

Original Article

Adopting an Online Oral Examination Practices Sustainable Framework from Students' Perspective, Case of the Open University of Tanzania

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Abstract - Information and communication technology (ICT) offers various possibilities and benefits for teaching and learning endeavors. The Open University of Tanzania (OUT) handles such teaching and learning activities through blended learning that combines online and face-to-face delivery. In 2020, the unimaginable COVID-19 pandemic came to light. In addition to its adverse effects on people's health, it also slowed down all socio-economic development, including education, in different countries. In Tanzania, this pandemic led to the closure of all learning institutions in mid-March 2020 due to the needed isolation and social distancing to minimize the pandemic's effect on the country. These measures also affected our blended learning approach in that its online delivery part was limited to formative, leaving summative to face-to-face mode. As a result of the pandemic, OUT investigated 'online summative assessment approaches and developed online oral examination (OREX). OREX was used by OUT during the annual examination sessions in July and August 2020 to meet the pandemic requirements and fulfill the university's vision, which is to be a leading open online university for knowledge creation and application. It was conducted via a web conferencing technology, Zoom, with inputs such as questions, examiners, and links from OREX. This study aimed to investigate experience with this OREX intervention from a student's perspective to develop a framework that can lead to a sustainable online oral examination ecosystem. The methodology applied was mainly a students' survey, complemented by a desk review that included collecting and reviewing relevant documents from offices that managed the OREX undertaking. The results indicated how beneficial the approach is to the students and social-economic development of the country and the suggestions on what could improve for a sustainable and efficient online oral examination. Based on these results and discussion, we propose a framework for the online oral examination ecosystem and the recommendations from a student perspective. Finally, the implications of the study outcome are pointed out to researchers, decision-makers, and practitioners.

Keywords - Online oral examination, OREX, Web conferencing tool, Zoom.

1. Introduction

Information and Communication Technology (ICT) offers a range of potential possibilities and benefits to teaching and learning endeavors, whether on campus or at a distance [1]. This ICT potential is evident in Sustainable Development Goals (SDGs) 2030. Some studies have indicated the importance of ICT in achieving these SDGs, including SDG4 on Quality Education for all. One of these studies, Huawei, showed that ICT's contribution to achieving 2030 SDGs ranked highly for SDG4 with a 72% correlation [2]. E-Learning, sometimes called online learning, is an intervention of learning via digital means mainly powered by the internet and has been adopted variably by higher learning institutions globally for over a decade. Both educators and learners benefit from e-learning opportunities such as access to educational materials, interaction, and assessment. A study at the Massachusetts Institute of Technology (MIT) found that the amount learned via e-learning was higher than that acquired in a physical lecture-based course. Not only is e-

learning helpful in this way, but it also lowers costs for students and provides greater flexibility on what, where, and how they learn and get assessed [3,4]. Generally, various studies and frameworks indicated that developing competence and confidence in pedagogical use can positively spin-off effects in various digital-based education delivery activities [5].

To a certain extent, these online or electronic learning practices and associated pedagogical use have also happened in higher learning institutions in Sub-Saharan Africa by increasingly adopting them to widen access to education and improve the quality of learning [6]. Tanzania is an example where its national ICT policy 2016 [7] has emphasized the effective use of ICT in teaching and learning in higher education. The Open University of Tanzania (OUT), an Open and distance e-learning (ODEL) based institution with centers in all regions of the country, has implemented a blended learning delivery model that combines online and face-to-face learning [8]. With a vision to be a leading open online



University for knowledge creation and application, this university's significant resources were spent developing and implementing systems, tools, policies, structures, and advocacy. Its resources have also been used in capacity building, ICT-enabled learning materials, and pedagogical interventions to advance teaching and learning [9].

In 2020, an unimaginable COVID-19 pandemic that shifted the world to rely on digital technology to survive came to light. Apart from its human health effects, it also distracted all socio-economic development activities, including education delivery in different countries and institutions. In Tanzania, this pandemic led to the closure of all learning institutions in March 2020. This closure was due to suggested measures such as isolation and social distancing to minimize the effect of the pandemic in the country. However, OUT, being ODeL based institution that offers its education through a Blended learning approach, continued operating with an impact on face-to-face. This effect is due to, among others, the distance learning technologies in use being mainly limited to formative assessments such as online quizzes, discussion forums, and assignments [10, 39,40,41]. Summative assessment such as Annual Exams (A.E.) was still done in physical face-to-face settings where our students come to our centers country-wide. Therefore, OUT investigated online summative assessment approaches considering online oral examination given the pandemic social distancing requirements. Such examination emanates from traditional practices of the oral examination, which is an examination of student learning conducted by the spoken word or an academic interview. The examiner(s) looks at students' understanding and breadth of awareness of a degree course.

Furthermore, such examination includes significant areas such as concepts, theories, procedures, applied problem solving, interpersonal competence and qualities, and integrated practice. This way becomes one of the summative assessments commonly practiced throughout university degree courses in various study fields in which oral exams are popular in which students speak to provide evidence of their competencies, i.e., knowledge, skills, and attitudes [11, 12, 13, 14]. In some ways, the achievement of the required competencies has been through Bloom's taxonomy [15, 16]. It contains six levels, i.e., remembers, understands, applies, analyzes, evaluates, and creates, allowing skills to be gained in a natural study progression within the learner-centric and learning outcomes and practices. Such preparedness affects the required competencies positively while attempting an oral exam [17].

With technological advancement and COVID-19 pandemic social distancing requirements, oral examinations in summative assessment have vividly taken another level in Online Oral Assessment. An online oral examination is an approach to students' summative assessment that, though seldom practiced, existed even before COVID-19 [18].

Examples include a study on compelling web video conferencing for proctoring online oral exams and a case study at scale in a Brazilian university [19]. Worldwide and as a matter of benchmarking, the online oral assessment approach has been adopted in one way or another by several higher learning institutions, accelerated by the COVID-19 pandemic. These higher learning institutions include the University of Twente (U.T.), the Netherlands [20], and Iowa State University, USA [21].

This way of oral assessment in the online environment was also contextualized, developed, and used as an OUT model of examinations, namely Online oRal EXamination (OREX). This University Senate Green-lighted system is unique in its design [22]. That includes marking rubric and criteria, automated online registration of exams, and session allocation using efficient random algorithms to keep anonymity for both examiners and the candidate. Others are generating randomly unique questions and marking schemes during a specific oral exam for a respective candidate [23 - 24]. Students used visa cards and any recognized official I.D. as entry and had to observe all exam regulations. Also adopted is using a web conferencing tool, in this case, Zoom, to bring together in a virtual examination room the chief and second examiners who are subject exams, a candidate who is examined, and an observer who ensures fairness. OREX has extended its dimensions to using a learning management system, in this case, Moodle. Apart from providing access to content, it gives access and review of tentative questions aligned to respective course learning outcomes, which are learning achievements that take the form of the acquisition of knowledge, skills, and attitudes as the evidence that learning has taken place [25, 26]. Social media is also utilized to support OREX use, in this case, WhatsApp, for awareness and communication through various students' program groups. Such systems and quality assurance measures led to a new, innovative, and unique product in university exams in Tanzania and the region, as indicated by a study that investigated the most influential ICT innovations in the administration of OUT and found to be topped by OREX [23]. It was used for the first time during the OUT annual examination sessions in July 2020 partly to ensure the social distancing necessary due to the COVID-19 pandemic [24].

OREX was also implemented and used to fulfill the vision of OUT, which is to be a leading Open online University in knowledge creation and application by 2022/23 as per its current strategic plan; thus, a need for Online assessment too for a complete online education delivery option [27]. This way, people from different backgrounds can access scalable self-paced higher education, learn, interact, collaborate, and get tested at any time and place while on the go, at home, at work, or at a business. Thus, consequently saving time and money and becoming more flexible and efficient [5, 24]. OREX approach also contributes to students' improvement in ICT skills using

intelligent devices and online collaboration tools. Thus, building confidence, enhancing communication skills, and enabling a good measure of understanding of a subject, as one can say more than one can write in a given time. The follow-up questions are another aspect that probes students to provide elaborative answers, thus assessing the subject's creativity, application, knowledge, and understanding of the learning outcomes [5]. Furthermore, OREX is not just an assessment of the student's performance; it is also an opportunity for the examiners to get instant feedback on the department and university's performance [24]. This way, such a system is a useful alternative assessment for final/annual examinations.

