

# Postgraduate students' experiences with learning management systems at a selected nursing education institution in KwaZulu-Natal Province

N G Mtshali,<sup>1</sup> PhD; A Harerimana,<sup>2</sup> PhD; V N Mdunge,<sup>3</sup> MN; S Z Mthembu,<sup>3</sup> PhD

<sup>1</sup> School of Nursing and Public Health, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

<sup>2</sup> School of Nursing and Midwifery, College of Healthcare Sciences, James Cook University, Townsville, Australia

<sup>3</sup> KwaZulu-Natal College of Nursing, KwaZulu-Natal Department of Health, Pietermaritzburg, South Africa

**Corresponding author:** A Harerimana (alexis.harerimana@my.jcu.edu.au)

**Background.** Learning management systems (LMS) are indispensable teaching and learning tools in nursing education, and in recent years, LMS have become a cornerstone to support online learning, particularly during the COVID-19 pandemic. The South African (SA) e-education policy requires every teacher and learner in the education and training sector to be information and communication technology (ICT)-capable, and able to use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve their personal goals and be full participants in their global communities.

**Objective.** To investigate postgraduate students' experiences with learning management systems at a selected nursing education institution in KwaZulu-Natal Province, SA.

**Method.** An exploratory, descriptive research design was used, and the whole population of 16 postgraduate nursing education students who were exposed to Moodle as a learning management system participated in the study. Qualitative data were collected through semi-structured interviews, followed by focus group discussions, with thematic analysis used to analyse data.

**Results.** This was the first time that most participants had been exposed to an online learning course, and the experience made them feel empowered as it provided enabled reflection and deep learning. Participants indicated that the range of interactions and level of engagement determined the eventual level of knowledge constructed. The online facilitator played a central role in guiding and supporting students, and ensuring that they achieved the learning outcomes. The online learning benefits included increased socialisation, convenience and flexibility, asynchronicity and accessibility of learning material. The challenges were the lack of real-time response, financial cost and technical issues.

**Conclusion.** An intense ICT orientation for students is recommended to ensure that they are informed of the requirements before starting the online course. The online facilitators must be more visible in the online space, participate more often in discussions and stimulate constructive dialogue.

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Learning management systems (LMS) are indispensable teaching and learning tools in nursing education,<sup>[1-4]</sup> and in recent years LMS have become a cornerstone to support online learning, particularly during the COVID-19 pandemic.<sup>[5-8]</sup> Online learning, particularly the use of LMS, has grown exponentially in the sphere of general education, with information and communication technology (ICT) integrating the active learning principles of reflection, interaction and engagement.<sup>[1,9,10]</sup>

An LMS such as modular object-orientated dynamic learning environment (Moodle) provides a comprehensive educational process through its extensive educational content, control, monitoring and evaluating of knowledge quality,<sup>[11]</sup> hence improving educational outcomes.<sup>[4,12]</sup> Using an LMS has major implications for students and institutions, as it provides opportunities to create a well-designed, student-centred, interactive, affordable, efficient and flexible online learning environment.<sup>[13,14]</sup> Furthermore, LMS helps students to access learning resources and communicate with each other and teachers, both synchronously and asynchronously.<sup>[15]</sup>

Synchronous online learning involves interaction between students and facilitators at a specified time, despite the students and facilitators being in different places. The interaction is live, and requires all participants to be available for the specified period of time when the classes are held. Synchronous online learning can take the form of texts, chats and/or video

conferencing.<sup>[16,17]</sup> Teachers and students experience synchronous learning as being social, with students feeling like participants rather than isolated.<sup>[18,19]</sup>

Asynchronous online learning allows students to work at their own pace and preferred times, and can include email or online conferencing. The most important element of this type of learning is that students need not be present at the same time or in the same place as the other students with whom they are communicating or from whom they are learning, although they might be online at the same time by chance or plan.<sup>[16]</sup> Asynchronous online learning is the most revolutionary aspect of online learning, freeing students from time and space restrictions.<sup>[15,20]</sup>

Learning management platforms encourage peer interaction, with students obtaining personalised guidance from the facilitator when necessary.<sup>[21]</sup> The facilitator brings value to the course by holding participants accountable for the various learning objectives. Through the interactive component of facilitated online learning, the facilitator can judge whether the participant grasps the content.

