



Fostering Intercultural Competence Through Virtual Exchange: Perspectives of Undergraduate Health Students

RESEARCH ARTICLE

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ABSTRACT

Globalization and the call for global citizenship education have enabled virtual exchange to prepare healthcare students as emerging healthcare professionals for working in an increasingly interconnected and diverse world. Integrating virtual exchange opportunities into undergraduate curricula in higher education equips students with the knowledge, skills, and attributes needed to be responsive to global healthcare challenges. This study reports on the perceptions of undergraduate healthcare students from geographically distant locations on how (if any) participating in an international virtual exchange project fostered their intercultural competence. Anchored in social constructivism and adopting a qualitative methodology, data was collected using an online, open-ended reflective questionnaire. Findings from the thematic analysis highlight that integrating virtual exchange into curriculum design can foster intercultural competence, preparing healthcare students as emerging professionals for the world of work that necessitates an appreciation for diverse ways of knowing, being, and doing to ensure optimal healthcare.

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There has been a significant increase in the importance of globalization, global citizenship, and global citizenship education (GCE) in higher education (Altbach et al., 2009; Knight, 2008; Tawil 2013). Although subject to various interpretations and perspectives, the concepts are widely debated, and it is evident from the existing literature that these interconnected trends significantly influence higher education (Tawil, 2013).

Globalization is ‘an increased flow of people, culture, ideas, values, knowledge, technology, and economy across borders, resulting in a more interconnected and interdependent world’ (Knight 2008, p. x). The literature widely discusses global citizenship, and it is evident that the term global citizenship is highly contested due to the wide range of interpretations, approaches, and dimensions (Cotton et al., 2019; Tawil, 2013). Despite the wide range of understandings, global citizenship refers to “A sense of belonging to a broader community and common humanity. It emphasizes political, economic, social, and cultural interdependency and interconnectedness between the local, national, and global” (UNESCO 2015, p. 14). This interconnectedness and interdependence force the integration of global issues into educational offerings (Tawil, 2013).

Educators recognize Global Citizenship Education (GCE) as a paradigm for reframing education to develop global citizenship. Consequently, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has identified education as a crucial element in promoting global citizenship and included it as one of the Global Education First Initiatives (GEFI) (UNESCO, 2015). According to UNESCO (2015), GCE revolves around the principle that, despite our diverse backgrounds, individuals face common global challenges and uphold universal values such as justice, equality, dignity, and respect. GCE signifies a conceptual transformation as it acknowledges the significance of education in equipping individuals to collaborate across borders in an ever-globalizing world. This preparation empowers students to face challenges and take advantage of the opportunities presented by the 21st century (Tawil 2013; UNESCO, 2015). In addition, the principles, and values of GCE are deeply embedded in the Sustainable Development Goals (SDGs) established by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development (UNESCO, 2015). Learning and working collaboratively in global inter-professional and learning teams (in the case of this study, in a virtual exchange project) can encourage to work collaboratively to address various global challenges such as inequality, peace, and justice with the aim to improve the well-being of people and the planet (UNESCO, 2015).

In the context of health professions education, Jogerst et al., (2015) argue that students, irrespective of their discipline and as emerging healthcare professionals, need to be educated to deal with complex global health challenges. Along similar lines, Murdoch-Eaton and Bezuidenhout (2014) also report on the importance of integrating global citizenship into the curriculum of undergraduate health students in South Africa. Research reveals the positive outcomes of GCE, including increased sensitivity and appreciation for cultural differences, improved adaptability in diverse work environments, and advocacy for cultural understanding (de Wit, 2013). Similarly, a recent study by Collins (2019) indicates that participants reported various benefits of GCE, such as enhanced self-awareness, expanded knowledge in multiple domains, and improved personal skills, such as improved interpersonal, communication, and collaboration abilities.

The emergence of Information and Communications Technology has presented many opportunities in education to nurture students as global citizens (Altbach et al., 2009; Bates, 2015). Furthermore, as highlighted by Commander et al., (2016), using virtual platforms to enable virtual mobility can effectively break down physical and geographical limitations, leading to an enriched learning experience. The concept of virtual mobility, implemented through virtual exchange initiatives, is a movement towards internationalization. In addition, virtual exchange collaborations expose students to an international and collaborative multicultural teaching and learning experience, foster cultural appreciation and understanding, and aid in developing digital literacy (Georgia State University, 2019).

