

Developing Online Educational Modules: A Case Report of the SHEPIZ Project in Zambia

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Abstract

Most Universities in Zambia offer flexible study options, which include, offsite and open distance learning (ODL) programs; carrying a strong online component and a few residential periods. Thus, educational modules provide a greater part of the teaching and learning process. The need for educational modules became crucial in Zambia during the COVID-19 pandemic, because all residential schools were suspended. Noting this gap in teaching and learning in the country, the Strengthening Health Professional Workforce Education Programs for Improved Quality Health Care (SHEPIZ) project, embarked on a program to build capacity in development of online educational modules among lecturers in both public and private higher education institutions (HEIs) in the country. The purpose of this report is to describe the process that was undertaken by the SHEPIZ project, to move with technological advancements in education and make ODL enjoyable and satisfying. The online module development process was undertaken through four workshops. A total of 18 lecturers from two public and two private universities got trained in online module development, writing and uploading onto the Modular Object-Oriented Dynamic Learning Environment (MOODLE) e-Learning

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platform for students to access. The lecturers and HEIs were selected through purposive sampling. The whole training process took 12 weeks, and consequently, the participants became Trainer-of-Trainers (ToTs); hence, broadening and strengthening institutional capacity building in online module development, writing and uploading onto e-Learning platforms. This report is highly beneficial for HEIs, particularly those in resource limited settings that heavily rely on face-to-face teaching and learning to adapt to different modes of educational delivery, in order to make ODL more engaging and fulfilling, and improve their preparedness in an event of a disruption from external factors, such as socio-cultural issues and pandemics.

Keywords

Online Educational Modules, E-Learning, Open Distance Learning, Capacity Building, Resource Limited Settings

1. Introduction

Learning is a process that encompasses a combination of two aspects; learning, directed to what must be done by the learner and teaching, oriented to what must be done by the educator (Yulando et al., 2019). It is the core of the whole education process, with the educator holding the primary role (Abubakar et al., 2022). Thus, it is a process that contains diverse actions by both the educator and the learner, based on a reciprocal relationship taking place in an educational institution, such as a university, to achieve specific goals. For the reciprocal relationship to be successful, it should be interactive in nature. Interactive learning is described as learning that makes it easier for learners to learn desired learning outcomes such as facts, skills, values, concepts, and living in harmony with others (Ketaren et al., 2023). In order for the teaching and learning process to succeed, availability of teaching materials, facilities and infrastructure that is in line with changing times is paramount.

Learning is inseparable from the general components of learning planning; one of which, is the learning resource (Arga & Rahayu, 2019). Learning resources are all appropriate things such as visual, sound, video materials and learning experiences that learners can use to learn and achieve desired objectives (Solihatin et al., 2020). In Zambia, the need for learning resources, in particular, online educational modules, became crucial during the COVID-19 pandemic. Most universities in the country offer flexible study options, which include, offsite and Open Distance Learning (ODL) programs that carry a strong online component and a few residential periods. Thus, online educational modules provide a greater part of the teaching and learning process. However, during the COVID-19 pandemic, it was discovered that students had no access to learning materials, while all learning institutions remained closed. This was because existing educational modules were in hard copies. Therefore, in order for the

teaching and learning processes to continue running smoothly, the use of online instructional media that contained interactive features had to be considered and adjusted to factors that drove trends during the pandemic. The aim of online educational modules was to ensure that learning processes were carried out efficiently, and according to Yulando et al. (2019), modules need to be structured in such a way as to achieve specific targets and competencies.

In the case of higher education institutions (HEIs) in Zambia, teaching and learning using interactive online educational modules was crucial in order to be able to convey materials in accordance with the learning target, without having to sacrifice learning effectiveness. The targets of HEIs are stipulated in their academic year calendars. Since learners can learn through smartphones or computers, which can be accessed anywhere (Yulando et al., 2019). One component of teaching and learning that required special attention was the selection of learning resources, that suited available materials and competencies among the educators. In this regard, the Strengthening Health Professional Workforce Education Programs for Improved Quality Health Care in Zambia (SHEPIZ) project, which commenced operating in Zambia in September 2019, undertook the task to build capacity in online module development and writing among selected HEI lecturers. This was in-line with the third project output aim of developing e-based dynamic and innovative courses and e-Learning networks for continuous professional development country-wide (Goma, 2019).

