

Effectiveness of Quality Review of the Online Modules Used During Emergency Multi-Modal Teaching and Learning in Higher Education

S Simelane-Mnisi

Tshwane University of Technology, South Africa

Abstract: The Coronavirus (COVID-19) pandemic has accelerated the need to be resilient, and to adopt a student-centered approach to learning for our survival. Globally, a majority of higher education institutions adopted online teaching and learning during the pandemic. At the study university, lecturers were provided with emergency remote support for designing learning material for delivery within a remote online environment by means of the IMFUNDO learning management system. The purpose of this study was to investigate the effectiveness of quality reviews for online modules used during emergency multi-modal teaching and learning. Participants were 67% female, and 33% male lecturers from the Faculty of Science. A mixed-method approach was used. Data were collected by means of IMFUNDO Module Quality Review Instrument open-ended questionnaires, as well as individual interviews. Quantitative data were analyzed using SPSS frequency distribution. Atlas.ti was used to analyze the qualitative data. The results showed that 261 modules were quality assured and used IMFUNDO year template. In terms of the basis for the storyboard relating to the design of IMFUNDO modules, it was determined that most lecturers used the approved HEQSF curriculum documents relating to the module descriptors and study guide. The planning, design, and implementation of theory modules were effective. However, the practical modules and quality of assessments remain a challenge. It is recommended that lecturers attend technology-enhanced professional development programs to improve their digital skills, competency, and pedagogy.

Keywords: Quality review, Learning management system, Online learning material, Multimodal teaching and learning, Higher education

1. Introduction

The Coronavirus (COVID-19) pandemic accelerated the need to be resilient, and to adopt a student-centered approach to learning for our survival (Radwan, 2022). Globally, the majority of higher education institutions adopted online teaching and learning during the pandemic. Hafeez, Naureen and Sultan (2022), indicated that in uncertain times, the quality of online learning was regarded to be a challenge amongst the institutions of higher learning. In addition, the COVID-19 pandemic raised the need for high-quality online education (Zimmerman, 2020). The challenge in this study was to evaluate the effectiveness of the quality review standards of online modules developed on the IMFUNDO. The IMFUNDO is the pseudonym for the learning management system used for the purpose of this study, by lecturers during the COVID-19 pandemic lockdown. This study was motivated by Simelane-Mnisi's (2022) recommendation with regards to investigating the quality of the IMFUNDO modules during the COVID-19 lockdown.

The study conducted by Al-Amrani (2021) on the development of frameworks for reviewing and designing courses in higher education, revealed that module has significant problems with its learning objectives, rationale, delivery strategy, learning material and resources, as well as assessments. Lack of quality control, development of e-resources, and delivery of e-content standards were observed as hinderances during uncertain times (Dhawan, 2020). Research shows that the review and design processes should be based on the module design framework (Volungeviciene *et al.*, 2014).

The instructional designer developed a quality review checklist based on redesigned module templates. The module templates assisted lecturers with the constructive alignment, scaffolding and chunking of learning material, resources, and activities. To further ensure the quality of developed modules in the training framework, the Faculty of Science module offering templates were designed. The framework for the design of online modules were grounded by the arena blended connected

learning design, Technological Pedagogical Content Knowledge, flipped learning approach, Revised Community of Inquiry, and the constructivism theory (Simelane-Mnisi & Mji, 2020b). It may be argued in this study that these theoretical frameworks and models assisted the instructional designer and lecturers to ensure that online modules provided quality in the online delivery of learning, considering the socio-economic backgrounds of the study University's students.

At the study university, the emergency multi-modal teaching, learning and assessment strategy was adopted during the COVID-19 pandemic lockdown (Simelane-Mnisi & Mji, 2020b). Lecturers were provided with Emergency Remote Support for designing learning material for delivery within a remote online environment by means of IMFUNDO (Simelane-Mnisi, 2020). This is supported in by Law (2022), who argued that it is necessary for lecturers to undergo regular training to ensure a more effective delivery process.

In this study, the quality review focused on the developed and implemented modules during 2021. The purpose of this study was to investigate the effectiveness of quality reviews relating to online modules used during emergency multi-modal teaching and learning. To accomplish this, the IMFUNDO Module Quality Review Instrument was used to determine the quality of online implemented modules. Survey questionnaires with open-ended questions were used to establish the lecturers' perception concerning learning material and activities, as well as the quality of the IMFUNDO modules. Individual interviews were also used to verify the data from other instruments.

