



Exploring the Attitudes of Natural Science Undergraduate Students Towards Microsoft Teams - Post the Covid-19 Pandemic, at a South African University

Vuyokazi Momoti¹ 

¹ Department of Mathematics and Natural Science Education, Faculty of Education, Walter Sisulu University, South Africa.

ABSTRACT

The purpose of this study is to assess the feasibility of adopting effective e-learning with Microsoft Teams in a South African university. The study sample was purposefully chosen to include 30 registered Natural Sciences students. The study used questionnaires to collect data from 30 undergraduate students enrolled in Natural Science courses at the university using a quantitative research approach. Descriptive statistics such as mean and standard deviation were used to analyse the data. The IBM SPSS Statistics was the program utilized for data analysis. According to the study's findings, the majority of students prefer to learn in person due to challenges such as load shedding and a reluctance to connect on the Teams platform. The TPACK Theoretical Framework, which states that comprehension of technology applications is vital in terms of pedagogy and content, lends credence to the study's assumption. This study aims to provide a thorough analysis of the advantages of e-learning as well as student opinions on the new learning platform.

Correspondence

Vuyokazi Momoti
Email: vmomoti@wsu.ac.za

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INTRODUCTION

During the Covid -19 pandemic, the majority of higher educational institutions took a different path by implementing online teaching and learning. Because the pandemic prevented face-to-face teaching, most educational institutions had to train both lecturers and students on alternative methods of keeping up with the syllabus for the benefit of the students. The utilization of electronic learning (e-learning) as a means of delivering high-quality education and guaranteeing maximum student engagement is already well-known. Nawi and Hamidaton, in their study on exploring student's readiness and behavioural towards virtual learning they argue that the outbreak of Covid-19 led to a surge in the adoption of e-learning software by all higher educational institutions, such as Teams and Moodle, among others.¹ Microsoft Teams, a collaboration platform linked to Microsoft Office 365, offers a range of features, including the ability to create virtual courses, as well as the storage of files and user convenience

These virtual courses can be established and managed in the same way as a real classroom, allowing students and professors to meet, chat, post, evaluate, and assess online. Microsoft Teams also provides protection for app user data. The range of features and conveniences of Microsoft Teams make it an ideal platform for the implementation of online learning and learning.² The primary goal of this study is to investigate

¹ Amani Nawi and Umi Hamidaton, "Exploring Student's Readiness and Behavioural Towards Virtual Learning via Microsoft Teams," *Malaysian Journal of Social Sciences and Humanities (MJSSH)* 7, no. 2 (February 10, 2022): e001273, <https://doi.org/10.47405/mjssh.v7i2.1273>.

² Buchal and Songsore, "Using Microsoft Teams To Support Collaborative Knowledge Building In The Context Of Sustainability Assessment"; Kristiana Nathalia Wea and Agustina Dua Kuki, "Students' Perceptions of Using Microsoft Teams Application in Online Learning during the Covid-19 Pandemic," in *Journal of Physics: Conference Series*, vol. 1842 (IOP Publishing, 2021), 012016.

the opinions of natural science undergraduate students at a South African university about Microsoft teams following the Covid-19 pandemic. The essay begins with a review of the literature and recent additions about Microsoft teams as an online teaching and learning tool. This is followed by the study's methodology, or how the study was carried out. The following section gives the findings and analyses how they relate to existing literature, and finally, the conclusion discusses the findings.

LITERATURE REVIEW

The premise of this study is underpinned by TPACK Theoretical Framework, denotes knowledge of ICT applications suitable for use in teaching in terms of pedagogy and content.³ In recent times, technological advances have enabled the emergence of systems that facilitate lecturers and lecturers in the formulation of educational and learning resources.⁴ Lecturers are now able to publish their learning materials on the internet, and students are able to access them, such as PowerPoint presentations, lecture video clips, and supplementary resources.⁵ Furthermore, a vast array of electronic devices, including smartphones, tablet computers, and laptops, are now accessible and accessible, enabling lecturers to deliver lectures and students to gain knowledge outside of the traditional classroom setting. Wang et al. revealed that in China, there is a Massive Open Online Course that offers online learning platform for students and tutors, induces a positive attitude and highlighted flexibility of time and improves attendance.⁶