Increased demand for online learning has provided many opportunities for teaching institutions, students and faculty, but has raised a number of challenges, including designing and implementing e-learning platforms such as Moodle, providing the required infrastructure, and ensuring adequate computer literacy of students and faculty.<sup>[2,22,23]</sup> Further hindrances

to the use of technology in nursing education include a lack of access to internet and ICT facilities, insufficient knowledge to use electronic devices, difficulty accessing required information, expensive internet subscription and the high cost of computers.<sup>[13,24,25]</sup> The literature indicates that lack of time and motivation on the part of faculty members poses a challenge to integrating ICT in nursing education.<sup>[2,24,25]</sup>

In order to meet the increased demand for nurses and simultaneously keep up with modern technology to meet students' needs, nursing education institutions face the challenges of changing not only their traditional pedagogical beliefs about teaching, but also the way they design nursing education.<sup>[26-28]</sup> Further complicating this milieu is the fact that the nursing curriculum is historically mandated and based on a model recognised as unresponsive to student preferences and needs.<sup>[29]</sup> This leaves nurse educators wondering what students perceive as appealing and motivating in their online learning experiences. This study, therefore, aimed to investigate postgraduate nursing students' experiences regarding their interactions while participating in an online course at a selected nursing education institution in KwaZulu-Natal (KZN) Province, South Africa.

## Methods

The exploratory, descriptive research design was guided by the naturalist interpretive paradigm to understand human thoughts and actions, as well as obtain deep insights and information about the phenomenon of online learning from the perspective of postgraduate nursing students. This approach allowed the researcher to examine life experiences in an effort to understand and give meanings to each phenomenon.<sup>[30]</sup> The research setting was a nursing department at a selected university in KZN that offers both undergraduate and postgraduate nursing programmes. At the postgraduate level, the department started an online learning course in the mid-1990s, and later adopted an online learning platform, a modular object-orientated dynamic learning environment (Moodle), which was used for the first time in the 2009/2010 cohort of postgraduate students. The sample size was 16 participants who were purposively selected, all of whom were enrolled in an online learning module in the Master of nursing programme.

Qualitative data were collected through 16 individual in-depth interviews, each taking an average of 20 - 30 minutes, followed by two focus group discussions (FGDs), which took 1 hour, using a semi-structured interview guide consisting of five participants. The first part of the questioning for both the interviews and focus group discussions related to how students experienced online learning, and their attitudes toward the phenomenon. The second part explored students' perceived benefits, advantages, disadvantages or challenges of online learning, and their recommendations for improving online courses. Thematic analysis was used to analyse the data as per Braun and Clarke's<sup>[31]</sup> step-by-step process. This is a deductive, flexible qualitative research method for identifying, analysing and reporting patterns (themes) within the data.

To ensure academic rigour and trustworthiness, the following strategies were used: credibility, transferability, dependability and confirmability.<sup>[32]</sup> Credibility was ensured through a dense description of the collected data, and triangulation by combining the in-depth interviews, FGDs and analysis of the documents to clarify and validate the meaning of behaviours.

Transferability was ensured through a detailed description of the research participants, methodology and interpretation of the results, to allow future researchers to determine whether the findings could be applied to another research study. To ensure dependability, the researcher conducted data

quality checks or audits, peer review coding and consultation with qualitative researchers. Confirmability was ensured by taking field notes, recording and transcribing the interviews for cross-checking and verification.

Ethical clearance was obtained from the University of KZN's Humanities and Social Sciences Research Ethics Committee (ref. no. HSS/0940/011M), with gatekeeper permission being obtained from the selected nursing education institution before embarking on the data collection process. Codes were assigned to transcripts instead of participants' names to ensure anonymity and confidentiality.

## Results

Of the 16 participants in this study, the majority were female ( $n=13$ ), and most ( $n=13$ ) were in the age group between 20 and 35 years, while a few were aged  $>35$  years ( $n=3$ ) (Table 1).

Table 2 summarises the themes and subthemes that emerged from the study.

### Students' online learning experiences

It emerged that the students were provided with opportunities for: (i) self-directed learning; (ii) reflective learning; (iii) interactive learning; and (iv) ability and skills to use technology.

