the elderly and their care, a study from Malawi demonstrated positive attitudes among medical and nursing students.[13] This positive finding may be attributed to cultural factors and exposure to community-based education. In most traditional African societies, the elderly are revered and respected. It is likely that these traditional values and attitudes may persist during UG training if supported by ongoing engagement with the community.

Given that health professions educators are being increasingly challenged to prepare medical graduates to care for ageing populations, the current study was conducted to explore the knowledge and attitudes of final-year medical students towards caring for the elderly. The information on student geriatric knowledge and attitudes will inform the design of educational interventions targeted at improving student preparedness to care for older patients.

## Aim

Our aim was to explore and describe final-year medical students' knowledge of and attitudes towards the care of elderly people.

## Objectives

Our objectives were:
- to evaluate medical student knowledge of medical care for elderly patients
- to evaluate medical student attitudes towards care for elderly patients
- to investigate factors influencing student knowledge of and attitudes towards caring for elderly patients.

## Methods

This cross-sectional, descriptive study was conducted at the University of KwaZulu-Natal (UKZN) between September and November 2019. The UG medical programme spans 6 years and uses a problem-based learning approach. Teaching and assessment of geriatric topics are integrated into other modules across most years of the academic programme.

The study population comprised all UG medical students registered for the final (6th) year of the medical programme at UKZN (*N*=219). A research assistant distributed a self-administered questionnaire to all eligible participants at the end of teaching sessions.

### Data collection tools

The self-administered questionnaire included questions on demographic characteristics, prior qualifications, exposure to older adults outside the curriculum and assessment of geriatric knowledge and attitudes. The knowledge and attitude assessment instruments have been used globally, with good internal reliability. Minor modifications were made to reflect the SA context. The tool was piloted before data collection.

Students' geriatric knowledge was assessed using Palmore's Facts on Aging Quiz.[14] This survey consisted of 50 true/false questions to assess factual knowledge on ageing and geriatric care. Correct responses scored 1 and incorrect responses 0. The total scores were converted to a percentage. Higher scores indicate a greater knowledge of ageing and geriatric care.

The University of California at Los Angeles geriatric attitudes scale (UCLA-GAS) is a 14-item survey assessing attitudes towards the aged and has previously been used among

medical students.[15] The survey uses Likert-scale responses to indicate whether the respondent agrees or disagrees with the statement.

### Data management and analysis

Data were exported to the statistical software package Stata version 15 (StataCorp., USA) for analysis. One outlier was noted and included in the statistical analyses. The latter were performed using analysis of variance (ANOVA) to compare mean student knowledge and attitude scores among variables (age, prior qualifications, exposure to older adults). Spearman's correlation examined the relationship between knowledge and attitude scores. A *p*-value of 0.05 was set for statistical significance.

### Ethical approval

Ethical approval was obtained from the UKZN Biomedical Research Ethics Committee (ref. no. BE479/19) prior to data collection. Participants were assigned a study number, and no personal identifying data were recorded.

## Results

The response rate for the survey was 79% (*N*=219). Nearly 60% (*n*=103) of the cohort consisted of female students and the median (interquartile range (IQR)) age was 24 (23 - 24) years. Twenty-four of the respondents (14%) had a higher education qualification in fields of study that included science, finance and optometry. Of all

respondents, 38% had some exposure to geriatric patients outside the formal curriculum.

### Geriatric knowledge of medical students

The mean score on Palmore's Facts on Aging Quiz was low (56.8% (standard deviation (SD) 10.4). As indicated in Table 1, students aged ≥26 years (*n*=24) had a significantly higher mean score than younger students. The students' knowledge scores did not differ significantly by gender or ethnicity. Possession of a prior higher education qualification was associated with greater geriatric knowledge.

### Students' attitudes towards caring for elderly patients

The UCLA-GAS measured attitudes on a scale of 1 - 5, with the scores reversed on the negatively worded statements. Scores >3.5 indicate a mostly positive attitude towards the aged, and a score <3.5 indicates a negative attitude. In this study, participants demonstrated a mean score of 3.67, indicating a slightly positive attitude towards the elderly. Cronbach's α was 0.69.

No factors were identified that contributed to positive or negative student attitudes towards caring for the elderly. Although students aged ≥26 years were found to hold a more positive attitude than younger students, this finding was not statistically significant. There were also no significant differences in attitudes between

**Table 1. Mean geriatric knowledge percentage scores per variable**

| Variable | *n* (%) | Mean (SD) | *p*-value |
|---|---|---|---|
| Age group, years | | | 0.0004* |
| <23 | 56 (32.4) | 57.6 (9.6) | |
| 23 - 24 | 74 (42.8) | 54.2 (10.4) | |
| >24 - 25 | 16 (9.2) | 54.5 (10.5) | |
| 26 - 34 | 27 (15.6) | 63.9 (9.6) | |
| Gender | | | 0.47 |
| Female | 103 (59.5) | 57.3 (10.5) | |
| Male | 70 (40.5) | 56.1 (10.6) | |
| Ethnicity | | | 0.05 |
| Black | 116 (67.0) | 55.4 (10.6) | |
| Coloured | 9 (5.2) | 60.6 (6.5) | |
| Indian | 43 (24.9) | 59.3 (10.6) | |
| White | 4 (2.3) | 64.5 (5.7) | |
| Not specified | 1 (0.6) | 56.8 (0) | |
| Other qualifications | | | |
| Yes | 24 (13.9) | 62.3 (9.6) | 0.01* |
| No | 149 (86.1) | 56.0 (10.4) | |

SD = standard deviation.
*$p<0.05$.

**Table 2. Associations between student attitudes and demographic characteristics**

| Variable | *n* (%) | Mean (SD) | *p*-value |
|---|---|---|---|
| Age group, years | | | 0.11 |
| <23 | 56 (32.4) | 51.4 (5.6) | |
| 23 - 24 | 74 (42.8) | 49.9 (6.7) | |
| >24 - 25 | 16 (9.2) | 50.8 (8.5) | |
| 26 - 34 | 27 (15.6) | 53.5 (6.5) | |
| Gender | | | 0.78 |
| Female | 103 (59.5) | 51.2 (6.4) | |
| Male | 70 (40.5) | 50.9 (6.8) | |
| Ethnicity | | | 0.42 |
| Black | 116 (67.0) | 51.2 (6.8) | |
| Coloured | 9 (5.2) | 53.4 (5.0) | |
| Indian | 43 (24.9) | 50.7 (6.4) | |
| White | 4 (2.3) | 47.0 (6.7) | |
| Not specified | 1 (0.6) | 51.3 (0) | |
| Other qualifications | | | 0.15 |
| Yes | 24 (13.9) | 52.9 (7.6) | |
| No | 149 (86.1) | 50.8 (6.4) | |

SD = standard deviation.

male and female students, nor between those of different ethnicities (Table 2). Respondents with prior higher education qualifications held a more positive attitude, but this finding was not statistically significant. There was no association between previous exposure to older patients and student attitudes.

Student responses to each of the statements were analysed to obtain a deeper understanding of their attitudes towards elderly patients. The numbers of students that agreed, disagreed or were neutral to each statement are summarised in Figs 1 and 2.

More than 82% (*n*=142) of students agreed that it was interesting to listen to the elderly accounting their past experiences. There were 76% (*n*=132) of students who agreed that elderly patients were pleasant to be with and that they tended to be more appreciative of medical care than younger patients. However, fewer students (53%) reported that they were more sympathetic to older patients than younger ones (53%) and that it was society's responsibility to care for the elderly (45%).

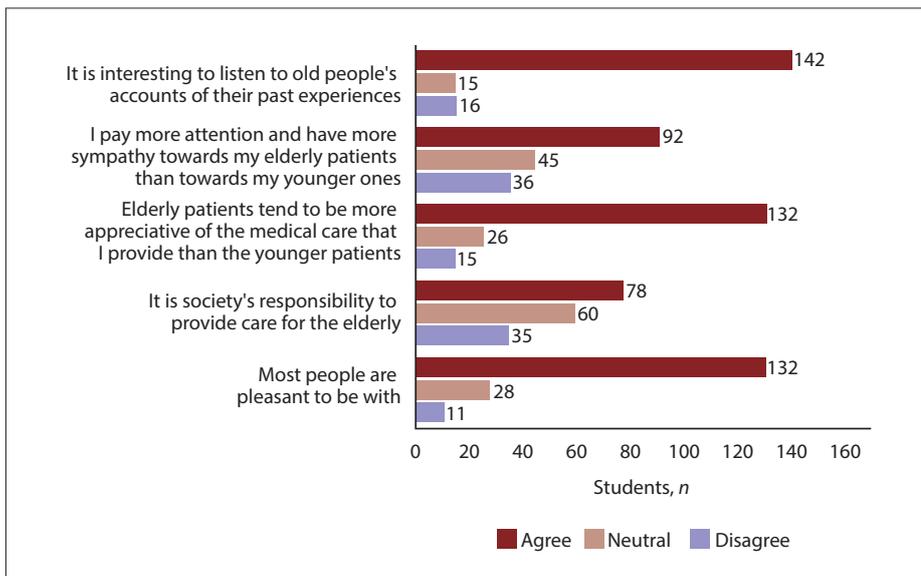Student responses to negatively worded statements are indicated in Fig. 2.

More than 79% (*n*=137) of students disagreed with the statement that treatment of chronically ill patients is hopeless. Almost 70% (*n*=121) of students also disagreed with the statement that the elderly do not contribute much to society. However, more students agreed than disagreed that people become more confused as they grow older and that it was laborious to take a medical history from older patients.

### Relationship between geriatric knowledge and attitude (total geriatric attitudes scale (GAS) and geriatric knowledge test (GKT) percentage)

As depicted in Fig. 3, there was no correlation between students' knowledge scores and their attitude scores regarding the care of older patients.

## Discussion

The current literature suggests that limited knowledge and negative attitudes of health professionals result in the neglect and suboptimal care of geriatric patients.[16] Health professions educators are challenged to prepare medical graduates who will be able and willing to provide quality medical care for their elderly patients. Despite student perceptions of receiving an adequate level of teaching in geriatrics, they displayed a minimal level of knowledge, with a mean (SD) score of 56.84 (10.42)%.

This finding is concerning, given the inclusion of geriatric topics in almost all years of the UG medical curriculum. It is possible that the lack of sub-minima in the assessment of geriatric content contributed to students' poor learning regarding this discipline.[17] It is also uncertain how this knowledge is translated into practice. To address medical students' relatively little knowledge of ageing, there should be a greater emphasis on teaching and assessment of geriatric learning objectives in the curriculum. Given the limited time afforded to geriatric teaching, it is crucial to evaluate the efficacy of educational strategies that can improve student learning in this neglected discipline.

It was encouraging to note that most students had positive attitudes towards working with elderly patients. Similar findings were noted among students in Singapore and Malawi.[13,18] However, these results conflict with reports of negative attitudes and behaviours of medical professionals towards their elderly patients.[3] It is possible that, after graduation, student attitudes could be negatively influenced by the organisational culture
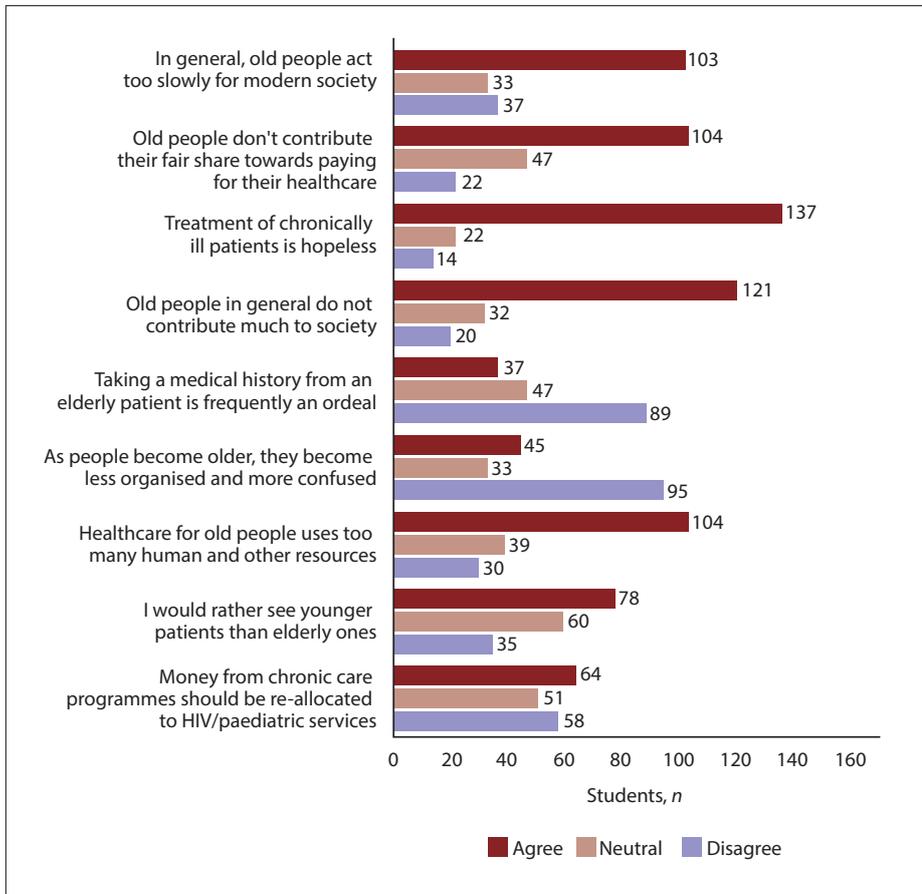


*Fig. 1. Geriatric attitudes scale: student responses to positively-worded statements.*
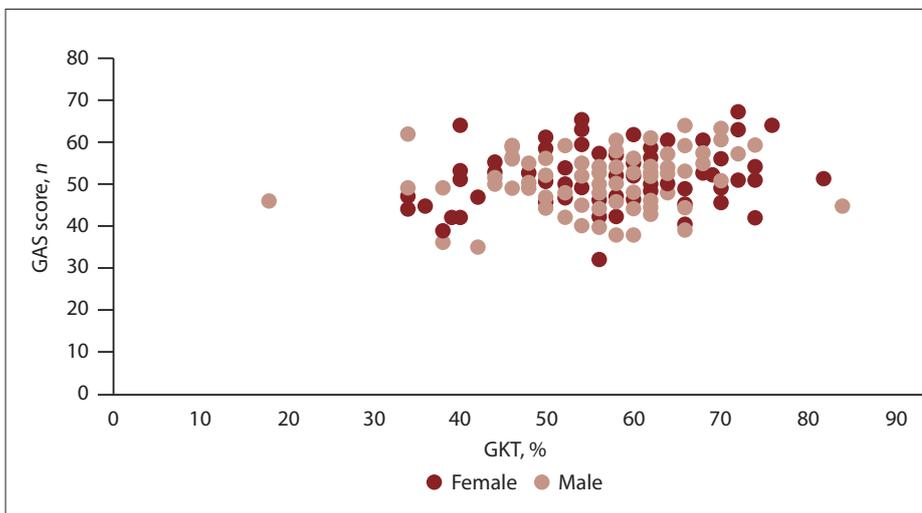
*Fig. 2. Geriatric attitudes scale: student responses to negatively-worded statements.*



*Fig. 3. Relationship between student geriatric attitudes scale (GAS) and geriatric knowledge test (GKT).*

challenge for most students. Greater attention is therefore required in communication skills training, especially regarding older adults with sensory and cognitive impairments. Furthermore, teaching and assessment of communication skills should be integrated with practical skills to provide a more realistic and comprehensive approach to the care of older adults.[19] Communication skills is also a key educational strategy in developing patient-centred practices in students, which is a key element in quality care for older adults.[20,21]

Studies report that female students and those who had exposure to the elderly outside the prescribed curriculum were more inclined to have positive attitudes towards the elderly.[11] However, this was not the case in our study. It is likely that the students were exposed to the same medical curriculum for 6 years, resulting in equal levels of empathy at exit level. Further research is needed to explore the influence of role models and intrinsic factors in students, which could contribute to student attitudes towards caring for older adults. The seemingly better knowledge and attitudes of older students would suggest that intake of mature students into the medical profession could produce graduates better able to provide quality healthcare to elderly patients. Older students may also be more likely to choose to work with older patients.

Of note, our findings showed no association between geriatric knowledge and attitudes towards caring for elderly patients. Other studies have also noted the poor relationship between geriatric knowledge and student attitudes.[22] Many initiatives in geriatric medical education have been noted to improve student knowledge in geriatrics, but not attitudes.[23] Hence, simply increasing the geriatric content in the UG medical curriculum is unlikely to develop empathy in students towards caring for elderly patients. Medical educators need to include teaching and assessment approaches that target the attainment of positive attitudinal and behavioural attributes in graduates regarding the care of older adults. The use of critical reflective activities, such as self-reflection journals, would be of particular value, as they assist students to identify and examine their perceptions towards elderly people.

The current literature indicates that educational interventions that involved community engagement and mentorship programmes with the healthy community-dwelling elderly lead to

in health facilities and by the role models they observe in practice. As this study only examined the attitudes of final-year medical students, it could not be determined if student attitudes towards caring for older patients improved or declined over the course of study. Further investigation is needed

regarding the changes in attitudes at different stages of study and professional practice, and other factors influencing the attitudes of medical professionals towards their elderly patients.

An analysis of students' attitudes indicated that communicating with older patients was a

positive attitudinal changes in students.[24] Community skills training and interprofessional education are considered to be of particular importance in preparing health professionals to care for older adults. These educational strategies have been shown to help develop patient-centred competencies in students and improve attitudes towards older patients.[11] Short-term clinical placements, as practised in the current curriculum, were shown to wear down student empathy towards elderly patients.

This study highlights the need to review and enhance the UG medical curriculum regarding teaching, learning and assessment of geriatric competencies. Given the overall poor geriatric knowledge of final-year medical students, there is an evident need for educators to reach consensus on the minimum competencies required by medical graduates for effective geriatric care. Educational interventions are required to stimulate student interest in geriatrics and improve learning in this field. Further studies should address the role of curricula in the development of student attitudes, and identify the reasons for the discordance between student attitude and graduate behaviour towards elderly patients. It is also evident that continuing medical education is required to enhance the limited geriatric knowledge of our graduates, particularly those working with aged patients.

## Study limitations

The results of this study have limited generalisability, because the study was carried out at a single academic institution. The questionnaire only provided for binary classification of gender, and did not allow for ethnic classification other than the four groups enrolled at the facility.

## Conclusion

SA's growing elderly population needs good-quality medical care. Findings from this study showed that students held mainly positive attitudes towards older patients, but that their knowledge of geriatrics was poor. These findings require an urgent analysis of the UG geriatric curriculum to assist health professions educators to enhance teaching and learning of core geriatric competencies. These could possibly include communication skills training, interprofessional education, greater community engagement and mentorship programmes with healthy community-dwelling elderly. There is also an urgent need to gain consensus on the minimum geriatric care competencies for inclusion in the UG medical curriculum. The poor geriatric knowledge of soon-to-be medical graduates also highlights the importance of continuing medical education in geriatric care for medical professionals who work with aged patients.