The SHEPIZ project is housed at the University of Zambia (UNZA). Therefore, the module development, writing and uploading process began with consultations between the SHEPIZ project management team and UNZA Institute of Distance Education (IDE); the custodians of ODL programs at the HEI. Being a project, it was prudent that they targeted HEIs whose members of staff were part of the project. The aim of the project output of training lecturers from HEIs involved in the SHEPIZ project was based on the findings from a desk review, which revealed that the HEIs, particularly those offering health and medicine courses were doing so without online educational modules. A further analysis revealed that although the lecturers had undergone Teaching Methodology training, they lacked training in module development and writing; be it in print form or online.

Therefore, the aim of undertaking the training in online module development and writing among lecturers was not only to build capacity, but to also have a pool of online module developers and writers who would undertake the role of Trainer-of-Trainers (TOTs) in different HEIs. The purpose of ToTs in different HEIs was to broaden and strengthen institutional capacity building in module development, writing and uploading among educators in the whole country; hence, improving the quality of teaching and learning, particularly for students learning via the ODL mode. Online educational modules do not only improve the quality of ODL teaching and learning; they also improve HEIs' preparedness in an event of a disruption from external factors, such as socio-cultural issues and pandemics.

Technology is developing, constantly evolving and changing; thus, teaching and learning should follow suit. Therefore, current teaching and learning practices must adapt not only to technological advancements, but also to disruption from external factors, such as what happened with the COVID-19. Consequently, these and other factors are driving current trends in education. The factors are considered more in terms of their impact on roles and practices. One of the practices that support teaching and learning are resources that are relevant to current technological developments, such as online educational modules that contain interactive features. The purpose of this report therefore, was to describe the process that the SHEPIZ project undertook to build capacity in development, writing and uploading of online educational modules among HEI lecturers in Zambia, so as to provide a platform to assist institutions that may find themselves in a similar situation, particularly those in resource limited settings.

An educational module can be compiled by a group or an individual, and arranged in a systematic manner, which can be printed or uploaded on an e-Learning platform. Previously, educational modules were in print form, but with technological developments in this digital era, they now have designs with digital concepts equipped with interactive and fun features. [Barbosa & Maldonado \(2011\)](#) explain that educational modules are effective tools and methods of instruction used as supplements to traditional classroom teaching, aimed at enhancing the educational experience. In this regard, just as face-to-face classroom teaching encompasses the art of motivating student, the use of online educational modules in the learning process should foster creativity, productive thinking habits, create active, effective, innovative, fun conditions, and develop literacy skills in students ([Halim et al., 2023](#)). Thus, they should be composed of theoretical and practical content, which can be delivered to learners by using technological and computational resources ([Guzdial et al., 2001](#)). This means that they need to be concise and have high flexibility, which accords the educator time to provide more detailed explanations on materials considered difficult. This was very important for the module developers in the SHEPIZ project, considering that the nature of most of the courses taught in health and medical sciences comprise of theoretical and clinical components. Therefore, to ensure that students learn effectively, educators must be able to create and build instructional materials based on their needs ([Mupa & Tendeukai, 2015](#)).

According to [Yulando et al. \(2019\)](#), educational modules must pay attention to the following; 1) Self instructions—the module should enable the learner to learn independently and not depend on other parties; 2) Self-contained—all the required learning materials should be contained in the module; 3) Stand-alone—the module should not depend on other teaching materials, or it does not have to be used in conjunction with other teaching materials; 4) Adaptive—the module should be able to adjust with developments in technology and be flexible to be used in hardware; and 5) User-friendly—the module should contain instructions and exposure to information that is helpful, friendly and easily accessible as desired. Thus, the use of simple, commonly used terms, medical and health

terminologies, and language that is easy to understand was essential in this instance because the targeted audience were health, nursing, midwifery and medical students, whose training involved dealing with people in vulnerable circumstances.