#### Self-directed learning

This was the first time that most participants had experienced an online learning mode of content delivery, with some indicating that it met their educational and technical needs. It empowered them to be self-directed students, with participants noting:

'It was the first time I engaged in such a learning methodology, and the experience was a great one ... For the first time in my life, I felt in control of my learning and felt in charge.' (student 6)

'My experience is that the online learning course facilitated my initiative, I had to drive my own learning, I learnt to be self-paced, as I had to make decisions on when and where to access the course, took note of the due dates for discussions and posting of the learning activities.' (student 10)

**Table 1. Sociodemographic characteristics**

Student code	Gender	Age group, years	FGD
1	Female	31 - 35	FGD 1
2	Female	20 - 25	FGD 1
3	Female	20 - 25	FGD 2
4	Female	26 - 30	FGD 1
5	Female	20 - 25	FGD 1
6	Female	20 - 25	-
7	Female	26 - 30	-
8	Male	31 - 35	FGD 2
9	Male	>35	FGD 2
10	Female	>35	-
11	Female	20 - 25	-
12	Female	>35	FGD 2
13	Male	31 - 35	-
14	Female	20 - 25	FGD 2
15	Female	20 - 25	-
16	Female	26 - 30	FGD 1

FGD = focus group discussion.

**Table 2. Themes and subthemes**

Theme	Subtheme
Students' online learning experience	Self-directed learning Reflective learning Interactive learning
Degree of interaction and engagement	Ability and skill to use technology Student-to-student interaction Student-to-facilitator interaction Student-to-content interaction
Role of the facilitator	Technical support, encouragement, motivation
Benefits of online learning	Increased socialisation Convenience and flexibility Accessibility Asynchronicity
Challenges of online learning	Lack of real-time response Financial cost of the technology Technical issues Internet and computer access
Recommendations for improvement	Provide timeous feedback from the facilitator Improve and enhance online learning experiences Invite subject experts to visit online space

### Reflective learning

The participants indicated that the nature of the online learning discussions provided them with time for reflection on their learning, and opened a safe space for dialogue where they did not feel as threatened by others as they did in the face-to-face classroom setting. They preferred this mode of learning, as evident in the following quotes from the FGDs:

'Online learning allowed us to debate our viewpoints freely, without the fear of the facilitator or other students judging you or passing remarks or expressing negative facial gestures.' (FGD 1)

'We could work independently and be able to come out with your own ideas ... it was interesting that you could also agree with people independently not being influenced by how you are thinking.' (FGD 2)

### Interactive learning

They not only learned by reflection, but also by exploration, introspection and interaction with the facilitator and other students, and sharing information within the group. The online learning experiences encouraged deep learning, as indicated by the following observations:

'I found it better than the face-to-face because with texting, it's easy to think about what is learnt, correct and refine what I wanted to communicate to the rest of the group ... rather than just open classroom discourse because with the latter what you have said you cannot take back.' (student 3)

'Understanding of the readings has to be greater when you're a student online than when you're in the classroom, because these are your ideas, you have to pull ideas from the readings, gave a deep thought from them and from various other resources then responded.' (FGD 1)

### Ability and skills to use technology

The participants indicated that in order for their learning experience to be fruitful and productive, they needed to be technologically comfortable and

confident in their ability to use computers. While the majority had some computer skills, they initially found the new experience of online learning challenging, which made them feel anxious, stressed and/or apprehensive, as indicated by the following views:

'I was comfortable since I had the skill already of using the computer, but it was frustrating and stressful at first because I was exposed to this type of learning for the first time. My skills eventually grew from strength to strength.' (student 7)

'Once you engage with online learning ... your computer and searching skills become sharp and you gain confidence as you practise all the time so I can say it was a good learning experience.' (student 9)

'I gained computer skills and it became more and more interesting.' (student 2)

Some indicated that they had thought they knew how to use technology, but did not realise how much depth it had in terms of the skills required. Some had not felt comfortable using the technology and had to quickly develop computer skills to bridge the gap, as indicated:

'I had minor computer skills, although I didn't have formal computer training ... I like the computer and I use it a lot preparing my stuff. Online learning really improved my technology skill and confidence.' (student 14)

'I would say I had some background knowledge and confidence on technology use; however, with online learning, I was unsure because I had never been exposed to it before ... but because I knew how to use the computer, it wasn't really difficult.' (student 11)

'I was uncomfortable and had no confidence because I had little technology experience but with the help of the colleagues, I slowly gained the skill and managed to pull through.' (student 3)

'While I had some skills, it was not enough, but as the course progressed I developed the skill.' (student 16)

The participants had mixed feelings, with some perceiving online learning as individually paced, autonomous, motivating and competitive, as reflected in their comments:

'I think when you're an online student, you have to pull ideas from the readings and from various other resources ... and they are your own ideas to others.' (student 4)

'It felt more competitive because I could see everyone's work; I wanted to outdo the other people ... and at the end, get satisfaction from it and that for me was rewarding and encouraging.' (student 13)

'I had to read extensively and engage with the material twice or even thrice because I needed to understand it ... I needed to push so as to be at par with others.' (student 1)

### Degree of interaction and engagement

Interaction emerged as an important aspect of online learning, being described as the opportunity to access a range of opinions and information. The participants revealed how the degree and/or level of interaction with other students and the facilitator was an essential aspect of the learning process and student success. It was increasingly possible for them to interact with one another, even when geographically separated. Most cited interactivity as the most beneficial aspect of online learning. The sub-categories that emerged were: (i) student-to-student interaction; (ii) student-to-facilitator interaction; and (iii) student-to-content interaction.

#### Student-to-student interaction

The students used one another as resources and for support by commenting on the information they collected from various resources, and the observations and experiences of others. They felt that the peer student interactions were open and active, with a high degree of intellectual engagement, with online discussions viewed as useful, well thought out, of a deep-learning nature and requiring them to be active learners, as indicated by their comments:

'I believe my role was to participate and communicate with other students and discuss the things that were part of the curriculum module we were doing.' (student 4)

'Interactivity was really important for all students. The way the discussion forums were structured really helped us to be grounded in what we were learning.' (student 2)

'The level of engagement was amazing ... It was professional and everybody was active, you could not have dodged, you had to write own view then other people would critically analyse and debate around one's thought until the views were clear and acceptable to all.' (FGD 1)

While many participants were satisfied with the level of online interactions and engagements, some of them felt that the student-to-student interactions and levels of engagement were insufficient and not up to the level they had expected them to be. Only a few students initiated the discussions and debated the issues, generally the same few, while some students took a long time to respond to postings and had to be probed by the facilitators to interact. This is illustrated in the following extracts:

'We were struggling to all engage as a group ... other students would post one comment as though it was a task to be fulfilled yet in my views and

understanding, the module was meant to allow ongoing conversation ... the interaction was poor in my view.' (FGD 1)

'There were few students who would initiate the discussions but it took too long for others to respond thus rendering the whole discussion slow and dragging for long.' (FGD 2)

'At first there was not much interaction, as individual just posted their work and nobody would comment ... the facilitator had to stimulate the discussion and even invite us by names to get us started.' (FGD 1)

#### Student-to-facilitator interaction and engagement

The facilitator was viewed as supportive and very helpful, giving instructions relating to the module, providing various other communication or feedback and guiding the online discussions. Some participants stated that:

'The facilitator engaged us in critical debates and provided topics that would stimulate active debates and deliberations.' (FGD 1)

'We would sometimes find comments from our facilitator, showing us where we were in terms of the course content ... she would also highlight where we needed to go for more information.' (FGD 1)

'The facilitator monitored our discussions and encouraged those who were less involved to put effort up to the extent of assigning specific work for them.' (FGD 2)

'She was good ... diligent to check if we had done the work like posting of the task, she would always remind us about the deadlines so that we can put effort.' (FGD 2)

#### Student-to-content interaction and engagement

The online learning experience allowed for interaction with and about the content, and afforded the students an opportunity to interact with the module content before interacting with the other students and/or facilitator, as indicated in their comments:

'In the past, interactions only occurred in the classroom, and almost solely between teachers and students ... now we are introduced to the modern e-learning interaction tool which makes the learning experience more worthwhile and valuable.' (FGD 1)

'Interactions among students and the facilitator and the content can be independent of time and place.' (FGD 2)

'Online learning afforded us more time to read our books, understand the content well before clicking into Moodle. You must have understood the section before being challenged by others ... be able to defend your views.' (FGD 1)

#### Role of the facilitator

The most important role of the online facilitator was to model effective teaching and learning. Furthermore, facilitators were responsible for keeping the discussions on track, contributing special knowledge and insights, weaving together various discussion threads and course components, and maintaining group harmony.