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# Research

# Nominal group technique review of the emergency care content of the clinical skills module in the undergraduate medical programme at the University of the Free State

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**Background.** Handling medical emergencies is essential for medical practitioners. Medical students at the University of the Free State have an emergency care block in their third year. Nominal group technique (NGT) has been introduced for programme development, and has been used for the assessment of educational programmes.
**Objectives.** To identify the strengths and weaknesses of the current teaching programme, as experienced by the students, and to obtain advice from lecturers on available resources and additional requirements.
**Methods.** A two-stage NGT was used to identify strengths and weaknesses of the programme from the 'clients' (students), and for the 'experts' (clinicians and educators) to suggest possible improvements. Two NGT sessions were conducted with students that had either recently (third-year students) or 2 years ago (fifth-year students) been exposed to the module. Students were asked to identify positive and negative aspects. Based on these sessions, two further NGTs were conducted with groups of 'experts' from the School of Medicine, asking for suggestions for improvement in the current resources, and for additional resources necessary.
**Results.** Students valued the practical skills obtained and some of the format of the teaching, but requested an increase of practical content, as well as additional tools and modes of teaching. Lecturers suggested co-ordinating outcomes to clarify basic concepts and to use additional media, but emphasised the need for human resources, teaching tools and functional clinical equipment.
**Conclusion.** NGT provides a valuable tool to obtain critical suggestions from students and lecturers for improvement of the clinical teaching of emergency care.

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Medical graduates are rightfully expected to be competent in managing clinical emergencies. South African (SA) regulations that govern undergraduate medical curricula, however, are fairly quiet about the matter, and in the absence of a national 'standard' curriculum, approaches to how to convey these capabilities might vary widely between the eight SA medical schools. Internationally, bodies representing emergency medicine and emergency physicians, such as the International Federation for Emergency Medicine and the American College of Emergency Medicine, have published recommendations on the emergency content of undergraduate medical training.[1,2]

At the University of the Free State (UFS), the MB ChB undergraduate medical programme runs over 5 years and is divided into the pre-clinical and clinical phase. At the beginning of their third year, the medical students receive seven 3-hour lecture blocks and two practical sessions (totalling 4 hours per student) during the 'clinical skills' module. These sessions form part of the students' introduction into clinical practice in phase 2, which spans semesters 4 and 5. In phase 3 (semesters 6 - 10), the students are exposed to clinical emergency conditions and their management during the rotations in specific medical disciplines. Without a department of emergency medicine at the UFS, there is currently no integrated emergency care curriculum, with only limited co-ordination between the different stakeholders.

Nominal group techniques (NGTs) were initially introduced in the 1960s as a project management tool, allowing a structured approach to the identification of 'client' needs and the development of projects in response to such demands.[3] The NGT is regarded as a 'consensus' tool, producing prioritised outcomes to guide a project implementation,[4,5] and has been gainfully applied in the assessment of a new undergraduate nursing sciences[6] and a redesigned undergraduate medical programme,[7] and in the evaluation of courses within undergraduate medical programmes.[8,9] The NGT has been credited for being creative by containing dominant group members and allowing quieter members to express their ideas.[3,10]

This study will hopefully contribute to the continuous critical review of current teaching practices to improve the quality of the MB ChB programme and optimise the competencies of graduates.

## Objective

The aim of this study was to explore undergraduate medical students' perceptions of the strengths and weaknesses of the current emergency care clinical skills module, and to identify, with the help of technical experts, available or desirable solutions to address some of the challenges.

The specific objectives were:
• to identify the strengths and weaknesses of the current approach as

experienced and expressed by the students who were exposed to the module

- to identify existing resources and potential new approaches based on the insights of local technical experts (academic clinicians/educationalists)
- to include the refined findings of this study in future teaching practice
- to establish a baseline for future empirical research on health professions education in emergency care in the MB ChB programme at UFS.

## Methods

In this study, a prospective, cross-sectional, qualitative approach was applied. As part of ongoing efforts to improve undergraduate medical education at UFS, it was decided to use the NGT to assess the experiences of undergraduate students who had participated in the clinical skills module either recently (current third-year students) or 2 years ago (current fifth-year students). This assessment was complemented by a second round of two NGTs with academic clinicians/educationalists involved in the teaching, who were asked to 'respond to' or 'work with' the findings of the first round.

Approval was obtained from the Health Sciences Research Ethics Committee, UFS (ref. no. HSREC 111/2017), and permission was granted from the authorities at the university. Written informed consent was obtained from all participants. Participation in the research was voluntary, and due to the nature of the method, results or statements are not attributable to an individual, and confidentiality of the participants was maintained throughout the process.

### Data collection and processing

In keeping with the processes described in the literature, four research assistants who had received prior instructions facilitated the NGT sessions. After a brief introduction and explanation of the process, a silent round of idea generation took place. The participants were subsequently asked to present one of their ideas each, which was captured on a flip chart. This was repeated until no additional ideas were presented. The ideas as written down were then discussed for clarification, and where the group felt that two ideas overlapped and should be combined, this was done. This revised list was put up for 'voting' when each participant was asked to choose the most important statement (5 points), second-most important (4 points) down to the fifth-most important statement (1 point). Ideas were ranked according to the number of votes each idea received. The NGT sessions followed the structure suggested by Gallagher *et al.*[10] An overview of the process and stages is given in Table 1. In the case of a large number of participants, the group was split into two desks, where the process, as described above, took place with a second round of ranking and voting to combine the results from the two desks added.

### Study population

#### First-round NGT – undergraduate medical students

Medical students from two different year groups at UFS who had previously done the emergency care clinical skills module constituted the study population for the first round of the NGT. This included the third-year class, who had done the module earlier in the year, and the fifth-year class, who had completed the module 2 years previously and had been exposed to most of the clinical rotations, thus having a better overview over the full clinical content of the MB ChB programme.

| Table 1. Stages of the nominal group technique* | |
|---|---|
| 1 | Introduction |
| 2 | Silent generation of ideas in writing |
| 3 | Listing of ideas on flip chart (round-robin) |
| 4 | Discussion of ideas on flip chart |
| 5 | Ranking to select the 'top-10' ideas |
| 6 | Voting on 'top-10' ideas |
| 7 | Break |
| 8 | Discussion of vote |
| 9 | Re-ranking and rating revised 'top-10' items |
| 10 | Conclusion of nominal group (and selection of representatives) |

*modified from Gallagher *et al.*[10]

With the assistance of class representatives, purposive sampling within the current third- and fifth-year classes was done, with the aim of achieving good gender and ethnic representation in samples from each of the two academic years, ideally totalling 10 - 15 participants per session.

#### Second-round NGT – technical experts

Academic clinical staff on the joint staff establishment for the School of Medicine, together with affiliated lecturers in the clinical disciplines and university staff from the School of Medicine (e.g. programme director, departmental teaching and learning co-ordinators and academic staff of the simulation and skills unit) constituted the total study population for the technical expert group. Based on the concept of purposive sampling,[11] a good representation of clinical disciplines and professional functions was aimed for when recruiting the total of 10 - 15 participants for the second round of the NGT process.

## Results

Four NGT sessions were conducted in September 2017. After conducting the NGT process (idea generation, clarification, vote to rank at the individual desk), the ranked statements, as listed in Tables 2, 3, 4 and 5, were obtained, with the number of votes for each statement. The results are presented separately for the two rounds (undergraduate students and technical experts).

For referencing in the discussion section, responses are coded in the tables. The code for the students consists of the question (student question 1/2 = SQ1/SQ2), year group (third-years = 3; fifth-years = 5) and the final ranking. For example, 'SQ1.3.4' refers to student question 1, third-year group, fourth-ranked response. The code for the technical experts consists of the question (expert question 1/2 = EQ1/EQ2), NGT session (panel 1 = 1; panel 2 = 2) and the ranking. For example, 'EQ2.1.5' refers to expert question 2, first NGT session (panel 1) and fifth-ranked responses.

### First-round NGTs (undergraduate students)

The two sessions with undergraduate students included 10 third-year medical students (4 men and 6 women, 2 of whom only joined for the second question) and 18 fifth-year medical students (4 men and 14 women).

Because of the number of fifth-year students (18), the NGT for this group was run at two desks concurrently, with an additional round of clarification and voting added to consolidate the results from the two desks into one.

# Research

## Second-round NGTs (technical experts)

The second round of NGT sessions was held with academic clinicians and health educationalists in two separate events with 8 (panel 1) and 7 participants (panel 2), respectively.

Panel 1 comprised 1 female and 7 male participants. These included consultants and medical officers from the departments of trauma, family medicine and surgery as well as a paramedic and an information technology (IT)/technical support staff member.

Panel 2 comprised 2 female and 5 male participants. This panel included consultants and medical officers from the departments of family medicine, anaesthesiology and internal medicine as well as from the Clinical Simulation and Skills Unit.

## Discussion
### Students' NGT
The students' responses did not contain any critical comments about individual

Table 4. Technical experts question 1 (EQ1): 'Write down suggestions, given current resources and based on the comments of the students, what you think can be done to improve the module content and delivery' (*N*=15)

| First expert panel (*n*=8) | | Second expert panel (*n*=7) | |
|---|---|---|---|
| Rank* | Responses (score) | Rank* | Responses (score) |
| EQ1.1.1 | Module guide outcomes/condense the content (decide on what is important on that level) (27) | EQ1.2.1 | Basic principles/clarifying concepts, e.g. what is a cardiac arrest/recognise emergency situations, e.g. low blood sugar/students must understand what is the purpose of their actions/integrate physiology/anatomy, etc./explain clearly/knowing when to stop the resuscitation (26) |
| EQ1.1.2 | Integrating practical bits into the theory content (22) | EQ1.2.2 | Visual aids/props in lectures, e.g. talk about airways – show it/combination of theory and simulation/make use of visual aids/stimulate their interest/more use of simulation (22) |
| EQ1.1.3 | Summary structured lecture: 'flipped classroom approach'/more videos, Blackboard media server, (practical station), short videos before class, login on Blackboard/online resources for blended learning (knowing the equipment) (21) | EQ1.2.3 | What are the general outcomes of this module (what level)?/start the first day and explain the bigger picture: one piece build onto the other (14) |
| EQ1.1.4 | Incorporation of different models (e.g. simulation, skills lab, manikins), more dedicated time in the skills lab (obtain signatures)/small group rotations (18) | EQ1.2.4 | Continuous evaluation/mock exam/practical sessions/more credits/marks for this module/assess the students/students accept responsibility (11) |
| EQ1.1.5 | What the content of the module should be in the lecture (well structured)/integrating with other modules later-on (taking the current level of knowledge into account)/build on the existing knowledge obtained (e.g. pharmacology, etc.) by introducing the practical aspect (basic critical care)/having simple structured (standard) approaches (PALS/ATLS etc.) (17) | EQ1.2.5 | Standardise the teaching material (approach – who are we holding our standards up to)/practise under guidance of professional (10) |
| | | EQ1.2.6 | a) Longitudinal EMC training/start in semester 5 and continue to semester 10 (8)<br>b) Two weeks of emergency care/smaller groups/rotations practicals and tutorials (8) |
| | | EQ1.2.8 | E-learning/Blackboard for content/QuestionMark/more time for practicals/make use of technology (cellphone) to look at videos etc. on YouTube/for teaching them how to find information (4) |
| | | EQ1.2.9 | Drowning/near drowning should be included – submersion injuries (2) |

PALS = paediatric advanced life support; ATLS = advanced trauma life support; EMS = emergency medical services.
*E.g. EQ1.2.3 = expert question 1 (EQ1), second panel (2), third-ranked statement (3).

lecturers, and only one lecturer was mentioned by name, to the effect that this lecturer should present a specific topic (SQ2.3.7). Students in both years appreciated the course's practical value in enabling them to address life-threatening situations (SQ1.3.1, SQ1.3.3, SQ1.3.4, SQ1.3.6, SQ1.5.1, SQ1.5.4, SQ1.5.6 and SQ1.5.7), which is in keeping with international literature.[12,13] As the module is taught at the beginning of, and as an introduction to, the clinical years in the MB ChB programme, this is to be expected, but also shows that the module met the students' expectations in this regard. The way the content was delivered also enjoyed positive feedback in some aspects (SQ1.3.2, SQ1.3.5, SQ1.5.2, SQ1.5.4 and SQ1.5.5).

When it came to students' suggestions for improvements (question 2), the 'practical theme' again dominated, with clear requests to increase the practical parts of the learning experience (SQ2.3.1, SQ2.3.2, SQ2.3.4, SQ2.5.1, SQ2.5.4 and SQ2.5.7). In addition to this, the students requested changes to the resources ('module guide'/'case studies' – SQ2.3.3; and SQ2.5.3, 'videos'/'real world' – SQ2.3.5 and SQ2.5.5), hinting at the use of blended learning/flipped classroom techniques.[14,15] Based on their greater clinical exposure, the fifth-year students also requested additions to the content (specific clinical emergencies – SQ2.5.2; specific scenarios – SQ2.5.6; and dealing with family

members and staff – SQ2.5.9), while the third-year students were more concerned with administrative issues ('mark' SQ2.3.6) and the role of a specific esteemed lecturer ('Prof. X' – SQ2.3.7).

Further comparing the third- and fifth-year students, the latter displayed a more differentiated appreciation of technical aspects ('manikins' – SQ1.5.1; 'scenarios' – SQ1.5.2; 'fixing mistakes'/'immediate remediation' – SQ1.5.4; 'real life stories' – SQ1.5.6), probably owing to their greater exposure to clinical teaching by the time of the NGT session. The fifth-year students also addressed the different professions/ranks in the health system in a more differentiated way ('EMS personnel' – SQ1.5.1; 'consultants' – SQ1.5.4), again probably owing to their greater exposure to the system. Comments on the timing of the module about the other clinical teaching are only possible in retrospect (SQ1.5.5).

## Technical experts' NGTs
Clinicians and educationalists put a strong emphasis on the clarification of outcomes and concepts in the module (EQ1.1.1, EQ1.2.1, EQ1.2.3), suggesting a proper 'scaffolding' of the content in the Vygotskian sense, rather than a mere accumulation of clinical conditions.[1,16]

**Table 5. Technical expert question 2 (EQ2): 'Write down suggestions on what additional resources and structures might be needed and how these would influence the delivery of the module content' (*N*=15)**

| First expert panel (*n*=8) | | Second expert panel (*n*=7) | |
|---|---|---|---|
| **Rank\*** | **Responses (score)** | **Rank\*** | **Responses (score)** |
| EQ2.1.1 | More dedicated facilitators for emergency care, not only in family medicine (27) | EQ2.2.1 | Trained manpower. Make use of various professions, e.g. nursing, emergency personnel/well-trained facilitators/instructors (25) |
| EQ2.1.2 | Somewhere to go to watch videos and access equipment (same space)/standardising the equipment (23) | EQ2.2.2 | Who takes ownership/where will advanced life support fit in/what level do we teach emergency care? (18) |
| EQ2.1.3 | a) Include road-shifts with EMS as clinical practice/more clinical time in the hospital setting (22) b) Alternative training method in instances of no actual resources (table exercises)/using resources at other faculties (expanding your footprint of resources) (22) | EQ2.2.3 | More funding (12) |
| EQ2.1.4 | - | EQ2.2.4 | More simulators/more equipment (10) |
| EQ2.1.5 | Capitalise on one-language policy (8) | EQ2.2.5 | Vertical integration of emergency care in the program/structure the curriculum (9) |
| EQ2.1.6 | IT training for the older folks (3) | EQ2.2.6 | Possibility of after-hour teaching such as ACLS (extra teaching time/practicals)/skills training facilities must be available; facilitators also (7) |
| | | EQ2.2.7 | Build a question bank (6) |
| | | EQ2.2.8 | Decent clinical equipment in hospitals (3) |

EMS = emergency medical services; ACLS = advanced cardiovascular life support; IT = information technology.
\*E.g. EQ2.2.3 = expert question 2 (EQ2), second panel (2), third-ranked statement (3).

With regard to the mode of delivery of the content, emphasis was again placed on the importance of practical aspects (EQ1.1.2) and the use of 'stimulating' methods, including simulation exercises (EQ2.1.2, EQ1.1.4) as well as online resources and videos (EQ1.1.3, EQ1.2.8). Continuous evaluation of the students and the inclusion of mock examinations would also aid the learning process (EQ1.2.4), mirroring the emphasis on 'assessment drives learning' in the literature.[17,18]

Standardisation of the teaching materials and the management approaches was suggested to improve the consistency of the teaching (EQ1.1.5, EQ1.2.5). The content should be integrated with and linked to modules in earlier and later parts of the programme (EQ1.1.5, EQ1.2.6) and this was mentioned under both questions 1 and 2 (also EQ2.2.5).

When considering additional resources, the top priority was the availability of well-trained facilitators, or in other words, human resource management and development issues (EQ2.1.1, EQ2.2.1, EQ2.2.6), including IT training for the 'older folks' (EQ2.1.6). The availability of equipment for teaching, simulators and videos was the second major theme (EQ2.1.2, EQ2.2.4), including the availability of appropriate clinical equipment at the actual clinical service delivery sites (EQ2.2.8).

Additional ideas that came up were the opportunities offered by the changed language policy of the university, which potentially frees up resources (EQ2.1.5), the utilisation of other emergency care personnel such as the emergency medical services (EMS) and their training facilities (EQ2.1.3), and the creation of a question bank of multiple-choice questions for formative and summative assessment (EQ2.2.7). Lastly, the general need for additional financial resources was expressed (EQ2.2.3).

## Implementation of ideas/suggestions
In the next run of the module after the NGTs, additional practical CPR training sessions and mock examinations have been included as suggested during the research, while much more work remains to be done regarding a general overhaul of the content and structure of the module, possibly in connection with a major review of the undergraduate curriculum.

## Weaknesses and possible confounders
Firstly, it needs to be acknowledged that the relatively small sample from both student groups might not be regarded as fully representative for the respective years. An additional quantitative, questionnaire-based vote on the finding by a larger sample could have added reliability through 'triangulation'.[7] Given the 2 years between the exposure to the module of the two year groups, staff attrition and reworking of course content might have introduced differences between the two 'runs' of the same module.

On the side of the 'technical experts', the composition of the group and the absence of some disciplines (due to lack of response from certain departments) might have biased the outcomes.

The results of the two sessions in the second round of NGTs, with the technical experts, have not been consolidated into a single 'rank order' as suggested by some authors.[19,20]

## Conclusion
Through the use of a two-staged NGT, it was possible to gain valuable feedback from undergraduate students who had experienced the teaching in the module that was under review. Both the positive comments and suggestions for improvement as expressed during this process led to fruitful discussions with the team of academic clinicians and educators who were currently involved in the programme.

As also reported in other studies, the use of the NGT provides concise and 'easy-to-apply' results on the needs of the 'users' (students) and the possible approaches from the 'experts'. By involving both 'sides' in this two-staged NGT, the experts respond directly to the identified challenges. Further evaluation will be necessary to measure the actual impact of this research, including the implementation of the findings.

Several challenges identified by the students, and some of the suggested solutions, are beyond the scope of the current research, which was focused narrowly on the emergency care teaching occurring in the third year. A more comprehensive approach to review the overall framework of emergency care teaching in the undergraduate programme is currently projected to cover these aspects.