To align with the dedication of North-West University to prepare well-informed, skilled, and value-driven graduates for the demands of the 21st century, the university entered a Memorandum of Understanding with the Board of Regents of the University System of Georgia,

acting on behalf of Georgia State University (North-West University & Board of regents of the University System of Georgia, 2019). The agreement aimed to foster collaboration and collegiality between the two institutions and contribute to the Scholarship of Teaching and Learning (SoTL). This collaborative research endeavor has been a valuable resource for guiding curriculum transformation to enhance multicultural teaching and learning experiences. As a result, these initiatives can enrich undergraduate health students' personal development and learning as global citizens in the 21st century.

The purpose of this qualitative study is to explore the perceived experience of undergraduate health students on how (if any) participating in an international virtual exchange can contribute to the fostering of intercultural competence.

SETTING

Two higher education institutions of learning, Georgia State University (GSU) in the United States of America and the North-West University (NWU) in South Africa, conducted the virtual exchange project. GSU is a respected public research institution in downtown Atlanta, Georgia, (Georgia State University 2023). Established in 1913, GSU boasts a vibrant and diverse student body, surpassing 50,000 students, and offers a broad spectrum of academic opportunities with more than 250 undergraduate and graduate degree programs spanning various disciplines. Georgia State University (GSU) has earned recognition as a prominent research university for its dedication to student success, pioneering approaches to education, and significant contributions to the field of research, (Georgia State University 2023).

The NWU is a public university with three primary campuses in Potchefstroom, Mahikeng, and Vanderbijlpark (North-West University, 2023). Since 2004, the NWU has emerged as one of the largest universities in South Africa. It is known for its strong emphasis on research excellence and extensive range of undergraduate and postgraduate programs spanning numerous fields of study. The NWU prides itself on its diverse student body, comprising individuals from varying cultural and socioeconomic backgrounds, and attracts both local and international students, fostering a rich multicultural learning environment (North-West University, 2023).

DESCRIPTION OF VIRTUAL EXCHANGE PROJECT

The virtual exchange project consisted of two components: Part One, the teaching and learning part, and Part Two, the research. Part one, the teaching and learning part, was conducted over three weeks, and then the research part (part two) started. Before the project's initiation, the researchers paired up GSU and NWU students, with each group comprising six members. At both institutions, the teaching and learning activities within the virtual exchange project formed part of the respective courses' standard teaching and learning activities. The lecturer-researchers designed the activities to be integrated into the students' academic preparation and study time, incorporating them as part of the notional hours in the courses. To establish an online social presence, the lecturers asked all group members to participate in a meet-and-greet activity at the beginning of the virtual exchange project. The meet-and-greet activity consisted of students introducing themselves to each other using Flip, a video-based tool that allows discussion across digital devices (Flip, 2023). The lecturers also asked the students to respond to other members' video postings during the meet-and-greet activity. Group members met online in the following two weeks and collaboratively completed the learning activities.

Using Zoom as an online communications platform, the virtual session started with a plenary in the main room (Zoom, 2022). Afterward, group members moved into their pre-assigned breakaway rooms to complete the learning activity; in this case, they discussed a case study patient who has an unhealthy lifestyle, the influence of culture on lifestyle, and suggestions to live a healthy lifestyle. Group members completed the pre-populated activity sheet using Padlet, a cloud-based, real-time virtual collaborative bulletin board (Sese, 2023). Each session ended back in the main room with a facilitated plenary discussion on the group activities in the breakaway rooms. At the end of the virtual exchange project, the students had the opportunity to share a goodbye message and share contact information. In addition, the lecturers, as the researchers, conducted the empirical research during the last week of the project. The empirical research part (part 2) asked students in the virtual exchange project to complete

an online reflection comprising of eight open-ended questions. In the empirical phase of the virtual exchange project, students could choose whether to provide informed consent for using their reflections for research purposes. This study used only the reflections of students who gave their voluntary consent.