Regmi and Jones define e-learning as an educational method that facilitates learning by the application of information technology and communication providing an opportunity for learners to have access to all the required education programmes.⁷ E-learning is rapidly becoming a key technology that is being adopted and utilized by educational institutions and universities around the world. In Indonesia Google Classroom was used to substitute face to face learning with online teaching, where biology and science students showed preference in using the Google Classroom during Covid- 19 pandemic.⁸ According to experts in e-learning, the environment created by e-learning provides meaningful connections that combine the skills and knowledge available to students. Therefore, it is essential for higher education institutions to have a strategy in place if they wish to move away from traditional e-learning methods.⁹

There is a significant relationship between performance of students and the use of Moodle Learning Systems as a learning platform.¹⁰ Martin and Tapp allude that teaching with Teams app offer better platform educators in higher education institutions for class discussions, easy access of teaching material by students material and immediate feedback.¹¹ Lopes et al. conducted using university students, teachers, and librarians found that e-learning was a preferred mode of teaching and learning platform.¹² The advantages of online teaching in comparison to traditional methods of instruction are numerous, including enhanced student motivation, enhanced interaction, and enhanced communication.¹³ Furthermore, distance education can be as successful as traditional teaching when it comes to learner outcomes. Also, online learners

³ Matthew Koehler and Punya Mishra, "What Is Technological Pedagogical Content Knowledge (TPACK)?," *Contemporary Issues in Technology and Teacher Education* 9, no. 1 (2009): 60–70.

⁴ Iraklis Katsaris and Nikolas Vidakis, "Adaptive E-Learning Systems through Learning Styles: A Review of the Literature," *Advances in Mobile Learning Educational Research* 1, no. 2 (2021): 124–45.

⁵ Md Nazirul Islam Sarker et al., "Leveraging Digital Technology for Better Learning and Education: A Systematic Literature Review," *International Journal of Information and Education Technology* 9, no. 7 (2019): 453–61, <https://doi.org/10.18178/ijiet.2019.9.7.1246>.

⁶ Kun Wang, Linglin Zhang, and Ling Ye, "A Nationwide Survey of Online Teaching Strategies in Dental Education in China," *Journal of Dental Education* 85, no. 2 (2021): 128–34.

⁷ Krishna Regmi and Linda Jones, "A Systematic Review of the Factors – Enablers and Barriers – Affecting e-Learning in Health Sciences Education," *BMC Medical Education* 20, no. 1 (December 30, 2020): 91, <https://doi.org/10.1186/s12909-020-02007-6>.

⁸ Firas Khaleyla et al., "Software Preference for Online Learning of Science and Biology Teachers under COVID-19 Pandemic," *JPBI (Jurnal Pendidikan Biologi Indonesia)* 7, no. 1 (March 31, 2021): 35–42, <https://doi.org/10.22219/jpbi.v7i1.14253>.

⁹ Said A. Salloum et al., "Exploring Students' Acceptance of E-Learning Through the Development of a Comprehensive Technology Acceptance Model," *IEEE Access* 7 (2019): 128445–62, <https://doi.org/10.1109/ACCESS.2019.2939467>; Slavko Rakic et al., "Student Performance on an E-Learning Platform: Mixed Method Approach," *International Journal of Emerging Technologies in Learning (IJET)* 15, no. 02 (January 29, 2020): 187, <https://doi.org/10.3991/ijet.v15i02.11646>; Tong Zhang et al., "Applied Model of E-Learning in the Framework of Education for Sustainable Development," *Sustainability* 12, no. 16 (August 10, 2020): 6420, <https://doi.org/10.3390/su12166420>.

¹⁰ Rakic et al., "Student Performance on an E-Learning Platform: Mixed Method Approach."

¹¹ Louis Martin and Dave Tapp, "Teaching with Teams: An Introduction to Teaching an Undergraduate Law Module Using Microsoft Teams," *Innovative Practice in Higher Education Journal* 3, no. 3 (2019): 58–66.

¹² Cristina Lopes et al., "E-Learning Enhancement through Multidisciplinary Teams in Higher Education: Students, Teachers, and Librarians," *Education Sciences* 12, no. 9 (September 4, 2022): 601, <https://doi.org/10.3390/educsci12090601>.

