A PERSONAL REFLECTION ON COVID-19 ONLINE TEACHING, LEARNING, AND ASSESSMENT WITH SUGGESTIONS FOR RESEARCH

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Introduction and Background

COVID-19 had a severe impact on teaching and learning in schools and tertiary education institutions. Human Rights Watch (Impact of Covid-19 on Children's Education in Africa, 2022) posits that due to the closure of many schools in African countries, a significant majority of learners were excluded from continuing their education as learning and teaching halted. The pandemic has also had its effect on the higher education sector within the South African context, however, data about non-attendance and drop-out seems not to be freely available as revealed by searching online. Nonetheless, it is reasonable to assume that there were drop-outs and non-attendance by students, however, not to the same extent as within schools as universities embarked on contingency plans to minimize dropouts. Nelson Mandela University in Gqeberha South Africa where the author of this editorial resides, implemented contingency plans within weeks of the COVID pandemic outbreak to offer students ICT devices on loan, *e.g.* by debiting it against their student accounts while Wi-Fi data access was secured through collaboration with internet providers. It appears that the university sector was able to be more proactive than schools, which can probably be attributed to the fact that the majority of universities have their own ICT infrastructures. In addition, many modules incorporated the use of ICT in various ways, including the use of learning management systems such as Moodle or similar. This resulted in many universities being better prepared to embrace the opportunity to extend online teaching, learning, and assessment in various forms during the COVID-19 pandemic.

At the same time, the challenge was not whether students had the behavioural intention to adopt online learning tools for teaching and learning, but to what extent lecturers in academia were ready and had the behavioural intention to do so as purported by the unified theory of acceptance and use of technology (UTAUT) theoretical framework (see Venkatesh, Morris, Davis & Davis, 2003; Venkatesh, Thong, & Xu, 2016). As such, the challenge within higher education was embracing forms of online learning which then leads to thinking differently about teaching, learning and assessment and this is in line with what Bond, Bedenlier, Marín & Händel (2021) argued, namely that COVID has had a significant impact on how academia perceives technology, as Information Communication Technologies (ICTs) had to be embraced to continue teaching and facilitate learning. Within the African context, specifically, South Africa, the above implied that academics had to embrace ICTs in existing and innovative ways. However, one of the major challenges seems to be that in many instances, many academics have not used ICT to the extent that was required from them then, as many had minimal knowledge of the *'how to'* and as such had to find their way through the proverbial forest, *e.g.,* either learning the *'how to'* on their own through self-discovery and experimentation, with assistance of colleagues and (or) training which was provided to them organised by their university.

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The above then paved the way for the focus of this editorial, namely, to personally reflect on my online teaching learning and assessment during COVID and post-COVID, as in our Faculty of Education, students are currently, *i.e.* in August 2022, continuing with online learning without traditional face-to-face teaching and learning in most of their courses and modules, while a hybrid mode is used in a few modules. Returning to campus is under review and this will then be implemented when the new year and new first semester commences in February 2023. Over this period of approximately four semesters, I had to redesign my courses (modules) to ensure online presence (see Garrison, 2007; Garrison, Anderson & Archer, 1999, 2009, 2010) and assisted staff members which enabled me to reflect on and contextualise my personal experiences.

As alluded to previously, the purpose of this editorial is to provide a personalised subjective reflection related to my own experiences and interactions concerning online teaching and learning, while being aware of personal bias playing a role in this reflection. My aim is not to provide a scientific editorial or paper utilising statistical tools, but merely to provide my subjective take while I do recognise that many readers' experiences related to COVID and online learning might reflect similar experiences and concerns while acknowledging that others might have had different experiences, and therefore could challenge my perceived opinions and even defeat them with grace. In the end, the qualitative reflective piece is my position at this moment and from a critical realist (see Benton & Craib, 2001; Sayer, 2000) position, my opinions are not reified, but open to change. In addition, I posit that my reflection can be viewed as a personal case study of online learning experiences and perceptions, as I am reflecting in depth in a real-world context on a contemporary real-life phenomenon (Yin, 2014), the case being personal-centred/related online learning perceptions and experiences. I do not present multiple data sources for triangulation purposes, nevertheless, I argue by using Stake's (1995) perspective that the reader is invited to interrogate my narrative and claims, to observe generalizations based on my claims, namely to agree with some of my perspectives and to disagree with others, or simply to disregard what I am stating in totality. In the conclusion section, I will make a final case for the importance of assessment integrity and quality concerns associated with the complexity of online teaching, learning and assessment while also suggesting possible research areas based on my reflection and personal experiences that could be pursued by academics informed by the shift in education praxis caused by the enduring COVID-19 pandemic.