Zambia is a land-linked country situated in south-central Africa, surrounded by eight countries, and has an area of 752,614 km (Mkandawire & Ilon, 2019). Over the last decade, the country has experienced rapid economic growth and among the most important natural resources are minerals such as uranium, cobalt, zinc, lead, coal, emeralds, gold, silver, and copper, which ranked Zambia on the fifth largest producer in the world (Masaiti & Mwale, 2017). Overall, the country has a young population. Youths account for more than 26.7% of the total country's population of 20,122,521 (United Nations Educational, Scientific and Cultural Organization [UNESCO, 2024]). While they represent a key part of Zambia's society, they face many socioeconomic challenges, such as access to quality education, lack of skills to access decent job opportunities, and unemployment. These challenges call for urgent action, so that young people can realize their full potential and actively participate in the country's development and growth (UNESCO, 2024).

Zambia's general education system follows a five-tier hierarchy: early childhood education, primary school, junior secondary, senior secondary, and tertiary or higher education (Mkandawire, 2017). Higher education refers to any structured and systematized learning that takes place in formal learning institutions that award Certificates, Diplomas and Degrees acquired after secondary or high school. Higher education includes universities, colleges, institutes, trades, seminaries, and specialized job training institutions. The development of higher education in Zambia started in the early 1900s.

The UNZA, established in 1965 (UNZA, 2017) is the oldest public university in the country, followed by Copperbelt University (CBU), established in 1987, and then Mulungushi University (MU), in 2008. To increase the number of public HEIs, some teacher training colleges such as Kwame Nkrumah, Mukuba, and Chalimbana were upgraded to universities by government, between 2010 and 2014 (Mkandawire & Ilon, 2019). Private universities and colleges have also been developing alongside public ones in the country. In the past few years, student enrolments have grown across all HEIs in Zambia. For instance, numbers of students at UNZA increased from 20,733 students in 2013 to 24,676 during the 2016/2017 academic year (Manchishi & Hamweete, 2018). This increase in student numbers is reflecting as a trend across HEIs in Zambia.

The HEIs, especially universities are autonomous; thus, they have freedom of choice and action, they select their own staff and students, determine their own curricula, market their own programs to both international and local communities, and can review courses anytime to meet societal needs. However, the autonomy in public HEIs is limited in areas such as financing, because they are funded and owned by the state. Arising from this, most public HEIS face challenges, which include, limited resources for teaching staff and students, inade-

quate infrastructure, shortage of academic staff (Carmody, 2021), and currently, the resilience to continue teaching and learning during emergencies such as the Covid-19 pandemic and the more recent cholera outbreak. The Higher Education Authority (HEA) registers and accredits all programs and curricula in HEIs in Zambia (Mkandawire & Ilon, 2019).

2. Methods

The module development, writing and uploading training was undertaken through four workshops, as shown in Figure 1. The workshops, which comprised of both theoretical and practical undertakings were facilitated by UNZA, IDE and Information Communication Technology (ICT) members of staff.