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# Understanding of clinical reasoning by undergraduate students and clinical educators in health and rehabilitation sciences at a South African University: The implications for teaching practice

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**Background.** Clinical reasoning (CR) is a skill acquired by students under supervision of clinical educators (CEs) when transitioning from classroom to clinical practice to optimise patient care. However, intra- and inter-professional differences in the definition and facilitation of CR have been reported. At the University of Cape Town, a teaching development grant was obtained and used for a staff development initiative aimed at improving the CR skills of undergraduate health and rehabilitation students.

**Objectives.** To gain insight into the understanding of CR among CEs and a cohort of third-year students across 4 professional programmes, using an interpretive approach.

**Methods.** The CEs responsible for third-year supervision (*n*=45) were invited to take part in a self-developed electronic survey and an initial workshop that explored their understanding of CR. The qualitative survey data, as well as workshop feedback and discussion, were analysed. Students' understanding was explored during focus group discussions.

**Results.** There were areas of commonality and differences among CEs. They agreed on a cyclical step-like process to CR and the need to cue students to develop this expertise in clinical settings. The approach of CEs in occupational therapy was client focused; physiotherapy CEs described a higher-order thinking; and audiology and speech and language pathology CEs described a structured procedure informed by evidence. Students were unable to conceptualise a complete picture to reasoning and decision-making.

**Conclusion.** The difference between students' understanding of CR and their poor awareness of strategies employed by CEs to facilitate reasoning could account for difficulties in transitioning from classroom to practice. This scenario suggests that divisions need to look at creating more purposeful strategies to teach students about the CR process and how the facilitation may occur within the clinical setting.

Transitioning from classroom to clinical setting presents multiple challenges for health science students. These challenges range from a lack of generic skills and professional behaviours to difficulties translating the taught skills and theory into patient management, raising further concerns about the existence of a 'theory-practice gap'.[1] Even under the supervision of clinical educators (CEs), students struggle with the complexity of the clinical situations they encounter. CEs are also challenged when facilitating students' learning in these complex clinical contexts, while providing effective service to patients.[2]

Skill in clinical reasoning (CR) is necessary to guide students and educators in assessing, assimilating, retrieving and/or discarding components of information that affect patient care.[3,4] Failure to develop CR is considered one of the key reasons for students' lack of confidence and effectiveness in the clinical area, ultimately influencing their academic success.[5] While the explicit development of CR is a foundation requirement of entry-level practice education,[6] it cannot be assumed to develop in the absence of specific educational strategies.[4] Therefore, CEs need to create learning opportunities that explain the multidimensional nature of CR to students to support them in developing these capabilities and scaffold the development as they progress through their clinical years.

'Until well into the 17th century, academic medicine was almost exclusively a theoretical affair. Reasoning played an important role, but it was exclusively employed to defend theses or to construct logical arguments, rather than to arrive at diagnoses or to select therapies'.[7] Over the years, there were many attempts to integrate theoretical knowledge with clinical experience, and thus the value of teaching CR to students became more evident. However, CR is not taught explicitly in all health profession educational programmes. Another challenge is the existence of different interchangeable terminologies, definitions and concepts for CR.[3,8-10] Differences among healthcare professionals regarding the CR processes were also noted. While medical professionals focus on a cognitive psychology perspective, nursing or physiotherapy professionals adopt an interpretive and sociocultural lens that goes beyond the cognition.[6] These discrepancies possibly contributed to a potential mismatch between CEs' and students' understanding of CR, and how learning and teaching may be facilitated.[10] It could also account for the lack of student awareness of the cues being provided by the CEs, which ultimately results in a lack of development in the area. Therefore, it seems that educators and students would benefit from attempts to develop a common understanding of the concept of CR and its terms.

Understanding the CR process is challenging.[11] In the broadest and most general sense, it 'can be summarised as the thinking and decision making of a health care provider in clinical practice',[11] leading to clinical decision-making. CR was also defined as 'an inferential process used by practitioners

to collect and evaluate data and to make judgments about the diagnosis and management' of patients' concerns.[12] It includes the application of cognitive and psychomotor skills based on theory and evidence, as well as the reflective thought process to direct individual changes and modifications in specific patient situations. Current research in CR suggests that the process of applying knowledge and skill, integrated with the intuitive ability to vary an examination or treatment based on reflection and interaction to achieve a successful outcome for an individual patient, separates expert clinicians from novices.

Teaching CR needs to be made tangible so that students can merge it into their own developmental processes in clinical practice,[13] utilising a range of capabilities – cognitive, metacognitive, social and emotional skills – during clinical decision-making.[6] Acknowledging that CR is a core competence of healthcare professional education in linking theory to practice, it is important to know if CEs create the necessary active learning environments for students to enhance CR.

At the University of Cape Town (UCT), the Department of Health and Rehabilitation Sciences (DHRS) offers 4-year undergraduate programmes in audiology, occupational therapy (OT), physiotherapy (PT) and speech and language pathology (SLP). The programmes are structured with the basic sciences and introductory profession-specific courses taught in the first 2 years. Limited clinical exposure is introduced in the second year, focusing on communication skills, clinical interviewing and basic examination skills. Students move to more independent practice in their third year and are exposed to a range of diverse clinical settings: hospitals, clinics, schools, non-governmental organisation (NGO)-run sites and old-age care facilities. During their fourth year, clinical hours are increased, with students working in tertiary care and complex environments. On-site clinical training is provided largely through CEs employed by the university.

Although there are some differences in the organisation of clinical education across the 4 undergraduate programmes, the students spend 4 - 6 weeks on each block placement. The CEs generally give 1 - 4 hours per week of individual facilitation to their respective students across their allocated sites. Working with clinicians or site personnel, CEs are required to optimise learning opportunities and ensure that student learning outcomes are met. Learning is enhanced through group teaching and peer-led sessions. Formative assessments are offered midway in a placement, and students' written portfolios create additional learning opportunities to facilitate growth and improvement before summative end-of-block assessments.

Although not always stated explicitly, developing CR is one of the key goals of clinical teaching.[13] Yet, CR as a concept is not formally taught in undergraduate programmes in the DHRS, except in OT. The two main steps in the CR process involve gathering and analysing information (diagnostic reasoning) and deciding on therapeutic actions specific to a patient's circumstances and wishes (therapeutic reasoning).[13] Differences have been reported in the thinking processes between 'expert' and 'novice' healthcare practitioners. In the context of student training in the DHRS, CEs are the expert healthcare professionals, while the students attempting to merge classroom theory with clinical reality are the novices. Two questions emerged from this scenario: (i) How is CR being taught in the DHRS at UCT?; and (ii) Are the differences in teaching of CR part of the barrier in students' inability to integrate their theoretical knowledge into clinical practice?

To respond to these questions, the DHRS applied for and obtained a teaching and development grant (TDG) from the Department of Higher Education and Training in 2014 to address the difficulties that students experience in transitioning from their second year to their third and fourth clinical years – moving from a theoretical to a more clinical paradigm. The broad purpose of the grant was to observe teaching practices in clinical courses, develop improved teaching strategies among CEs across the 4 different programmes and work at improving student performance in profession-specific clinical courses. A staff development initiative was conceptualised, which was aimed at developing an educational approach to teaching CR to students across the 4 professional programmes in the DHRS. It was hypothesised that the developed framework will improve the experiences of students in their integration of theoretical knowledge into clinical practice.

To achieve this outcome, the TDG-funded programme undertook the following 5 key activities over a 3-year period:

- The collection of baseline data on: (i) the understanding of students and CEs regarding CR; (ii) teaching strategies used by CEs to facilitate students' CR; and (iii) challenges faced by CEs in developing CR.
- The training of CEs through workshops on CR, identifying the challenges students encountered and to target strategies to facilitate reasoning.
- Informing students of the teaching strategies, followed by evaluating the awareness of the use of these strategies in the clinical setting.
- Monitoring and evaluating the impact of the developed framework.
- Development of a training tool for CEs regarding CR.

This article draws on some of the survey information obtained in the collection of baseline data, the initial facilitated workshop with third-year CEs and the focus group discussions with third-year students. It aims to:

- Provide insight into the initial understanding of CR among CEs across divisions.
- Provide insight into the initial understanding of CR among third-year students across the 4 undergraduate professional programmes in the DHRS.
- Discuss differences and similarities in the understanding of the CR process between CEs and students and the implications thereof.

It is assumed that if CEs and students share similar views or have an awareness of each other's perceptions of CR, the education process is likely to be more effective.

## Methods

At the start of the project, a decision was made to investigate third- and fourth-year students and CEs separately. It was presumed that there would be different issues raised in the different years, possibly requiring different facilitation. Hence, only third-year students and CEs were included in this phase, with the hope of repeating the process for fourth-year students at a later stage. All the CEs involved in teaching of third-year students in the 4 professional programmes ($n$=45) were invited to take part in a self-developed electronic survey that was conducted via Survey Monkey. The researchers, some of whom had CE roles, were excluded from the data collection process. The questionnaire was developed with the assistance of the Education Development Unit (EDU), taking into account the overall outcomes of the project. This review provided some validation of the questionnaire, and all stakeholders reached agreement regarding the relevant questions. There was no piloting process, and all information

obtained was used. Informed consent was obtained from the CEs before the administration of the survey questionnaire, which was completed anonymously. The first part of the questionnaire sought information regarding the CEs' clinical teaching experience and expertise, formal teaching education and years of professional experience. Three open-ended questions were then posed:

- What is your description of CR?
- How would you facilitate CR with a student who struggles with the integration of theoretical knowledge in clinical practice?
- What are the main problems associated with enhancing CR in third-year students entering clinical practice?

A response rate of 35.5% (*n*=16) was achieved, comprising 7 PTs, 4 OTs, 3 audiologists, and 2 SLPs. The qualitative data were extracted by an independent assistant and core phrases highlighted for analysis by the researchers.

This baseline survey information was explored further in a facilitated workshop for third-year CEs. Of the CEs invited, 24 attended. CEs were provided with literature on various forms of CR and small-group interdisciplinary discussions on types of CR introduced. CEs were then encouraged to reach consensus on their own understanding of the process of CR and what steps students ultimately would need to go through and understand when working with clients for successful outcomes. These conclusions are presented in the results section. Discussions on strategies and problems encountered in the CR facilitation process were tabled and formed the basis for subsequent workshops. These discussions are not within the scope of this article.

Purposeful sampling was used to recruit third-year students in audiology, OT, PT and SLP for focus group discussions around the topic of CR. The recruitment invitation was sent through the university's electronic communication site (VULA) on the individual clinical pages of each of the 4 academic programmes. Separate focus groups were also planned for each discipline, as it was important to appreciate each discipline's understanding of CR, as well as how each discipline experienced the teaching of CR. All 175 registered third-year students were eligible to participate. Of these, 9 PT, 5 OT and 4 SLP students and 1 audiology student participated. The response rate was very low, probably because the timing was close to the end of academic year examinations. Consequently, a single focus group discussion was held for each of the 3 professional programmes, i.e. OT, PT and SLP. The audiology student was interviewed separately.

Students were informed of the purpose of the study and signed informed consent forms, as well as a confidentiality agreement before participation. The groups were audio-taped and facilitated by a CE from a professional discipline different to that of the students in their group. This was to avoid any preconceived bias with regard to how teaching happened in that specific discipline, and to ensure that students would feel more open to discussion by not 'knowing' the facilitator. Each group was asked the same 3 core questions:

- What is your understanding of CR?
- What are the difficulties you experience with CR in practice?
- How do you pick up CR cues given by the CE?

However, the depth of discussion could develop at the discretion of the facilitator. These questions aligned to the questions asked in the initial survey of CEs. The findings of the first question are reported in this article.

The audio-recording of each focus group discussion and interview was transcribed and analysed as a single case.[10] An inductive approach was used to analyse the transcription. The principal investigator did an initial analysis, highlighting the core findings. The researchers then worked in pairs to further discuss, analyse and define key areas in line with the research focus. For the purpose of this article, 2 authors again reviewed the core data. Where there were differences in opinion or interpretation, the third author was approached to assist in reaching a consensus.

### Ethical approval
Ethical approval (ref. no. HREC/REF 693/2014) to use the information in the first phase of the project for research purposes, was obtained from the Human Research Ethics Committee, UCT.

## Results
### Survey of clinical educators
The educational profiles of the CEs are presented in Table 1. The average years of experience as a CE at UCT was 6.9 (2 - 30) years. CEs spent an average of 6 hours per week in direct supervision of the students. The sites where CEs were mostly deployed for clinical supervision are presented in Table 2.

### Clinical educators' description and understanding of clinical reasoning
The PTs described CR as a 'higher order thinking process in the clinical setting', highlighting the concepts of 'gathering information, interpreting and creating hypothesis, utilizing information as part of an intervention, and then reflection on outcomes'. One of the CEs described CR as '... the process used to make sense of all the information gathered on a patient and then how to use the information to identify and analyse (by linking theory to observations) the patient's problems, plan and implement an appropriate intervention and re-evaluate the outcome, using reflection'.

The OTs had a clear theoretical construct of CR, framing it in terms of whether it was 'procedural, narrative, conditional etc.', talking about 'conscious cognitive application and procedural categories of thinking about

**Table 1. The educational profile of clinical educators (*N*=16)**

| Profile | Response, *n* |
|---|---|
| Educational qualifications | |
|    BSc | 9 |
|    MSc | 5 |
|    PhD | 2 |
| Had prior teaching or educational training in the form of short courses | 11 |
| Had prior training specific to clinical reasoning | 6 |

**Table 2. Sites where clinical educators were mostly deployed for supervision of third-year students**

| Primary site of clinical supervision | Response, *n* |
|---|---|
| Tertiary hospitals | 4 |
| District hospitals | 6 |
| Community healthcare facilities | 1 |
| Schools | 4 |
| Non-governmental organisations | 1 |

thinking'. None of the other disciplines framed the process using theoretical terminology. The other noticeable feature regarding OT decision-making was that it was very client focused, using information on the clients' circumstances and values to support their reasoning.

The audiologists' CEs seemed to have the most procedural approach to decision-making, speaking about collecting information in a 'structured way' and being guided by clinical protocols and diagnosis in management.

The SLP CEs described CR as 'the process that a person uses to formulate an opinion on management of a case'. SLPs also referred to using the theoretical knowledge to assist clinical decision-making.

### Workshop 1 for clinical educators

Twenty-four CEs completed the first workshop and agreed to have their comments and opinions recorded for study purposes. They all indicated an improvement in their own understanding of CR after the workshop (Table 3).

Most participants agreed that workshop 1 gave them new insights into the process of CR and that it confirmed their pre-existing ideas about CR (Table 4).

Through discussion, there was disciplinary agreement that CR is a comprehensive, cyclical process. This was elaborated on by all participating CEs to create a 4-step concept of the CR process (Fig. 1).

The first step involved **gathering** of information, which occurred in multiple

**Table 3. Clinical educators' levels of agreement after workshop 1 (third year)**

| Level of agreement | Workshop gave me new insights into the process of clinical reasoning | Workshop affirmed my pre-existing ideas about clinical reasoning |
|---|---|---|
| Disagree | 0 | 0 |
| Neutral | 2 | 3 |
| Agree | 12 | 11 |
| Strongly agree | 10 | 10 |
| Total | 24 | 24 |

**Table 4. Clinical educators' ratings of their levels of knowledge before and after workshop 1 (third year)**

| Please use a scale of 0 - 5 to rate your knowledge before and after the workshop (1 = I know nothing about this; 5 = I understand this completely) | Before the workshop (average) | After the workshop (average) | Difference (average) |
|---|---|---|---|
| Clinical reasoning (as a general concept) | 3.4 | 4.3 | 1.0 |
| Steps in the clinical reasoning process | 2.8 | 4.1 | 1.3 |
| Hypothetico-deductive reasoning | 2.4 | 4.0 | 1.6 |
| Reasoning based on pattern recognition | 3.0 | 4.1 | 1.1 |
| Narrative reasoning | 2.6 | 4.1 | 1.6 |
| Procedural reasoning | 2.9 | 4.1 | 1.2 |
| Interactive reasoning | 2.7 | 4.1 | 1.5 |
| Conditional reasoning | 2.5 | 4.0 | 1.5 |
| Pragmatic reasoning | 2.5 | 4.1 | 1.6 |

ways. It drew on reading, listening and visual cues relating to a specific client and context. Many CEs perceived this as the integration and/or application of their theoretical knowledge into clinical practice. Step 1 led to step 2, where, after appropriate clinical assessment, **interpretation** of the gathered information allowed them to generate a working hypothesis or diagnosis. The interpretation **was used** in step 3, which involved the management of the client. These first 3 steps happened logically, as treatment decisions linked to theory and knowledge that were gained through experience. Decisions were then prioritised for maximum effect. In step 4, overall effectiveness was constantly monitored through **reflection** and outcome measures.

### Students' focus groups

Data from students revealed that there were differences in their understanding of CR. The PT students ($n$=7) struggled to voice a clear definition or understanding of CR. They focused mostly on their relationships with the CEs, and how this either facilitated or hindered their learning on clinical block placements:

'Strategies that do work, having a good relationship, supervisors who are really patient, who are willing to help, knowledgeable, available and just approachable to be honest.'

The students' responses showed their lack of awareness of strategies employed by their CEs to guide them, as they considered the questions posed by their CEs as a hindrance rather than a facilitator of the CR process:

'You need to be able to go to your supervisor and say "I've clinically reasoned to come to this conclusion of what I'm doing" and then to be able to say that that's right and that's wrong or just guide you on the right path, um, instead of asking further questions and being like why did you think, you've got the answer there, you know what I mean. Be more straightforward.'

The SLP students ($n$=4) described CR as transference of knowledge obtained in the classroom, accessing evidence, considering contextual relevance and being able to formulate an intervention plan. There was a strong
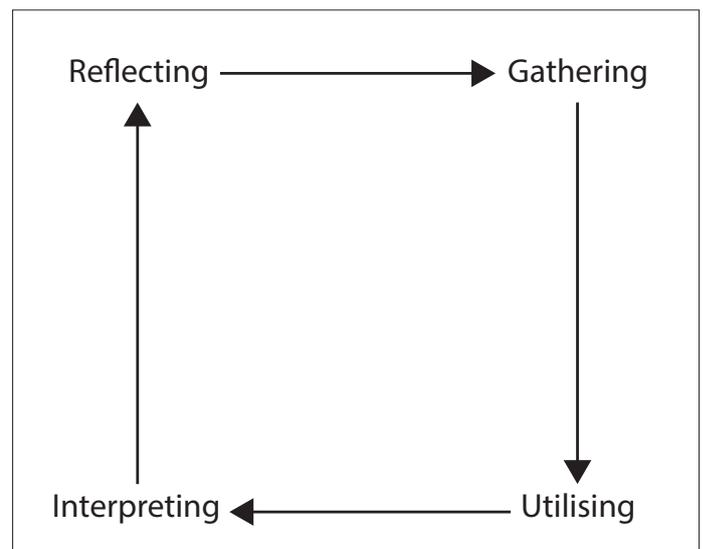


*Fig. 1. The 4-D model of appreciative inquiry.[1]*

emphasis on the importance of supporting their practice with the literature/ evidence. They seemed to understand that in addition to the evidence that was required, you had to think and reason about whether it was relevant to context and that this process defined reasoning:

'You still have to take whatever information you have and make it patient specific.'