Moving From a Traditionalist to an Online Presence Mode Was a Given Requiring Change

During this disruptive time, contrary to the traditional way higher education institutions (HEIs) operated (Iglesias-Pradas et al., 2021), one of the main challenges was how academic staff in numerous instances were not well-prepared to embrace this forced transition, as many were lacking the necessary skills to embrace online teaching, learning and assessment (Erlam et al., 2021). Despite this situation, academics had to continue to teach online and design online assessments. In many instances, the alternative to traditional face-to-face learning resulted in a shift to emergency online teaching where traditional teaching methods were simply continued but using ICT (Hodges et al., 2020). MsTeams or Zoom became the new delivery tools accompanied by email and Whatsapp to *'courier'* notes and assignments between the lecturer and student and *vice versa*. This mode where Ms Teams and Zoom are utilised has been referred to as *'Pedagogy Zoom'* an instructivist and teacher-centred pedagogy (Du Plessis & Blignaut, 2020). This type of teaching and learning is not embracing the full opportunities which online learning pedagogy provides, rather, it is an approach to retaining the *status quo* through traditional forms of teaching and assessment methods. On the other hand, utilising an online Learning Management System (LMS) such as Moodle, BlackBoard, CANVAS, *etc.* affords an online learning experience which has the potential to extend emergency teaching, yet, the mere availability of using familiar teaching methods such as the provision of notes, links, videos, *etc.* could result in the use of LMS in a repository mode which does not extend the learning envisaged. For online learning to harness its full potential of learning, the principles of social presence, cognitive presence and teacher presence should be explicitly integrated into the planning, made present or visible (Garrison, 2007; Garrison, Anderson & Archer, 1999, 2009, 2010) which can be daunting to implement to the extent that it is required for many experienced and novice academics, something which I also grappled with. Invoking these presences was something I tried to harness and this will hopefully become prevalent in the subsequent sections. Table 1 compares my pre-COVID and in-COVID teaching and learning context.

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Table 1
Comparing My Pre-COVID and In-COVID Teaching and Learning Context

	Pre-COVID	During-COVID
Teaching	• Face-to-Face • Eclectic: Lecturing, Group work, Discussions, Cutting-and-pasting and manipulating media, Methodology in the context of the topic and student Presentations	• Screen-to-Screen • Eclectic: Lecturing, Discussions, Cutting-and-pasting and manipulating media, Methodology in the context of the topic and student Presentations [Not the same *'quality'* of interaction] • WhatsApp group discussions and clarifications • MS Teams Chat
Traditional tools	• Chalkboard and whiteboard	• Electronic Whiteboard [e.g. Ms Whiteboard or Whiteboard in Zoom]
ICT Tools	• Email, YouTube and Moodle as a repository for sharing of material and links	• Email, YouTube, Moodle as teaching, learning, sharing of material and links, assessment tool and feedback tool • Ms Whiteboard sessions with voice • Ms Teams Chat option during contact sessions
Material	• Comprehensive and detailed module material with content, links and homework AND study letter printed as one document • No recordings of contact sessions • PowerPoints (if used), links to online material and YouTube videos are made available on Moodle	• Comprehensive and detailed module material with content, links and homework AND and study letter online available separately for each unit in pdf • Recording of each Ms Team contact session made available on Moodle • PowerPoints (if used), links to online material and YouTube videos are made available on Moodle
Assessment	• Uploading assignments to Moodle • Paper-based assignment: Lesson plan OR Poster without using ICT tools • Two to three smaller semester tests in a controlled setting on several units on campus: short, medium and longer questions [Not a test after each unit] • One final sit-down examination in a controlled setting on campus: short, medium and longer questions • Excluded from the final exam if the year mark is less than 40%	• Online reflections • Online forum discussions • Uploading assignments to Moodle: Individual and Group assignment • Paper-based assignment: Lesson plan OR Poster to be designed using ICT tools where possible • Online MCQ test after every unit or every second unit module in a non-controlled setting • Two to three larger MCQ tests during the semester on larger three or more units: Mid-semester and at the end of the semester • No exclusions, final mark of 50% to be obtained to pass – Continuous assessment
Support	• Question time during contact sessions • Appointments in my office • Email responses to questions • Test memorandum provided on Moodle • Questions about the test discussed during classroom time • Homework discussed during class time	• Question time during online contact sessions • Appointments via Ms Teams • Email responses to questions • WhatsApp group: Students and lecturer engage with anything related to the module • WhatsApp group: Share and discuss queries about the tests questions after every test • Posting written and drawn images and voice notes to explain answers which are queried • Homework uploaded as evidence of completion and discussed during class time
Assessment weighting	• 20% for assignments, 30% for two to three large tests reworked to 100% as the year mark (50% weighting) and 100% of the sit-down exam mark (50% weighting)	• 15% for online reflections and discussions and forums, 30% for online assignments, 25% for unit tests and 35% for larger tests adding to a total of 100% continuous assessment.