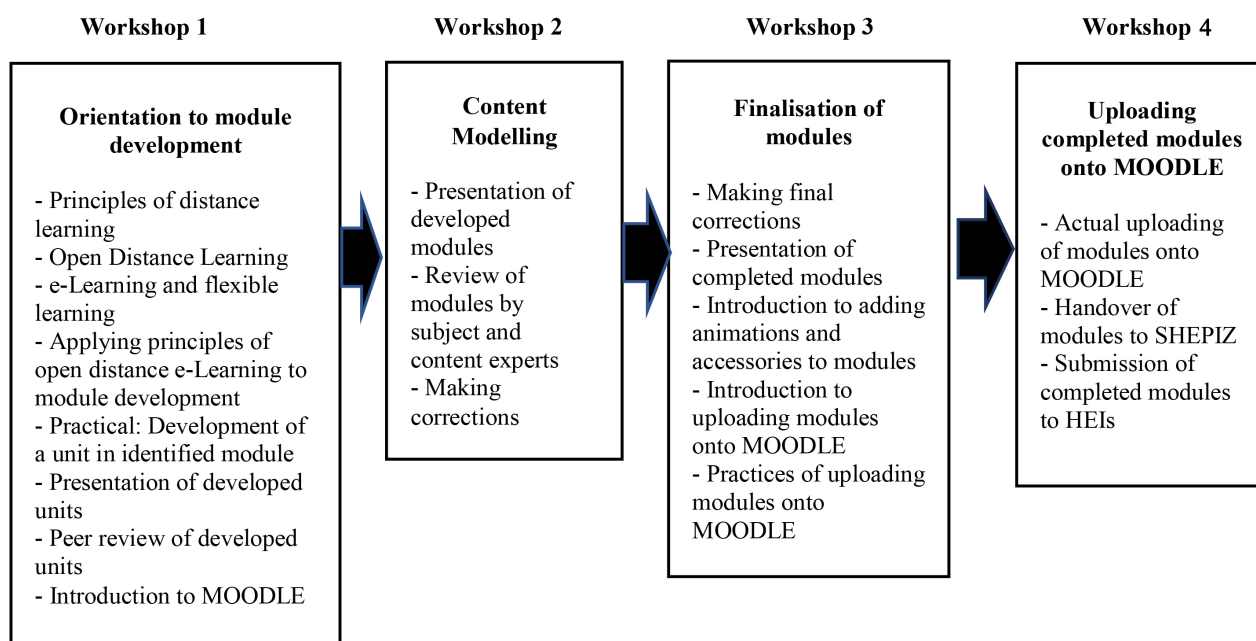


Figure 1. Stages of development, writing and uploading online modules.

The development process commenced with a one-week orientation of participants to principles of distance learning, ODL, e-Learning and flexible learning. Participants were also taken through the process of applying principles of open distance e-Learning to module development. Thereafter, each participant was tasked to develop one unit from an identified module in their respective courses. Each participant presented their developed unit, which was peer reviewed by fellow participants, under the guidance of facilitators. Lastly, the participants were taken through the Modular Object-Oriented Dynamic Learning Environment (MOODLE), which is the e-Learning platform in most HEIs in Zambia. After completing the orientation process, the module developers were allowed to go back to their respective institutions to continue working on their individual modules for six weeks.

During the six weeks of module development and writing stages, participants

could contact the IDE facilitators via phone calls or through virtual meetings. During the same six weeks, a virtual meeting to assess and evaluate how the participants were fairing was conducted. This gave the participants confidence in what they were doing because they were aware that even though they were working individually, guidance was still available. This is very cardinal because no matter what the module would be used for, it is important to have the right balance of information, knowledge checks and actionable content. By the end of six weeks all the participants had finished writing their modules.

After six weeks, the participants were called for a second workshop, which also lasted one week. During the second workshop, the modules were interchanged among participants and proof read. Thereafter, they were given back to the individual writers to make corrections. After that, each participant presented their supposedly completed and corrected modules to the whole group. The modules were then submitted to subject and content experts to be reviewed for content modelling purposes. After the review by subject and content experts, participants were given two weeks to amend their individual modules in accordance with the comments made.

After the two weeks, participants were called for a third one-week workshop. Those who had not finalised making corrections were provided time to do so. Each participant then presented their completed module to the whole audience. During the same workshop, the participants were introduced to ICT skills, such as adding animations and other accessories, as well as uploading their modules onto the MOODLE platform. The last day was spent on practicing all what had been learned during the workshop. Participants went back to their respective institutions to finish off uploading and adding interactive activities to their modules.

During the two-weeks of adding animations and interactive activities, each completed module was sent for typesetting. After this process, the participants attended the last three days presenting their completed modules, which were now uploaded onto the e-Learning MOODLE platform. The modules were handed over to the SHEPIZ project for onward submission to the four HEIs whose lecturers had undergone the training. Each participant received a Certificate of Completion. In total, the whole process of developing, writing and uploading modules onto the MOODLE platform took 12 weeks.