This OREX, apart from providing indicated benefits, also allows access to the examination session links. Besides delivering Zoom-based virtual sessions, each exam session instantly provides a room to fill examination results [28]. Also, since it was a new approach to the university and students involved, it had some uncertainties concerning its infrastructure and staff and students' readiness. Therefore, after its first use, there was a need to re-study its utility, challenges, and possible improvements from a student perspective in all phases, i.e., before, while, and after these online oral exams. Several universities have deployed related approaches, an example being the University of Twente (U.T.), which developed a framework for Remote Assessment [20], and Iowa State University on a step-by-step guide for the oral online exam just before and at the end of the exam [21]. This development, however, does not show the entailed uncertainties around systems, infrastructure, and people and how to handle them more consistently from a student perspective. Therefore, this study aimed to investigate students' experience in this OREX intervention at OUT to have a sustainable framework and recommendations for improvement from a student's perspective. Apart from this introduction, this paper covers the methodology, findings, and conclusions.

2. Methodology

The methodology, a scientific method used to collect data to answer the research questions [22], was applied based on the aim of this study, which was to investigate students' experience with the new intervention of OREX before, while, and afterward. Its ultimate purpose was to provide recommendations, including a framework of an online oral examination ecosystem from a student's perspective. It was essential to get both quantitative and qualitative data from students because of the nature of the study, complemented by a desk review and other supporting literature on what students did to prepare for OREX. As a student, this meant looking into what seemed to be success stories, challenges, lessons learned, and what could be done to improve the application of and experience with OREX before, during, and after the exams.

Quantitatively, it involved a population sample of all students who did OREX in July and August 2020 that were more than 1000 [23]. The survey, a data collection research method used to collect data from a predefined group of respondents to gain information and insights into various topics of interest [24], was used. This survey was created based on Google forms, validated by two experts, and different means such as emails and WhatsApp groups were used to reach these students scattered across the country and beyond. Together with the student survey, and as part of the case study research method, which is in-depth investigations of a single person, group, event, or community and data gathering from a variety of sources [25], several relevant documents, presentations, and reports were collected through a desk review. These documents include approved Senate document for OREX, OREX Poster for TCU exhibition, and OREX students guide mainly from the offices of Deputy VC-academics, Directorate of Examinations, and Teaching and Learning section. The review of these documents was for assembling relevant information on OREX preparation and undertaking from the students' perspective on what transpired and a contribution to a framework and other recommendations that can lead to an even better, well-founded, and sustainable online oral examination ecosystem. The survey and desk review data were analyzed using quantitative and qualitative tools. These tools included descriptive analysis using excel and narrative analysis methods to study content from various sources such as documents and observations from the field or surveys to answer the research questions [26, 25].

3. Findings

The results are based on the aim of this study, which was to investigate students' experience with the new intervention of online oral examination with the ultimate purpose of analyzing and learning what transpired and proposing a framework of an online oral examination ecosystem from a student's perspective. The results are based on OREX OUT sessions in July/August 2020 that had a maximum of 10 sessions per day. Each session lasted an hour and was conducted via Zoom, a web conferencing tool. In contrast, all inputs such as examination questions, examiners, observers, links, and student information for a particular session were accessed via the university's developed OREX. The result was achieved by a survey of students who undertook exams through this new approach complemented by a desk review and presented from a student perspective.

4. Results and Discussion

4.1. Students Profile

The survey was carried out with 88 students from various faculties of the Open University of Tanzania (OUT), who are part of about 1500 students who participated in July/August 2020 online Oral Examinations (OREX) that generated a total of 7,479 exam sessions. All 88 participants were valid as they filled in what was required, so all responses were

evaluated. Gender-wise, 26% of the participants were female, and 74% were male, while in terms of nationality, the majority were local students (Tanzanian) with 98% and international students with 2%. Looking at their faculties, more students were from the Faculty of Education - FED (31%) with more student population than any other faculty in the university. The rest were from the Faculty of Arts and Social Science - FASS (25%), Faculty of Business Management - FBM (23%), Faculty of Science, Technology and Environmental Studies - FSTES (18%), and Faculty of Law - FLW (3%). In terms of the respective educational level majority of these students were taking bachelor's at 85%, which is in line with students' distribution in the programs University-wide. The rest were masters (9%), Diplomas (5%), and certificates (1%). Generally, more students were in the first year (38%) and the rest in the second (25%), third (26%), and beyond the third year (11%), of which most of them in this OREX did an average of about six (6) exams.

Concerning the regions where these students did exams, the data indicates various regions in mainland and Zanzibar, with Mbeya having more students (14%). The remaining regions are Arusha (11%), Dar es Salaam (10%), Dodoma (8%), Geita (8%), and others. Though with percentage variation, the participants indicated to spread across the gender, faculties, programs, and coordination/regional centers.

4.2. Why do students opt for OREX exams instead of written exams

As shown in Figure 1 below, many students said that cost-effectiveness and affordability were the main reason they used OREX (17%). This pattern was confirmed by documents that OREX saved students time and money, about 500 dollars per exam session. Others were the strength of oral assessment over written exams (14%).

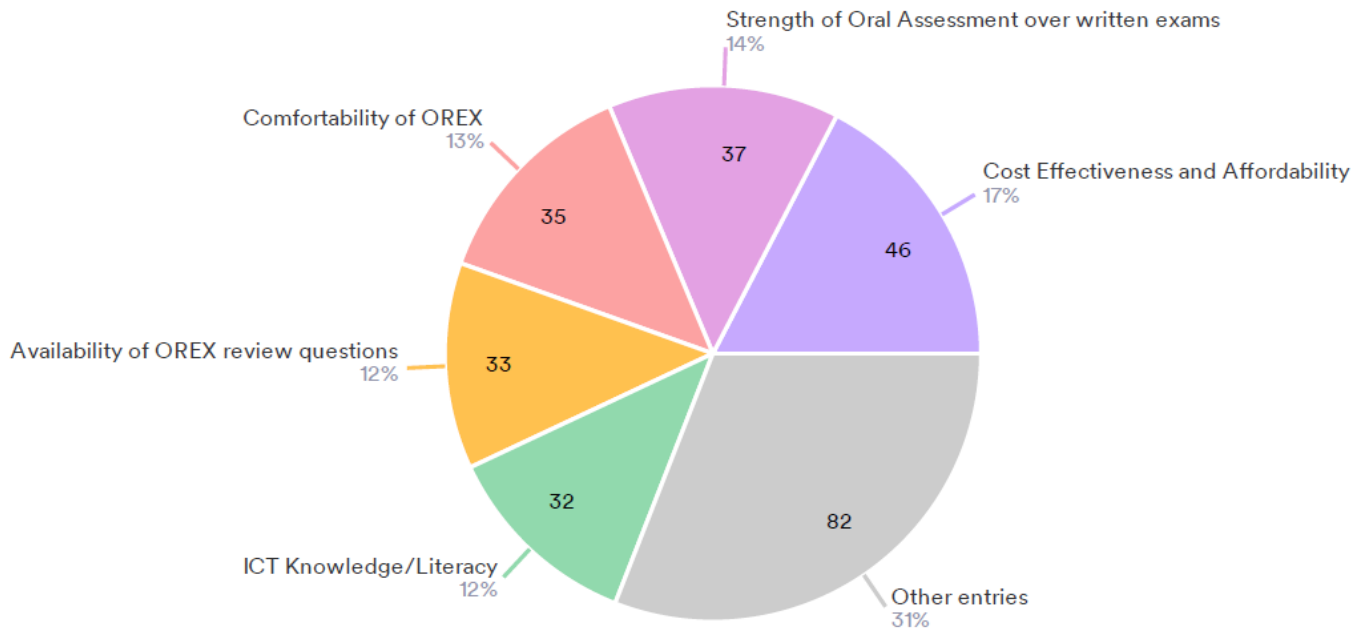


Fig. 1 Reason to opt for OREX exams instead of written exams

Its corresponding documents also indicated this strength as testing higher-order skills bloomy taxonomy-based questions were used and formulated to demonstrate that students have digested the materials. These skills include concepts, theories, procedures, applied problem solving, interpersonal competence, qualities, and integrated practice, and students can understand, explain, argue, relate, create, compare or apply what they learned. For example, students were asked to apply the concept or theory from the syllabus to an unfamiliar situation not discussed in class. This strength

was also brought by the fact that students in all disciplines were told and assessed on three main items, i.e., understanding of learning outcomes, Confidence (fluency & accuracy), and Content with consideration of communication skills, creativity, knowledge, and understanding of problem-solving. Students noted that these communication skills and competency-based assessments promoted in this approach might lead to a confident and more practical graduate. Also, the strength of online oral assessment was due to examination quality. External examiners were randomly

engaged in some OREX sessions and provided summarised student record sheets and audio-visual records from the OREX session. This engagement was on top of the procedure of regular exams in which students' results are moderated at departmental and faculty levels. Before all that, the moderation of exam questions was also undertaken.