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Teaching Style Compromised or Not?

Using a personal perspective, I will be reflecting on my own experience of having to design and facilitate three Intermediate Phase Mathematics Methodology modules during 2020 forming part of the *'old'* B Ed Intermediate Phase programme and the design and implementation of three new Intermediate Phase Mathematics Methodology modules for our new B Ed Intermediate Phase programme in 2021 and 2022, modules where most of the class sizes ranged from 100 to 160.

I have to admit from the outset that how I would have *'preferred'* to teach, interact, and informally and formally assess my students did not materialise due to some of my pedagogical initial limitations and my limited knowledge about online learning, *i.e.* using MsTeams, Whatsapp and Moodle as Learning Management System (LMS). My teaching style is eclectic, as I prefer to utilise pedagogical practices associated with behaviourism, cognitivism, social constructivism and constructionism. From a behaviourist perspective, *e.g.*, I utilise repetition, praise and positive reinforcement while from a cognitivist viewpoint I want students to process information through meaningful interactions such as individual problem solving, planning, execution or implementation, self-reflection, *etc.* I believe that it is important to promote Bloom's taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956), as well as the revised taxonomy of Anderson et al. (2001) to promote thinking on all cognitive levels as presented in all six levels by the associated action verbs. The social constructivist and cooperative learning dimension is catered for, *e.g.*, through utilising jigsaw, problem-solving groups, discussions, group presentations, collaborative design of and the presentation of lesson plans and its execution in a micro-teaching context to receive on-the-spot constructive feedback from myself and their peers.

I also prefer that students experience the introduction and development of mathematics teaching-facilitation in a hands-on classroom space, *e.g.* when teaching perimeter and area of squares, rectangles, triangles and parallelograms; I provide them with square grid 1cm^2 paper and then they draw the various shapes based on the sizes that I provide. They count, colour-in, cut-out, *etc.* and I use these activities to enable them to *'discover'* the formulas for the perimeter of a square and rectangles, as well as the area for all these shapes, thus I model how they could teach it. I am aware that the students know what the formulas are, hence they have the procedural and formula knowledge, but when asking them why the formula is what it is, many do not always have the conceptual understanding. The same applies when I engage with Pythagoras' theorem, why Pi is 3.14, why the formula for the circumference of a circle is πr^2 and why the area of a circle formula is . The same applies again when engaging with the different types of angles, triangles, interior, and exterior angles of regular polygons, *etc.* The tactile and visual dimension is thus vital from my perspective. I have provided my students with material to engage in during my lessons when I show them the *'why'* and the '*how to*', as well as providing opportunities to cement procedural fluency. The focus was thus not just on theory and academic readings, as it is evident from the above that I also opted to focus in my online class sessions on showing the *'how'* one could hands-on explain and (or) let learners experience how to find formulas or to make deductions by being practically involved, while I also require that my students interact with aspects related to calculations related to the content, *i.e.* how to perform the calculations procedurally and accurately. Equally important, I also included online apps or software and simulations, *e.g.*, Geogebra, whenever possible to model the utilisation of online learning apps and software that can be used within the school classroom context when I teach. Another example, when I teach different methods of the four basic operations and order of operations in their first year, I prefer that students show and share which methods and strategies they used when they were at school, while I also provide them with several methods in printed format and then request them to individually, in pairs or threes or fours engage with these methods and to make sense of them by requesting them to explain what these methods entail. This is then followed by individuals, pairs or larger groups presenting their understanding(s) to the class.