#### Technical support, encouragement and motivation

Participants perceived the facilitators' online role and qualities as very important for facilitation and enhancement of learning. They regarded the facilitator as giving technical support, encouragement and motivation, as indicated in the following excerpts:

'As adults who were not used to the computer, the support and encouragement she offered were great and remarkable which made us to pull through till the end of the course ... at the same time, making sure we achieve the learning outcomes.' (FGD 2)

'Our facilitator had a positive attitude and very supportive, you would think you are doing great because of the encouraging comments, once commended us on the depth of the discussions we were engaged on.' (FGD 1)

'Since I was not comfortable with the technology, she eased my frustration by giving technological support and guidance which was evident in the orientation she conducted and throughout the module, since she knew that we were not familiar with technology and as they say ... technology immigrants.' (student 9)

While most participants revealed that the facilitator was approachable, non-judgemental, supportive and professional, some perceived that there was an element of anonymity in the online environment, as indicated by the following views:

'When we were meeting face-to-face and motivated us to keep up the good effort. She was concerned about the problems we were facing as online beginners, and she would ask us individually.' (FGD 1)

'The facilitator was helpful to those students who were shy and not as verbal ... however, I feel that our relationship with the facilitator lacked personal connection.' (FGD 2)

'Obviously, face-to-face interactions and body language were absent ... I was just thinking about the missing piece and uncomfortable ... You need connectedness with the facilitator.' (FGD 1)

## Benefits of online learning

The students found the true power of online learning in its potential to share and exchange information, and its convenience and flexibility in allowing them to work at their own pace. Four subthemes emerged: (i) increased socialisation; (ii) convenience and flexibility; (iii) asynchronicity; and (iv) accessibility.

### Increased socialisation

The participants viewed their relationships with other students as increased socialisation. They shared information, supported each other, worked with groups and made a continuous effort to improve their writing skills, as their colleagues read all their work. They valued each other's contributions and perceived a sense of equality in the course, as noted in the following:

'The online environment is a public and permanent academic platform ... everyone is able to see one's strengths and weakness of others ... but usually, we were supportive to each other.' (FGD 2)

'The online environment provided an opportunity to learn about other students' clinical practices ... and to connect with people from other countries.' (FGD 1)

### Convenience and flexibility

Many of the participants described flexibility and convenience as the most beneficial features of the online learning environment. As adult students, they appreciated the flexibility of being able to control time, place and pace, as indicated below:

'I already had experience with computer, but I still learned new ways to optimise my use. The benefits were that you attend to your work twenty-

four seven at your own tempo ... you are not confined in one place in one time; any time is suitable especially as mature learners.' (student 4)

'I could attend my online tasks or assignment anywhere ... anytime at my own convenience ... that was nice. For me the benefits are the flexibility of time ... eh ... I think it's a good method for adult learners.' (student 2)

'You access it wherever, whenever ... you pace yourself, you decide when you want to do the work ... for me that was the key benefit ... It allowed me to conduct my work in my own space, at my own speed, at my own suitable time.' (student 13)

### Asynchronicity

Asynchronous learning refers to learning where the instructor, the learners and other participants are not engaged in the learning process at the same time, and there are no real-time interactions. Asynchronous online learning allowed the students to work on their own, anywhere, in their own time and to log into the online space whenever they were ready. Participants indicated that the asynchronous discussions and chats allowed time for reflection, to mull over ideas, refer back to previous messages and take any amount of time to prepare for responses, as reflected in the following comments:

'The module gave us more time to think about what we wanted to post ... I could make my point, write everything out, and made sure I wrote what I wanted to write.' (student 7)

'You can express your thoughts without interruption ... You have more time to reflect on and respond to discussions and other students' comments, and since the time frame is longer you are able to refine responses before posting.' (FGD 1)

'Of course, we didn't have a situation where people would want to take over the class discussion ... instead, we all had opportunities of thinking hard of what we wanted to say and the shy people could also participate more ... everyone got to say what they wanted to say.' (FGD 2)

### Accessibility of learning material

The participants regarded the online environment as flexible and convenient, and providing access to many resources. Technical support was available to students from the facilitator and their fellow students, and the course-ware and related tools facilitated learning. They highlighted the benefit of course orientation, as it eased the stress related to the online learning experience, as indicated below:

'E-learning was very good because one can combine family life and career together and learn at the same time.' (FDG 2)

'I enjoyed learning and using the internet and finding articles online ... That was really exciting and fun.' (student 1)

'The orientation was good, the facilitator showed us what was expected from us, how to use password and log on, write and post messages, we did that repeatedly and told us that was the manner we were to communicate and interact.' (FGD 1)

'The orientation afforded us the opportunity to get acquainted with the programme and how we could navigate through the system.' (FGD 2)

### Challenges of online learning

While online learning may have numerous benefits, the participants mentioned some of the challenges that had hampered their learning experiences. The most frequently mentioned ones were: (i) lack of real-time response; (ii) financial cost; (iii) technical issues; and (iv) issues of internet and computer access.