Comfortability of OREX (13%) was another aspect that its corresponding collected documents also indicated OREX to be highly flexible to a candidate as these exams were taken from anywhere in and outside the country, in, or away candidate's working place or home which is also the case for the associated session examiners and observer. This comfortability was also due to the Availability of OREX review questions (12%) that its corresponding collected documents indicated most of the OREX questions to be uploaded in Moodle (LMS in use) as review questions, thus giving students the format and marking rubric awareness and the possibility to practice.

ICT knowledge/literacy (12%) is yet another aspect that the interviews and collected documents also indicated students to have received a short guide and got oriented and trained cost-effectively online on use and procedures to access and participate effectively in OREX sessions using Zoom facility and OREX system by respective Deans, HoDs, Program coordinators, and Director of Coordination/Regional Centres (DRCs). OUTSO/Students leaders' awareness and training were also provided throughout the country by DVC (A.C.) office, specifically through DES and UTLS. Other entries (over 31%) included a response to the COVID-19 pandemic by promoting social distancing and instant feedback. Results and fairness of OREX.

Concerning OREX support, necessary administrative, technical and psychological support was provided. Students and collected documents indicated IEMT instructional designers/experts, University teaching and learning coordinators, Heads of departments, Program coordinators, Director of Regional Centres, and session examiners to provide such support. Regarding the COVID-19 pandemic, the interviews also indicated its strength due to online examination, an activity has done face to face, and now in an online or blended learning approach. Concerning instant feedback and results, the interviews and collected documents indicated to have been handled in real-time to generate exam questions, host exam links, and handle audio-visual responses and post-observation reports and results. Fairness of OREX system is yet an entry that interviews indicated the system to be able to generate question paper with randomly

selected questions and marking scheme on the exact date and time of which three interviewers were involved to interview a student comprising two examiners and an observer for fair student assessment. Before this, OREX fairness is also a question design made from six (6) knowledge areas (K.A.s) representing and aligned to the course learning outcomes, of which a student is required to answer only two (2) questions.

Examiners ask follow-up questions that are built on the primary OREX questions. Furthermore, in the 'Other entries' category, reasons pointed

4.3. Significant reasons for some students not registering for OREX

From the survey, significant reasons for some students not registering for OREX were primarily oral exam fear (29%) and Technology/Zoom fear (20%) (Figure 2). The complimentary documents also echoed such outcomes, which indicated that the approach and technology in use were new and not familiar, therefore creating uncertainties and thus undecidedness. Another primary reason was connectivity problem (21%) of which collected documents also indicated that though the network accessibility and power backup were generally OK with increased Internet speed (bandwidth) from 150Mbps to 300Mbps during the OREX exam period, the server that hosts OREX misbehaved in one of the exam dates due to many logins at the same time. However, this was resolved quickly by acquiring and deploying the new server with a higher RAM capacity of 32 G.B. Additionally, ICT literacy (16%) indicated the availability of students who are still ICT illiterate, thus needing improvement. Furthermore, are not having clear guides on how OREX works (11%) which shows that despite efforts made to disseminate various guides and do awareness, some students were not reached or did not prioritize attending, thus creating this bottleneck. On 'Other entries' (4%), students also pointed out several reasons: lack of confidence, phobia of expressing themselves, unstable power, and the presence of follow-up questions. These results on significant reasons for some students not registering for OREX also align with other studies that indicated students' fear and phobia of expressing themselves due to anxiety/nervousness, especially when starting with this approach [11]. These studies also showed concerns about the technicalities of setting up and using involved online collaboration tools such as Zoom and other technologies and the need for adequate technical support [29, 19]. Therefore, there are concerns about the quality assurance of the online event relative to the physical setup that may be considered for further improvement while students are preparing for and doing their online oral examination.

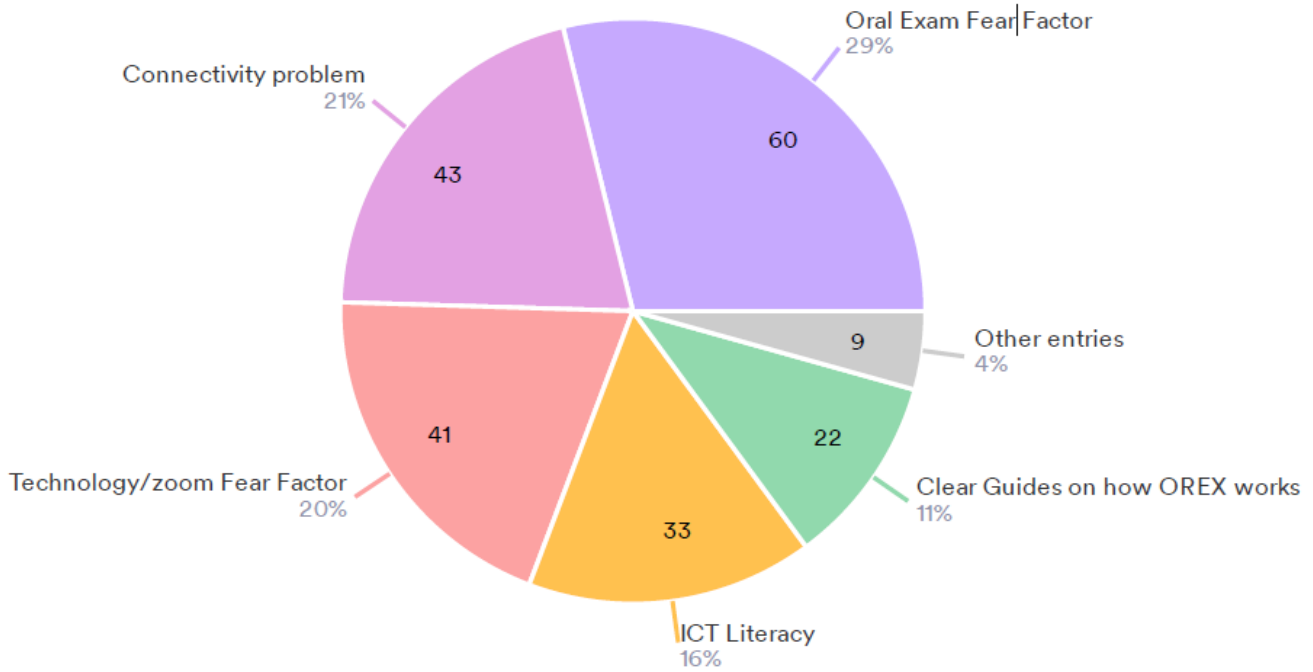


Fig. 2 Significant reasons for some students not registering for OREX

4.4. Kind of/nature of examination location

The survey indicates that students used various locations to do their OREX exam sessions. It was led by at home (64%), followed by Office (23%), OUT Regional Centers (7%), OUT-HQ (1%) & Others (6%), as shown in Figure 3.