2. Literature

2.1 Emergency Remote Support

At the study university, lecturers were provided with Emergency Remote Support for designing the learning material for delivery within a remote online environment by means of the IMFUNDO learning management system (Simelane-Mnisi, 2020). This is supported by Law (2022), who argued that it is necessary for lecturers to undergo regular training to ensure the delivery process is more effective. Sumer, Douglas and Sim, (2021) argued that formal training on the learning management system (LMS) operation and what online teaching looks like, should be

organized, and customizable frameworks should be supplied. To reinforce the view of Sumer, Douglas and Sim, the researcher utilized the IMFUNDO teaching and empowerment [training] framework (ITEF), presenting lecturers with the necessary skills for the planning, design, and development of the IMFUNDO modules (Simelane-Mnisi, 2022). Considering that the university adopted a 'one instructional designer per faculty' strategy, the Do-It-Yourself approach was used. The Do-It-Yourself (DIY) strategy means that lecturers created their online modules under the guidance of the Instructional Designer. Since technology alone cannot provide a positive or successful learning experience, the instructional designers ensured that pedagogy received a higher priority status (Vlachopoulos, 2020).

2.2 Quality Standards of Online Learning Material

Quality Matters (2022) emphasizes that, when designing an online or remote module, it is critical to consider the eight general standards of quality relating to course overview and introduction: learning objectives (competencies), assessment and measurement, instructional materials, learning activities and learner interaction, course technology, learner support, accessibility and usability. The course quality review process is aimed at improving course quality (Al-Amrani, 2021). In this study, when preparing online or remote teaching, it was critical not to compromise the quality of online material (Simelane-Mnisi, 2020; Simelane-Mnisi & Mji, 2020b). The authorized Higher Education Qualifications Framework (HEQSF) curriculum was established – with the concept of constructive alignment in mind – to assist lecturers in their preparedness for the online-learning (Simelane-Mnisi, 2022). The module descriptor and study guide were the relevant documents supporting the planning and development phase of the story board. Constructive alignment assisted to focus on the learning outcomes, assessment criteria, learning material (content), learning activities, interactions (collaborations) and feedback, as well as course technology.

2.3 Online Modules Quality Measures

An institution's quality assurance processes involve educating lecturers about the criteria for course design and mandating them to use such criteria, as well as assessing the quality of courses offered (Zimmerman, 2020). For higher education institutions

to achieve excellent results in online learning, various researchers and instructors have suggested numerous quality assurance indicators (Hafeez *et al.*, 2022). A number of models for quality assurance in online learning have been identified by Hafeez *et al.* (2022), including the Comprehensive Approach to Program Evaluation in Open and Distributed Learning Model (CAPEODL), the E-Learning Maturity Model, and the Evaluation and Assessment Logic Model. Planning, Development, Process and Product Evaluation (PDPP), a conceptual framework for quality assurance of online learning, a conceptual model for online learning quality assessment, and a conceptual model for online learning quality assessment, are a few examples of conceptual models for determining the quality assurance of online learning. Zimmerman's (2020) study context was provided by Quality Matters course reviews, offering lecturers peer evaluation of online course design since 2005. During the initial review, approximately 591 (39.7%) of the 1,487 courses were not particularly designed to adhere to Quality Matters course design standards. In this study, principles of Quality Matters as well the IMFUNDO system tools assisted the researcher to support the lecturers in reviewing the quality of the online modules.

3. Methods and Material

A mixed-method approach was used. Creswell and Creswell (2018) suggested that a mixed-method approach involves combining or integrating data to provide a deeper understanding of the problem or question at hand. The triangulation design's

convergence model was used, as the researcher collected and examined qualitative and quantitative data separately on the same phenomena before converging the results during the interpretation phase (by contrasting and comparing the results) (Creswell & Plano-Clark, 2017). Hence in this study, the IMFUNDO Quality Review Instrument (IQRI), survey questionnaire with open-ended and closed-ended questions, and interviews were applied to collect data. Quantitative data were analyzed using Statistical Package for the Social Sciences frequency distribution. Atlas.ti was used to analyze the qualitative data. Ethics clearance was obtained from the study university to collect data from participants in the Faculty of Science.