Although I have tried to incorporate some of these ideas in my online class sessions, the responses of students have not been as positive as I envisaged. What I have noted, is that it was in many instances the same engaged students who responded consistently, and when some students were asked to provide feedback to a question, they were *'online'* in MsTeams, but NOT present online, as they did not respond while the system indicated they were connected. This might have been the result of students knowing that sessions are recorded, or they do not or cannot stay in front of the screen for all their online sessions due to possible *'screen fatigue'* or some might just not *'feel-like it'* responding at that time. In some instances, a student would 5 or 10 minutes later respond to a question which might be due to not being in a position to contribute at the actual point

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in time, or not being in front of the screen at that time or perhaps a friend has notified the student that the lecturer was directing a question to that person and they then subsequently responded. Although I was able to establish some form of teaching and social presence, I believe that this was not at the same level as I would have been able to do so within a face-to-face on-campus mode. Perhaps my perception based on the above is based on the fact that I relied too much on my Ms Teams' traditional lecturing interactions. However, on the other hand, it is also important to acknowledge that there is also the possibility that a great deal of learning has occurred by using both Ms Teams and Moodle, but due to my preference for the more traditional face-to-face on-campus model, this could have tainted my perceptions and experiences.

My Whatsapp group and individual interactions also increased with students, as students started to post questions to me and to the group which resulted that many students starting to assist their peers which also promoted learning. As such, social, cognitive and teacher-student presences increased which provided learning opportunities which were not harnessed before and this also showed me that the possibilities of alternative tools that I have not used previously offer great potential.

Assessment Conundrum

Pre-COVID, I utilised mostly sit-down written tests and one assignment for assessment purposes while also requesting paper-based reflections. COVID-19 made me rethink assessment as I started to map formative activities and formal activities to my module and unit outcomes. These included students required to engage with online reflections on module unit experiences, critical reflection on topics related to the modules, reflections based upon questionnaires related to determining personal learning philosophies and learning theory preference, group online presentations graded individually and as a group, online lesson plan assignments and online tests after each unit, as well as two to three larger online tests addressing multiple units. The weightings for each Mathematics methodology module have been indicated in Table 1. Previously, I did not assess to this extent.

The design and preparation of multiple-choice questions were very time-consuming as between 80 to 150 MCQs were set for each unit test counting between 20 and 40 marks and extra questions were designed for the larger tests to curb any forms of academic dishonesty. What made it more challenging is that online tests had to be opened for longer times due to load shedding, at times students could be without power for 2 to 3 hours once or twice a day when power outages were experienced at a regular interval. Having many more questions than required for the total of a test meant that no student completed the same questions in the same order nor did they all receive the exact questions, however, this required a great deal of extra time to set this range of questions and to set them in such a manner that students received questions on different cognitive levels. In addition, with large student numbers, it ~~has~~ also become extremely difficult and time-consuming to assess longer questions online, specifically when one wants students to draw examples to accompany their explanations, or to use fractions and equations due to the non-availability of certain software plug-ins in our current Moodle system. I followed the following process when designing my MCQ, namely the questions and answers were typed in Ms Word, then imported to Respondus where the layout and answers were checked again, and next the MCQ tests were imported to Moodle and all the settings were affected.