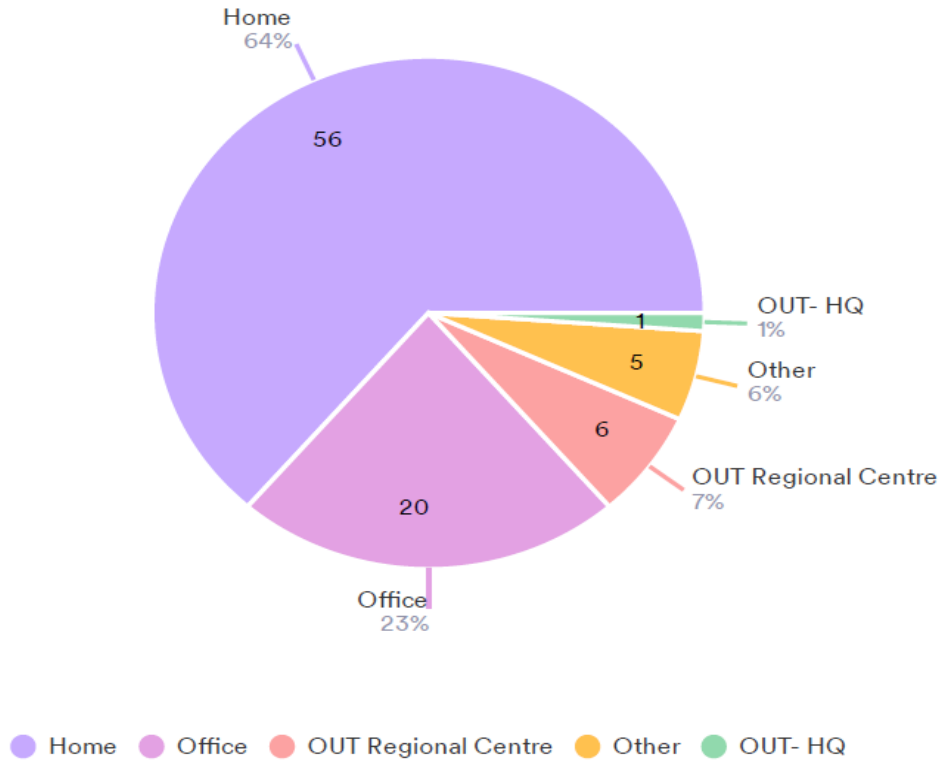


Fig. 3 Kind of examination location

4.5. Types of devices used by students during OREX

From the survey, the data indicated that the types of devices used by students during OREX sessions mostly were Smartphones (53%), followed by laptops (41%), and tablets (6%) (Figure 4). Also, it is supported by collected documents that indicate the preparation done to include requirements, guides, and orientation for traditional devices such as Desktop computers and laptops and mobile devices such as Tablets and Smartphones commonly used in education and other socio-economic development endeavors today. These devices, associated software, and required connectivity

quickly and flexibly facilitate audio-visual online communication and interaction. The mobile devices support this use in the country that its statistics indicate that there are 53,063,085 sim cards, about 90% of the population by April 2021 [30], of which part is smartphones. Also, the smartphone taxes from this financial year (2021/22) have been removed. A new development for smartphone factories will reduce costs and motivate online assessment activities and education in general [30].

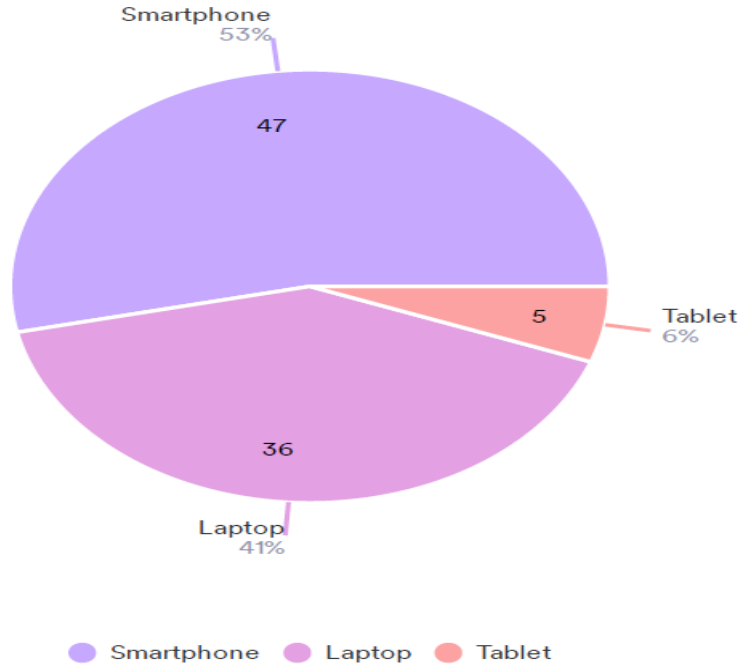


Fig. 4 Types of devices used by students during OREX sessions

4.6. Internet connectivity access and quality

The survey results in terms of used Internet connectivity access indicated to be mainly through mobile (56%), and the rest were Wireless Hotspot-WIFI (23%), Mobile tethering to laptop (20%), and LAN cable - 1% (Figure 5). The complimentary documents echoed these results, indicating that students' access is mainly through mobile devices. The Tanzania communication regulatory authority (TCRA) statistics supported this access via mobile devices, putting Internet users at 29,071,817, about 50% of the population, by March 2021 [30]. Regarding internet quality, the survey results indicated mainly a range of Excellent to Good (87%), and the rest were Poor and Very poor (13%). Also, it was

indicated that no power cut-off during the whole period of OREX sessions happened though the server hosting OREX misbehaved on one of the exam dates, and a new server with a higher RAM capacity of 32 G.B. was deployed to handle smoothly increased concurrent users. Also, mobile devices' internet connectivity quality tests made through Internet bandwidth testing software available on the internet such as Speedtest.net, at least in some urban places and providers indicated to have more than the required minimum capacity of Internet connection broadband wired or wireless which is 800kbps thus the possibility of having quality online connection and services.

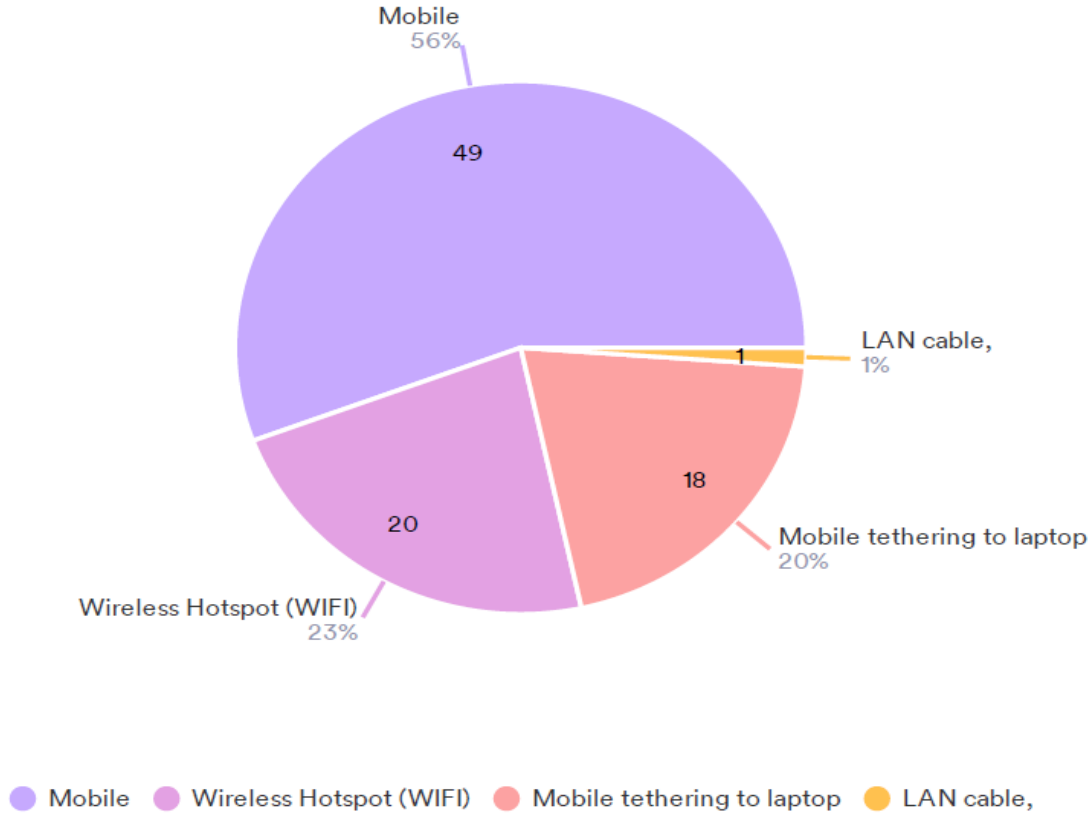


Fig. 5 Internet connectivity access

4.7. The extent of OREX is easy to use, cost-effectiveness and resources saving

When students were asked to what extent oral online exams via Zoom were easy to use, most agreed with 84%. A few were uncertain (7%), and 9% disagreed. The students were also asked to what extent this assessment system was more cost-effective than written exams. The majority (58%) indicated to agree, while the remainder were uncertain (5%), and 33% disagreed. The latter was complemented with an indication of the type of resources that OREX does save compared to written exams (Figure 6), in which many indicated time is saved (28%), traveling costs (25%), requests for travel permission logistics (23%), and accommodation costs (21%), followed by others (3%). Also, the students showed another resource type that OREX saves compared to written exams, i.e., extra budgets since they use the daily home/working place budget. In addition, students can handle both exams and job timetables. One does not have to ask for permission, as within 1 hour, wherever a student is, they can do an exam and continue with other duties. The collected