3.1 Participants

In selecting the participants, the study employed stratified purposive and convenient sampling (Cohen, Manion & Morrison, 2018). The researcher draws the convenient sample population from the Faculty of Science lecturers at the study university, as they were easily accessible, and the researcher is the instructional designer assigned to the faculty. The participants were also involved in the quality review process of IMFUNDO. This implies that 116 participants (67% female and 33% male lecturers) from the Faculty of Science responded to the online survey. Table 1 shows the biographical data (gender and age) of the participants in a cross-tabulation format according to the IMFUNDO Module. The results revealed that 114 of the participants indicated their modules were active on IMFUNDO. Of

Table 1: Cross-Tabulation of Participants' Biographical Data

		IMFUNDO Module		
		Yes	No	Total
Gender	Female	75	2	77
	Male	39	0	39
Total		114	2	116
Age	25 – 35	26	0	26
	36 – 45	25	0	25
	46 – 55	36	1	37
	56 – 65	22	1	23
	66 and above	5	0	5
Total		114	2	116

Source: Author

these participants, 75 females indicated their modules were on IMFUNDO. The results also showed that approximately 36 participants, average age group range between 46-55, revealed their modules were active on IMFUNDO.

3.2 Instruments

The IMFUNDO Module Quality Review Instrument (IMQRI), survey questionnaire with closed-ended questions, and individual semi-structured interviews were used. The IMQRI and closed-ended questions from the survey were analyzed using SPSS. Data from the open-ended questions and semi-structured interviews were analyzed by means of Atlas.ti software.

4. Results and Discussion

4.1 IMFUNDO Quality Review Instrument

It was established that the Faculty of Science had 1389 active modules on IMFUNDO during 2021. The first semester consisted of 333 modules, second Semester comprised of 263, Year modules totaled 525, Work Integrated Learning (WIL) comprised of 114 modules, and 154 other modules were also included. It may be argued that less than a quarter of the modules were evaluated for quality assurance in 2021. The reason for so few modules to be evaluated can be attributed to the fact that a self-evaluation method was used, and not all lecturers evaluated their modules. Table 2 shows the quality review per module offering. It may be observed from the table that 261 modules were evaluated. The LMS common template/structure was proven to be effective in the Cho et al. (2021) study, where 100% teacher usage and student participation have been observed. Of these modules, the majority (166) were Year/Semester modules.

According to Dhawan (2020), it is essential for lecturers to consider the improvement and development of the quality of virtual courses offered in time of crises. The results of the Year/Semester with practical component self-evaluation quality review are presented.

4.2 Year/Semester Modules with Practical Component

The results of the Year/Semester modules with Practical component frequency distribution are presented. In terms of Course Home Page [CHP], it was found that 94.6% of the modules created learning content widgets (CHP5). It may be argued that lecturers built this element and chunked the learning material and activities with each unit. This was expected to curb the cognitive load, and promote participation and engagement from the students; even during self-study. This finding is reinforced in literature by (Chen, 2021), who revealed that scaffolding and chunking increase opportunities for engagement by presenting the information in a variety of methods and modalities. This was followed by 90.5% of the modules that updated Lecturer user profiles (CHP2) and created a welcome and introduction widget (CHP4). The results suggested that the majority of lecturers uploaded their picture and a short biography for students to identify and or recognize their lecturers online.

4.3 Module Information

Regarding welcome and introduction [WI], the results indicated that 94.6% of the modules customized and updated the study guide (WI9). It was found that 91.9% of the modules customized and updated the Welcome Statement (WI1) and added Lecturer details and consultation times (WI3). It may

Table 2: Quality Review per Module Offering

Module Offering	Modules Evaluated
Year/Semester	166
Year/Semester module with practical	74
Block	7
Problem Based Learning	7
WIL	7
Total	261

Source: Author

be argued that the majority of lecturers uploaded a study guide and ensured their personal identity and teaching presence in an online environment.

4.4 Learning Content

Concerning learning content [LC], the results revealed that 90,5% of the lecturers populated topic, description, learning outcomes and assessment criteria (LC4). This suggests that the constructive alignment was maintained online. It was also found that the majority 93.2% of lecturers added New Units/Chapters/Topics to modules under learning content (level 1) using new unit element. (LC1) showed that most 85.1% of the lecturers added Unit/Chapter/Topic short introduction and outline of learning material, created HTML document for learning material [Notes in PDF, PPT, PPT with audio etc.] (LC5) and provided clear instructions to the students as well as created links for live classes with MS Teams. It was found that the IMFUNDO modules developed online adhered to the required design. This suggests that the constructive alignment was maintained online.