After each test was written, the test was re-opened for students to check their answers and to indicate to me as lecturer if there were incorrect ones. I checked and corrected answers where necessary and then run a recalculation or regrade for students on Moodle, after which the final test assessment marks were updated automatically. This checking period normally lasted for 24 hours and students were informed via email and on their Whatsapp group that tests were open for review. Where students needed an explanation, I provided a written explanation and (or) drawings where appropriate which were photographed and Whatsapp to the student and in some instances shared with students during our online presence sessions when using Ms Teams. Further engagements, if required, followed with students on an individual level, and also on the Whatsapp group as a whole when necessitated. I believe that these reflective and student(s)-lecturer interactions promoted learning and created social presence, teacher presence and thinking presence, and when more students engaged in the Whatsapp and MS Teams groups, it also promoted these presences to a larger extent (see Garrison, 2007; Garrison, Anderson & Archer, 1999, 2009, 2010). Regarding online assignment assessment tasks, students who struggled and did not achieve the minimum 50% for an assignment were provided with a second opportunity to achieve a maximum of 50% for their second attempt to not disadvantage students who scored above 50%,

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a practice which is in line with our Faculty of Education's humanizing pedagogy (see Salazar, 2013; Zinn, Adam, Kurup & Du Plessis, 2016).

Concerns Related to Online Learning from a Student Perspective

South Africa has one of the highest Gini coefficients in the world (Department of Statistics, 2020), thus it is argued that poverty played and still plays a vital role in limiting our students' ability to have access to all the resources that they would have had when they stayed on campus in hostels or near the university when there is face-to-face teaching and learning. However, due to the postponement of face-to-face tuition, students have not had the same contact with lecturers as previously while the data that they received were capped at 10 gigabytes of daytime data and 20 gigabytes of night-time data, something I alluded to in a previous section. Poverty, housing contextual conditions that the majority of our student population had to endure, connectivity issues, access to laptops or tablets despite being offered options by the university, as well as not being able to return to campus due to COVID regulations by many were some of the challenges that our students had to endure. These ICT-related and contextual challenges were not only a major stumbling block, as internet connectivity was also problematic since students received 10 gigs of daytime data per month which was not enough, as many of them reported that their data was depleted after 20 days of each month and did not have in many instances the financial resources to purchase more data. The 20 gig of night data was available from 00:00 to 05:59 which required students who had to access the internet to do so at times when they have to recuperate after their daytime sessions, resulting in many of them showing signs of sleep deprivation. This then also probably led to less online teaching and learning presence during online sessions, as well as less time to be in touch with me as the lecturer at certain times, thus influencing lecturer teaching and interaction presence. Equally important, this could also have impacted opportunities to review the recorded Ms Teams online class session videos which were made available after each class on Moodle.

Concerns Related to Online Learning From a Personal Perspective

The quality of my assessment instruments, especially the online tests, did not cause my greatest concern, as I have indicated in a previous section how I have tried to ensure that the assessment was fair and addressed different cognitive levels for each student without students having to answer questions at just one level. What was my main concern was that I started to have doubts regarding the reliability of online assessment tests, *i.e.* whether I would obtain similar results if my students wrote the tests in a controlled environment as before or when measures could be implemented where student cameras had to be switched on, including browser locking while they were completing online assessments. Despite these measures of cameras and browser locking, I believe that there would still be challenges if online assessments are not conducted in a traditional secure venue, either online or through paper-based assessments. These doubts arose as there is a possibility that some students might *'sit'* together when responding to a test – even when they do not write the same test due to having a large question bank to select from and (or) the possibility that someone else might assist when writing the test, and (or) someone else might be writing their tests. Furthermore, without browser locking and even with it, there is still the possibility to search for answers online on a second device even if the questions and online answers found are not identical, but similar. On the other hand, trying to find the correct answer online, though not identical, might again create a learning opportunity also. Another concern was the provision of a longer time frame window during which online tests could be conducted due to load shedding schedules as a result of electricity issues that our country experiences. These longer time frames have the potential to create opportunities for screen image capturing that can easily be shared via email, Messenger, Whatsapp, *etc*. It is thus quite possible that due to the non-controlled assessment environment, possibilities for academic dishonesty can increase (see Comas-Forgas, Lancaster, Calvo-Sastre & Sureda-Negre, 2021; Janke, Rudert, Peterson, Fritz & Daumiller, 2021; Erguvan, 2021) and that is something that I have wrestled with, although I do not have evidence to substantiate this concern or claim.