¹³ Daniel R Bailey and Andrea Rakushin Lee, "Learning from Experience in the Midst of COVID-19: Benefits, Challenges, and Strategies in Online Teaching," *Computer-Assisted Language Learning Electronic Journal* 21, no. 2 (2020): 178–98.

have a more positive attitude towards learning than traditional learners, and online classes are beneficial for some students, especially those who are shy.¹⁴ On the other hand, Rapant posit that online learning is a subset of distance education using electronic media that, if done well, takes place in dynamic and carefully designed learning environments.¹⁵ It provides a well-considered learning ecosystem, aimed at increased flexibility and better access to learning opportunities, through the careful design of unique courses that appropriately combine synchronous, asynchronous and independent study activities.

In the study conducted by Firmansyah discovered that e-learning facilitates the process of learning and thereby changes in practice by supporting instructional design and delivery mechanisms, which captures the developing of materials using set learning objectives, including teaching strategies – embedding feedback and evaluation to influence learners’ intrinsic and extrinsic motivation factors, the process has been influenced by several internal, external and contextual factors, including time, IT, flexibility, and independence.¹⁶

The disadvantage of online learning, according to some scholars, is the isolation and impersonal nature of online learning.¹⁷ Students who study online have fewer opportunities to interact with their peers and teachers, which may affect their motivation, cognition, and affective performance. Other disadvantages of online learning include lack of access to technology, lack of equipment and infrastructures, teachers’ and students’ technological competencies, teachers’ self-efficacy navigating online environments, and lack of or inadequate teacher training. Sari et al. suggest a positive attitude toward technology as a key starting point for teachers and students to improve their digital competencies.¹⁸ Maatuk et al. argue that e-learning is playing a vital role in the existing educational setting, as it changes the entire education system and becomes one of the greatest preferred topics for academics.¹⁹ In conclusion, e-learning both traditional face-to-face and e-learning improve performance in teaching and learning, has higher performance impacts in teaching and learning than traditional face-to-face provide higher education educators with insights about the potential of e-learning.²⁰

Research questions

RQ1: What are the experiences of undergraduate students enrolled in Natural Science course towards the use of Teams as a teaching and learning tool?

RQ2: What are the attitudes of undergraduate students enrolled in Natural Science course towards the use of Teams as a teaching and learning tool?

THEORETICAL FRAMEWORK

TPACK

TPACK denotes knowledge of ICT applications suitable for use in teaching in terms of pedagogy and content. It describes the following as components of TPACK: Technological knowledge (TK): refers to an understanding of the capabilities and limitations of technology and the abilities necessary to utilise technology effectively. Knowledge of technology also implies an interest in tracking the progression of emerging technology. Technological content knowledge (TCK): relates to an understanding of the relationship between content and technology and how content and technology impact and constrain one another. Technological pedagogical knowledge (TPK): is an understanding of the nature of teaching and learning using technology in

¹⁴ Adelina Ramadani and Brikena Xhaferi, “Teachers’ Experiences with Online Teaching Using the Zoom Platform with EFL Teachers in High Schools in Kumanova,” *SEEU Review* 15, no. 1 (July 1, 2020): 142–55, <https://doi.org/10.2478/seeur-2020-0009>.

¹⁵ Chrysi Rapanta, “Can Teachers Implement a Student-Centered Dialogical Argumentation Method across the Curriculum?,” *Teaching and Teacher Education* 105 (September 2021): 103404, <https://doi.org/10.1016/j.tate.2021.103404>.

¹⁶ Firmansyah Firmansyah, “Motivasi Belajar Dan Respon Siswa Terhadap Online Learning Sebagai Strategi Pembelajaran Di Masa Pandemi Covid-19,” *Edukatif: Jurnal Ilmu Pendidikan* 3, no. 2 (2021): 589–97.

¹⁷ Forat Falih Hasan and Muhamad Shahbani Abu Bakar, “From Google Forms to Data Repository: A New Methodology in Data Collecting, Data Transforming, and Information Systems Evaluation,” in *2022 International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)* (IEEE, 2022), 710–14; Ivan Yuhanna, Arzuni Alexander, and Agemian Kachik, “Advantages and Disadvantages of Online Learning,” *Journal Educational Verkenning* 1, no. 2 (December 24, 2020): 13–19, <https://doi.org/10.48173/jev.v1i2.54>.

¹⁸ Nirmala Sari, Erika Erika, and Neldawati Neldawati, “Student Attitudes Towards Natural Science: Review Of Pleasures And Career Interests At Junior High School 17 Jambi City,” *IJIE (International Journal of Indonesian Education and Teaching)* 4, no. 1 (2020): 102–9.