Participants in the training program were lecturers from four HEIs; UNZA, MU, South-Valley University (SVU), and Eden University. Among the four HEIs, UNZA and MU are public universities, while SVU and Eden are private. Purposive sampling was utilized to select the four HEIs based on the fact that they were establishing new health and medical programs; hence, there was a more urgent need to build capacity among the lecturers to develop and write educational modules that were designed with digital concepts and equipped with interactive and fun features. A total of 18 lecturers, divided as shown in **Table 1**, were selected using purposive sampling.

Table 1. Distribution of participants who underwent training (N = 18).

Variable	Category	Frequency	Percentage
Sex	Women	10	55.6%
	Men	8	44.4%
Academic Background	Registered Nurse	8	44.4%
	Registered Midwife	3	16.6%
	Health Scientist	3	16.6%
	Medical doctor	1	5.6%
	Public Administrator	1	5.6%
	Pharmacist	1	5.6%
	Radiographer	1	5.6%
Specialization	Medical Surgical Nursing	4	22.2%
	Public Health Nursing	1	5.6%
	Human Anatomy	2	11%
	Biochemistry	3	16.7%
	Pathology	3	16.7%
	Anaesthesiology	1	5.6%
	Psychology	2	11%
	Midwifery	1	5.6%
Oncology	1	5.6%	
Lecturer Status	Senior Lecturer	3	16.7%
	Lecturer I	3	16.7%
	Lecturer II	4	22.2%
	Lecturer III	8	44.4%

Development of educational modules should consider intrinsic characteristics of knowledge, the way the content is structured and organised, and the module should also be evolvable, reusable and adaptable to different learning scenarios and objectives (Barbosa & Maldonado, 2011). Therefore, the lecturers were selected based on the course that they were teaching. Health and medical programs were the courses on high demand at the time; hence, the HEIs had introduced the programs to meet societal needs. Each lecturer voluntarily chose the module to develop from the courses.

Quality assurance was a vital step in the whole online module development, writing and uploading process. Hence, during the one-week orientation workshop, each participant developed a unit from their selected module under the guidance of the facilitators. Each unit was presented to the whole group and comments made. Finally, the units were distributed among participants to be

peer reviewed. In addition, during the six weeks when participants went back to their institutions for module development, the facilitators were there to guide, either through phone calls or virtual meetings. The standard process for developing the educational modules were tailored to the context of the module by including aspects of content modelling (Barbosa & Maldonado, 2006). In the case of this process, participants used existing curricula for content modelling, formulation of objectives, skills, competencies and standards. The approach of referring to individual curricula resulted in creation of effective training modules and proper strategies on how modules were to be utilized. In addition, the completed modules were reviewed by subject and content experts during the second workshop. After the review, participants were given two weeks to amend their individual modules in accordance with content experts' comments. The practices from instructional designs helped in providing an overview of different approaches to the process of defining what participants needed to know and be able to do. Additionally, before the completed modules were uploaded onto the e-Learning MOODLE platform, they were sent for typesetting and the participants were taken through the uploading process. The whole process of module development, writing and uploading was guided by the step by step process used to produce and check for quality assurance of modules developed by UNZA, IDE. The steps begin with nomination and appointment of writers, ending with dispatch and distribution of the modules (Hamweete, 2012).

Since the module development, writing and uploading in this report was not a brainchild of HEIs, but an initiative of the SHEPIZ project; the process did not end at dispatch and submission of developed online modules. The project went on to evaluate the effectiveness and impact of the modules. The HEIs started utilizing the developed modules during the 2022/2023 academic year. To evaluate the learning and teaching impact of the developed modules, summative evaluations for assessments of students' performance were incorporated. In addition, summative evaluations for the purpose of determining whether learning objectives for each module had been achieved were added. This was done by comparing each specific module objective against the others. Lastly, students' online evaluations have described the developed modules as being very effective and educative. To ensure continuity, the participants were mandated to oversee on-going online module development, writing and uploading by other lecturers in their institutions. To allow broadening and strengthening institutional capacity building in module development, writing and uploading among educators the participants, who are now ToTs can be consulted by other HEIs to assist in planned trainings.