## Lack of real-time response

In the online learning experience, students found it difficult to work with peers on group work, with the majority not actively participating in the work assigned to the group. Another drawback of working online was that they did not receive immediate feedback from the facilitator or their peers. Unlike the more traditional way of learning, where they would receive help or prompt feedback during a class, they had to wait to get responses from peers and/or the facilitator, as some explained:

'You felt like you were just all alone. I just thought I was typing into space or something ... and there was no one on the other side.' (student 10)

'The feedback from the facilitator I think it was not enough because after the deliberations about the activities with other students about the topic posted to us, the facilitator's comments will be delayed ... we needed her input right when we were also online.' (student 8)

'Feedback from the facilitator was not as expected ... I guess it's because she had so much workload during this semester, I was not sure about the validity of our discussions in terms of meeting the module objective.' (FGD 1)

'You do expect feedback so that you know that you are in the right path and that was very limited ... sometimes until the next topic is commenced ... you see there were set dates for postings and we needed to know if we were in the right direction before proceeding to the next tasks.' (FGD 2)

## Financial cost

Financial cost emerged as a challenge, as some participants had to purchase computers and arrange for internet access, costs that they had not catered for, as indicated in the following excerpts:

'It was costly for me, because I had other plans. I did not know that the module was going to be conducted online, I had to buy a laptop and also had internet installed.' (student 12)

'The cost was a challenge because I had to travel to the university LAN from work or home to access the computer and internet ... eventually, I had to buy the laptop which was not budgeted for.' (student 2)

'I had to apply for the internet to be installed at home because it was not possible to make through the whole module without internet, and when you have internet, you worry about the cost.' (student 1)

## Technical issues

Some participants highlighted their frustrations with the technological problems they encountered, which sometimes distracted them from effectively contributing to the online learning sessions:

'Most of the time I used to access online at home it frustrated me because my system was not of good quality, the bandwidth was limited and slow operating.' (student 11)

'Losing my postage was quite stressful you would only realise when there is no response towards your discussion and another problem which made me feel like a fool when I was unable to edit or delete the posted message when I discovered it had flaws.' (student 16)

'Sometimes I was not able to access Moodle and thus would not be able to contribute to the discussions. This was wearisome because I would lose important engagements with my peers ... it meant having double sessions the next time you access the online class.' (student 6)

## Issues of internet and computer access

Issues related to internet and computer access surfaced as a matter of concern for most of the participants, with some only being able to access the

online material at home where they had little technological support, while others had computer access both at home and at work. Some participants had no computer at home, and had to travel to an internet café or the university to access the online module, as a number of students explained:

'I did not have access to computer and internet at home, so I had to drive to the campus or drive to the internet café to attend to the online tasks and activities assigned to us. I had a computer with internet at home but I was not familiar with the technology at times I would struggle to try to log in to access material but with the help of the children I ended up doing it on my own.' (student 15)

'I was particularly disadvantaged by the fact that I did not have access to the internet at home or in my office so I had to go to the campus or drive to the internet café.' (student 8)

'At the commencement of the module, I had no computer and no internet and could not access the work at home which was an inconvenience on my side but I bought the computer ... as time progressed I had the internet installed.' (student 14)

## Students' recommendations for improvement

Three recommendations emerged from this study: (i) getting timeous feedback from the facilitator; (ii) improving and enhancing online experiences; and (iii) inviting experts on the subject to visit the online space.