'Um and what I've seen as well is that clinical reasoning can be something that can actually come out of the clinical setting and that particular type because for instance if today I plan that I'm going to do aim A because Joseph Duffy [name of author in the literature] did it and he found that it works for patients with aphasia and I find that with my patient it doesn't work well because of the context that I'm in. If I restructure whatever he said and do it in a way that is context specific and tailored for my patient, I can write it down with the rationale that is backed by Duffy's evidence.'

One of the audiology students saw CR as a more procedural process. Situations that differed from the regular caseload could not be easily reasoned through, leaving students unable to make decisions about assessment and treatment:

'They are going to feel uncomfortable when you test the ear, so I wasn't prepared for that. I think it was only mentioned once or twice in my course so when I actually assessed this patient, I was quite flustered because I didn't really know what to do.'

The OT students (*n*=5) saw CR as the ability to problem solve, reflect in action and evaluate in hindsight. One student commented:

'It kinda got, like why did you do that, and I had to think about why they did that, … and just be forced to go, this is why I did this, this is why I did that.'

Another OT student stated:

'Reflection is a big part of it, um, which we obviously did throughout our blocks and also like you, clinical reasoning happens while you [are] doing a session so, in action or out of action.'

The OT students displayed a theoretical knowledge of reasoning strategies and approaches, which was different to that of the other students. However, although they grasped the idea, they did not draw out the process as comprehensively as the CEs, and did not describe all the steps they would go through in the decision-making process.

## Discussion

Over a 3-year period, several TDG-funded key activities were carried out to address the difficulties that undergraduate students in the DHRS at UCT experience in transitioning into the clinical years of their education programmes. This article reports on the initial stages of the activities, which aimed to gain insight into the understanding of CR among CEs and students.

According to the literature, there were discrepancies among CEs regarding basic CR terms,[8,9] and there seemed to be initial differences in the focus of the description of CR among the CEs of the different disciplines that took part in the baseline survey. The PTs focused on the process that required a higher-order thinking in the clinical setting. The OTs framed their description as client focused. The CEs for audiology and

SLP focused on structured procedure that was informed by evidence from the literature. However, through a workshop process, it became clear that, although the naming of the CR type or core descriptors may have differed, there was an underlying agreement that CR is a cyclic step-like process, whereby information is obtained, processed, used and reflected on to provide the best care for clients.

In contrast, students did not portray the same understanding of the CR process. Unlike some students who perceived CR as an instrumental, clinician-centred process that is dependent on knowledge and context,[10] PT students linked CR to relationships with CEs and how they could facilitate or hinder learning. For OT students, their understanding was related to the process of identifying the problems that were most important to the patient.[12] Students in audiology and SLP would require clinical decision-making skills when appraising the available evidence in an effort to select the most appropriate treatment.[12]

The data showed that there is a gap between CEs and students' perceptions of the process of CR and the components that need to be in place for reasoning to develop.[11] Educators seem to share a common understanding of the components of the reasoning process and can define the steps involved. However, it is apparent that they see this as a cyclical process, where one step leads to another, drawing on multiple cues and information.[4] Students, however, do not seem to grasp the entirety of the process or note when CEs are trying to develop their CR. They recognise parts of what is required, but do not seem to easily put it all together. This process may be developmental in nature, changing as they progress through the clinical years, moving from novice to more independent practice.

Even the OT students, who had the strongest sense of what reasoning relied on and could label the types of reasoning strategies they needed to use, did not break the process down as succinctly as the CEs or note the cues used by CEs to facilitate CR. They are formally taught reasoning strategies as part of a preclinical course, which clearly puts them ahead of the other disciplines in recognising aspects needed for CR.

Perhaps the best alignment between CEs and students was in the audiology discipline, where procedure seemed to be key. This alignment could speak to the nature of the work that audiologists are involved in, especially at a third-year level. However, this observation cannot be generalised.

### Study limitations

The sample size, particularly of students, provides a limited view of the topic. Unfortunately, the long-term intention to complete focus group discussions with fourth-year students, which may have added deeper insight into the understanding of CR development across clinical years, was not feasible within the period of funding. This remains an area for investigation.

## Conclusion

CR is a complex, learnt process that needs to be explicitly taught and guided in the clinical setting. There are inter-disciplinary differences among CEs in defining CR across the health and rehabilitation sciences. This speaks to the different scopes of the professions within clinical contexts. However, when probed, all the disciplines recognised the complex cyclic nature of the process, which relies on multiple cues and inputs for success. Of concern are the differences between CEs and their students. This leads to students potentially missing key cues from CEs guiding them through the CR process and a lack of awareness that the CE is stimulating the process. This

mismatch may be consistent with the literature, alluding to the gap between theoretical knowledge and its clinical implementation. Divisions need to consider how to minimise the disconnect between CEs and students to reduce the gap. Explicit teaching around the nature of CR and the strategies of facilitation by CEs could aid in this process.

## Future research

Although not discussed within the scope of this article, there are some common strategies that can be drawn on to guide students entering clinical practice. These include formal training with students around types of reasoning and strategies used by CEs to facilitate CR, as well as a conscious effort by educators to make their own thinking practices of CR visible to students during sessions. The facilitation of the students' CR process through shared awareness is the key to closing the gap and aligning the mismatch between the perceptions of CEs and students as to what CR entails.

**Author contributions**. HT and FC-S: main body of the article, discussion and conclusions; SLA: literature review and introduction, content oversight and flow.

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# Development of a feedback framework within a mentorship alliance using activity theory

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**Background.** Mentorship is useful in enhancing student learning experiences. The provision of feedback by faculty mentors is a central activity within a fruitful mentorship relationship. Therefore, effective feedback delivery by mentors is key to the development of successful mentorship relationships. Mentorship is a social interactive relationship between mentors and mentees. Therefore, activity theory, a sociocultural theory, has been applied in this study to develop a framework for feedback delivery within the mentorship educational alliance between mentors and mentees.

**Objective.** The purpose of the study was to explore experiences of students and faculty mentors regarding feedback in a mentorship relationship, and to develop a feedback delivery framework in a mentorship relationship underpinned by activity theory.

**Methods.** This was a mixed-method sequential study conducted at Makerere University College of Health Sciences using both quantitative and qualitative data collection methods. The study involved undergraduate medical students and faculty mentors. Data were collected through self-administered questionnaires, focus group discussions and interviews. Descriptive statistics were used for quantitative data, while thematic analysis was used for qualitative data.

**Results.** Most students reported negative experiences with feedback received during the mentorship process. Of the total of 150, a significant number of students (*n*=60) reported receiving no feedback at all from their mentors. One hundred students reported that feedback received from mentors focused on only weaknesses, and 80 reported that the feedback was not timely. A total of 130 students reported that the feedback sessions were a one-way process, with limited involvement of mentees. The feedback also tended to focus on academics, with limited emphasis on psychosocial contextual aspects that may potentially influence student learning. The focus group discussions with students confirmed most of the quantitative findings. The interviews with faculty mentors led to the emergence of two key themes, namely: (*i*) limited understanding of feedback delivery during mentorship; and (*ii*) need for feedback guidelines for faculty mentors. Based on the findings of the mixed-method study as well as the theory guiding the study, a feedback framework for mentorship interactions has been suggested.

**Conclusion.** While students generally reported low satisfaction with feedback received from mentors, faculty suggested the need to have feedback guidelines for mentors to frame their feedback during mentorship interactions. A feedback framework to guide mentorship interactions has therefore been suggested as a result of this study, guided by principles of activity theory.

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Mentorship has been defined as a developmental relationship in which a more experienced person assists a less experienced person to grow professionally and realise their maximum potential.[1,2] Literature emphasising the importance of mentorship in health professions education is fast emerging.[3-6] The common denominator in this literature speaks to the fact that mentorship should be part of the overall student learning experience. In a number of institutions, the closest relationship a student has with a faculty member is through supervision during clinical rotations, practical sessions, tutorials and conduction of a research project.[7,8] However, such supervision is not necessarily mentorship, and students may not accrue the real benefits of mentorship.[8] A mentor is an advisor, coach, counsellor, teacher, listener and facilitator, who pays attention to all facets of the learning process, including cognitive, psychomotor and affective domains of learning. The mentor should view completed tasks within the realm of broader professional growth, positive progression and holistic development of the learner, focusing on not only academic achievements,

but also psychosocial accomplishments.[9] Any feedback given therefore needs to target all these developmental aspects of the learner/mentee.

It is important that faculty (mentor) and learners (mentees) recognise that there are natural phases in the mentorship relationship, so that they can think purposefully and communicate effectively on how to maximise the relationship benefit and navigate transitions. The phases have been defined by different names in the mentorship literature.[8-11] However, they eventually converge on a similar meaning. These stages include: (*i*) initiation phase (creating rapport between mentor and mentee, setting targets); (*ii*) cultivation phase (maturation, and where mentee engages with mentor to reach set targets, involving performance reviews); (*iii*) separation phase (accomplishment of goals, evaluation of targets); and (*iv*) redefinition phase (moving on and closure, where mentee transitions from novice to expert). Through all mentorship phases, provision of feedback by the mentor is crucial.[9-13] Feedback is information provided to someone that identifies both strengths and weaknesses, aimed at attaining desired goals.[14] Effective

feedback has been reported to facilitate the achievement of reflective, self-directed and life-long learning, and self-judging and self-regulated learning skills.[15] Mentoring is an interactive process through which faculty feedback can play a central role towards the acquisition of such skills.

At Makerere University College of Health Sciences in Uganda, where this study was conducted, students are randomly assigned mentors from their first year, and these are expected to interact with the students and nurture them during their development. The assigned mentors are academic faculty members at the institution. All faculty members are supposed to be mentors, and usually undergo some training in principles of mentorship. The training is usually a 1-day session that may occur once every academic year. Since the mentorship training occurs infrequently and is not periodically programmed throughout the year, some mentors have more skills and knowledge than others. Some junior mentors learn from more experienced mentors. In addition, students are engaged in an interactive talk on mentorship at the beginning of each academic year with the faculty. Therefore, the students may have some knowledge about mentorship.

The mentorship relationships have not been previously evaluated at the institution. In addition, there is limited published literature from the sub-Saharan African context that positions faculty-student mentorship relationships as a form of interactive educational alliance that involves learning via a community of practice between the faculty mentor, student mentee and learning environment. In this alliance, feedback is a key driver of the mentorship process. In the present study, we also applied principles of activity theory (AT), to develop a feedback framework to be used in the mentorship social learning interaction. Thus, AT provided a lens for the interpretation and synthesis of the findings in this study.

AT originated from the sociocultural tradition in Russian psychology, the key concept of which is the 'activity', which is an interaction between individuals (subjects) and the world (object).[16] The fulcrum of this theory is the 'activity'- a purposeful and transformative interaction between people. During the interaction, there are rules and roles, and tools to execute the activity and the targeted outcome to be achieved. Activity cannot thus be separated from the context in which it occurs. The AT framework is illustrated in Fig. 1.

According to the AT framework, any activity is organised into components that include: subjects (individuals being studied who are engaged in the
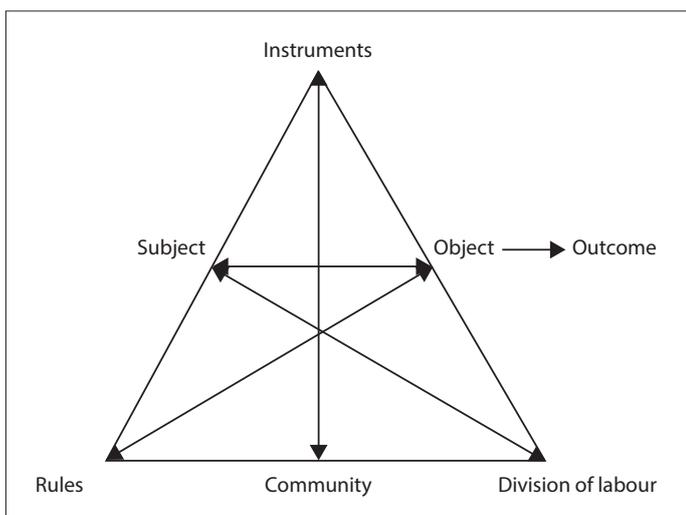


*Fig. 1. Activity theory framework.[16]*

activity, e.g. the mentors and mentees in a mentorship relationship); object (the raw materials or problem areas to which activity is directed, e.g. feedback) – the object of the activity could be either physical or a construct, and is always oriented towards achieving particular outcomes with the assistance of mediating tools or instruments; and instruments/tools in the framework, which are mediation artefacts for executing the activity – instruments could be physical or mental artefacts. In a mentorship educational alliance, for example, an instrument for executing feedback delivery could be a feedback guide. All of these are geared towards a purpose to which members in a community of practice direct their activity (e.g. in a mentorship relationship, the activity of feedback delivery is directed towards addressing any gaps, and thus facilitating effective development of the mentee). Thus, it can be argued that the AT framework is applicable in a social learning environment such as a mentorship relationship. The relationship between the mentors/mentees and their environment is then considered through the component of community. Although AT has been applied in various settings, its application as an interpretive lens in mentorship relationships in health sciences education has been less widely reported. Thus, the purpose of this study was twofold: (*i*) to explore students' and mentors' experiences of feedback during mentorship relationships; and (*ii*) to utilise these experiences to develop a framework for feedback delivery during mentorship interactions underpinned by principles of AT.

## Methods
### Setting and design
This was a mixed-methods sequential study conducted at Makerere University College of Health Sciences between March and July 2019.

### Participants
The study involved undergraduate medical students and faculty. Only faculty who had previously been mentors were included in the study. For the quantitative survey, simple random sampling was used to select 300 students. This was done by allocating all students codes, and randomly selecting 300 codes. These were the ones that were used. For the qualitative part of the study, two focus group discussions were conducted with the students, each group consisting of 8 participants. This translated into a total of 16 students who participated in the focus group discussions. Convenience sampling was utilised to select participants in the focus groups on a first-come, first-serve basis. Only students who had participated in the quantitative survey were eligible to participate in the focus group discussions. In addition, 10 individual interviews were conducted with faculty mentors. The faculty who participated in the individual interviews were selected using purposive convenience sampling. Faculty members who were available to give time to the study were selected.

### Data collection
Quantitative data from students were collected using self-administered electronic questionnaires. The questionnaire captured the demographics of the students, an indication of their previous experience of mentorship and specific items regarding the students' experiences of feedback from their mentors during their mentorship relationships. The measure of positive experience of feedback received from faculty mentors was the indication of agreement with each item on the questionnaire. An item where students indicated either 'disagree' or 'neutral' was regarded as negative feedback

experience during mentorship. Response frequencies were tallied. The questionnaire items were developed from a review of literature on student satisfaction with feedback within mentorship relationships. To provide a measure of face and content validity, the questionnaire was first piloted with 10 students. The major change made to the questionnaire was the wording of items that had technical educational terms such as outcomes that were not familiar to the respondents. Such terms were replaced with more basic words. Three weekly email reminders were sent to the students to complete the questionnaire. Qualitative data were collected using focus group discussions conducted with students, as well as individual interviews conducted with faculty mentors. One of the researchers moderated the discussions and interviews. Responses from the focus group discussions and interviews were audio-recorded and later transcribed. Questions for the student focus groups and faculty interviews were open-ended and semi-structured. The questions were informed by findings from the quantitative survey and synthesis of previous literature. The qualitative aspect was aimed at further exploring the students' and faculty mentors' experiences of feedback within the faculty-student mentorship alliance.

### Data analysis

Quantitative data were analysed using SPSS version 25 (IBM Corp., USA). This involved determining frequencies and percentages of responses to given items, as well as determining whether there were any significant differences in responses across the years of study the students were in. Thematic analysis was used for qualitative data using open coding. The coding was conducted manually by one of the researchers following an iterative process, and it commenced immediately after the first student focus group and first faculty mentor interview. The open coding involved identifying patterns of similar meaning from the participant responses. These were aggregated to form representative themes. Findings from the quantitative part of the study informed the questions developed for the qualitative part.

### Ethical considerations

Approval to conduct this study was granted by the Research and Ethics Committee, School of Medicine, Makerere University (ref. no. REC REF 2019-007). Informed consent was also obtained from each study participant prior to conducting the interviews. Confidentiality of participants and their responses were also observed.

## Results

Results were both quantitative and qualitative in nature.

### Quantitative results

A total of 300 questionnaires were sent out to the sampled students electronically. Of these 300 sampled students, 72 were in year one, 70 were in year two, 62 were in year three, 50 were in year four and 46 were in year five. Of the 300 questionnaires sent out, 172 were returned, giving a response rate of 57.3%. Of the 172 returned questionnaires, 22 were excluded from further analysis because the students only partially completed the questionnaire, as they indicated that they had never previously participated in any mentorship relationship. This left 150 student questionnaires that were included in the final analysis. Therefore, the results presented were from the 150 students who fully completed the questionnaire. Of the 150 students included in the final analysis, 61.3% ($n$= 92) were male and

| Table 1. Student distribution by year ($N$=130) | |
|---|---|
| Year of study | Students, $n$ (%) |
| 1 | 26 (17.3) |
| 2 | 30 (20.0) |
| 3 | 31 (20.7) |
| 4 | 33 (22.0) |
| 5 | 30 (20.0) |

38.7% ($n$= 58) were female. The distribution of students by year of study is summarised in Table 1. The students who responded to the survey reflected similar numbers from each year of study. In order to assess student satisfaction with feedback received during their mentorship relationships, the students were asked to indicate whether they agreed with, disagreed with or remained neutral on key items. These findings are summarised in Table 2.

From Table 2, one can see that all students who completed the questionnaire reported knowing the meaning of mentorship, and reported having had a faculty mentor at one point in time during their studies. However, the majority of the students seemed not to fully understand the roles of mentors/mentees. Specifically, in relation to feedback during mentorship, the overall trend in findings generally indicates that students infrequently received feedback from mentors, and that the feedback was not very clear and mostly addressed students' weaknesses. In addition, the feedback from mentors mostly focused on academic matters, with less emphasis on psychosocial aspects of the students' experiences. More than three-quarters of the students reported that the feedback process was unidirectional and not interactive, with the mentor driving and dominating the process. Overall, the findings indicate low student satisfaction and negative experience with the feedback from their mentors. There were no significant differences noted across the different student years of study within the responses. Further insight into the meaning of the survey results was carried out using focus group discussions with students and interviews with faculty mentors.

### Qualitative results

Two focus groups were conducted with 16 students about feedback from mentors. The students' experiences of the feedback from mentors are illustrated below.

**Student experiences of mentor feedback**

The student responses from the focus groups generally reflected what was observed from the survey results. For example, many responses emphasised the observation that feedback from mentors often addressed only weaknesses and not strengths, that feedback was infrequent and that little attention was paid to psychosocial aspects:

'Although the mentors tried sometimes to give us feedback, they often pointed out only bad things … this somehow demotivates us the students … they should also point out what areas am doing well as my mentor.'

'My mentor used to point out mostly the negative aspects of what I was not doing well during our mentorship sessions … this was sometimes demotivating … I would have liked to hear more about what I was doing well also.'