4.5 IMFUNDO Tools to Engage the Students

The quality furthermore evaluated the use of IMFUNDO tools to engage the students. In this case and in terms of Gradebook [GB], the results showed that more than half (54.1%) of the lecturers built a module gradebook (GB1), 51.4% added all required grade items (GB2), and 50% ensured that the final calculated grade sums to 100% (GB3). These results suggested that the gradebook contributed to student engagement, as it was critical for students in an online platform to continuously be presented with the results of their online activities in order to monitor their academic performance. The results indicated that more than half (59.5%) of the lecturers did not use group (G1) activities online. This suggests that lecturers were not familiar with the formulation and utilization of online groups to enhance students' collaboration, teamwork, and communication skills.

Regarding Formal Tests (FT), it was found that most (82.4%) lecturers provided clear instructions for online quizzes/tests (FT1) and students knew exactly what was expected from them. The results showed that 62.2% of the lecturers did not add digital badges (awards) associated with quizzes/tests (FT3). This suggests that the lecturers did not know

how to use the badges functionality available on IMFUNDO. In terms of Formative Assessments (FA), the results revealed that less than three quarters (74.3%) of the lecturers provided the students with clear instructions on quizzes/tests (FA1). The results indicated that 71.6% of the lecturers stated and calculated the correct marks for all quizzes/tests (FT2). The results showed that more than half (58.1%) of the lecturers did not add the digital badges (awards) associated with quizzes/test (FT4). Furthermore, the results revealed that more than half (55.4%) of the lecturers did not activate the intelligent agent for tracking and monitoring the student-at-risk.

Concerning the Discussion Forum [DF], the results indicated that more than half (55.4%) of the lecturers did not use the scoring discussion topics (DF1). The results also showed that 50% of the lecturers did not provide marks for discussion topics (DF3). This suggests that lecturers were not familiar with the use of the discussion forum or how it can be used to promote student engagement while learning online.

Regarding the Assignments [A], the results showed that more than half (59.5%) of the lecturers provided marks and clear instructions to the students (A2). The results also indicated that more than half (51.4%) of the lecturers provided stated and calculated correct marks for all assignments (A3). The results suggest that more than half of the lecturers were able to use and provide assignments to students in an online platform. The results indicated that 56.8% of the lecturers did not use the digital badges (awards) associated with assignments (A4). The results also showed that 51.4% of the lecturers did not activate the intelligent agent for tracking and monitoring the student-at-risk (A5).

4.6 Practical Component

In the Faculty of Science, most modules have a practical component requiring students to be equipped on laboratory skills. In terms of the Practical on IMFUNDO, a Practical Component [PC] was created. The results indicated that 64.9% of the lecturers added new units to create practical components for a module (PC1). The results showed that 63.5% of the lecturers added a brief practical overview (PC2). The results revealed that 66.2% of the lecturers created HTML documents for experimental material [Notes in PDF, PPT, PPT with audio etcetera] (PC7) and provided students with clear guiding

instructions. In terms of the Practical Component Gradebook [GPC], the results indicated that less than half (44.6%) of the lecturers built a module gradebook (GPC1) and added all required grade items (GPC2). The results also revealed that less than half (40.5%) of the lecturers ensured that the final calculated grade sums to 100% (GPC3) and that the total weight of all categories and items amount to 100% (GPC4).

More than half (52.7%) of the lecturers did not use online group (PGG1) activities. In terms of pre & post-laboratory tests [PPLT], the results showed that less than half (44.6%) of the lecturers stated and calculated marks correctly for all quizzes/tests (PPLT2). The results also indicated that less than half (40.5%) of the lecturers included clear instructions on quizzes/tests to offer guidance to the students (PPLT1). The results also revealed that less than half (41.9%) of the lecturers did not use digital badges (awards) associated with quizzes/tests (PPLT3).