RESEARCH DESIGN AND METHODOLOGY

This qualitative study is grounded in an interpretive paradigm. Doyle et al., (2009) argue that individuals construct subjective realities through social interactions. Historical and social contexts influence their reality, forming the basis of interpretivism (Doyle et al., 2009). In essence, lived experiences are unique to each individual and can differ significantly from another person's view or understanding (Ingham 2016). In this study, the perceptions of each undergraduate health student participating in the virtual exchange project and how (if any) it contributed to their intercultural competence development are subjective. To gain insight into the subjective nature of students' perceptions, the authors viewed interpretivism as the most appropriate paradigm for this study (Stewart et al., 2017).

SAMPLE AND RECRUITMENT

This study considered students from the selected courses at the two institutions best suited. The recruitment and informed consent processes in both institutions were fully aligned. As the NWU cohort had more students than GSU, the researchers decided to use randomized sampling to identify the NWU students who will form the members of the 27 groups who will be part of the virtual exchange project. The sample consisted of GSU students (N = 54) and NWU students (N = 108). Additionally, nonprobability sampling, with the espoused main methods being all-inclusive voluntary sampling, was used within these 27 groups. As noted earlier, activities in the virtual exchange project formed part of the formal teaching and learning activities in both courses. However, students had the voluntary choice to consent to the use of their reflections for research at the end of the virtual exchange project.

The researchers uploaded information about the intended research to the course sites at both institutions. The researchers requested that the students familiarize themselves with the intended research and gave the students ample time to do so. The researchers also invited prospective participants to attend a research information session. During this session, a neutral and independent research support member informed them about the intended research, discussed the content of the informed consent form with prospective participants, and addressed any questions or uncertainties they had. Attending the researcher information session was optional, and no student faced discrimination for choosing not to attend the session or for withholding consent.

DATA COLLECTION

Both institutional review boards granted ethics approval (NWU-HREC: NWU-00321-20-A1; IRB: H20500). Qualitative data was collected at the end of the virtual exchange project using an online reflection activity consisting of eight open-ended questions. Reflective questions focused on the students' perceptions of the extent to which (if any) virtual exchange contributed to the development of cultural competence. The reflective questionnaire was hosted behind the institution's security system and on the web-based software for administering online surveys at the institutions (NWU: QuestionPro; GSU: Qualtrics).

Students received the online reflection activity link via a personalized email and had two weeks to complete the reflection. Because of the low response rate, the researchers reopened the reflection, giving the participants three weeks in total to complete it. The neutral and independent research administrators who were part of the research teams downloaded the raw data sets and removed any identifiable information to enhance the anonymity and confidentiality of participants who consented. They also removed the responses of students who did not consent and then saved the raw data set in a password-protected folder according to the institution's data management policies. Lastly, they released the cleaned data set to the researchers for analysis.

The sanitized data was analyzed using the data-analysis software ATLAS.ti 9. Using the steps of Tesch (1990) and Creswell and Clark (2018), the principal investigator, as the main coder and the co-coder, prepared the data for data analysis by organizing the data and reading through the data to develop a general sense of the data. The researchers used inter-coder reliability strategies to enhance the research's validity and trustworthiness. These strategies included collaboratively identifying code-able units, creating codes, co-coding the data, discussing agreements and disagreements in the coding process, and, if needed, amending the coding accordingly by recoding the data (Creswell & Clark, 2018).

Mindfully examining and processing the information, the coder and co-coder linked related text segments to deductive and inductive codes and then linked the codes to a sub-theme, theme, and pattern. Where needed, the researchers merged repetitive codes, sub-themes, and themes, and using the networking functionality in ATLAS.ti 9, interrelationships were created (Atlas.ti, 2023). The researchers then discussed and interpreted the findings to understand how they answered the research question, met the study's objectives, and related to existing literature.

FINDINGS AND DISCUSSION

During the data analysis, the researchers identified three main themes: Theme 1: Virtual exchange to foster cultural competencies, Theme 2: Benefits of virtual exchange to foster intercultural competence, and Theme 3: Communication as an essential skill for fostering intercultural competence. In the following discussion, the researchers will elaborate on the three themes and include supporting quotations to elucidate the findings.