'Mentorship would have been good if only our mentors also stressed those aspects that we the students are actually doing well … only pointing out the not so good things is not enough for us because we also want to know

| Table 2. Student responses regarding feedback from mentors (*N*=150) | | | |
|---|---|---|---|
| Item | Agree, *n* (%) | Neutral, *n* (%) | Disagree, *n* (%) |
| I know the meaning of mentorship | 150 (100) | 0 | 0 |
| I clearly understand the benefits of mentorship | 100 (66.7) | 20 (13.3) | 30 (20) |
| I clearly understand the roles of a mentor | 80 (53.3) | 20 (13.3) | 50 (33.3) |
| I clearly understand the roles of a mentee | 85 (56.7) | 19 (12.7) | 46 (30.6) |
| I have ever had a mentor at medical school (if yes, proceed to next questions. If not, do not proceed, stop at this question.) | 150 (100) | 0 | 0 |
| I periodically received feedback from my mentor | 60 (40) | 40 (26.7) | 50 (33.3) |
| My mentor always gave me feedback in time | 40 (26.7) | 30 (20) | 80 (53.3) |
| The feedback received from my mentor was clear to me | 35 (23.3) | 40 (26.7) | 75 (50) |
| The feedback received from my mentor specified my strengths | 20 (13.3) | 30 (20) | 100 (66.7) |
| The feedback received from my mentor specified my weaknesses | 100 (66.7) | 20 (13.3) | 30 (20) |
| The feedback received from my mentor gave direction to cover up my gaps | 60 (40) | 20 (13.3) | 70 (46.7) |
| The feedback from my mentor positively facilitated my learning | 50 (33.3) | 30 (20) | 70 (46.7) |
| The mentor gave me feedback about social life besides academic issues | 15 (10) | 15 (10) | 120 (80) |
| Feedback from my mentor often helped me psychologically | 20 (13.3) | 20 (13.3) | 110 (73.4) |
| The feedback process was interactive, where my mentor allowed me to give my views/opinions | 10 (6.7) | 10 (6.7) | 130 (86.6) |
| Overall, I was satisfied with feedback received from my mentor | 40 (26.7) | 30 (20) | 80 (53.3) |
| I never received any feedback from my mentor | 40 (26.7) | 50 (33.3) | 60 (40) |

what is going on well both academically and socially … since I believe that is what mentorship is all about.'

The aspect of feedback being infrequent during mentorship interactions can be seen through the following responses:

'Some of our mentors gave feedback about how we were learning. However, they were rare and there was no formula of receiving this feedback. For me I only got feedback only once in the whole semester yet I would like to get such feedback more often.'

'I tried to meet my mentor as often as possible; however, this was not possible all the time. Therefore, the feedback I used to receive came only once in a while … I think there should be a schedule when we meet our mentors to give us feedback on our progression in medical school.'

'I think the frequency of the feedback meetings with our mentors needs to be streamlined. I agree we cannot meet mentors all the time, but some of us rarely got feedback that we desired yet that feedback is supposed to drive us to improve.'

The observation that mentor feedback focused heavily on academic issues is seen in the student responses below:

'As students, we have many issues affecting our studies. It may not be academic only, but social issues, stress, challenges. However, the mentors given to us most times only talk about academic matters … from what I know of a mentor, even they are supposed to guide us on how to go about some of these social challenges that may affect out studies.'

'Much as our mentors sometimes tried to give us feedback, however infrequent it was, this feedback the few times it was given to us tended to drill us on our academic progress. I do not remember my mentor for example having a talk about my social life, challenges and how I behaved in the mentorship relationship.'

The aspect of limited interaction between mentor and mentee during the feedback process also resonated through most responses, further emphasising the limited interaction observed in the questionnaire survey. The following response reflects what was observed across most participants:

'I think our dear mentors should give us time to interact and participate in the feedback process, allowing us to give opinions and views regarding our studies. I think it would be interesting when we actively participate in the feedback process where we exchange ideas and opinions.'

### Interviews with faculty mentors

In order to gain more understanding of the feedback process during mentorship, views were also sought from faculty mentors through individual interviews. Two key themes emerged from the faculty responses, namely: (*i*) limited understanding of feedback and mentorship; and (*ii*) need for feedback guidelines for mentors.

#### *Limited understanding of feedback delivery during mentorship*

The faculty interviewed in this study reported that they had limited training in feedback and the mentorship process. This may have influenced the manner in which they directed the feedback process during mentorship. The following responses reflected this observation:

'Feedback seems to be an important activity during mentorship. Although we may have some understanding of feedback principles and the mentorship process, probably we need more training on how first of all mentorship means and then how to give feedback during the mentorship process.'

'The fact that we as faculty are not trained on how to be mentors and how to give effective feedback most likely contributes to how our students experience the mentorship process. If mentors do not deliver well-balanced feedback, the students are likely to have negative attitude towards the whole process.'

From the responses above, it can be observed that mentors need training on how to drive the mentorship process, and then on how to give effective feedback for students to benefit from the mentorship relationship.

*Need for feedback guidelines for faculty mentors*
The other dominant theme that resonated through the faculty responses related to the need to have guidelines for giving feedback for faculty mentors. This can be seen through the following responses:

'Sometimes we do not know what to concentrate on when giving feedback to our mentored students. There are so many aspects to think about, but how do you prioritise? Probably we need some kind of guidance on what to consider when giving feedback to our students that we are mentoring.'
'Feedback is wide and there are so many aspects to consider depending on situation. As I mentor my students, how should I go about the feedback to give? Besides, we are different mentors and we need to give at the feedback that follows similar lines. Maybe we need some institutional guidance for feedback delivery during the mentorship interactions.'

The above responses demonstrate the need to have feedback guidelines for faculty mentors to be used during the mentorship interactions with students.

## Discussion

The purpose of the present study was to explore student (mentee) and faculty (mentor) experiences of feedback delivery during mentorship, and to utilise these experiences to develop a framework for feedback delivery during these interactions. The developed framework is guided by principles of AT. The survey conducted with students demonstrated that they had mentors and reported some knowledge about mentorship; however, they were not satisfied with the feedback received from their mentors. From the present study, students demonstrated some knowledge about mentorship, probably owing to the fact that students are given orientation on mentorship at the beginning of every academic year, which may have increased their knowledge. They may have reported low satisfaction with mentor feedback because the feedback did not meet their expectations in terms of supporting their development.

From the reported literature, key principles of feedback delivery include timeliness, specificity, a balance between positive and negative feedback, and clarity.[14] From the student experiences reported, most of these aspects were not adequately met by mentors. This can partly be explained by mentor training that was inadequately focused on effective feedback delivery within a mentorship relationship, as evidenced by the responses from the mentors themselves. Feedback in mentorship relationships is key, and faculty mentors play a crucial role in this process. Therefore, training of mentors on how to effectively deliver feedback is important, an observation that has been previously reported.[12] The limited training in feedback delivery could perhaps also offer an explanation as to why some student mentees never received any feedback at all. However, it should be noted that training alone may not necessarily lead to improved feedback delivery during mentorship. Other factors, such as motivation and protected time for mentors, should also be considered.

As part of the leaning process, it has been reported that mentors' feedback to mentees should not focus only on academic progress, but also on other factors that may influence the holistic professional growth and development of the mentee.[9] Siddiqui[11] suggests that this may include provision of feedback on psychosocial and contextual experiences that a mentee may be undergoing. In the present study, mentors seemed to place less emphasis on feedback that targeted issues outside the academic progress of the students. Previous studies have also reported similar tendencies

among some mentors.[8,10] The reason for this is not clear cut. However, a plausible explanation speaks to the limited importance mentors may attach to sociocontextual and psychological factors that may influence student progress. Mentorship interactions do not occur in a vacuum, but are rather situated within a community of learning. This community of learning may have various interacting factors that can influence student growth. Addressing these factors through feedback by mentors should therefore not be ignored.

The fact that students in this study experienced limited feedback from mentors targeting psychosocial aspects other than academic progress calls for significant attention. This observation may point to the need to have guidelines on feedback delivery for mentors. Such guidelines could emphasise key domains that mentors should focus on when framing their feedback. Having guidelines for feedback delivery during mentorship interactions was also proposed by the mentors themselves. It has been reported that mentorship should be an interactive process between mentees and mentors, where each person has a defined role to play, with mutually agreed-upon targets to achieve.[3] This active interaction involves dialectical communication in the form of feedback between mentor and mentee, which ultimately differentiates mentorship from supervision.[13] In the present study, we therefore propose a framework that can perhaps improve feedback delivery during mentorship interactions in a community of learning between mentors and mentees. This framework, guided by principles of AT, can potentially deepen our understanding of mentorship interactions and how well-framed feedback can play a role in enhancing these mentorship interactions in order to achieve the desired learning outcomes.

### Framework for feedback delivery during mentorship interactions

Utilising findings from this study, a framework for feedback delivery in a mentorship relationship has been developed. The framework, based on AT, is illustrated in Fig. 2. This framework moves beyond merely training mentors in feedback delivery, and considers mentorship as a reciprocal process between the mentor and mentee in which each has a role within a community of practice. AT is useful in studying human interactions in a social group. Mentor and mentee interactions through feedback represent a
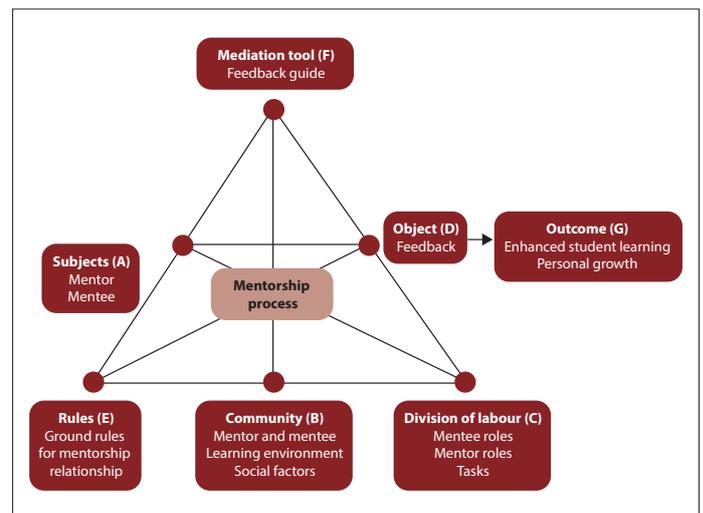
*Fig. 2. Feedback delivery framework within a mentorship alliance.*

social learning group, and thus principles of AT are key in such a community of learning. The fulcrum of this theory is an activity through which human interactions occur. In this study, the activity should be regarded as the feedback delivery process during mentorship interactions. Such an activity takes place within a community, organised into components that include: subjects; object; tools; rules; community; division of labour; and outcomes, key elements of AT. The components illustrated in the framework are dialectic in nature, interacting with each other within one system to influence the feedback delivery process. Therefore, there exist multiple mediating dialectical relationships within a complex integrated mentorship activity system. Subjects (A in Fig. 2) refer to the players in the mentorship interaction (i.e. the mentor and mentee). The mentor delivers feedback, and the mentee is the recipient of that feedback. The mentor and mentee thus form a team that actively engages with the feedback in an interactive manner. This team subsequently becomes a community of learning with a common understanding of their goals. Formation of this social community of learning is another key component of the activity framework (B in Fig 2).

Both mentors and mentees should have specific roles in the mentorship relationship that translate into a division of labour (C in Fig. 2) along with key ground rules that should be followed by both mentor and mentee (E in Fig. 2). To contextualise this to the mentorship process, tasks for both mentor and mentee need to be clarified, and feedback should focus on these tasks. In the context of this study, the object (D in Fig. 2) is the feedback itself, which should interactively occur between the mentor and mentee. This feedback plays a key role in the mentorship alliance as it provides the pathway towards achieving the targeted outcome of the mentorship relationship, which is enhanced student learning, and professional and personal growth of the mentee (G in Fig. 2). However, according to AT, a mediating tool is crucial to drive the feedback process within the mentorship alliance. Such a mediating tool can be in the form of a feedback guide (F in Fig. 2). The need for a feedback guide also strongly resonated throughout this study. Thus, from this study, we propose a feedback guide (mediating tool) for mentors that can potentially drive mentorship interactions in the desired direction. This feedback guide is crucial within the mentorship activity framework.

### The feedback delivery guide for mentors: A mediation tool from the AT framework

The feedback delivery guide is summarised in Table 3. This guide is aimed at acting as a mediating tool for mentors during feedback delivery, and at ensuring that mentors frame their feedback to target holistic growth of mentees. The strength of the guide lies in its simplicity and highly structured nature. Structuring the guide is likely to achieve two things: (*i*) it may be acceptable to faculty, and feasible to implement; and (*ii*) it could be an avenue through which mentees receive feedback across other domains beside academic progress. Though structured, the feedback guide should not be viewed as restrictive to mentors. The mentor should be free to deliver feedback on any other aspects (s)he deems necessary for the benefit of the mentee.

This study utilised the experiences of students (mentees) and faculty (mentors) to develop a framework for feedback delivery during mentorship interactions. The framework was further underpinned by principles of AT, a sociocultural theory that places mentorship and feedback delivery within the mentorship relationship as an activity between faculty mentors and student mentees. Application of AT in this context to develop a feedback

| Table 3. Feedback guide for mentors (mediation tool) | |
| --- | --- |
| **Feedback domain** | **Description** |
| Academic growth and development | Mentor should discuss with mentee:<br>• progress in terms of mentee's academic work<br>• extent of achieving set goals<br>• enablers and barriers towards achieving goals<br>• plan for achieving the set targets |
| Psychosocial growth and development | Mentor should discuss with mentee:<br>• progress in terms of mentee's psychosocial growth outside academics e.g. networks made, organisations joined, activities involved in, social achievements, motivation to learn |
| Strengths and areas to improve | Mentor should identify to the mentee his/her:<br>• strengths<br>• areas that need improvement<br>NB. Mentor should comment on academic strengths and other generic competencies such as time management, communication skills, interpersonal skills, teamwork and collaborative practice, self-regulative skills, reflective skills, self-judgement |
| Learning environment | Mentors should discuss with mentee:<br>• mentee's experience of the learning environment, with focus on: learning resources; where to seek assistance; how to negotiate through the learning context; how to make the learning experience better |
| Challenges | Mentor should probe and assist mentee to:<br>• identify challenges (both academic and psychosocial, such as stress, depression, emotions, relationship issues, power tensions, conflicts with fellow students and staff etc.) that may hinder academic and social growth of mentee<br>• identify strategies to overcome the challenges<br>• identify resource persons/units in the institution that can assist mentee to address the challenges |

delivery framework has been infrequently reported in health sciences education, a gap that this study has tried to address. Specifically, the emergence of a mediating tool in the form of a feedback guide for faculty mentors may have implications for mentorship practice in health sciences education. Therefore, these findings form a basis upon which future studies can be anchored.

### Study limitations

This study was conducted in one institution, but social and academic contexts may differ across institutions, and therefore the findings may not be generalisable, a major limitation of the study. In addition, the model/framework developed did not consider other areas of student support such as peer mentorship/feedback that could be vital, since this was not the focus of the study. This could be an area for further research focusing on peer mentorship.

### Further research

The implementation of the feedback guide developed for mentors, and evaluation of its potential impact on the outcomes of mentorship

interactions, are particularly encouraged. In addition, the AT framework developed from the study perhaps needs further interrogation, especially investigating the various factors that interact within the mentorship activity system, such as peer mentorship/feedback, which could potentially provide additional support for students.

## Conclusion

The present study explored student and faculty experiences of feedback delivery within a mentorship alliance. Students were not satisfied with the feedback, and faculty pointed to the lack of feedback guidelines to use for mentors. An activity framework has been developed to aid more understanding of feedback delivery within the mentorship alliance, and specifically, a feedback guide for mentors has been developed as a mediating tool to potentially improve feedback delivery within the mentorship relationship.

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# Research

# A comparative analysis and evaluation of the naturopathic curriculum in South Africa

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**Background.** Naturopathy has been taught at tertiary level in South Africa (SA) for 18 years. This research paper examines the naturopathic curriculum to determine whether it is benchmarked to international standards and meets the needs of graduates in practice. It is the first research paper that critically reviews the curriculum of a complementary alternative medicine profession taught at a higher education institution (HEI) in SA.
**Objective.** To critically review the naturopathy curriculum taught at an SA HEI.
**Methods.** This research used a sequential two-stage qualitative methodology. In stage one, a comparative document analysis was conducted using the curriculum recommended by the World Health Organization (WHO), the World Naturopathic Federation (WNF) and the University of the Western Cape. Stage two consisted of a graduate review of the curriculum. Eighteen graduates participated in the review by providing input on all the subjects in the curriculum via email. The responses were summarised and thematically analysed.
**Results.** It was found that the SA curriculum is aligned to international curricula. Graduate inputs suggest a restructuring of the curriculum so that subjects which are core to naturopathic training can be taught in greater depth over a longer period of time.
**Conclusion.** The subjects offered in the SA naturopathic curriculum are on par with international standards. Concerns raised by graduates suggest a need for a restructuring of the curriculum to develop a deeper understanding of the curriculum to ensure that graduates are competent to meet the changing healthcare needs of the population.

Naturopathy is a system of complementary medicine (CM) that emphasises prevention, treatment and promotion of optimal health through the use of therapeutic methods and modalities which encourage the self-healing process – the *vis medicatrix naturae*.[1] Philosophical underpinnings guide naturopathy, which focuses primarily on the prevention of illness through education, lifestyle and dietary changes.[2,3] Over 100 000 naturopaths currently practise globally.[4]

Naturopaths have been practising in South Africa (SA) since the 1950s.[5] Currently only one higher education institution (HEI) in SA offers naturopathic training as a 5-year course. This consists of a 3-year undergraduate Bachelor of Science in Complementary Health Sciences (BSc CHS) degree, which provides the foundation for the professional 2-year postgraduate Bachelor of Complementary Medicine in naturopathy (BCM naturopathy) degree. The training programme started in 2002 - a time when there was no benchmark available to serve as a roadmap for the development of the course. In 2010 the World Health Organization (WHO) benchmarked the minimum standards for the education and training of naturopaths - which included listing the curriculum and the number of training hours required for minimum competency.[1] This guideline, as well as subsequent documents,[6] aimed to set standards for training to ensure the safety of the public, create awareness of the different levels of training for naturopaths, to assist governments in regulating and accrediting practitioners and ultimately to promote the integration of naturopathy into the public health system.[1] In 2016, based on the findings of a global

survey of naturopathic educational institutions, the World Naturopathic Federation (WNF)[3] established that there is global uniformity in the type of curriculum used in naturopathic training programmes.

The use of a comparative and benchmarked template affords the opportunity to engage in suggested corrective action.[7] In the present study, the SA curriculum was compared and evaluated against the WHO and WNF curricula, in order to establish whether the curriculum meets the minimum requirements. A systems view of relevant training HEIs demonstrate how inputs from students, staff, faculty and various other resources can potentially help to transform and improve both the training and outcomes of an institution. This study used input from graduates. Using comparative analysis of the curricula as well as graduate reviews, recommendations for improvement to the SA naturopathic programme were made.

## Methodology

This research used a sequential qualitative methodological approach, consisting of two stages. The first stage was a comparative document analysis, based on the major categories and the courses in each category of the naturopathic curriculum proposed by the WHO,[1] the WNF Roots Survey which summarises the curricula taught in 30 different countries across all continents, [4] and the SA curriculum.