¹⁹ Abdelsalam M. Maatuk et al., “The COVID-19 Pandemic and E-Learning: Challenges and Opportunities from the Perspective of Students and Instructors,” *Journal of Computing in Higher Education* 34, no. 1 (April 3, 2022): 21–38, <https://doi.org/10.1007/s12528-021-09274-2>.

²⁰ Aaron Bere, Hepu Deng, and Richard Tay, “Assessing the Impact of Using Instant Messaging in ELearning on the Performance of Teaching and Learning in Higher Education,” in *Australasian Conference on Information Systems 2018* (University of Technology, Sydney, 2018), <https://doi.org/10.5130/acis2018.by>.

the classroom. It comprises utilising technology and gaining knowledge of the advantages and downsides of various technologies for specific pedagogical practises.²¹

Koyuncuoglu posit that TPACK abilities should be assessed holistically to increase graduate students' technological and pedagogical competencies, teaching and learning, and prepare them for academic procedures.²² Being familiar with technology does not imply that TPACK is well-known. Graduate students must have the knowledge and abilities to use technology in their academic fields in the future, as well as examine suitable pedagogical approaches while using technology. To effectively integrate technology into their education, teachers must have adequate TPACK.

Juanda, Shidiq, and Nasrudin agree that technology has presented new learning problems to teachers, such as how to build technical expertise and integrate it with content, teaching, and learning in a specific environment.²³ As a result, teachers should have subject knowledge, pedagogical knowledge, and technology knowledge. In essence, this condition necessitates teacher preparedness and appropriate TPACK abilities in order for learning to be effective.²⁴ Maatuk et.al concur with other scholars in that ICT offers unique educational and training opportunities as they improve teaching and learning, and innovation and creativity for people and organizations.²⁵ Furthermore, the use of ICT can promote the development of an educational policy that encourages creative and innovative educational institution environments.

METHODOLOGY

A group of 30 undergraduate students in the Natural Sciences field were randomly assigned questionnaires via Whatsapp during the 2023 June holidays. All 30 questions were completed and returned. Five participants who were enrolled in Natural Sciences Level 2 courses were chosen at random for a pilot research. The Internal Reliability of the Construct Items of the questionnaire was evaluated using Cronbach's Alpha. The Reliability Value of the questionnaire was estimated to be 0.67, and if the Cronbach Reliability Co-efficient is equal to or greater than 0.6, it is considered acceptable.²⁶ This finding was supported by the two Natural Sciences Experts at the University.

The administered questionnaire was divided into two pieces. Section A contained personal information such as gender and age. Section B had ten construct items that were scored on a five-point Likert scale, with 1 indicating "strongly disagree," 2 indicating "disagree," 3 indicating "neutral," 4 indicating "agree," and 5 indicating "strongly agree."

PRESENTATION OF DATA AND ANALYSIS

Descriptive Statistics											
Table 1.		Construct1	Construct2	Construct3	Construct4	Construct5	Construct6	Construct7	Construct8	Construct9	Construct10
N	Valid	30	30	30	30	30	30	30	30	30	30
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		4.3667	4.1000	4.1667	4.1000	3.6000	3.8667	4.0000	2.3667	4.0333	1.7333
Std. Deviation		.49013	.30513	.59209	.30513	.85501	.50742	.78784	1.12903	.88992	.63968

Mean interpretations

Mean between 4.00 and 5.00= High

Mean 3.00 and 3.99= Medium High

²¹ Koehler and Mishra, "What Is Technological Pedagogical Content Knowledge (TPACK)?"

²² Ozdal Koyuncuoglu, "An Investigation of Graduate Students' Technological Pedagogical and Content Knowledge (TPACK)," *International Journal of Education in Mathematics, Science and Technology* 9, no. 2 (March 7, 2021): 299–313, <https://doi.org/10.46328/ijemst.1446>.

²³ A. Juanda, A. S. Shidiq, and D. Nasrudin, "Teacher Learning Management: Investigating Biology Teachers' TPACK to Conduct Learning During the Covid-19 Outbreak," *Jurnal Pendidikan IPA Indonesia* 10, no. 1 (March 31, 2021): 48–59, <https://doi.org/10.15294/jpii.v10i1.26499>.