### Timeous feedback from the facilitator

Participants suggested that timeous feedback from the facilitator was very important, and students reported that they wanted prompt responses to technical problems, as expressed in the following excerpts:

'I think being accessible ... I mean the facilitator ... and responding in an appropriate time frame would help because if we type our posting ... we hanged on, waiting for responses.' (student 11)

'It is just responding and knowing that the facilitator is actively involved in what we are doing that makes all the difference.' (student 2)

### Improve and enhance online learning experiences

The participants also highlighted a number of recommendations that they felt would improve and enhance the online learning experiences. These included that the facilitator could be more objective and more encouraging of their contributions, and that the quality of the content could be enhanced to ensure that it was always relevant to the subject being covered. These recommendations are reflected in the following statements:

'The use of various learning options can stimulate student participation and interaction ... few examples include small online group discussions, polling activities and one-on-one message exchanges to name what I can think of.' (student 5)

'The facilitator should always consider such things as the tone and content of the posting and time of the posting in relation to the tasks at hand.' (student 16)

'The online facilitator needs to be content if two or three well-articulated, major points are communicated in a particular thread of discussion.' (FGD 1)

'It is important that the material is always relevant, questions and activities developed for students should relate to the student' experiences.' (FGD 2)

### Inviting experts on the subject to visit the online space

One participant suggested that it would be a good idea to invite an expert(s) on the subject to visit the online space to comment on the students' postings, as stated in the following quote:

'Guest experts could be invited to join the online conversation with students to respond to posted contributions or so ... students can then ask them questions.' (FGD 1)

## Discussion

LMS and online learning have gained popularity in recent years, particularly during the COVID-19 pandemic.<sup>[8,33-35]</sup> The pandemic has forced academic institutions to suspend their face-to-face classes, and students to learn remotely in order to maintain social distancing.<sup>[33,34]</sup> Studies have reported that online learning provides people with flexibility, convenience and varied learning opportunities.<sup>[33,36-38]</sup>

Online learning systems such as Moodle help nursing students to meet their educational needs, improve their technical skills and be self-directed, reflective and collaborative.<sup>[4,39-40]</sup> Online learning provides the opportunity to access online reading material and participate in discussions and doing assignments. Online learning allows students to reflect upon each message posted, provide an adequate response and participate in a thoughtful manner, which is more considered and reflective than is possible in a face-to-face session.<sup>[2,13]</sup>

Collaboration among students is essential in online learning. It allows them to support each other and work within online groups, as allocated by their facilitator, and make continuous efforts to improve their writing skills as colleagues read all their work.<sup>[13,25]</sup> The use of technology requires the users to have a certain level of competence, with Vonderwell *et al.*<sup>[41]</sup> noting that a good understanding of the required tasks and adequate writing skills were needed by online students to explain themselves fully and appropriately, and was influential to the success of the discussions. They found that online learners who were inexperienced and lacked writing skills struggled to comply with the writing conventions that emerged in the discussions, which made them appear less competent and unable to complete the course requirement.

It is essential to ensure that the students have adequate computer skills on enrolment to avoid the technology-mediated learning environment's challenges. Online learning is challenging for students with limited digital skills, and students may experience anxiety, fear and/or apprehension.<sup>[42]</sup> In this study, students reported not being comfortable using technology at the course outset, and they had to make a concerted effort to develop computer skills to bridge the gap. Supporting these findings were Meyer *et al.*<sup>[43]</sup> who contended that they had experienced feelings of discomfort and insecurity during the initial phase of their online study due to their inadequate level of information technology (IT) skill, but that after initial feelings of chaos and not trusting their abilities, they started to take charge of the situation by developing the necessary skills.

Being computer illiterate adversely affects students' learning, and requires more training before embarking on the course.<sup>[44,45]</sup> Students who are computer illiterate find online learning difficult and not an ideal medium for learning, as they have to learn and interact with the instructor, students and content without having the necessary technology skills.<sup>[18,46]</sup>

Access to the internet and a computer positively or negatively affected the students' learning outcomes and their perception of online learning, as reported in this study. Takalani<sup>[18]</sup> found that many students did not own personal computers, and therefore had to work at designated venues or centres where they could access the necessary resources. Other studies<sup>[46-48]</sup> also found that while some students had computers, not all had internet

connections in their residential areas. The difficulties they faced gaining internet access made online learning a challenge. Access to a computer and the internet allows students to fully enjoy online learning benefits, including convenience and flexibility, interactions with colleagues and facilitators, and active engagement in their learning, irrespective of where they are.<sup>[2,13,49,50]</sup>

The facilitator plays an important role in online learning, and can enhance student engagement and deeper learning. According to Vonderwell *et al.*,<sup>[41]</sup> the instructor's feedback is an essential element of online engagement and is important for student learning. The authors suggested that instructors need to guide the learning and facilitate discussions by responding to individual students' questions and to the class as a whole.<sup>[41]</sup> Liu *et al.*<sup>[51]</sup> concur with the findings of this study in that an online facilitator should use various instructional techniques that foster understanding of the key concepts of the course and provide timely feedback. In contrast to these findings, Ivers *et al.*<sup>[52]</sup> indicated that their participants complained that they had experienced a lack of instructions and communication from the instructor, which left them feeling overwhelmed, excluded and intimidated by the online experience.