5. Quality of IMFUNDO Learning Material and Activities

With the use of Atlas.ti, Saldana's thematic method was used to analyze the qualitative data and identify meaningful patterns (themes) in codes (Saldana, 2021:177). The two themes generated were quality and suggestions of IMFUNDO learning material and activities. The names used in the qualitative findings are pseudonyms. The lecturers had to indicate the warranty of not compromising the standard of learning material and activities on IMFUNDO, and the speedy instructional design of their modules for remote or online teaching in uncertain times. It was found that most of the lecturers used the approved HEQSF curriculum documents (relating to the module descriptor and study guide) as the basis for the development of their online module. This was to emphasize the constructive alignment in an online environment so as not to deviate from what the module requires within a qualification. Dr Pillay mentioned that *she tried to keep everything on IMFUNDO as per Institution standards guided by the module descriptor and study guide*. Dr Dlamini, a Head of Department, indicated that *she ensured that lecturers in her department utilized study guides to maintain standards, more especially the learning outcomes and assessment criteria*. Ms. Lebo indicated that *she covered everything as it was stipulated in the study guide, as she designed IMFUNDO module*. In an online environment, constructive

alignment ensures that students achieve the learning outcomes they desire, enhances learning and retention rates, and improves student engagement (Quality Matter, 2022).

It was further established that the lecturers maintained the standard on IMFUNDO by using the prescribed template according to the module offering. Mr Mphahlele revealed that *he tried to keep to the prescribed layout of the learning content and activities of IMFUNDO*. Dr Mahaye, the Head of Department (HoD), also indicated that *she confidently believed that none of the lecturers deviated from what was supposed to be taught for the students or left out sections or study units, because the module template provided guidance on the development of the study material online*. At the College of the Mainland in Texas City, Texas, the adoption of a standard "master" template in an LMS was observed in order to promote best practices for employing technology for developmental education (Goomas & Czupryn, 2021).

The results showed that the quality of IMFUNDO was accomplished at various levels such as HoDs, lecturers, and students. In term of HoD, Mr Mahlangu mentioned that *he requested observer access to all the IMFUNDO modules so that he could view all the modules in his department to do a spot check of quality*. He verified the learning material and activities. Mrs Mayburg revealed that *she attempted to maintain a higher quality online as she normally maintained in the face-to-face environment*. Mr Lugweju indicated that *he asked the students for frequent feedback to ensure that the learning material and activities engage them, and are of a high quality*. Zimmerman (2020) argued that online instructional design and delivery enable lecturers to empower online students to manage their own learning experience through time and energy management.

It was found that IMFUNDO quality was assured by the lecturers' exposure to the application of course design. In this case, the HoD, Mr Maluleke said that *he ensured IMFUNDO quality by engaging the staff in the department internal show and tell type of meeting*. In this meeting they discussed online practices on IMFUNDO to help everybody, and to indicate on what levels of content is uploaded. This was to ensure that all the lecturers worked fine on IMFUNDO, and the level of content and activities uploaded was not compromised online as opposed to face-to-face. Research has demonstrated that lecturers' perception of the influence of course design in online learning are

improved by their exposure to a collaborative evaluation of course quality (Zimmerman, 2020).

Some of the lecturers felt that Covid did not affect the quality of material, as they were equipped during the planning phase on how to prepare the material for online presentation. Dr Chauke indicated that *she was not sure how Covid could affect the quality of anything on IMFUNDO, because it was online – not like face to face where the pandemic affected heavily*. Mr Mafiqqa indicated that *they worked as a team of six in their module, and before they upload anything on IMFUNDO, they circulate amongst themselves so as to ensure quality*. Mr Samiya mentioned that *the feedback from team members assisted in improving and making changes on the IMFUNDO module*.

It was further established that the new approach to teaching during uncertain times improved the quality of teaching. Mrs Nhlengethwa said that *this new approach to teaching forced them to improve the quality of teaching, because it allowed them to evaluate the content*. For example, *the module that she taught for more than seven years which she did the same thing in the face-to-face classes, she was forced to revise and offer it in a better way using IMFUNDO tools*.

6. Suggestions on Quality Review of IMFUNDO Modules

Lecturers were conflicted in their comments as provided after reviewing the 2021 Year/Semester modules. Some lecturers were satisfied and succeeded in designing and developing their modules using the Year/Semester Faculty Template. In this case, Mr Van Brink said *he is happy with design*. Dr Mooi said *IMFUNDO is a very user-friendly tool*. Dr Ndlela mentioned that *IMFUNDO functions very well for her*. It was also found that some of the lecturers attended the training, which assisted them in building the modules on IMFUNDO. Mr Makhubele revealed that *the training was fantastic*. It has been demonstrated that using a standard, pre-built template effectively reduces lecturer frustrations (Simelane-Mnisi & Mokgalaka-Fleischmann, 2022).