THEME 1: VIRTUAL EXCHANGE TO FOSTER CULTURAL COMPETENCIES

The data highlighted the importance of being culturally competent for 21st century healthcare professionals in a globalized society. Participants indicated that the world is much more accessible than before, which implies that healthcare professionals can work collaboratively with patients and professionals from other countries and across borders. It is evident from the data that many students plan to work in a different country and feel that being culturally competent is essential to working globally to achieve better health outcomes. The following quotes support these findings:

'The various continents and countries are much more accessible now – another country is not a lifetime away, only a few hours flight. Thus, we all get to know and live with a much wider variety of people and need to treat those people in a professional capacity. Knowing how to work with these people will better the care that we care provide and optimise their health outcomes'.

'As far as my professional goals this affected me and made me want to look into a career overseas so that I can help others who are outside of my comfort zone. I absolutely love other cultures and I think that it should be a requirement for every single major to do a virtual exchange'.

Participants also pointed out cultural competence as essential for health professionals as they will work with professionals and patients with diverse backgrounds and cultures. Most participants emphasized the importance of healthcare professionals possessing the skills necessary to interact with diverse individuals, acknowledging that patients come from various backgrounds with different worldviews and beliefs about healthcare. It highlights the need for understanding and ensuring patients' comfort with the treatment they receive:

'Because, as health care professionals we will have to deal with different kinds of people, from different backgrounds and who have different worldviews and beliefs in terms of healthcare and as health care professionals we need to learn how to understand these individuals and make sure that they are comfortable with the treatment that you offer'.

Also mentioned by participants is the role of digital care across the globe using various online platforms, making it possible to learn from other cultures as well as the obstacles they are facing.

‘Because of COVID-19, the world realised how crucial online communication was and opened a brand-new world for networking. With tools like Zoom, Webex, and Skype, health professionals can communicate across the globe and learn more about the different cultures and obstacles that different populations face’.

Furthermore, analysis of the findings highlighted the significance of gaining new perspectives and exposure to different experiences, which can foster understanding among people. The findings imply that a collective effort is needed to solve complex problems that would be difficult to tackle individually. Participants also commented on the importance of being open-minded, particularly as a healthcare professional facing new conditions and learning constantly. Lastly, participants highlighted the importance of collaboration and resource-sharing among individuals to solve problems.

‘This [the virtual exchange project] helps bring people together and work collectively solve problems that would otherwise be hard to be solved individually’.

‘Every day as a health worker you experience new conditions or learn new things, it’s very important to be open minded especially in this new generation we are living in, sometimes team work really can make a huge difference’.

‘It’s important for us to all work together, because we can share resources, most people are traveling the world and it’s important that we learn other people’s culture’.

Findings in this study highlighting the importance of cultural competence support research conducted by Jogerst et al., (2015), who argue that students, irrespective of their discipline, must be educated to deal with complex global health challenges. Furthermore, findings also confirm that virtual exchange activities in undergraduate studies contribute to equipping individuals to collaborate across borders in an ever-globalizing world (Jogerst et al., 2015). Findings illuminate, and support research that is participating in a virtual exchange empowers students to address the challenges and seize the opportunities presented by the 21st century (Tawil, 2013; UNESCO, 2015). Furthermore, the above findings concur with de Wit (2013), who reports the positive outcomes of GCE, including heightened sensitivity and appreciation for cultural differences, improved adaptability in diverse work environments, and advocacy for cultural understanding.

THEME 2: BENEFITS OF VIRTUAL EXCHANGE TO FOSTER INTERCULTURAL COMPETENCE

The participants shared personal and professional benefits when asked about the benefits of participating in the virtual exchange. Participants recognized that this experience would benefit them as future healthcare professionals. Being prepared to interact with people of different backgrounds, cultures, experiences, and beliefs is critical to a successful healthcare professional. Numerous participants commented on how this experience with other cultures will better prepare them for their future:

‘I thoroughly enjoyed being able to communicate with people from different parts of the world. I believe that it was an excellent avenue for growth both as a person and in your views towards other parts of the world. Every chance we get as young adults that broadens our horizons can be used to benefit the rest of our lives’.