Although the use of Moodle for the online learning environment was experienced positively in this study, several challenges were reported that hampered student experiences, such as lack of real-time response, financial costs and technical issues. Unlike face-to-face classroom situations, where students can receive help or prompt feedback during lessons, the participants indicated that online sessions required them to wait to get a response from their peers and the facilitator. This finding echoed that of Kim *et al.*,<sup>[53]</sup> whose participants stated that they found online learning very challenging when there was a lack of opportunity to receive feedback or answers in real time. Wang and Woo<sup>[54]</sup> also highlighted a lack of immediate response from others as a challenge, with students not participating simultaneously. In this study, the participants also felt that the lack of real-time responses led to social isolation and ineffective group work. According to Miers *et al.*,<sup>[55]</sup> students missed the social information they gain from face-to-face interactions within group activities, as online learning lacks the personal touch of being able to see someone. This results in the absence of eye contact or the ability to interpret body language, expressions and non-verbal behaviour and feel reassured of acceptance within a group. The findings are consistent with those of Gallagher-Lepak *et al.*,<sup>[56]</sup> where participants reported that they felt out of the loop and experienced feelings of aloneness in the online environment.

Financial cost also emerged as a challenge to those who had no computer and internet facilities at home. According to Meyer *et al.*,<sup>[43]</sup> students in their study were not sufficiently informed regarding the additional finances required for the course, such as fees for a computer and the internet. Furthermore, Childs *et al.*<sup>[57]</sup> noted that students voiced concern about their online course's financial implications, as they had been compelled to purchase computers, printers and internet access when it was not available at home or work. Another issue that was noted by Knowles and Kerkman<sup>[58]</sup> was the financial implication for students who are not computer literate and therefore take a long time to do their readings on the internet, particularly if the internet is accessed via a cybercafé.<sup>[59]</sup>

The participants in this study highlighted frustrations with the technological problems they encountered, which were viewed as distracting them from effectively contributing to the online learning sessions. Meyer *et al.*<sup>[43]</sup> reported that their participants experienced frustrations owing to technical problems

and a lack of technical know-how, which compromised their participation. These results are consistent with those of other researchers,<sup>[60-62]</sup> who state that students' frustrations and dissatisfactions resulted from technical problems and lack of technical support for IT management. Other researchers<sup>[62,63]</sup> have also referred to technical issues, arguing that computer glitches and slow operating systems distract students from contributing effectively in their learning. These IT problems need to be tabled as expected challenges to students at the start of the course, with suggestions about the actions that need to be taken when they manifest.

In order to improve the experience, the participants in the present study suggested effective facilitation of online learning and timely feedback from the facilitator. Facilitators need to encourage passive students to be more active, as participation is the hallmark of online learning.<sup>[56]</sup> According to Lofstrom and Nevgi,<sup>[64]</sup> relevance and meaningfulness of learning activities and content are central to the transferability of knowledge, which instructors should keep in mind when designing material for use with technological devices. This sentiment is further echoed by Berge,<sup>[65]</sup> who argued that instructors must develop activities for students that relate to the topic and are relevant to their experiences.

## Conclusion

The use of technology in education, particularly LMS for online teaching and learning, has numerous advantages owing to its flexibility and ability to offer learning to students irrespective of time and place, with self-directed, reflective and collaborative learning being key pillars. While students perceived the use of Moodle as an LMS positively, it is important to take into consideration the challenges that hamper online learning outcomes. These include insufficient computer literacy among the students, poor facilitation of online learning and financial constraints to purchase IT equipment and services. Therefore, it is essential to enhance students' computer skills at the beginning of their enrolment through an intense ICT orientation and continuous pedagogical and technological support in an online learning environment. The facilitator's role is vital in a technology-mediated learning environment, and needs to be visible in the online space, participating in discussions and stimulating constructive dialogue. Providing students with computers and access to the internet and online resources would improve their motivation to work collaboratively in an online learning environment. The future of online learning lies in a transformative education that embraces technology and strives to ensure that students benefit fully from a platform that enables self-directed reflection and constructive engagement with others at a time and place that suits them.

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