documents echoed these cost and time savings, which showed that OREX reduced the time and costs for both the university and students. OREX approach also allowed a student to be examined at home, work, and when traveling, provided has reliable internet connectivity.

Furthermore, each student had a printed OREX Visa Card (OVC) bearing essential student information similar to the traditional Exams Hall Ticket (EHT) that facilitated the identification and exam attendance control like paper-based exams. The literature also supports it, such as [19] indicating how an online oral exam was easy to handle, brought flexibility, and reduced student costs. The support is also provided by [32], which showed several conveniences, including transparency and instant results, and offered new educational possibilities in a constantly changing world, including new mobile technologies and students' mobility.

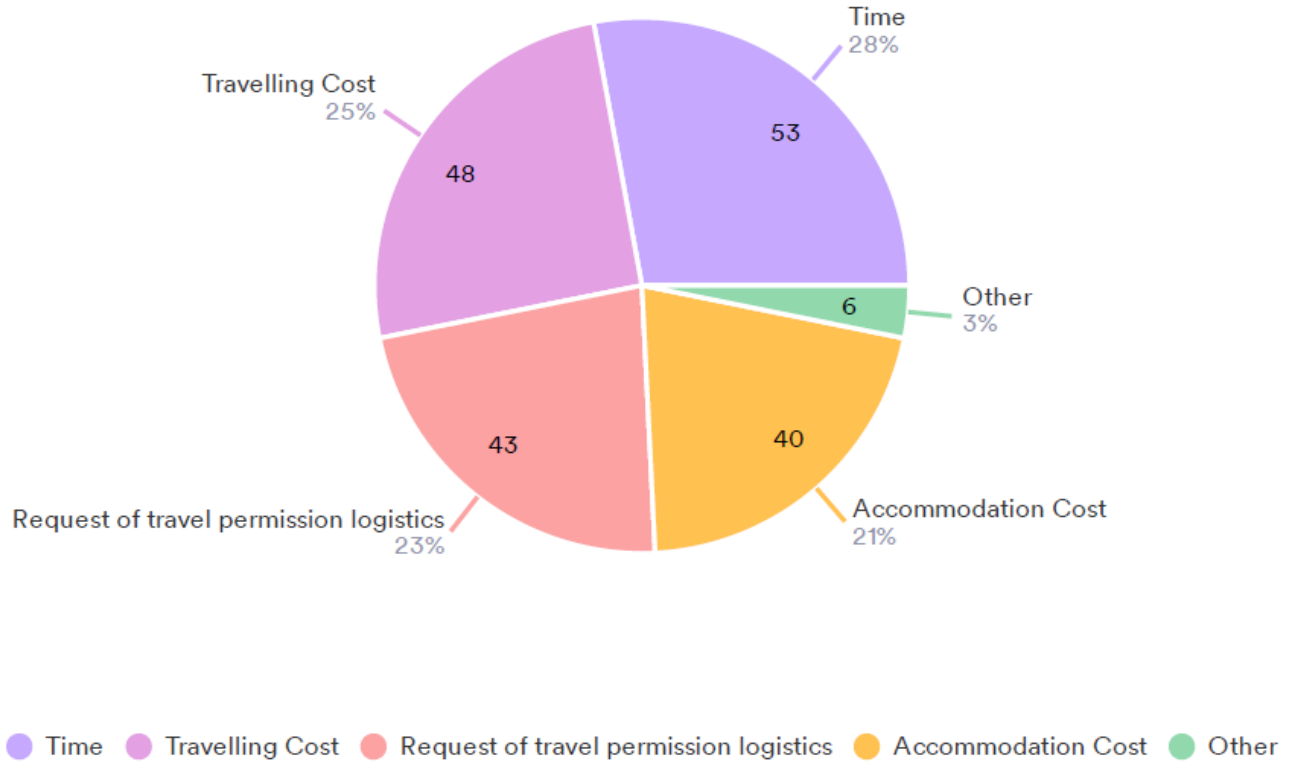


Fig. 6 Resources that OREX does save compared to written exams

4.8. OREX learning outcome demonstration, innovation, and awareness

When students were asked whether they were able to express and demonstrate their learning outcome understanding before examiners through their responses to the main and follow-up questions, most of them indicated generally agreed, 74%, and the rest, fewer, were Uncertain (11%) as well as generally disagreeing (15%). The complimentary documents also indicated that the higher-order skills bloomy taxonomy-based questions that ensured validity & reliability aspects were prepared, moderated, and shared with students as the primary review questions via Moodle. Finally, each student got assessed with just two of them randomly, plus the related follow-up questions where deemed necessary. These questions mainly were beyond the level of facts and definitions; thus, students could demonstrate to have read, digested, and understood the course materials, including concepts, theories, procedures, interpersonal competence and qualities, and applied problem solving by citing examples that reflect the world of practice and application of what they have learned in six (6) knowledge areas aligned to the course learning outcome. Furthermore, the format of the questions, marking rubric, and criteria were provided in advance. Two examiners assessed students in all disciplines on three items using their average: Content (50%) comprised of Communication Skills, Creativity, Knowledge and Understanding, and Problem

Solving. The other items understood were Learning Outcomes (30%) and Confidence - Fluency & Accuracy (20%).

Additionally, when students were asked whether this OREX innovation is helpful and supports distance learning, which is the kind of education delivery via blended or online mode, most agreed with 80%. The rest, fewer, were Uncertain (10%) and generally disagreeing - 10% (Figure 7). The complimentary documents also echoed it, indicating that the Virtual exam venue (OREX system and Zoom tool) was indeed an innovation that comprised of a student, a chief examiner (CE), the second examiner (SE), and an exam observer (EO) that also ensured fair student assessment. Also, quality of examination was handled digitally in an innovative way where apart from student results being moderated using a similar approval process at departmental and faculty levels, External examiners (EE) were engaged in some OREX sessions virtually on a random basis and were also given summarised students record sheets and if need be an observer report and an audio-visual record from the OREX session. Furthermore, the OREX system was able to generate question papers with randomly selected questions (for student and examiner) and a marking scheme (only for examiners/observers) on the date and time of the exam while taking care of the pairing of CE/SE/EO and a respective student.

Still in the same perspective, when students were asked whether their OREX awareness was OK, most of them indicated generally agreed, 61%. The rest, fewer, were Uncertain (10%) and generally disagreeing (10%). The complimentary documents also echoed it, indicating that, indeed, students were oriented and trained on the use, functionalities, and procedures to access and participate effectively in OREX sessions using Zoom facility by HoDs in their respective departments, DRCs in their respective regional centers, and coordinators in their respective programs. The OREX awareness and training also involved student government leaders (OUTSO) throughout the country by the office of Deputy VC Academics, specifically through

the Director of Examination Syndicate (DES) and University Teaching and Learning Services (UTLS) unit. Also, all information on the use of OREX was communicated to students two months in advance, including an OREX short student’s guide that explained operations and technical requirements of the new OREX approach and dynamic systems, as well as exam malpractices and irregularities that lead to cancellations of exams, suspension, and discontinuation of studies. Furthermore, the guidance of students was provided in an actual live OREX session before the main & follow-up questions that probed subject competency.