‘This experience [participating in the virtual exchange project] allowed me to be more open minded to different cultural habits and beliefs that may be deemed as odd to me as an American, and it really allowed me after reflection to be less biased when it comes to interacting with different cultural habits that we may not understand. People deserve respect and unbiased treatment. This will influence my development as an emerging healthcare professional by being open minded and advocating for the health of everyone while being aware of my own biases’.

'When working as part of a team to care for patients, you will sometimes have to work with people from other cultures. It is important to make sure that there is respect for others' ideas and opinions. Ultimately, we have the same goal in mind and that is making sure the patient gets the best care possible'.

Participants also stated that although there are differences between cultures, there is still the recognition of the importance of healthy living that allows all people to relate to each other. One participant said, "it made me realise that although we come from different backgrounds, health still plays a similar part in the world." Another participant said, "I enjoyed learning that no matter where you are in the world, we share the same matters."

Participants could see how the virtual exchange experience will benefit them as they promote health and wellness among future patients and clients. Additionally, several participants shared how they intend to use this experience to help design individualized healthcare interventions:

'I was able to see what other students did pertaining to exercise requirements, leisure time, and the basic nutritional guidelines and barriers to exercise in other countries. As these guidelines differ across countries, this factor will help me understand the importance of individualising programs for various clients I will see in the near future'.

Many participants also found that learning about other cultures helped them broaden their understanding of people with different backgrounds. Additionally, more than half of the participants commented on how participating in the virtual exchange project has helped them overcome barriers such as language and implicit biases:

'It [the activities in the virtual exchange project] helped me to see that people have different views and beliefs. It will help me to be more considerate and compassionate toward people from different cultures or languages. It eliminated the barrier I had about approaching and helping people if I do not have the same views or beliefs that they do'.

'It [participating in the virtual exchange project] has definitely made me a lot more accepting. I used to believe that if a patient, for example, needs medication, which they are not allowed to take due to their culture, they should still be given to them because it will help them with their condition but now I understand that culture plays a big part in the healthcare system as well and we should instead offer them alternatives'.

Participants in the virtual exchange activities shared remarkable personal and professional gains. They acknowledged that interacting with individuals from diverse backgrounds, cultures, and belief systems is a vital skill for successful healthcare providers. The findings from this study support research conducted by Beach (2005), who found that participating in virtual exchange projects enriches students' perspectives and broadens their horizons. Having a broader perspective enables healthcare professionals (in the context of this study, students as emerging professionals) to appreciate and respect different cultural habits and beliefs. By overcoming implicit biases and fostering open-mindedness, participants also expressed the importance of committing to providing unbiased and compassionate healthcare to patients from all walks of life (Beach 2005).

One of the key takeaways from the virtual exchange was the recognition of universal health concerns. Supporting research by Beach et al., (2017), participants noted that despite cultural differences, the importance of healthy living resonates across all societies. This understanding can significantly impact their health promotion and disease prevention approach, as they plan to design individualized exercise programs based on diverse cultural norms and requirements. By embracing creativity and flexibility in patient care, emerging healthcare professionals aim to address the unique needs of their clients and foster confidence in the healthcare system (Saha et al., 2008).

THEME 3: COMMUNICATION AS AN ESSENTIAL SKILL FOR FOSTERING INTERCULTURAL COMPETENCE

Most participants indicated a strong sense of self-awareness, being mindful of personal traits such as communication skills, collaboration, and the influence of personality types on

fostering intercultural competence. Participants viewed good communication skills as essential competency when collaborating with international students. Participants commented:

‘Myself and my group members were able to clearly communicate with one another and openly share ideas and thoughts about the differences among what happens in the United States and how it’s different in other countries’...

‘I felt very competent relating to the students in my group because there were no language barriers. We had to explain some local jargon but there were no gaps in communication’.

Despite the overall positive feedback, some participants highlighted the influence of language, being more of an introvert, and lacking confidence as barriers to communication.

‘I am not good at communicating with strangers I just keep quiet until I really have to speak.’

‘their [the South African students] accents were heavy and there were a couple of students that didn’t understand much English so it was hard to communicate with those few individuals that weren’t as fluent’.