In addition, I have also compromised my assessments, as in many of my online tests, the focus has become more on procedural fluency, however, this resulted as I have realised from my assessment analysis that many of my students do not have the Mathematical procedural fluency as expected on an Intermediate Phase level grade (grade 4 to 6), including Senior Phase level (grade 7 to 8), and hence I had to make provision that they

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also show the ability to perform certain calculations. As an experienced Maths lecturer, I consider that both procedural fluency, as well as conceptual understanding, is vital. Thus, if one only focuses on conceptual understanding, it does not imply that a student can engage with calculations in front of learners in a classroom context without a calculator, for example, or even with one and procedural fluency is also vital. As such, I posit that my cognitive and teaching presences might have been compromised in general as a result of online learning which I believe would not have been the case when on campus during face-to-face sessions instead of screen-to-screen sessions. Lastly, providing two opportunities to write each test could have played a part in students obtaining a higher mark during the second opportunity, however, marks did not always increase for all students during the second attempt. Thus, providing multiple opportunities for each test, also created additional challenges and I would revise this approach in the future by taking the average of the two tests as the final assessed mark, rather than the highest mark of the two test opportunities.

Summing-up

The quality of assessment practices and the advocacy for the development of different assessment practices to the traditional sit-down examinations have been debated before the COVID-19 pandemic and have forced academics to re-think and reflect on their assessment practices which lead to different and innovative assessment approaches (Hughes & Tait, 2021; Twist, 2021). The disruption led to deeper critical personal reflection by myself and many international colleagues about the purpose of traditional assessments, however, at the same time, it is important to ascertain to what extent the pandemic impacted students' learning (Twist, 2021) and school learners' learning as indicated in the introduction section. As such, it is thus important to reflect and gather data to establish to what extent these *'pandemical-changes'* have impacted positively and (or) negatively on students' learning in higher education, as well as on learners at the school level. I noted that my averages for pre-COVID tests in my modules were significantly lower than those attempted during COVID while assignment results were quite similar on the other hand. This became a concern, as there is the possibility that the integrity of tests as assessments could have been compromised due to possible academic dishonesty. On the other hand, the provision of two opportunities to write a test with the highest mark awarded as the one taken could also have impacted this, but as Table 1 shows, a great deal of extra support in the form of recordings of online sessions, Whatsapp group discussions of queries, *etc*. to name a few only, might have also attributed to higher averages and *'better'* learning opportunities, as well as using MCQs more than longer questions.

One suggestion to assist with establishing to what extent learning has occurred, something I alluded to in a previous section, is to utilise formative assessment frequently. Liberman, Levin and Luna-Bazaldua (2020) have argued that formative assessment holds the key to ascertaining to what extent learners and students are learning, as it can be implemented in synchronous and asynchronous modes. In my context, students were provided with opportunities to formatively assess themselves when they were engaged with online examples during the contact session or when we discussed homework during the online session. As such, I as the lecturer was not able to see their progress, but the students could formatively assess their competence through self-assessment.

This then also raises the following questions that can be pursued, how frequently does one assess during a semester in order not to over-assess leading to possible *'assessment fatigue'* for the learners, students, teachers and lecturers? How do we ensure that online formative and summative assessments in all forms reflect the authentic *'work'* of the learners at schools and students at universities? How can one ensure and minimize possible academic dishonesty? How do we ensure that or determine whether our pre-COVID teaching and learning and in-COVID teaching and learning yielded not only *'better'* results but also *'better'* learning? What measures or instruments can we use to determine this? Are we retreating to the traditional pre-COVID pedagogy related to our teaching praxis and assessment, or not? Why or why not is this the case? Lastly, to what extent are the behavioural intention and actual usage of online learning tools continuing in a post-COVID society? The above are only some of the issues that could be explored through quantitative, qualitative or mixed method research. It is hoped that such research would feature in forthcoming issues related to Science and Technology in the Journal of Baltic Science Education and may the debate on the concerns and positive outcomes of online learning continue.

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