It was further determined that some lecturers still need to be empowered in utilizing the advanced tools available on IMFUNDO. In this regard, Prof Mamaki mentioned that *he needs to do more training on badges and intelligent agent*. Dr Leeroy revealed that *IMFUNDO should have a calendar that they can customize themselves to put on dates of special activities*

such as test dates, due dates, and others. Mr Nkomo indicated that *he wanted to import content from previous year IMFUNDO module to current year for quick update or editing, not start afresh construction content areas every year*. Ms. Mahlangu said *she would like to explore IMFUNDO more for assessment purposes*. Ms. Khoza said *refresher workshops for users of IMFUNDO are needed probably once a year*. It may be argued that even though the Emergency Remote Support was provided (Simelane-Mnisi, 2020), it was not sufficient for other lecturers.

It was found that the quality review checklist was easy and helpful. Mrs Mbele said *the quality checklist helps a lot too! Thank you*. It was also found that lecturers would prefer to review all the modules on one checklist. Here, Mr Nkuna indicated that *it would be better to do the review for all modules on one form*. Various models for quality assurance in online learning have been identified by Hafeez *et al.* (2022). Furthermore, the QM module review process provided a detailed official review process for online modules quality (Quality Matters, 2022).

In terms of Block module, it was found that some lecturers were able to design according to the module template, whilst others faced difficulties. Ms. Coetzee indicated that *all the required materials uploaded under a block module were well organized into different categories to make it easily accessible for students(users)*. On the other hand, Mr Mafa revealed that *the nature of Block module is not linked to many of the requirements of the template*. It may be argued that not all departments were involved in the development of the Block module template, therefore could not provide the necessary and relevant information to the instructional designer responsible for developing the Block template.

For the Problem-based Learning (PBL) module, it was found from the comments that one lecturer who provided inputs for the PBL module, did not evaluate 2021. However, the 2022 module was still a work in progress. Regarding the WIL module template, it was found that the template did not cover the aspect required for WIL. Mr Nhlanhla said *the template used for WIL is not applicable to all aspects entailed in WIL. This occurs in industry, and students work under supervisors. Supervisors do not have access to IMFUNDO. This template could be verified*. It may be argued that providing different IMFUNDO templates – according to the module offering – proved successful. I may strongly argue that a one-size-fit-all

IMFUNDO template is not conducive to different module offerings. It is critical that instructional designers work collaboratively with subject matter experts to ensure the support provided and the selection of the appropriate IMFUNDO tools, cover the scope of the module.

7. Conclusion and Recommendations

From this study, it can be concluded that the study University made an effort to ensure lecturers were supported during the designing phase of the IMFUNDO module. A multimodal teaching, learning, and assessment strategy was implemented during the pandemic crises. To support the strategy, the Emergency Remote Support provided to lecturers allowed them to create their own online modules on IMFUNDO – under the guidance of the instructional designer. It was noted in this study that the instructional designer placed more emphasis on the constructive alignment, the use of HEQSF approved documents relating to the module descriptor, and the study guide. This was accomplished to assure that quality standards of teaching and learning in an online environment are fulfilled. Furthermore, during uncertain times, lecturers were offered the appropriate guidance to design IMFUNDO modules.

As a one-size-fits-all template proved ineffective, the quality measuring instruments in this study were developed depending on the types of modules available in the Faculty of Science. The quality measurement instruments were established using Quality Matters, with a stronger emphasis on the IMFUNDO LMS. Additionally, it was discovered through this study that the quality checklist assessed the elements within module information, learning content, students' engagement tools and assessment tools, as well as the practical component encouraging student engagement. Proper guidance, scaffolding and chunking of learning material proved successful to manage cognitive overload and promote participation. The quality reviews of online modules used in this study proved to be successful, as it assisted both the instructional designer and subject matter expert to improve on their practice based on what produced results, and what did not offer a desired result during implementation. The study therefore recommend as follow:

High academic standards are necessary for a university to provide high-quality research and teaching outcomes, which ultimately results in the production

of high-quality graduates. It is critical that higher education institutions emphasize quality standards when subject matter experts design online modules, even in times of crises. Best practices for online learning across the institutions – and among peers – should be practiced. Institutions of higher learning should strive to establish internal online modules quality measurement instruments catering to LMS (emphasizing student engagement), and consider other awarding bodies. It is recommended that lecturers attend technology-enhanced professional development programs to improve their digital skills, competency, and pedagogy. A further study could be conducted with a larger sample in a different context. Further studies relating to the quality of online modules could be conducted with other module offerings, as identified in this study.