²⁴ Sakyiwa Boateng et al., "Pre-Service Teachers' Perspectives towards the Use of GammaTutor in Teaching Physical Sciences in South African Secondary Schools," *International Journal of Learning, Teaching and Educational Research* 21, no. 6 (2022): 304–23.

²⁵ Maatuk et al., "The COVID-19 Pandemic and E-Learning: Challenges and Opportunities from the Perspective of Students and Instructors."

²⁶ Ira Nurmala et al., "Reliability and Validity Study of the Indonesian Smartphone Application-Based Addiction Scale (SABAS) among College Students," *Heliyon* 8, no. 8 (August 2022): e10403, <https://doi.org/10.1016/j.heliyon.2022.e10403>.

Mean between 2 and 2,99= Medium Low

Mean between 1 and 1.99-Low

Standard deviation (SD) interpretations

SD between 0,300 and 0,500positive agreement

SD between 0,5001 and 0,999.....moderate agreement

SD > 1.000.....disagreement

Construct 1: Lecturers share PowerPoint presentations well

The mean for this construct is 4.3667 and Standard deviation (SD) is 0,49013, the responses of students are high the lecturer shared their PowerPoint presentations well. Since SD is 0,49013 it is very low thus indicating positive agreement. Pratama, et al. Microsoft PowerPoint software is designed to allow the user to present information in engaging sound and video.²⁷ Rouadi and Anouti advocate that PowerPoint is more attention capturing than the traditional

Construct 2: There are internet disruptions due to load shedding

Load shedding refers to regular planned power outages, the deliberate shutdown of parts of the electricity supply to the grid and to safeguard against the risk of national blackout.²⁹ In Table 1, the mean for this construct is 4.030513, this means that, the level of agreement is high and that students experienced load shedding during class via Teams. It is evident from these results that the students strongly agree that their learning was indeed affected. This may have negative effect on the academic performance of students.

Construct 3: Students are allowed to ask questions by using the chat box .

With regard to construct 3, the mean is 4,1000 and SD is 0,59209, this indicates that students agree to the fact that they were allowed to ask questions using chat box during online learning. Students' interactions with their online instructor shows social presence and promotes information sharing behaviour.

Construct 4: The lecturers highlight the behaviour rules when using Microsoft Teams

In Table 1, under construct 4, the mean is 4.1000 and SD is 0.30513. The results show high level of agreement from students with regard to the fact that the lecturers explained behaviour rules during online teaching (Microsoft Teams). Al-Khatib argues that netiquette or behaviour is an important element in the effective digital citizenship.³⁰ Many scholars concur that, he highlights some netiquette rules such as paying attention, acknowledge others, listen, be inclusive, speak kindly, do not speak ill, accept and give praise others. In essence, the house rules should be set by each teacher before presenting the lesson to students.

Construct 5: I feel shy to talk using Microsoft Teams platform

With reference to Table 1, the mean for construct 5 is 3.600 and SD is 0,85501, thus indicating that students' level of agreement is moderate. Shyness, low esteem and fear of peers/ instructor's judgement hinder student's participation in classrooms.³¹ In this study, it is obvious that some students displayed shyness and did not participate in online class activities.

Construct 6: I attend my classes all the time

The mean for construct 6 is 3,8667 which means the level agreement of students is moderate low and SD is 0,50742 this indicates moderate agreement that they attended classes at all times. Nieuwoudt argues that it is important for students to attend classes, academic success may be increased by providing various options for

²⁷ Farhan Pratama et al., "Improving the Ability of Microsoft Office to Develop Junior High School Student Learning," *Tanjungpura International Journal on Dynamics Economics, Social Sciences and Agribusiness* 4, no. 1 (2023): 39–44.

²⁸ N El Rouadi and Mohammad Faysal Anouti, "Flipping the Classroom Concept through the WhatsApp Platform and the Microsoft PowerPoint Presentations for the Service of Teaching Mathematics, A Case Study in a Lebanese Public School," *International Journal of Advanced Research in Science, Engineering and Technology* 8, no. 1 (2021): 16384–403.

²⁹ Kay Walsh, Rachel Theron, and Chris Reeders, "Estimating the Economic Cost of Load Shedding in South Africa," in *Paper Submission to Biennial Conference of the Economic Society of South Africa (ESSA)*, vol. 22, 2021.

³⁰ Tahani Al-Khatib, "Netiquette Rules in Online Learning through the Lens of Digital Citizenship Scale in the Post-Corona Era," *Journal of Information, Communication and Ethics in Society* 21, no. 2 (2023): 181–201.