3. Discussion

This report presents the process that the SHEPIZ project undertook to build capacity in online module development, writing and uploading among lecturers of health and medical programs in four selected HEIs in Zambia. The need for

online educational modules became crucial during the disruption of face-to-face teaching and learning caused by the COVID-19 pandemic because targets for academic calendars needed to be met. To abate the spread of the virus, learning institutions in Zambia were closed and students sent home. This thus, created a disruption in the learning and teaching process, particularly for students studying on full time basis.

The COVID-19 pandemic became a wake-up call for a number of countries in sub-Saharan Africa by revealing how unprepared their HEIs, particularly those training health and medical students were for such unforeseen circumstances. In this regard, it was important that HEIs, particularly those that heavily relied on face-to-face teaching and learning adapted to different modes of educational delivery. They needed to develop teaching and learning resources that could help students to continue learning by widening faculty members' horizons related to new modes of teaching, and engage diverse capacity building, coupled with corresponding experiences, lessons learned and outcomes, as direct benefits. It was during this uncertain time of disillusionment that the SHEPIZ project embarked on the training of lecturers for the newly introduced health and medical programmes in the four HEIs involved in the project. In order to enhance generalizability of the process, the report describes the real-life situation experienced by lecturers in selected HEIs, who were involved in online module development, writing and uploading process. To produce quality products, the online educational module development, writing and uploading process required to urgently adapt established systematic processes that could yield results in the shortest possible time in the midst of resource limited settings.

Therefore, although the concepts of online learning and module development are well-explored territories, and the intervention undertaken by the SHEPIZ project closely resemble other initiatives utilized globally, the new insights that this report brings to the existing body of knowledge are that the training focused on faculty members with diverse training backgrounds that did not have module writing as a component, and with participants becoming ToTs in educational online module development and writing, there was broadening and strengthening of institutional capacity building. Hence, more HEIs in Zambia are now better prepared to continue teaching and learning even in the midst of disruptions from external factors such as socio-cultural issues and pandemics. Another implication of the report is that it can be used to mentor educators, especially those in resource limited settings, to support multimedia-based learning processes and move with technological advancements in education; thereby, making ODL enjoyable and satisfying. Pooling individual capacities in faculty members is another innovation that enhanced inter-professional-education and collaboration among the participants, with potential to coordinate perspectives of students and faculty members for a holistic approach to faculty growth; thereby, improving health service provision.

Skills transfer was one of the important capacity building components for the SHEPIZ project. Therefore, when embarking on a process of developing and

writing modules, particularly in resource limited settings, a suitable format in accordance to identified needs is critical. In the case of the training undertaken by the participants in this report, the one-week orientation workshop was in tandem with the step by step construction and development of learning modules (Chantarasonbat & Rooyuinyong, 2020). However, despite their being conversant with the MOODLE platform, most of them could not upload their developed modules; pointing to the fact that module development, writing and uploading was a different skill from simply utilizing e-Learning platforms for teaching and learning. Thus, the combined skill of developing, writing and uploading, required adequate timing and preparation. For the few participants who managed to upload portions of their modules, they were still not proficient enough to transfer the skill to the participants who were struggling. Nonetheless, because sufficient time was given to introducing modalities of module development and writing, the participants were able to go back to their institutions and develop and write their modules, individually, after the one-week orientation. Thus, Hande et al. (2014) state that, following the right module criteria is needed in order for the process of module development to be easily understood by trainees.

The 18 uploaded online educational modules were: 1) Medicine and Medical Nursing; 2) Introduction to Adult Medical Surgical Nursing; 3) The Well-Child and Low Risk Midwifery; 4) Research in Nursing and Midwifery; 5) Principles of Anatomy; 6) Human Gross Anatomy; 7) Meat Inspection and Pathology; 8) General Pathology; 9) Chemical Pathology; 10) Biomolecules; 11) Physical Pharmaceutical Chemistry; 12) Biochemistry; 13) Critical Care; 14) Pain and Symptom Management in Palliative Care; 15) Anaesthesia; 16) Introduction to Public Health Nursing; 17) Introduction to Counselling and Psychotherapy, and 18) Human Capital Management.