References

- Al-Amrani, S.N. 2021. Developing a framework for reviewing and designing courses in higher education: A case study of a post-graduate course at Sohar University. Available at: SSRN 3811202.
- Chen, L., Manwaring, P., Zakaria, G., Wilkie, S. & Loton, D. 2021. Implementing H5P online interactive activities at scale, December 2021, ASCILITE 2021, Australia, Armidale, pp. 81-92.
- Cho, H.J., Zhao, K., Lee, C.R., Runshe, D. & Krousgrill, C. 2021. Active learning through flipped classroom in mechanical engineering: Improving students' perception of learning and performance. *International Journal of STEM Education*, 8(1):1-13.
- Cohen, L., Manion, L. & Morrison, K. 2018. Research methods in education, (8th Ed.), London, Routledge.
- Creswell, J.W. & Creswell, J.D. 2018. Qualitative, quantitative, and mixed methods approaches, (5th Ed.), USA, Sage.
- Creswell, J.W. & Plano-Clark, V.L. 2017. Designing and conducting mixed methods research (3rd Ed.). USA, Sage.
- Dhawan, S. 2020. Online learning: A panacea in the time of Covid-19 crisis. *Journal of Educational Technology Systems*, 49(1):5-22.
- Gamage, K.A., Pradeep, R.R., Najdanovic-Visak, V. & Gunawardhana, N. 2020. Academic standards and quality assurance: The impact of Covid-19 on university degree programs. *Sustainability*, 12(23):10032.
- Goomas, D. & Czupryn, K. 2021. Using a learning management system common template in teaching adult basic education: Opportunities and challenges. *Community College Journal of Research and Practice*, (45):227-230.
- Hafeez, M., Naureen, S. & Sultan, S. 2022. Quality Indicators and Models for Online Learning Quality Assurance in Higher Education. *Electronic Journal of e-Learning*, 20(4):374-385.
- Law, M.Y. 2022. A Review of Curriculum Change and Innovation for Higher Education. *Journal of Education and Training Studies*, 10(2).

- Quality Matters: Helping you deliver on your online promise, 2022. Available at: <https://www.qualitymatters.org/>. Accessed 25 January 2022.
- Radwan, A. 2022. The post-pandemic future of higher education. *Dean and Provost*, 23(6):1-5.
- Saldaña, J. 2021. Coding techniques for quantitative and mixed data. *The Routledge Reviewer's Guide to Mixed Methods Analysis*, (2021):151-160.
- Simelane-Mnisi, S. 2020. Faculty online or remote teaching support plan.
- Simelane-Mnisi, S. 2022. University teachers' capacity development programme on the development of IMFUNDO modules. October 2022, 21st European Conference on e-Learning, University of Brighton, UK.
- Simelane-Mnisi, S. & Mji, A. 2020a. July. Covid-19 pandemic: Opportunities for online learning to unblock the minds of students during the lockdown period. In Proceedings of the Education and New Learning Technologies Virtual Conference (EDULEARN'20): 8621-8629.
- Simelane-Mnisi, S. & Mji, A. 2020b. July. Preparing lecturers for remote teaching and flexible learning during Covid-19 pandemic. In Proceedings of 13th Annual International Conference of Education, Research and Innovation Virtual Conference (ICERI'20): 9111-9120.
- Simelane-Mnisi, S. & Mokgala-Fleischmann, N. 2022. Training Framework to Enhance Digital Skills and Pedagogy of Chemistry Teachers to Use IMFUNDO. *New Updates in E-Learning*, pp. 33-110.
- Sumer, M., Douglas, T. & Sim, K.N., 2021. Academic Development through a Pandemic Crisis: Lessons Learnt from Three Cases Incorporating Technical, Pedagogical and Social Support. *Journal of University Teaching and Learning Practice*, 18(5):1-14.
- Vlachopoulos, D. 2020. Covid-19: Threat or opportunity for online education? *Higher Learning Research Communications*, 10(1):16-19.
- Volungeviciene, A., Teresevičienė, M. & Tait, A.W. 2014. Framework of quality assurance of TEL integration into an educational organization. *International Review of Research in Open and Distributed Learning*, 15(6):211-236.
- Zimmerman, W., Altman, B., Simunich, B., Shattuck, K. & Burch, B. 2020. Evaluating Online Course Quality: A Study on Implementation of Course Quality Standards. *Online Learning*, 24(4):147-163.