³¹ Malahat Khalili et al., "Epidemiological Characteristics of COVID-19: A Systematic Review and Meta-Analysis," *Epidemiology & Infection* 148 (2020).

students to participate and interact online and to attend classes synchronously or asynchronously.³² The flexibility of online classes can enable students to be successful in their studies.

Construct 7: I gain additional computer skills through using Microsoft Teams

The mean for construct 7 is 4,000 and SD is 0,78784 in Table 1, this indicates that the level of agreement of students was moderate in that they gained additional computer skills through Microsoft Teams. The use of online teaching platforms enhance technological competencies in students.³³

Construct 8: I enjoy having a class anywhere

In Table 1, the mean for construct 8 is 2,3667 indicates medium low agreement of students pertaining enjoyment of attending anywhere and SD is 1,12903, indicates that students did not enjoy attending classes anywhere. This means that they did not enjoy classes on Teams. According to Dennis, in relation to pace and mode of learning will always be constrained by external factors.³⁴ These high level of disagreement indicates that these students did not enjoy having classes anywhere.

Construct 9 : I prefer face-to face classes

The mean for construct 9 is 4,033 and SD is 0,88992 as in Table 1, this shows that the level of agreement is moderate. Students prefer face-to- face classes. Gherhes et al. argue that face to face interaction allows students to interact with the teacher and other participants thus enabling more affective non- verbal communication³⁵.

Construct 10: I prefer online classes using Microsoft Teams

With regard to Table 1, construct 10, the mean is 1,733 and SD is 6,3968, this indicate very high level of disagreement , The students do not like online classes at all. This could be to inability to focus on screens for a long time, problem with technology, more time consuming than lectures.³⁶

RECOMMENDATIONS

Computer and technological literacy and competency has become necessary for students in pursuit of today's modern education. The following are the recommendations for the university academic administration:

- a. To offer backup generators in student residences.
- b. To provide portable inverters to students living in their homes.
- c. Allowing students to attend face-to-face classes.

CONCLUSION

The study examined how undergraduate students studying natural science at a South African university felt about Microsoft Teams in the wake of the COVID-19 epidemic. According to the survey results, all students agreed that the lecturers shared their PowerPoint, Excel and Word presentation well and that the internet outage during the online classes was caused by load shedding. It is evident that online learning helps to improve students' technological skills and their pedagogical skills. Most students were hesitant to speak up during the online course (Microsoft Teams). Students prefer in-person classes over online courses because they can interact with their classmates and lecturers. The use of TPACK and ICT has a positive impact on the teaching and learning process this have been published by many scholars across the world and is very much relevant to this study.

LIMITATIONS

The research was limited in scope because it only looked at data from students enrolled in the Natural Sciences course at the Faculty of Educational Sciences. The next stage is to do more in-depth study with a bigger population of all students enrolled in various courses at the same university.

³² Johanna Elizabeth Nieuwoudt, "Investigating Synchronous and Asynchronous Class Attendance as Predictors of Academic Success in Online Education," *Australasian Journal of Educational Technology*, January 28, 2020, 15–25, <https://doi.org/10.14742/ajet.5137>.

³³ Pitambar Paudel, "Online Education: Benefits, Challenges and Strategies During and After COVID-19 in Higher Education," *International Journal on Studies in Education* 3, no. 2 (September 27, 2020): 70–85, <https://doi.org/10.46328/ijonse.32>.

³⁴ Chris Dennis, "Online Learning Communities and Flexibility in Learning," in *Flexibility and Pedagogy in Higher Education* (Brill, 2020), 193–97.

³⁵ Vasile Gherheș et al., "E-Learning vs. Face-to-Face Learning: Analyzing Students' Preferences and Behaviors," *Sustainability* 13, no. 8 (2021): 4381.

³⁶ Gherheș et al., "E-Learning vs. Face-to-Face Learning: Analyzing Students' Preferences and Behaviors."

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ABOUT AUTHOR

Vuyokazi Momoti is currently a Laboratory Instructor and Researcher in Life Sciences (Botany, Zoology, Natural Sciences Education) at the Department of Mathematics and Natural Science Education, Faculty of Educational Sciences, Walter Sisulu University, South Africa. She is also a Doctor of Education candidate at the Atlantic International University.