The second stage consisted of a purposively sampled graduate review of the programme. All registered naturopaths who had graduated between 2007 and 2016, and whose email contact details could be traced, were invited to participate

in the research via email. Thirty-eight emails were sent explaining the purpose of the research. Included in the email was the ethics clearance document and the document summarising all the subjects in the training course, divided into the BSc and BCM degree courses. Participants were requested to: (*i*) provide comment on all the subjects covered in the curriculum; and (*ii*) make suggestions for improvements if they felt it was necessary to do so. Over a period of 2 months, 3 reminders were sent and 18 participants responded. These responses represent a spread across the years from the first cohort of graduates of the naturopathy programme to the 2016 graduates. Half of the respondents were in full-time practice as naturopaths. The response rate was

higher among participants who graduated later. Responses were coded in order to protect the identity of the participants. The responses were summarised and thematically analysed based on the frequency of an occurring theme.

## Results
### Stage 1: Comparison of curricula
An analysis of the three documents found that the curriculum could be divided into four major categories consisting of the basic sciences, clinical sciences, naturopathic studies and clinical training. This is summarised in Table 1.

**Table 1. A comparison of curricula**

| WHO | WNF | South African curriculum |
|---|---|---|
| Basic Sciences: | Basic Sciences: Hours – Basic + Clinical Sciences combined: 1 200+ | Basic Sciences: Hours – 2 000 |
| Anatomy | Anatomy | Biotechnology |
| Physiology | Physiology | Chemistry |
| Pathology | Pathology | Medical bioscience |
|  |  | Medical microbiology |
|  |  | Pathology |
|  |  | Pharmacology |
|  |  | Physics |
| Clinical Sciences: | Clinical Sciences: Hours - Basic + Clinical Sciences combined: 1 200+ | Clinical Sciences: Hours – 900 |
| Patient history taking | Patient history taking | Patient history taking |
| Clinical assessment | Clinical assessment | Clinical assessment |
| Physical examination | Physical examination | Physical examination |
| First aid and emergency medicine |  | Emergency medicine |
| Hygiene and public health |  | General medicine |
| Naturopathic Studies: | Naturopathic Studies: Hours – 950 minimum | Naturopathic Studies: Hours – 1 200 |
| Naturopathic history and practice | Naturopathic history, principles and philosophy | Naturopathic principles and philosophy |
| Nature cure | Clinical nutrition | Nutrition |
| Nutrition | Applied nutrition | Hydrotherapy |
| Hydrotherapy | Hydrotherapy | Botanical medicine |
| Botanical medicine | Botanical medicine | Tissue salts |
| Homeopathy and tissue salts | Homeopathy | Bach flower therapy |
| Bach flower therapy | Counselling and naturopathic psychotherapy | Stress management |
| Stress management | Pharmacology | Lifestyle counselling |
| Lifestyle counselling | Energetic therapies | Light therapy |
| Light therapy | Physical manipulation | Electrotherapy |
| Electrotherapy | Massage and soft-tissue techniques. | Iridology |
| Iridology |  | Soft-tissue therapies |
| Soft-tissue therapies |  | Aromatherapies |
| Aromatherapies |  | Thermal therapy |
| Acupuncture |  |  |
| Clinical Training: Hours – 400+ | Clinical Training: Hours – 1 200+ | Clinical Training: Hours – 1 200+ |
|  |  | Additional subjects: Hours – 650 |
|  |  | Computer literacy |
|  |  | Primary health care |
|  |  | Principles of natural healing |
|  |  | English for educational development |
|  |  | Complementary healing systems |
|  |  | Interdisciplinary health promotion |
|  |  | Health psychology |
|  |  | Study of human development |
| Total number of hours of naturopathic training: |  |  |
| 1 500+ hours | 4 000+ hours | 5 950 hours |

WHO = World Health Organization; WNF = World Naturopathic Federation.

It was found that the SA curriculum falls into the same categorisation of subjects as that stated in the WHO[1] and the WNF[4] documents and offered a wider range of subjects in the basic sciences. While the basic science subjects of anatomy, physiology and pathology are offered in the SA curriculum, it also offers physics, chemistry, biotechnology and pharmacology. These subjects provide a foundation which fosters an understanding of the various biochemical processes and their impact on the body at a cellular level.[8] The curriculum also offers a number of additional subjects which cover various topics, such as psychology and introduction to natural health and healing systems, and provides foundational courses, such as computer literacy and English for educational development (EED) which addresses the SA context.

When the total number of training hours were compared, it was found that the SA training programme exceeded the minimum recommended training time determined by the WHO[1] and WNF.[9] The SA programme meets the minimum clinical training hours set by the WNF but has a bigger emphasis on the basic and clinical sciences component, and exceeds the minimum number of hours recommended by the WNF by 1 700 hours.

## Stage 2: Graduate review
The following themes were identified:

### Responses to the BSc (Complementary Health Sciences) programme:
*Theme 1: Limited relevance of the course*
While there was a general agreement that most of the subjects in the undergraduate BSc degree were essential as a foundation to the BCM degree, the relevance of the following subjects for the course was questioned.

*English for Educational Development (EED)*: It is an elective taught in the first year. Respondents questioned the need for this English component when the medium of instruction at the university was English. It was felt that students needed 'to have a basic knowledge of Xhosa and Afrikaans in order to communicate with people from different walks of life - especially in the Western Cape region' (participant 8).

*Computer Literacy*: This is a compulsory subject for all first-year students. Its relevance was questioned because it was felt to be too basic as most students were computer literate by the time they entered university. Respondents felt that a competency assessment would determine if students needed to do this course, proposing that it 'should be an elective for those who never really used computers' (participant 10).

*Theme 2: Important to the course but the content needs to change*
The participants all agreed on the following subjects being important to the course as they provided a foundation for understanding concepts which would be taught later in the course – but the participants found the content did not fulfil this expectation.

*Complementary Health Sciences 201*: This subject was deemed to be important to the course as it introduced students to the different CM professions taught at the university. However, respondents felt it to be 'very superficial' and 'not detailed enough' and needed to have more 'depth' added to the course contents (participant 2). It was suggested that a greater focus on 'philosophies of the different complementary healing systems would provide some insight into how and why the different healing systems practise in a particular way' (participant 7).

*Pharmacology 204*: All respondents agreed on the importance of the subject to understand the pharmacokinetics of commonly prescribed drugs.

However, there needed to be a greater 'focus on drug-herb interactions as naturopaths use herbs as a part of their treatment and many of the patients naturopaths see are already using chronic medication' (participant 9). It was also felt that the course needed to be more focused 'on the effects of polypharmacy as this is what practitioners see in practice' (participant 11).

*Nutrition 211 and 221*: These subjects were seen to provide the foundation of nutrition and it was suggested that 'the course should be extended to include functional and nutritional therapy and be introduced from the first year' (participant 17).

*Primary Healthcare*: The aim of this subject is to introduce students to the SA public healthcare system and create awareness of the needs of the communities who access the system. There was consensus among all respondents that this subject does not achieve the objective of getting all students to understand 'how the whole health system in SA works and where naturopathy fits into the bigger South African context' (participant 18).

*General Medicine 301*: Introduces students to common pathologies and disease presentation. There was consensus on the importance of the course. However, owing to the course content being 'a lot and overwhelming' (participant 4), it was suggested that 'the content needs to be covered over a two-year period' (participant 6).

*Theme 3: Important to the course but method of delivery needs to be improved*
These courses were acknowledged by all participants to be crucial to understanding the anatomy and physiology of the body. The main concern with these subjects was the method of delivery and the challenges experienced with assessment.

*Medical Biosciences 111, 121, 231 and 232*: These subjects were acknowledged as being key to understanding pathology and the disease process in the rest of the curriculum as they cover anatomy and physiology. Respondents felt that, 'due to the volume of work and the difficulty of the work, the quality of teaching and assessment needed to be improved on' (participant 6). It was suggested that the 'number of lectures per week needs to be increased as well as the number of tutorials and assignments' (participant 2).

*Theme 4: Mixed comments*
Comments on these subjects varied and could not be categorised into any one theme. However, it is important that the responses are reflected as they contribute to the evaluation of the curriculum.

*Principles of Natural Healing 111*: This subject introduces students to the theories and principles which underpin natural medicine. The responses could be divided into three categories:
- Unable to recall – one-third of the respondents reported not being able to recall any of the course content
- The contents needed to change – as 'it was very superficial – it didn't provide a sound basis for understanding how natural medicine differs from conventional medicine' (participant 3).
- Important to the course but poor delivery – 'this course is a foundation to understanding what natural medicine is, therefore it should be taught properly with more student engagement' (participant 1).

*Biotechnology 216*: This subject builds on the first-year science courses and is aimed at developing an understanding of how the living systems' organisms work. It also develops the basic skills needed to do research in laboratories.

Responses to this subject ranged from those who questioned the relevance of the course, while others felt that it was necessary but 'the focus should be on nutritional biochemistry, which would be more relevant for naturopaths' (participant 9). Others felt that that this course was only relevant for those students who intended 'to follow a career path that required laboratory work/skills' (participant 10).

*Study of Human Development 211 and Health Psychology 224*: In these subjects students are introduced to the various developmental theories and the various biological, psychological and social factors which influence health respectively. The responses to these subjects were similar and ranged from 'I can't remember much of the course' (participant 4), 'I'm not sure how it all integrates together' (participant 5) to 'it was a offered on a very basic level' (participant 9).

*Interdisciplinary Health Promotion*: This subject creates awareness in students of the need to work together as an interdisciplinary team in order to maximise patient health outcomes. Responses ranged from those who felt the course was important because 'the more different health professions are exposed to one another, the better the opportunity for inter-professional co-operation which is in the patient's best interest' (participant 15) while others felt that 'it was poorly structured and taught' (participant 2) and they 'didn't understand what they were supposed to get out of the course'. (participant 6)

### Responses to BCM (Naturopathy) programme

This programme is a postgraduate professional degree. Completion of the BSc (CHS) degree is a prerequisite for entry into the BCM (Naturopathy) programme. All subjects in the curriculum are fundamental to the naturopathy training programme. The responses from the participants were summarised into the following themes:

### Theme 1: Relevance of course

There was only one subject where the relevance of the course was questioned. From the responses received, it is clear that it was not the relevance of the course itself but the research topics which students were given.

*Research Project 508:* The research project component is the practical application of research skills in a research project. Most participants questioned the relevance of the research project topics as 'the research project consumed a disproportionately large amount of time' (participant 5) and it was not related to what the students were studying. As a result the project, and by implication the course, was deemed to be 'a waste of time' (participant 7) as the 'research topic had no relevance to the profession we were studying' (participant 1).

### Theme 2: Content needs to change

Most participants identified the following subjects as needing to have some aspect of the content changed.

*Counselling skills 410*: This subject aims to develop the skills to enable students to counsel patients. It is taught in the final year of the programme. All participants agreed on the importance of counselling to the training programme but felt that the course needed to 'be extended over a full year and the content expanded to include the theories underpinning counselling as well as develop the skills to enable them to use it effectively within a consultation' (participant 5).

*Ethics, Jurisprudence and Practice Management*: This course introduces students to the various ethical theories and the legislation as it pertains to the registered Allied Health Professions Council of South Africa (AHPCSA) professions. Participants all found the subject very important, interesting and also relevant but there was consensus that 'the practice management component needs to be expanded on in order to better prepare students to run their own practice' (participant 8).

*Differential Diagnosis*: The respondents agreed on the importance of the subject as it develops the knowledge and skills to arrive at a differential diagnosis but felt that it needed 'greater depth using practical examples' (participant 11) and should be 'integrated into other subjects so that students can understand how the different parts are all connected' (participant 2).

*Treatment Modalities*: These subjects are fundamental to the naturopathy programme, teaching the philosophy and principles, as well as the various treatment methods which naturopaths use in practice. The general view regarding the course was that it required the teaching of all treatment practices in the legal scope of practice (SOP). However, all treatment practices should not be allocated an equal amount of teaching time as the view was expressed by some of the participants that the treatment practices taught impact on the graduates once they are in practice: 'treatment practices taught should be focussed on practice, what is affordable and realistic on implementation – for example the various physical therapies, botanical medicine' (participant 1). It was felt that a standardised curriculum needs to be developed based on the SOP. The following comment summarised the view of the majority of participants on the nutrition component of the course: 'as dietary intervention is the cornerstone of naturopathy, nutrition should be taught throughout the duration of the programme, not only in the second and third year of the BSc programme' (participant 13).

### Responses to the overall programme

*Restructure the curriculum*: Most of the participants made recommendations for changes to the curriculum so that there is improved scaffolding and 'integration of subjects in order for naturopathic subjects to be taught earlier as two years is not enough to teach a naturopathic course' (participant 6). This would entail removing subjects from the curriculum deemed to be irrelevant to the course so that more time could be spent on teaching the naturopathic curriculum in greater depth. Recommendations for restructuring of the programme included a bigger emphasis on the teaching of nutrition as the 2-year curriculum is specific to naturopaths and has 'too much content which is overwhelming and there isn't enough time to practice the knowledge and skills in a clinical setting' (participant 4).

## Discussion

The SA naturopathy curriculum was found to exceed the curriculum benchmarked by the WHO.[1] It also compares favourably to international curriculum established by the WNF.[4] The curriculum places emphasis on the basic sciences in the curriculum. While knowledge of the biochemical and physiological processes is important in understanding disease processes and treatment,[8] this has to be balanced with adequate clinical training as it is here that the theoretical knowledge is integrated into practical clinical training and patient care.[10] Baer[11] suggests that naturopathy, in an attempt to legitimise naturopaths' training, has increasingly incorporated the basic sciences into their programmes. Clinical training is crucial for developing the necessary competencies to ensure that graduates are safe, competent practitioners – and re-evaluating the time allocated to the different components of the training is necessary to ensure that there is a balance in

the hours allocated to the theoretical component and clinical training. This was reflected in some of the comments in the graduate review.

The graduate review looked at the curriculum from a different perspective. Often graduates are not consulted for input on their training programmes, but their input on the evaluation of a programme potentially offers opinions which could improve the programme[12] and provide insights into possible deficits in the programme.[10] This could stimulate curricular debate and ultimately changes beneficial to future students of the programme. In order to ensure that a curriculum remains relevant to address the health needs of a country, it is necessary to regularly review the curriculum[12] to ensure that students are prepared to meet the challenges of a changing health system. [13] Concerns raised by graduates in respect of the curriculum need to be weighed up in terms of the competencies expected of graduates within the SA health system as determined by the professional body, the AHPCSA. For all the participants, it was more than a year or longer since they graduated from the naturopathic programme and they had been working in various capacities in the healthcare sector. The response from graduates indicated a recognition of the importance of most subjects in the programme. However, the relevance of having certain subjects in the programme was questioned by all respondents. The inclusion of these subjects needs to be considered in terms of the population of students who are enrolled in the course. The university population is drawn from diverse communities, cultures and age groups,[14] and students from impoverished communities and rural areas may not have the requisite English language or computer literacy skills to succeed academically at university. Thus, subjects such as Computer Literacy and EED are important for students to ensure that they develop the requisite skills necessary to succeed at university. By participating in EED, students engage with each other and this helps to break down language[14] and cultural barriers. Primary Health Care and Interdisciplinary Health Education are important co-curricular subjects for they provide students in the Faculty of Community Health Sciences with the opportunity to develop an understanding of the SA health system, the different medical professions and how they work together interprofessionally within the health system[15] in order to address the healthcare needs of their patients. These subjects have to be integrated into the broader curriculum so that there is a scaffolding of skills and knowledge to ensure that students have acquired the skills and knowledge which they need in the senior years.[16]

One of the main challenges of the naturopathic curriculum appears to be related to the need to integrate the curriculum on both a horizontal and vertical level so that all subjects in the curriculum are offered in sufficient depth. As the complete 5-year curriculum comprises the basic sciences, a clinical science component, and a naturopathic theoretical component, as well as the additional subjects discussed above, horizontal integration at every year level would help students to understand how the different subjects and concepts[17] are related to each other. Vertical integration allows students to understand how the different subjects are scaffolded, allowing a deeper understanding of the inclusion of different subjects in a curriculum. Integration in an undergraduate medical curriculum encourages clinicians to critically view and review their subject matter and methods of diagnosis and therapy.[16]

Findings from this research suggest that there is a need for a restructuring of the naturopathic programme to ensure that the curriculum is relevant and ensures that graduates have the necessary knowledge and skills to competently practise their profession within the SA healthcare system.

One of the limitations of this research was the small sample size. However, there are less than 100 registered naturopaths in SA, and of these, less than half are graduates of the tertiary programme. There was a 47% response rate. Another limitation was that responses were obtained via email. Some of the participants went into great detail in their responses while others kept their responses very brief. Conducting this research via face-to-face interview may have resulted in more in-depth responses from all participants. This research focused on the subjects taught and excluded a deeper analysis of the content of the subjects in the naturopathy curriculum.

## Conclusion

In order to ensure that the naturopathic programme remains relevant and contextual to the demands of the public, there is a need for a regular review of the programme to allow all aspects of the programme to constantly improve. This ensures that graduates achieve an acceptable level of competency and professionalism. Further research into the re-curriculisation of the programme and a critical evaluation of the content could assist in developing a programme which ensures that naturopathy graduates are competent to meet the current challenges of the SA health system when they are in practice.

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# Teaching about disability and food security in the School of Health Sciences, University of KwaZulu-Natal, South Africa

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**Background.** Food security is a significant challenge in South Africa, especially for persons with disabilities. This topic is therefore important for educators in the health sciences. Nevertheless, little is known about educators' awareness of the relationship between food security and people with disabilities, or to what extent the topic is included in their curricula or what their attitudes are regarding this topic.

**Objectives.** We explored the knowledge and attitudes of educators pertaining to food security and people with disabilities. We assessed the current teaching practice associated with the food security of people with disabilities in the School of Health Sciences, University of KwaZulu-Natal.

**Methods.** Thirty-five participants completed a cross-sectional online survey. The participants represented diverse disciplines including audiology, occupational therapy, optometry, physiotherapy, speech-language pathology and sports science. Quantitative data were analysed using descriptive statistics and qualitative data were analysed thematically.

**Results.** The participants had limited self-reported knowledge about the definition of food security. Fewer than 60% of the participants reported a relationship between three of the dimensions of food security and disability, and 80% for one of the dimensions (food utilisation). Of the participants, 88% did not teach food security and disability theoretically, and 80% did not teach it practically. According to the participants, students were not equipped to assess if their clients with disability had food security problems, and were unsure of appropriate interventions.

**Conclusion.** Despite a lack of knowledge, participants had positive attitudes towards including food security into their teaching, although limited teaching existed at the time of the study.

Food security remains a significant challenge in South Africa (SA), as in other economically developing countries, with persons with disabilities specifically being at risk of inadequate nutrition.[1] In SA, according to the General Household Survey of 2016, 22.3% of households had inadequate or severely inadequate access to food, 11.8% households experienced hunger and 13.4% individuals experienced hunger.[2] Based on the same survey, 4.7% of South Africans aged 5 years and older were classified as disabled.[2] Persons with disabilities are vulnerable to food insecurity, because they are often economically marginalised and therefore chronically poor.[3] The relationships between poverty, food security and disability are bi-directional as one can cause the other.[4-6] For example, poverty results in limited purchasing power for food and limited intake, rendering the individual unable to work, further reducing available income. Malnutrition arising from food insecurity may drive disability in individuals with chronic illnesses, such as HIV/AIDS, further limiting their ability to access, prepare and consume food. Disability may therefore cause poverty and vice versa, especially if there is limited access to healthcare services[7] and inadequate community support.