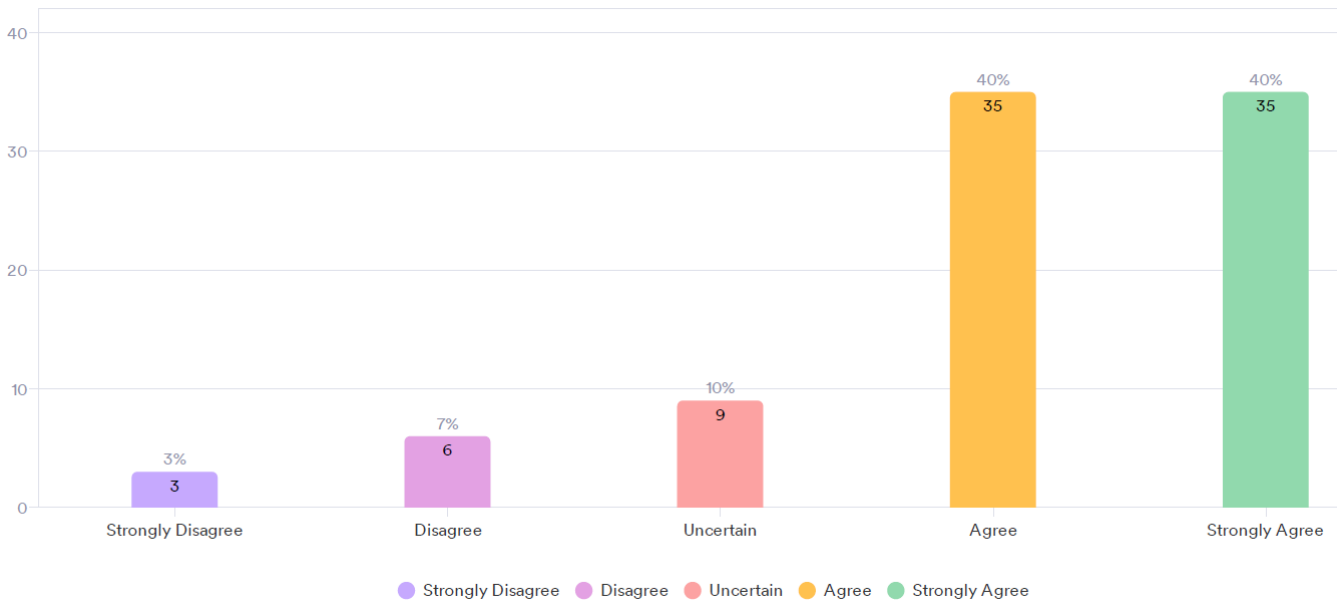


Fig. 7 The extent OREX innovation is applicable and supports distance learning, which is the kind of education delivery via blended or online mode

4.9. Challenges/issues deterring good performance and sustainability of the OREX

Students were asked what they thought to be the challenges/major issues deterring good performance and sustainability of the OREX from their one-month experience. However, some indicated not experiencing any; several indicated facing some, as shown in Figure 8. Internet availability was the major one (23%), supported by complementary documents that indicated some students reported University Internet instability during OREX exams and the poor or unavailability of connectivity at times from the side of some students. Also, there was the underperformance of the OREX server at the beginning of these exams, where the system was found not accessible to

examiners and associated students. Others were the lack of online oral experiences (15%), Fear/Phobia (12%) that prayed part in OREX acceptability difficulties, Software usability (8%), and training (7%). Other entries (36%) collectively, each in a small percentage, included Power problems/interruptions, Price/costs, Uncertainty of educational policies, Unclear OREX guides, Security concerns, and limitations on used digital platform free time and knowledge by staff and students. Some of these aspects were complemented by interviews. They collected documents that indicated threats of inaccessibility due to power outage, including electric power supply interruptions and the use of 40 minutes free Zoom account that somehow disrupted the sessions and concentration.

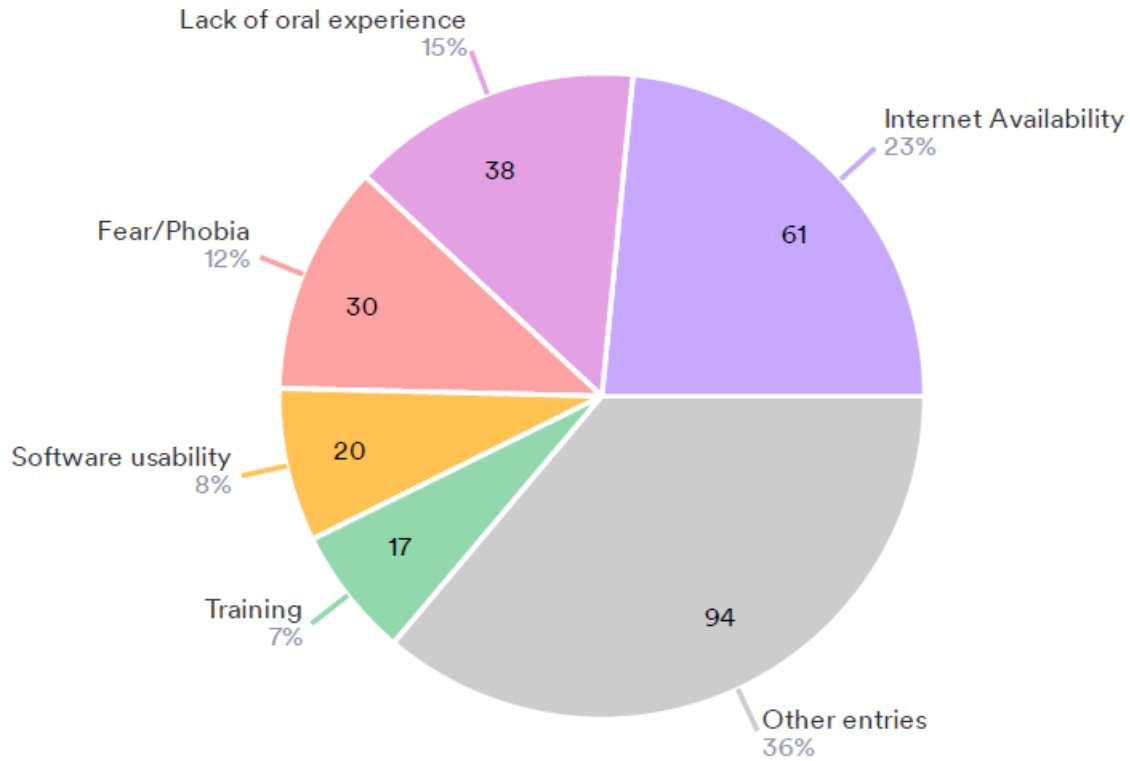


Fig. 8 Challenges/issues deterring good performance and sustainability of the OREX

Other significant challenges/issues indicated in the students' survey are deterring good performance and sustainability of the OREX. Some students were found to need counseling or awareness to remove fear, including technophobia due to the technological change, such as a lack of knowledge on how to use and manage Zoom. In addition, there were English competency and speaking fluency issues as some candidates lacked the confidence to speak English. Furthermore, question selection, where it applies, was done by examiners while students prefer to do it themselves like in traditional examinations. A missing display complements examiners' question reading, especially when it is longer. Some of these aspects were also indicated by collected documents, including the noted non-centralized storage and management of MP4 files of the recorded sessions that, if not organized well, could be problematic to access when required. Others are some courses not having OREX review questions that caused some students who paid the fee for these courses to decline to attend their sessions because of those questions in Moodle platform, some examiners asking follow-up questions not related to the main questions, and in some minor cases not even from topics covered in the course, and availability of some missing and incorrect Zoom links.

Furthermore, are some nonconformities of questions to OREX template and required quality and coverage, some instructors' unpunctuality, harshness, and unfriendliness to

students, the poor language barrier in some cases, which sometimes blocked smooth communication, some non-alignment of the prospectus due to changes made to adopt OREX, and difficulties in dealing with science-related practical exams as OREX mode are unfavorable to these kinds of practical related subjects. The study by [19] also supports it by indicating issues that influence the exam, such as punctuality, minimum equipment (computer, webcam, and audio), good web connection, associated software, and means to connect them. It also supports addressing questions with objective answers and being prepared to interact in a short time and online by feeling calm and confident to demonstrate knowledge and competencies.