Virtual exchange activities enable the development of a wide range of competencies, such as intercultural collaboration and communication skills, which are considered very relevant for the modern workplace and specifically for healthcare workers (O’Dowd 2021). The findings from this study confirm that effective communication skills and language proficiency contribute to cultural competence perception. Roy et al., (2019) reference international research on intercultural competence gained during virtual exchange, confirming that short-term international mobility enhances intercultural competence and positively influences culturally appropriate work practices. This research confirms the findings of Roy et al., (2019). Also, it confirms the findings from the EVOLVE Project Team Report (2020), which emphasizes the importance of exposing students to cultural diversity within a globalized world. However, despite the overwhelmingly positive feedback, a few participants reported on challenges experienced during the virtual exchange project. These included communication difficulties due to the influence of personality (introvert), a lack of confidence, and language barriers such as different accents, which made communication difficult. Deliberate attention should be given during the design of virtual exchange activities to managing constraining factors that may negatively impact the fostering of intercultural competence (O’Dowd, 2021).

CONCLUSION

In conclusion, the increasing emphasis on globalization, intercultural exchange, and global citizenship education in higher education has paved the way for virtual exchange to play a significant role in the growth and development of future healthcare professionals. This study highlights the use and benefits of virtual exchange to foster intercultural competence and the importance of developing communication for effective intercultural collaboration among students as emerging healthcare professionals in an ever-globalizing world.

Integrating virtual exchange activities into higher education curricula has immense potential in shaping a new generation of healthcare providers with the knowledge, skills, and empathy required to tackle global health challenges. Drawing on their experiences, these professionals are ready to impact the health and well-being of individuals and communities worldwide positively and lastingly. Embracing diversity and cross-cultural understanding in healthcare enhances patient care and builds a more inclusive and equitable healthcare system for all benefits.

As we move forward, integrating virtual exchange activities into higher education curricula can be instrumental in shaping a new generation of healthcare professionals equipped with the knowledge, skills, and empathy required to address global health challenges. Embracing diversity and cross-cultural understanding will improve patient care and contribute to building a more inclusive and equitable healthcare system worldwide. These emerging professionals, armed with invaluable insights gained from virtual exchange experiences, are ready to make

LIMITATIONS

Despite the detailed and careful planning and rigorous data collection and analysis, this study has limitations. Participation in this research was voluntary. Although many students participated in the virtual exchange project, not all participants consented to use their anonymized reflection for research purposes. The smaller sample of NWU students consenting to the researchers using their reflections for research purposes may limit the diversity of responses and themes. Using only the reflections of students who consented may have created a bias as only the more motivated students participated and consented. In this study, the researchers collected data using an open-ended reflective questionnaire. Using more than one data collection instrument, such as face-to-face interviews, may have yielded more detail. The interviewer could have picked up on non-verbal cues and asked follow-up questions to clarify, potentially enhancing the depth of understanding. Despite the time available for its completion, responses were also concise. Participants may have rushed through their responses for different reasons unknown to the researchers, leading to incomplete or less thoughtful reflections.

At both institutions, the primary investigators were the lecturers, responsible for the course's teaching, learning, and assessment. The dual role of lecturer-researcher, each with its own identity and responsibility, creates an ethical dilemma (Pool et al., 2022). Lecturers are in a position of power, while students, on the other side, are considered a captive audience (Pool et al., 2022). To mitigate the risk of coercion, the researchers used a neutral and independent research team to engage with the students during the research-related activity (Pool et al., 2022). However, despite being fully informed about the intended research, some information needed by the participant to make a fully informed decision to consent or withhold consent may have been lost, resulting in students not consenting.

Despite these limitations, the researchers believe the findings from this study will be helpful for university teachers, faculty management and other stakeholders interested in exploring and implementing virtual exchange collaborations to expose students to an international and collaborative multicultural teaching and learning experience, and foster intercultural appreciation, understanding and competence.

DATA ACCESSIBILITY STATEMENTS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

ETHICS AND CONSENT

Ethical approval was obtained for the work described in this article from:

- North-West Health Research Ethics Committee (NWU-HREC)
 - Reference number: NWU-00321-20-A1
- Georgia State University Institutional Review Board (IRB)
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COMPETING INTERESTS

The authors have no competing interests to declare.

Yolande Heymans: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing; Courtney Strosnider: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing; Jessica Pool: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing; Marieta Jansen van Vuuren: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

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