Baro and Deubel[8] argue that community involvement, new technologies and support from both international and national governments and non-governmental organisations (NGOs) are vital to food security responses in Africa. Drimie and McLachlan[9] agree that solving the complex food security challenge requires an explicit transdisciplinary approach, including input from health sciences professionals. Health sciences professionals work with individuals on a one-on-one basis and multidisciplinary teams are often in contact with persons with disabilities. Community healthcare workers should also be aware of and able to assess the nutritional status of persons with disabilities, and be able to identify appropriate interventions to promote food security (Table 1) in these individuals.

Many healthcare professionals work with persons with disabilities, and healthcare students should be trained to assess and work with affected persons. The extent to which the relationship between food security and persons with disabilities is covered in health sciences curricula is unknown, both internationally and in SA. We found no literature on the attitudes of educators towards teaching this subject, even though the subject is societally important. We aimed to discover the knowledge, attitudes and practices associated with including food security and disability into curricula in the School of Health Sciences at the University of KwaZulu-Natal (UKZN).

## Methods

We conducted an explorative cross-sectional online survey using closed- and open-ended questions. We structured the questionnaire into three sections,

| Table 1. The four dimensions of food security | |
|---|---|
| Food availability | The supply side of food security, namely the availability of sufficient quantities of quality food coming from imports and domestic agriculture production. In other words, the level of food production, stock levels and net trade.[10,11] |
| Food access | The income, expenditure and buying capacity of individuals or households.[11] Therefore it takes into consideration whether the individual has enough resources to be able to acquire the appropriate quantity of quality, nutritious foods. |
| Food utilisation | How individuals utilise food through adequate diet, sanitation and healthcare, so that they can reach a state of nutritional well-being;[12] therefore, how much food, and what and how individuals eat.[11] Other components include food preparation, water, healthcare practices and intra-household food distribution. |
| Food stability | The continuation of the other three dimensions over time, namely stability of availability, accessibility and proper utilisation conditions.[11] Food stability may be affected by numerous conditions, e.g political instability, adverse weather conditions and economic factors, e.g. unemployment and rising food prices.[10] |

based on a literature review, and input from a statistician, a research expert and an expert in food security. We established content validity by sending the questionnaire to five experts for review.[13] This panel determined whether the questions were understandable, easy to answer and appropriate for what the researcher was wanting to determine. The questionnaire was then piloted with three health sciences professionals not currently employed at UKZN, improving the clarity and content of the instrument.

The population comprised all educators whose email addresses were received from the heads of departments within the professions of audiology, occupational therapy, optometry, physiotherapy, speech language pathology and sports science (*n*=70 in January 2017). A link to the survey, together with the information document and informed consent form, was emailed to all educators. Thirty-five staff responded (response rate of 50%). Table 2 depicts the demographics of the participants.

Quantitative data were analysed using descriptive statistics and qualitative data were analysed thematically using Nvivo 11 software. Themes were established through three-level coding. Data were coded in Nvivo,

using the exact words in the text, and descriptively, where the text was described and interpreted by the researcher. The study was approved by the Humanities and Social Sciences Research Ethics Committee at UKZN (ref. no. HSS/1740/016). Gatekeeper permission was also obtained from the registrar of UKZN.

## Results
### Knowledge of food security and disability
We asked the participants if they understood the different dimensions of food security (Table 1). Participants either answered 'no', 'somewhat' or 'yes', and if they answered 'yes' or 'somewhat', we asked them to elaborate. Table 3 indicates the participants' self-reported understanding of the different dimensions of food security.

Upon further elaboration, the participants understood food availability as having sufficient quantities of food; food that is available (locally and internationally); that there is food being produced; the 'percentage of fats, carbohydrates etc. (that are) contained in food'; or having access to good food for all in a group of people.

Participants understood food access as the ability to 'get' food, through finding the means, being in close proximity, affordability, ease of obtaining, or physical and economic access to nutritious food; all people having access to food; 'the percentage of fats, carbohydrates etc. (that are) contained in the food'; or having 'reliable and trusted access to food'.

Participants understood food utilisation as using food, either how they use it, or 'how the body uses food', how much food is eaten, for what purpose and 'how much of a specific food group' is used; using the 'available channels to access food'; one's ability to eat food that is available; the 'correct consumption patterns of food'; the 'ability of an individual to prepare regular meals using food'; or the ability of a person to choose what food is 'good'.

In addition, participants understood food stability as having sustained and sufficient food in terms of supply, over a period of time, at a given time, consistently and regularly; the shelf-life of food; 'all the variables of food production and supply'; or 'having food and being able to get food and eat food that is available.

The final questions within this section gauged participants' opinions regarding the relationship between the different dimensions of food security and disability. The dimensions were further explained within the question so that the participants had a clear understanding of the dimensions. Refer to Table 4 for findings.

Five themes, as seen in Table 5, emerged from the data. The categories are represented under the four dimensions of food security.

### Attitude about including food security and disability in the curriculum
We provided the participants with 15 items that could possibly be included

| Table 2. Demographics of participants | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discipline** | ***n* (%)** | **Educational level** | ***n* (%)** | **Employment level** | ***n* (%)** | **Employment type** | ***n* (%)** |
| Audiology | 3 (9) | Bachelor's degree | 4 (12) | Senior tutor | 8 (25) | Part-time | 6 (18) |
| Occupational therapy | 11 (32) | Master's degree | 22 (65) | Junior lecturer | 18 (56) | Practical supervision only | 1 (3) |
| Optometry | 5 (15) | Doctoral degree | 8 (24) | Senior lecturer | 5 (16) | Full-time | 26 (79) |
| Physiotherapy | 6 (18) | | | Associate professor | 1 (3) | | |
| Speech language pathology | 5 (15) | | | Professor | 0 | | |
| Sports science | 4 (12) | | | | | | |

| Dimension | No, % | Somewhat, % | Yes, % |
|---|---|---|---|
| Food availability | 46 | 46 | 9 |
| Food access | 46 | 46 | 9 |
| Food utilisation | 57 | 34 | 9 |
| Food stability | 60 | 34 | 6 |

\*Percentages have been rounded off, hence this dimension does not add up to 100%.

**Table 4. Educators' opinions on the relationship between the different dimensions of food security and disability**

| Is there a relationship between this dimension of food security and disability? | No, % | Yes, % | Do not know, % |
|---|---|---|---|
| Food availability | 12 | 47 | 41 |
| Food access | 3 | 80 | 17 |
| Food utilisation | 9 | 54 | 37 |
| Food stability | 3 | 54 | 43 |

in the curriculum. We asked participants to rank the items on a scale of 1 to 5, with 1 being 'definitely exclude from teaching' and 5 being 'essential to include in teaching'. Of the 15 items, 10 items were ranked by 80% of participants as either 'important to include in teaching' or 'essential to include in teaching'. These were:

- the definition of food security
- the influence of the social context on food security
- the influence of the environmental context on food security
- the influence of the economic context on food security
- the risk factors of food insecurity
- the consequences of food insecurity
- the macro factors influencing the food security of persons with disabilities
- the micro factors influencing the food security of persons with disabilities
- how to incorporate food security into the assessment of persons with disabilities
- how to incorporate food security into the treatment of persons with disabilities.

## Current practice of teaching about the relationship between food security and disability

In the final section of the survey questionnaire, participants were asked, 'Do you currently teach anything about the relationship between disability and food security in clinical settings' practically and theoretically, and 'Do you think students are currently equipped to treat and advise persons with disabilities who have food insecurity problems?'

### Theoretical teaching about the relationship between disability and food security

Of the participants, only 11.8% reported that they included something in their teaching about the relationship between disability and food security theoretically and 88.2% said that they did not. Where it was taught, it was done in the study themes 'accessibility issues on disability issues'; incorporating the social and economic context into assessment; within intervention required for visual problems (e.g. glasses) so that the individual with visual problems can see the food; and in referrals to a dietician.

### Practical teaching about the relationship between disability and food security

Twenty percent of participants included teaching something about the relationship between disability and food security practically, while 80% did not include anything. The practical teaching occurred within assessment, intervention, and on a case-by-case basis. Regarding assessment, if 'the patient was found to have poor nutrition/low socio-economic status and disability then emphasis is placed on the vulnerability of the patient to this kind of crisis'; it is addressed if there is poor volition of the client to attend therapy and why this may be so; and in incorporating the social and economic context into assessment. Regarding intervention, it was included for those who have visual problems, and referral to the dietician.

### Educators' opinion on whether students are equipped to treat and advise persons with disabilities who have food insecurity problems

Regarding the perception of participants on whether students are equipped to treat and advise persons with disabilities who have food insecurity problems, 37.1% stated that they felt students were somewhat prepared and 62.9% felt that students were unprepared. Participants further explained that this situation was a curriculum problem (on why it was not included), that it may be covered in some places, should be included, or even that it should not be included as there was already an overload of teaching. Participants felt that students learn incidentally and should be encouraged to think and treat holistically, and that they should make use of allied team members. In this way, food security is addressed within individualised healthcare, as opposed to only on a larger scale.

These factors are integral to the realisation that it is essential to address disability and food security holistically within health sciences professions.

## Discussion

We assessed the knowledge, attitude about inclusion in teaching and the current teaching practice of educators regarding food security and disability in the School of Health Sciences at UKZN. Educators had little theoretical understanding of the different dimensions of food security but once the dimensions were explained, they acknowledged the importance of the relationship between disability and food availability and that it should be included more extensively in the curriculum.

### Knowledge: What the educators understood about the relationship between disability and food security

Despite not understanding the different dimensions of food security, health sciences educators showed a general appreciation for the relationship between food security and disability. More than 40% of participants (this study) stated that they did not understand the food security dimension. However, less than 12% of participants did not acknowledge the relationship between the different food security dimensions and disability. We were unable to find literature that specifically links the dimensions of food security to disability. We were, however, able to find examples of how food insecurity drives disability and vice versa. Studies have shown, that food insecurity is associated with reduced physical and mental health status.[4-6] Persons with disabilities experience high levels of poverty and unemployment.[14] This increases food insecurity of the individual and of the household.[5] Food insecurity is also a barrier to accessing health care.[15] The SA Department of Agriculture[16] notes in its 'Integrated Food Security Strategy for South Africa' that access to food may be affected because of disability. Additionally,

**Table 5. Themes and categories displaying the relationship between the different dimensions of food security and disability**

| Theme | Food availability | Food access | Food utilisation | Food stability |
|---|---|---|---|---|
| The relationship between disability and food insecurity is bi-directional | Lack of food can cause and influence disability | Disability leads to food being inaccessible and conversely, poor access to food can lead to disability | Food insecurity can create or worsen the disability, yet food security improves health | Lack of food can lead to a disability |
| Disability, poverty and food insecurity are interlinked | The food insecurity of persons with disabilities 'is one of the contributors to poverty' | Poverty leads to lack of food which leads to a disability. Disability results in unemployment which results in less access to food | Disability leads to poverty which leads to lower quantity, less nutrition, less variety of food and inappropriate food choice | Lack of food stability leads to poverty and conversely poverty leads to lack of food stability |
| Disability influences food production, food preparation and feeding | Persons with disabilities are unable to contribute to food production | | Disability affects the ability to grow food. Disability affects the ability to prepare food. Disability leads to poorer feeding, for example, in having a cleft lip or palate | Disability limits access to and preparation of food |
| Economic and social factors influence food security | When there is greater availability of food fostered by a strong economy, this creates cheaper, more accessible and greater variety of food for persons with disabilities. However, 'if the production and import is low or not sufficient, (and people rely on subsistence farming) people with disabilities suffer the most as they cannot produce food' on their own' | Economic and social factors affect the quality and frequency of food. The disability grant limits access to food (since it may not be sufficient for nutritious food, or is being used by the family) | | |
| Food security positively influences disability | | 'Access (to food) fosters wellness' | | 'If food is constantly available, this can positively impact the disability' Persons with disability who rely on their families are dependent on others to buy and prepare food, as well as feed them |
| Dietary requirements and food choice are influenced by disability | | Persons with disability 'have specific dietary requirements, hence food may be available but not necessarily accessible' | Disability leads to poorer food choice as individuals may not be in control of choosing their food as they have to rely on what is handed to others. Persons with disability may not have the cognitive capacity to be aware of what constitutes nutritious food | |

malnutrition, considered under 'food utilisation', is a cause of disability.[17-19] Malnutrition can be caused by the inability to feed. Feeding can be impaired through different types of disabilities, e.g. cerebral palsy, which is characterised by low muscle tone that can cause difficulties in swallowing.[20,21]

**Attitude: Educator's attitudes to providing instruction about disability and food security**

We were unable to find any direct guidelines on what the curriculum content for the various professions within health sciences should be, as well as what

is needed in order to intervene appropriately with affected persons. When presented with relevant items to be included in the curriculum, participants placed much importance on these various themes. In SA, especially KwaZulu-Natal Province, almost half of the people live in rural areas. Rural areas are usually low-resource areas, where most of the population relies on subsistence farming, comprise single-income households and have inadequate access to resources. In this milieu, the relationship between food security and disability is vitally important and community health workers need to know how to approach the problem.

## Practice: What educators already included in the curriculum about the relationship between disability and food security

We were unable to find any information about what health sciences educators at other institutions teach about the relationship between disability and food security. In this study, we ascertained that, when included, this topic is not taught in a structured, explicit way, but rather as the need arises and as a part of the so-called hidden curriculum. The ad hoc way in which the topic is included also leads to the limited presentation of themes related to food security. For example, one participant teaches about intervention for persons with visual impairments, so that they can see the food (e.g. with glasses); however, visual impairments encompass a much broader range of consequences for food security. These individuals may experience difficulties in shopping, and accessing environments, as well as being able to prepare food and have a variety of food to eat (because of inaccessibility to materials).[22] Food security should be addressed in individualised healthcare, to ensure that the intervention is person-specific, as opposed to being a generic solution. Generic solutions do not cater for individuals who have specific needs. For example, having a food kitchen will not necessarily ensure that a person who requires a wheelchair will be able to access meals.

## Study limitations

This study was only conducted at one university. The study did not specify the results of the questionnaire in accordance with the various professions. The implications of including food security and disability into the curriculum may be different according to each profession's scope of practice. We propose that the theory of food security should be included as a generic subject at first- or second-year level, with the theme adapting as students in different disciplines progress.

## Recommendations

One of the possible reasons for the lack of content in the curriculum is that the food security of people with disabilities living in rural areas is not currently being studied in SA. The prioritisation of research in this field would promote inclusion into the curriculum.

Further studies should be conducted among the health sciences professions at other universities in SA and cover how to include food security and disability into the curriculum. The health science professions should review how they can intervene with persons with disabilities who are food insecure. These issues should also be discussed with the Health Professions Councils, including a review of the scope of practice, as well as the curriculum of the various disciplines with specific exit-level competencies being identified.

## Conclusion

According to the present study, educators had a limited subjective knowledge of food security at a specific School of Health Sciences.

Educators had a somewhat good understanding of the link between the different dimensions of food security and disability and they felt that more should be taught about disability and food security in the School of Health Sciences professions. Including this content should enable students and graduates who deal with persons with disabilities who are at risk of food insecurity. If students learn about this link, they should have the necessary awareness to address food security to be able to intervene with their clients and patients holistically. For example, if someone with a swallowing disability does not have access to appropriate food, teaching them how to eat will not ensure that they receive appropriate nourishment. Therefore, as food security is a baseline challenge which impacts all areas of functioning, rehabilitation can either remain incomplete or be unsuccessful if this basic need is not addressed.

The study raised awareness among participants about the importance of food security and disability. The findings will be used to inform participants of gaps within their curricula, and ensure that this pertinent aspect of disability is addressed in student education. These aspects should be foregrounded by important discussions with the Health Professions Council of South Africa (HPCSA) to address the different disciplines' scope of practice.

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# Nursing students' perceptions regarding feedback from their educators in a selected higher education institution in KwaZulu-Natal province, South Africa

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**Background.** There is global awareness of investment in higher education to ensure quality learning. Provision of quality feedback is perceived as a key benchmark of effective learning and a vital requirement in meeting students' expectations. Nevertheless, increased students' demands and expectations regarding quality feedback compete with increased pressure on academic resources, which may result in student dissatisfaction. Despite the high priority that higher education institutions (HEIs) place on quality of feedback, insufficient research studies have been conducted of student nurses' perceptions of such feedback.

**Objectives.** To describe nursing students' perceptions of feedback received from educators in a selected HEI.

**Method.** A non-experimental, exploratory descriptive design was used to guide the research process. The non-probability convenience sampling method was used, with 75 nursing students as respondents. A descriptive statistics procedure was used to present the findings of the study.

**Results.** Most respondents (82.7%) reported that they received understandable, timely, personalised, criteria-referenced, positive clear feedback after assessment. Conversely, 17.3% of respondents indicated that they received delayed, non-understandable feedback, as well as unclear and negatively written feedback. The findings of the study suggest that quality feedback mechanisms in the selected HEI were used for effective learning and to meet nursing students' requirements and expectations.

**Conclusion.** The findings of the research indicate that nursing students receive quality feedback after assessment. However, there is a need for the HEI to develop a clear organisational structure with an operational guideline to aid the feedback process and ensure that all students receive quality feedback, improving their performance and meeting their needs. The feedback process should be made transparent and communicated to educators and students.

There is global awareness of investment in education to ensure quality teaching.[1] Therefore, higher education institutions (HEIs) have taken a proactive approach to improve quality teaching by designing principles of effective, transparent and easy-to-understand feedback related to assessment criteria.[2] According to Taras,[3] provision of quality feedback is widely perceived as a key benchmark of effective teaching, as it is vital in meeting students' expectations. This article describes nursing students' perceptions of feedback received from educators in selected HEIs in South Africa (SA).