To complete and assist the learning process, the developed modules incorporated support materials such as audios, videos, images, texts, links, animations, and quizzes. Participants were encouraged to download videos for the purpose of engaging learners and demonstrating topics that are difficult to explain through text only, such as, palliative care. The videos were also effective for evoking emotions, which were useful for topics, especially those that deal with the affective paradigm. The modules also have other supporting features to help facilitate navigation in form of buttons namely; sound controller, go to the page, thumbnails, print, search, share through social media, share by email, back to the home screen, about, select text, auto flip, and help. Since the developed modules are intended for students who do not commonly benefit from classroom settings, such as those juggling between work and learning, they are engaging and interesting, while also providing up-to-date and useful information.

In order to maintain quality assurance and ensure their effectiveness, it was critical that facilitators together with participants carefully planned and designed the modules well before any material was developed. Before creating any module, each participant had to determine the learning objectives. This was done

with guidance from the facilitators. After defining the learning objectives and audiences for the training, participants determined the best format for their online modules. This was done immediately after the orientation workshop. Participants used existing curricula to provide overviews of different approaches to the process of defining what learners needed to know and be able to do at the end of various learning cycles. They decided on the main topic of the training course and broke it down into smaller topics that were utilized for their modules.

In addition, use of, or referring to individual curricula assisted participants in formulation of objectives, skills, competencies and/or standards for the different programs. The approach of referring to individual curricula also resulted in creation of effective training courses and proper strategies on how online modules were to be used. The process of developing modules in consultation with existing curricula was in line with the step by step module development for learners, by [Hendriyani et al. \(2020\)](#), which includes, 1) defining the learning objectives and the audience, 2) Choosing the right content and format, 3) Creating a training module template, and 4) sharing with learners and tracking results.

Peer review, which is a process by which learners rate their peers by considering the amount, level, value, worth, quality or success of learning of peers of similar status ([Tillema, 2010](#)), was also done, during throughout the training process. Peer and self-assessment are key skills in module development because they enable participants to self-monitor and self-regulate their writing ([Harrison, 2010](#)). These approaches assisted participants to make judgements with regards to their peers and their own standard of work. This therefore, helped them identify gaps, weaknesses and strengths in their individual module development process. The peer review process also invariably provided guidance on what each module developer was to concentrate on; thus, participants were motivated to progress with their module writing even in the absence of facilitators.

Although a standard format was provided during the orientation workshop, later, the participants were shown other training module templates, which could be utilized in the process of developing further modules, going forward. Therefore, some participants utilized other formats because they worked better for their courses. In tandem with this practice, [Yulando et al. \(2019\)](#), state that a good and appropriate structure must be used while developing a module, in order for it to be easily understood and to meet the necessary requirements. Ethics approval for the program was granted by UNZA-Biomedical Research Ethics Committee (REF: 920-2020).

Limitations

Data for this case report was collected from four HEIs; hence, generalization should be done with caution because of contextual differences and uniqueness of the institutions involved. However, the information in this report is similar to many other settings, particularly those that are resource limited.

4. Final Considerations

This case report has explained the process that the SHEPIZ project undertook to empower lecturers in four selected HEIs in Zambia in interactive module development, writing and uploading on an online MOODLE platform. The length of period that was undertaken to achieve the task is in line with specified periods by other module developers. The lecturers experienced the process of module development, writing and uploading on an online platform; hence, creating a strong base in their skills, psychomotor and cognitive paradigms, which can be transferred to others. The experiences of the participants in this report can be utilized by other HEIs intending to prepare for unforeseen circumstances that may interrupt face-to-face teaching and learning. The experiences can also be utilized to avoid making the shortcomings that were encountered by the SHEPIZ project.

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Conflicts of Interest

The authors declare no conflicts of interest with respect to the publication of this case report.

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