4.10. Benefits of OREX from Students' Point of View

Students were asked what they see as benefits from their one-month experience using this OREX over the other assessment systems. Generally, the results were good. Expressly, they indicated that the process assisted them in ICT skills building, flexibility as one can do exams anywhere, saving time and saving costs including the ones related to travelling such as travelling tickets/fuel, substance allowances, and accommodation cost. It also provides them competency through competency-based OREX questions, makes them more confident, and challenges them to improve communication skills that can assist them in performing other

face-to-face interviews and economic and family-related activities more efficiently.

Furthermore, it allows the students to clarify answers with follow-up questions. They indicated that most examiners are cooperative, and such an approach makes them more competent and does not happen in written exams; results are released quickly. The exam is recorded if a student wishes to appeal against the results. The complementary interviews and collected documents also indicated that Audio-visual of the examination sessions were made and stored in the event of a student seeking an appeal, invigilator indicating malpractices, or any other future reference such a record is essential to the student and the university. Additionally, the availability of a neutral moderator (observer) beyond the Chief Examiner and second examiner ensured that both Examiners & a student were pretty treated during OREX and its random allocation of those examiners maintained a high level of anonymity, thus contributing to corruption avoidance that may have otherwise affected students. Furthermore, the approach ensured assessment focused on learning outcomes, ability to probe the students' knowledge, and reflects the world of practice while providing the means of clarifying questions, thus better learning. Moreover, it had a cost-effective virtual assessment software, well-defined processes, and learner support.

Other benefits include being more focused when studying for exams because of learning outcomes and associated review questions. Generally, OREX fits and contributes to OUT's vision of "to be an open and online university in knowledge creation and application" due to these online oral examinations. Generally, most students were satisfied with how OREX sessions were conducted regarding readiness to attempt examinations online and oral examination questions asked during OREX sessions. These led to the acceptability level of the OREX system being higher among students and many requests on the DES table asking for OREX exams. [18] also support it with their case study of oral examination as an online assessment tool and [19] in their study of compelling web video conferencing for proctoring online oral exams: a case study at scale in Brazil that despite years difference both indicated the increased access, flexibility, validity/high-quality assurance, clarification of questions and reduced cost brought by such online oral examinations.

4.11. OREX Improvement Suggestions -Students' ViewPoint

Students were asked in the survey what they see as an improvement that can be made from their one-month experience using this OREX. The students indicated that the system was generally good. However, several improvements can be considered, such as entering results on time after the last examination, assessing the students to be fair and not laughing at them, and conducting OREX every quarter to

finish their studies on time. Also, the system should proceed, giving students second chances if they fail to do it at an arranged time for some reason, such as a network problem on either side. Moreover, the system should be used even for other universities since it is efficient and will enable students with economic issues to do their exams wherever they are at home, at the office, or anywhere else. The suggestion for improvement from complementary interviews and collected documents further brought to light the following:

4.11.1 Institution backend infrastructure

The university should have reliable internet and power supply during OREX exams. It should also increase bandwidth, processing, and storage capacities to accommodate many concurrent users during OREX sessions.

4.11.2. User devices and access to the internet

The university should put up an awareness campaign in partnership with mobile and other tech companies to students on the availability of affordable laptops, tablets, smartphones, and internet bundles. This way can reduce the cost while increasing access to learning resources. On the part, students should consider having sufficing internet bundle and being in an area with reliable Internet during OREX exams.

4.11.3. Change management/awareness and training

The university should ensure that changes in OREX are reflected in the prospectus for easy referencing and unambiguous dissemination to students. Students should also visit the OUT website, their emails, the OREX system, and relevant social media groups to know their scheduled exam dates and any updated guides on the examinations. Additionally, students should practice the use of group video calls in use at the time, in this case, Zoom. Moreover, students should acquire the digital literacy necessary to undertake OREX exams, including group video, calls tools, learning management systems, social media, mobile gadgets, and audio-visual and connectivity skills. On the part of examiners should be provided with continuous training on OREX issues like setting the right questions and fair assessment and treatment of candidates during the sessions. Generally, a single-page student brochure for easy dissemination and awareness about OREX with all information they need to know may have value-added.

4.11.4. Content and assessment preparation

The university should ensure writing material and incorporating activities for the students to practice Bloom's Taxonomy six levels, from remembering to creating while studying, thus filling the required student learning outcome and competencies. Students should also practice all provided OREX template-based review questions in a Moodle course, demonstrating that they have read, digested, and understood the course materials, showing that they have insight and can explain, contrast, compare and apply what they have learned to a familiar or unfamiliar situation. Furthermore, students

should be aware of assessment criteria, i.e., OREX rubric & marking criteria in three areas, i.e., content comprising of CS-Communication Skills, CR-Creativity, KU-Knowledge, and Understanding PS-Problem Solving, learning outcome comprising LO-Understanding of Learning Outcomes, and confidence comprising fluency and accuracy. The assessment should also involve doing students data analytics per course, program, or even the entire department, faculty, or university to determine students' engagement and performance, aiming to communicate back to the university, lecturers, and students with recommendations for improvement as the system records the student progress in terms of all digital access done, continues assessment and OREX results in the form of individual assessed skills, as well as observers, report. Moreover, the university should find out more about the means for practically oriented courses such as STEM to be tested theoretically and practically from an OREX perspective. The suggestion for improvement also enhances timely exam creation, moderation, and subsequent uploading results into SARIS.

4.11.5. Student support

Guaranteed students support pedagogically and technically should be embraced before and during OREX exams for its smooth undertaking.

4.11.6. Used assessment platforms related to improvement (OREX & Zoom)

Ensuring timely student access to OREX and associated Zoom links and having a mandatory field for a student telephone number to directly facilitate examiners calling if a student does not timely appear for exams. Also, some of the questions proved to be a bit longer, so having a standardized and documented way to read. At the same time, students see them as well may add value (e.g., copy and paste in the chat, copy and paste in a word document or a PowerPoint slide that you can then share). Additionally, the system should be

able to remind instructors via their emails (copied to the respective head of the departments) of the courses that have no OREX questions just before the submission deadlines. Furthermore, more systematic, centralized, and automated management of MP4 files of the recorded sessions is required to increase reliability, thus enabling HoDs and others to see recordings the same as they can see /her department results. Moreover, it is to negotiate, leverage, and deploy an effective education package of Zoom or any other cost-effective collaboration tool, thus avoiding short interruption brought by its 40 minutes session limit in a free account.

5. Proposed Framework

Based on the literature and desk review done, an observation made, practices experienced, study results obtained, and discussion made, an online oral examination ecosystem framework is proposed from a student perspective. This framework ensures a systematic and sustainable ecosystem approach to online oral examinations at the OUT. The framework includes four (4) main phases, 16 components, and several elements to be considered for a smooth Online Oral Examination (OREX) from a student perspective. The four phases are: While studying (Phase 1); Preparing for exams (Phase 2); Doing exams (Phase 3), and Post exams (Phase 4), as depicted in Figure 9. These four phases (Figure 9) are essential and interlinked. Together with proposed recommendations in the next section, they can contribute to a systematic and sustainable ecosystem of student approach to online oral examination at OUT and beyond. This proposed framework is also in line with the learner-centered approach that allows the students to master their learning environment [32,41], thus a need for students' development in information-handling skills, which this framework contributes to concerning the optimal use of online oral examination (OREX). The four involved phases are further described below.