Student feedback has been defined differently by various scholars. Brookhart[4] defines feedback as a response in which information regarding previous performance is used to provide the facilitator's positive views, suggestions and guidance on students' work. Progressive philosophical views regard quality feedback as a collaborative problem-solving intervention or a strategy rather than a reward for complying with teachers' expectations or punitive consequences for failing, which is observed in behavioural theory.[5] Therefore, nursing education encompasses the external curriculum programme for which assessment and feedback are mandatory in both classroom and clinical teaching.[6]

According to Mulliner and Tucker,[7] the purpose of feedback is to increase students' understanding of a learning goal and their own achievement status in relation to the goal, as well as enabling them to bridge the gap between their status and the desired status. Hughes and Quinn[8] assert that feedback provides scaffolding that may help to guide students through their potential maze of complex feedback by providing signs, clues and a partial learning solution. Moreover, Brookhart[4] states that feedback involves motivating learners to deconstruct a task to make it more achievable, providing direction, identifying differences between achievements and expectations and reducing risks. Furthermore, Hughes and Quinn[8] suggest that it is crucial that feedback feeds forward, encouraging further learning and helping students to identify gaps between their actual and desired performance. For students to benefit fully from the clinical experience, regular feedback is required, which provides student nurses with information on current practice and offers practical advice for improved performance.[9] According to Clynes and Raftery,[9] the benefits of feedback include an increased sense of personal satisfaction, student confidence, motivation, self-esteem and enhanced interpersonal skills. Even though principles of feedback may be employed in higher education, students' experiences might differ; hence their perceptions could be useful on how feedback can be improved.[10]

The principles of effective feedback need to be adhered to, as students' learning processes, progress and understanding will otherwise be diminished.[4] Moreover, recent studies of perceptions of feedback explain that students are dissatisfied and do not use feedback owing to timing, clarity, quality and the way in which written feedback is presented.[3,7,10] A study in the

School of Built Environment, John Moores University, Liverpool, UK, of undergraduate students (*n*=194), showed that the majority (95%) agreed that feedback received too late was useless.[2] The same study revealed that regarding the ideal time frame to receive feedback, 42% of students agreed on 2 - 3 weeks.[7] However, Khowaja *et al*.,[11] found that in Pakistan, ~40% (*n*=152) of students perceived delayed feedback, low grades and limited opportunity to clarify feedback as common obstacles related to learning. In Tanzania, lack of adequate supervision and feedback were regarded as hindering factors.[12] In SA, a study that evaluated higher education management students' (*n*=601) perceptions of teacher feedback, found that 64% rated their perceptions as average, 17.5% as good and 13.2% as weak.[13] However, information on feedback in HEIs, particularly in KwaZulu-Natal (KZN) province, remains limited. In this context, the current article seeks to explore nursing students' perceptions regarding feedback from their educators in a selected HEI.

## Methods

A quantitative, non-experimental, exploratory descriptive design was used to conduct the research. An exploratory design investigates the full nature of the phenomenon, the way it manifests and other factors in relation to the underlying process.[14] According to Grove *et al*.,[15] a descriptive design may be used for development of theory, identification of problems in current practice, justifying current practice, making judgements or detecting what others in similar situations do. This design was appropriate to obtain information that describes 'what exists' with regard to nursing students' perceptions of feedback, the key question addressed in this study.

### Setting

The study was conducted at a selected HEI in KZN. The specific school (within the HEI) where the research was conducted falls under the College of Health Sciences and offers various undergraduate programmes, such as the Diploma in Nursing, the Bachelor's Degree in Nursing and advanced practice.

### Population and sampling

The study population comprised all 84 nursing students registered for the first year of the Bachelors' Degree in Nursing programme in 2017. The non-probability convenience sampling method was used to select respondents. According to Polit and Beck[14] and Brink *et al*.,[16] when using the non-probability convenience sampling technique, the researcher chooses elements of the study that are available and ready at the right place and the right time during the study period. In the current study, the researcher distributed questionnaires to nursing students who were available and accessible in their theory class for the two weeks that data were collected. Seventy-five of 84 nursing students registered for the first year of the Bachelor's Degree in Nursing Science programme in 2017, who completed the questionnaire and were included in the study.

### Data analysis

Descriptive analysis was used to describe and summarise student nurses' perceptions of feedback. According to Polit and Beck,[14] descriptive statistics are sometimes used to directly address research questions in studies that are primarily descriptive and help set the stage for understanding of quantitative research evidence.

The questionnaire was developed by a researcher with the assistance of a research supervisor and a statistician, using the literature to guide the development. The five responses on the Likert scale were: strongly agree, agree, not sure, disagree and strongly disagree. Face validity was established by consulting experts in the field of nursing education, the supervisor and the statistician to provide feedback regarding validity of the questionnaire. To maintain test-retest reliability of the questionnaire, it was pretested in 10 respondents. As no changes were made to the questionnaire, these data were included in the final sample. By means of Cronbach's alpha reliability statistics, validity of the instrument (questionnaire) was grounded at 0.81 (81.0%), i.e. findings from this study would be reliable. The completed questionnaires were counted and coded to facilitate capturing and auditing of data after collection. The scores of the negative questions in the questionnaire were reversed to accommodate negativity. Data were then entered into SPSS version 24 (IBM Corp., USA) for analysis. Descriptive statistics were used to describe and synthesise data, where frequencies, percentages, standard deviations (SDs) and means were reflected. Tables and graphs were used to enhance interpretation. The composite score was computed for questions with ranges.

### Ethical considerations

Grove *et al*.[15] asserted that researchers must comply with three ethical principles, i.e. beneficence, respect for human dignity and justice. Permission to conduct the study was obtained from the School of Nursing and Public Health, University of KZN, and ethical clearance was received from the Research Ethics Committee of the University of KwaZulu-Natal (ref. no. HSS/1409/017H), where the study was registered and conducted. To respect the rights of respondents, the researcher explained the purpose of the study, that participation was voluntary and that students may withdraw at any time without fear of negative consequences. The researcher also explained that respondents would experience no harm by participating in the study.

After providing the necessary information regarding the study, signed informed consent was obtained from those who voluntarily accepted to participate. The researcher explained to the respondents that the questionnaire would take ~15 minutes to complete and that their anonymity and confidentiality were respected by using codes. Their names and student numbers did not appear on the questionnaire. The respondents were treated equally and data were transcribed verbatim. The data were kept in a locked area that only the researcher and supervisor could access. The researcher explained that the findings of the study would be helpful to students, including those who did not participate, as it would aid their transition to higher education. The results of the study may be useful in informing and reviewing the policies of the institution.

## Results

Questionnaires were handed out to the total population of 84 nursing students, of whom 75 completed and returned their questionnaire. Students had varied perceptions regarding quality of feedback (Table 1).

When exploring quality of feedback after assessment, 20.0% (*n*=15) of 75 respondents strongly agreed and 37.3% (*n*=28) agreed with the statement that 'feedback mainly tells me how well I am doing in relation to others', while 5.3% (*n*=4) strongly disagreed and 29.3% (*n*=22) disagreed. However, 8.0% (*n*=6) were not sure about the statement.

Regarding 'feedback shows how to do better next time', 40.0% (*n*=30) of respondents strongly agreed and 42.7% (*n*=32) agreed with the statement, 4.0% (*n*=3) strongly disagreed and 10.7% (*n*=8) disagreed, whereas 2.7% (*n*=2) indicated that they were not sure.

As to 'feedback helps respondents to understand things better next time', 41.3% (*n*=31) strongly agreed and 41.3% (*n*=31) agreed, 2.7% (*n*=2) strongly disagreed and 6.7% (*n*=5) disagreed, while 8.0% (*n*=6) were not sure about the statement.

Based on the statement that 'I can hardly see from the feedback what I need to do to improve my performance', 22.7% (*n*=17) of respondents strongly agreed and 10.7% (*n*=8) agreed, 8.0% (*n*=6) strongly disagreed and 42.7% agreed, whereas 16.0% (*n*=12) stated that they were not sure, with the highest mean score (SD) 3.03 (1.33).

Regarding 'once I read the feedback, I understand why I got the marks I received', 34.7% (*n*=26) strongly agreed and 41.3% (*n*=31) agreed, 5.3% (*n*=4) strongly disagreed and 10.7% (*n*=8) disagreed, whereas 8.0% (*n*=6) stated that they were not sure.

With reference to 'I do not understand some of the feedback that I receive', 12.0% (*n*=9) strongly agreed and 24.0% (*n*=18) agreed with the statement, 4.0% (*n*=3) strongly disagreed, 38.7% (*n*=29) disagreed and 21.3% (*n*=16) stated that they were not sure.

As regards 'feedback encourages me to improve my performance', 44.0% (*n*=3) strongly agreed and 40.0% (*n*=30) agreed, 2.7% (*n*=2) strongly disagreed and 8.0% (*n*=6) disagreed, while 5.3% (*n*=4) stated that they were not sure, with the lowest mean score 1.85 (1.02).

Regarding 'I can easily read the feedback I receive on my assignment', 26.7% (*n*=20) strongly agreed with the statement, 41.3% (*n*=31) agreed, 1.3% (*n*=1) strongly disagreed and 12.0% (*n*=9) disagreed, whereas 18.7% (*n*=14) stated that they were not sure.

Based on the statement that 'feedback received on assignment was too brief to be helpful', 25.3% (*n*=19) strongly agreed, 48.0% (*n*=36) agreed, 1.3% (*n*=1) strongly disagreed and 10.7% (*n*=8) disagreed, whereas 14.7% (*n*=11) stated that they were not sure.

With respect to 'feedback on an assignment can be useful in a subsequent assignment', 26.7% (*n*=20) strongly agreed and 45.3% (*n*=34) agreed, 2.7% (*n*=2) strongly disagreed and 5.3% (*n*=4) disagreed, while 20.0% (*n*=15) stated that they were not sure.

## Discussion

The study indicates that the majority of respondents perceived that feedback mainly shows them how well they are doing in relation to others, compared with a minority of 34.6% of respondents, who opposed the statement. This may be owing to the previous content-based curriculum, which emphasised students' comparison of marks rather than their competency. The study results are in line with those of the University of Western Cape, where the majority of respondents reported that the purpose of feedback was to show them how well they were doing in relation to others.[13]

The majority of respondents agreed that feedback shows them how to do better next time, while the minority opposed the statement. This may be owing to educators' use of principles of effective feedback, such as transparent feedback, easy-to-understand feedback and feedback related to assessment criteria that are imposed by HEIs. This is in line with Hughes and Quinn,[8] who asserted that it is crucial that feedback feeds forward, encouraging further learning and progress. Moreover, Seker and Dincer[17] echoed this sentiment in a study at the Foreign Language School in Turkey, to identify students' perceptions on feedback. The results revealed that students felt that they had been assessed, they were satisfied and had improved.

**Table 1. Quality of feedback after assessment in nursing science**

| Items | Strongly agree, *n* (%) | Agree, *n* (%) | Not sure, *n* (%) | Disagree, *n* (%) | Strongly disagree, *n* (%) | Mean (SD) |
|---|---|---|---|---|---|---|
| Feedback mainly tells me how well I am doing in relation to others | 15 (20) | 28 (37.3) | 6 (8.0) | 22 (29.3) | 4 (5.3) | 2.63 (1.25) |
| Feedback shows how to do better the next time | 30 (40.0) | 32 (42.7) | 2 (2.7) | 8 (10.7) | 3 (4.0) | 1.96 (1.12) |
| Feedback helps me to understand things better the next time | 31 (41.3) | 31 (41.3) | 6 (8.0) | 5 (6.7) | 2 (2.7) | 1.88 (0.91) |
| From the feedback, I can hardly see what I need to do to improve my performance | 17 (22.7) | 8 (10.7) | 12 (16.0) | 32 (42.7) | 6 (8.0) | 3.03 (1.33) |
| Once I read the feedback, I understand the marks I received | 26 (34.7) | 31 (41.3) | 6 (8.0) | 8 (10.7) | 4 (5.3) | 2.11 (1.16) |
| I do not understand some of the feedback that I receive | 9 (12.0) | 18 (24.0) | 16 (21.3) | 29 (38.7) | 3 (4.0) | 2.99 (1.13) |
| Feedback encourages me to improve my performance | 33 (44.0) | 30 (40.0) | 4 (5.3) | 6 (8.0) | 2 (2.7) | 1.85 (1.02) |
| I can easily read the feedback I receive on my assignment | 20 (26.7) | 31 (41.3) | 14 (18.7) | 9 (12.0) | 1 (1.3) | 2.20 (1.01) |
| Feedback received on my assignment is too brief to be helpful | 19 (25.3) | 36 (48.0) | 11 (14.7) | 8 (10.7) | 1 (1.3) | 2.15 (0.97) |
| Feedback on my assignment can be useful in subsequent assignments | 20 (26.7) | 34 (43.3) | 15 (20.0) | 4 (5.3) | 2 (2.7) | 2.12 (0.96) |

SD = standard deviation.

The current study suggests that the majority of respondents agreed that feedback helped them to understand things better subsequently, while the minority disagreed with the statement. This may be owing to the selected HEI-qualified nurse educators, who were able to deliver clear, understandable feedback based on the needs of students. This is in keeping with the report by Mulliner and Tucker,[7] who asserted that the prime aim of feedback was assisting students to understand more regarding their learning purpose. The results of the current study also correspond to those of a study conducted in the School of Built Environment, Liverpool, where the majority of students (72%) agreed with the concept.[7] However, in the National Student Survey (NSS) study in 2009, <55% of respondents in the UK agreed that feedback was helpful in clarifying understanding.[3] Moreover, Taras[3] added that the results of the NSS were in marked contrast to the overall course dissatisfaction (>80%).

Based on whether respondents hardly have an understanding of the feedback of what is needed to improve their performance, the minority of respondents were positive, while the majority opposed the statement. This may be owing to educators providing clear and understandable criteria and guidelines before assessment and when marking and giving feedback. These results concur with those of a study conducted among first-year business-unit students at an Australian university, where results revealed that 80 - 81% of students agreed that feedback helped them to achieve the unit outcomes and satisfaction was between 70% and 79%.[18]

The results indicated that once the respondents had read the feedback, they understood their results, because the majority responded positively to the statement. This could be because of educators' use of clear marking criteria, which are provided to students in advance. Nixon et al.[19] echoed this sentiment in the study conducted at John Moores University, Liverpool, UK, with second-year students, where the major theme was around marking criteria, with issues such as vagueness, lack of detailed guidance, lack of clarity and unhelpful comments.

The results indicated that the respondents understood only some of the feedback that they received, because the majority answered negatively. This is in contrast to the study by Pitt and Norton,[20] who asserted that some of their students reported that they did not understand all the feedback they received from their lecturers, as they did not understand the language that their lecturers used.

For the purpose of whether feedback encouraged respondents to improve their performance, the results suggested that feedback encouraged respondents to improve their performance, because most responded positively. This may be observed in students' continuous assessment reports and portfolios, which show that respondents improved on their performance. The study results are in keeping with those of the Foreign Language School in Turkey. The results revealed that the majority of students felt that they had been assessed, they were satisfied and had improved.[17]

The current study results also correspond to those of a study of first-year students in business and the humanities, UK, where the majority of students (97%) believed that they kept feedback in mind for later use.[21] However, this is in contrast to results of a study conducted by Crisp,[22] on effects of students' response to feedback, where findings revealed that there was little evidence of improvement in scores or regarding the reduction of problems.

Based on whether feedback received on an assignment was too brief to be helpful, most respondents answered positively. This may be because

the educators, when giving feedback to students, observed the quality – not the quantity – of feedback, which may also be influenced by the types of feedback, such as verbal, written and email feedback. However, the results are in contrast with those of the NSS study, where <55% of respondents agreed that feedback had been detailed and helpful in clarifying understanding.[3]

Based on whether feedback can be useful in a subsequent assignment, the majority answered positively. This may be assessed in students' portfolios on a summative report. It is also in line with the study by Pitt and Norton,[22] who stated that the majority of the students indicated that the feedback they received regarding an assignment helped them in writing the next assignment, as it made them realise their weaknesses.

## Recommendations for improving feedback

The provision of quality feedback is widely perceived as a key benchmark of effective teaching and as an important requirement for meeting students' expectations.[3] However, there is need for HEIs to develop a clear organisational structure with a policy and an operational guideline, which will aid the process to ensure that all students receive quality feedback to improve their performance and meet their needs. The feedback process should be transparent and communicated to educators and students.

## Conclusion

Students acknowledged that quality of feedback received after an assessment positively aided the process. However, there is a need to provide feedback that improves performance of students and that meets their needs.

## Recommendation for further research and policies

Further research is recommended, including four levels of the Bachelor's Degree in Nursing Science, using both qualitative and quantitative research approaches. It is also recommended that feedback policy be developed in HEIs.

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## December 2021

> **Please note:** The change in CPD question format comes from the accreditation bodies, who have informed us that CPD questionnaires must consist of a minimum of 5 questions, 80% of which should be MCQs with a minimum of 4 options and only 20% of which may now be in the form of 'True or false' answers.
>
> MCQs may be of 'single correct answer' or 'multiple correct answer' format. Where the question states that more than one answer is correct, mark more than one of a, b, c or d (anything from two to all answers may be correct). For example, in Question 1, if you think that a, b and c are correct (note that these are not necessarily the correct answers), mark each of these on the answer form. Where the question states that only one answer is correct, mark the single answer that you think is correct.

**Learn-teach-learn: Evaluating a South African near-peer teaching programme**

1. The results of the study showed that student learners:
a. demonstrated an insignificant improvement in knowledge scores
b. demonstrated a significant improvement in both the confidence scores
c. agreed that the NPT programme was a useful addition to the standard curriculum
d. would recommend the programme to other students at developmental level.

**Is blended learning the way forward? Students' perceptions and attitudes at a South African university**

2. Online teaching and learning has been found to
a. lead to better utilisation of content
b. improve retention rate
c. increase collaboration
d. improvement in student attittude.

**Evaluation of assessment marks in the clinical years of an undergraduate medical training programme: Where are we and how can we improve?**

3. From a theoretical perspective, it is possible to improve the quality of assessment by addressing criteria such as:
a. reliability
b. validity
c. fairness
d. standardisation

**Medical students' perceptions of global health at the University of Cape Town, South Africa: The gap between interest and education**

4. The study found that:
a. the majority of students reported no formal or informal global health education
b. very few expressed interest in incorporating global health into their career.

c. most students perceived a lack of role models as a barrier to incorporating global health into their careers
d. less than half of the students were aware that the majority of surgical conditions worldwide occur in LMICs.

**The knowledge and attitudes of final-year medical students regarding care of older patients.**

5. Despite student perceptions of receiving an adequate level of teaching in geriatrics, they displayed a minimal level of knowledge. (True/false)

**Nominal group technique review of the emergency care content of the clinical skills module in the undergraduate medical programme at the University of the Free State**

6. Feedback from students and technical experts included the following suggestions for improvement:
a. increase the practical parts of the learning experience
b. changes to the resources
c. less use of blended learning techniques
d. additional financial resources.

**Understanding of clinical reasoning by undergraduate students and clinical educators in health and rehabilitation sciences at a South African University: The implications for teaching practice**

7. According to the literature, which of the following about clinical reasoning are considered true:
a. failure to develop CR is considered one of the key reasons for students' lack of confidence and effectiveness in the clinical area
b. teaching CR need not be tangible for students to develop and apply in clinical practice
c. developing CR is one of the key goals of clinical teaching
d. there are clear and specific terminologies, definitions and concepts for CR.

**A maximum of 3 CEUs will be awarded per correctly completed test.**

## December 2021

**Development of a feedback framework within a mentorship alliance using activity theory**

8. The results of the study showed that:
a. most students reported positive experiences with feedback received during the mentorship process
b. feedback from mentors mostly focused on academic matters
c. all students reported knowing the meaning of mentorship
d. all students reported having a faculty mentor at one point in time during their studies

**Teaching about disability and food security in the School of Health Sciences, University of KwaZulu-Natal, South Africa**

9. Educators had a somewhat good understanding of the link between the different dimensions of food security and disability. (True/False)

**Nursing students' perceptions regarding feedback from their educators in a selected higher education institution in KwaZulu-Natal, South Africa**

10. The definition of student feedback is a response in which information regarding previous performance is used to provide the facilitator's positive views, suggestions and guidance on students' work, according to:
a. Hughes and Quinn
b. Brookhart
c. Mulliner and Tucker
d. Kohn.

**A maximum of 3 CEUs will be awarded per correctly completed test.**