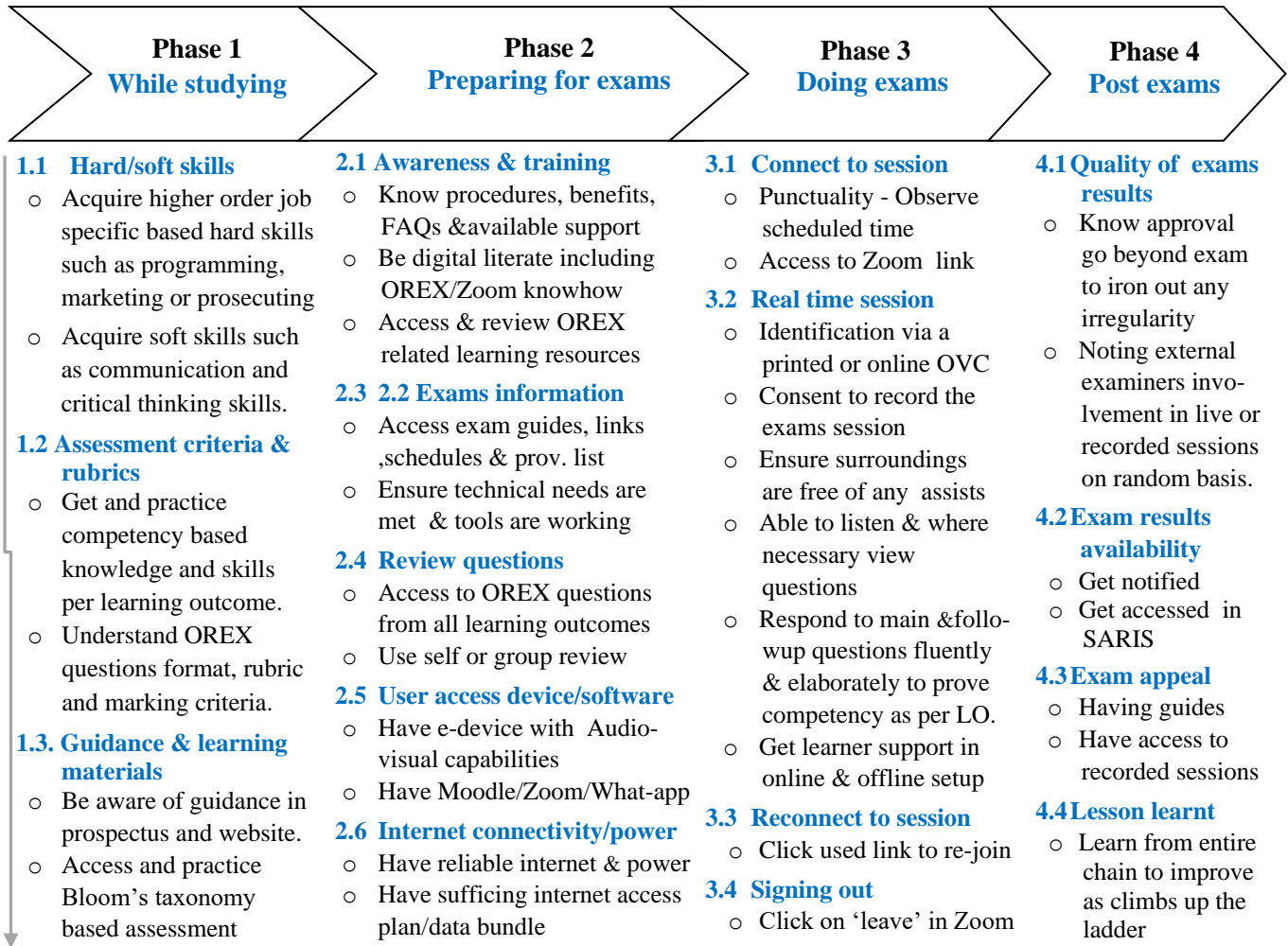


Fig. 9 Proposed framework for online oral examination ecosystem from a student perspective

5.1. Phase 1: While Studying

5.1.1. Hard and soft skills

Acquire hard skills to demonstrate insights on digesting, arguing, comparing, relating, contrasting, and providing practical examples or cases of learned materials, including concepts, theories, procedures, and practical solutions to apply them to a related or unfamiliar situation in real life. These skills include marketing, programming, or prosecuting by learning and working on given activities, assignments, and practices in the enrolled programme to acquire competencies. This handover is done via approaches such as Bloom's Taxonomy, six cognitive levels covering three lower & three higher-order skills from remembering, the lower order skill, to creating, the highest order skill [35-36]. Acquire soft skills in capacity building

Initiatives using available opportunities during 1st year and subsequent yearly orientations provided by the university in today's digital era [42], such as digital literacy [34,43]. These opportunities include web conferencing tools, a learning management system, social media, and own university-developed OREX for successfully undertaking ICT-enabled, hybrid, blended, and online learning and assessment. Moreover, is acquiring soft skills required for employability, such as the 4Cs of 21st-century learning, which are communication skills, collaboration, critical thinking, and creativity [37].

5.1.2. Assessment criteria and rubrics

Acquire and practice required knowledge, skills, and competencies per course learning outcome as the quality of assessment directly correlates to the quality of learning [38]. In this case, guided by three assessment criteria which are 1) Content comprising Communication Skills (C.S.), Creativity (C.R.), Knowledge and Understanding (K.U.), and Problem

Solving (P.S.); 2) Learning outcome comprising understanding of learning outcomes, and 3) Confidence which is Fluency and Accuracy.

Understand OREX question format, rubric, and marking criteria that will eventually be used for scoring based on three assessment criteria, i.e., 1st on content (50%) comprising of C.S. (10%), C.R. (10%), and K.U. (10%). Furthermore, P.S. (20%); 2nd on Learning outcomes that comprises understanding them (30%); and 3rd on confidence forming of Fluency and Accuracy (20%).

5.1.3. OREX-based guidance and learning materials

Access to OREX-based high-level guidance information is reflected in the prospectus and website for easy referencing and decisions.

Having access to and practice the learning materials incorporated with activities and other engaging assessments based on Bloom's Taxonomy six levels from remembering to create.

5.2. Phase 2: Preparing for Exams

5.2.1. Awareness & training

- Acquire digital literacy necessary to prepare and undertake OREX exams, including basic web conferencing such as Zoom, learning management systems such as Moodle and the associated Moodle Mobile, social media such as Whatsapp, and Online Oral Examination System (OREX) itself, and used devices audio-visual and connectivity skills. Acquiring such digital literacy, among others, includes attending all necessary orientations where a student learns benefits and how to access and use all indicated OREX-related platforms effectively & supporting infrastructure to avoid technophobia and become efficient.
- Access and review online oral exam format, questions, and associated materials.
- Know and get used to all available learner support mechanisms and channels for smoothly handling the dynamic student-related systems and tools.
- Access relevant updates and frequently disseminate Asked Questions (FAQ) to increase efficiency and avoid unnecessary communication.

5.2.2. Exams information

- Access OUT website and other channels such as email and social media regularly to know the scheduled dates of OREX examinations and any updated guides/instructions such as requirements to ensure and malpractices to avoid on OREX examinations for planning and other necessary preparations.
- Access a provisional list of OREX candidates (OREX list) published in advance by the DES office, showing students and OREX registration details.

- Access to and ensure video conference (e.g., Zoom) technical requirements are met for an OREX Session.
- Knowing in advance that Examiners will ask a student two main OREX and follow-up questions, provided they are built on the main questions.
- Knowing that system generates OREX questions & pairs with relevant CE/SE/EO.
- Able to access individual online oral examination timetables and respective Zoom links in OREX.
- Access to a brochure with all necessary information one needs to know about OREX, which is on one page for easy access and awareness about OREX.

5.2.3. Review Questions

- Access to lower and higher-order skills Bloom's taxonomy-based review OREX questions from all 6 K.A.s to evaluate the extent to which one has achieved the learning outcomes are moderated and uploaded in Moodle. An example is when students apply a concept from the syllabus to an unfamiliar situation not discussed in a class.
- Focus on the self/group approach to review questions.

5.2.4. User Access Device and Software

- They have a cost-effective digital device such as a desktop computer, laptop, tablet, iPad, a smartphone with Audio-visual capabilities that enables OREX sessions & other necessary digital access/interaction.
- They have installed and practiced required software and tools such as Zoom, Moodle, Whatsapp, and others to enable OREX sessions & other interactions.
- They have installed supported Web browsers such as M.S. Windows (Ms. Edge, Firefox, Chrome, Safari), Mac (Safari, Firefox), and Linux (Firefox, Chrome).

5.2.5. Internet Connectivity and Power

- They have availability and reliability of the internet and power in an area where the student intends to do OREX exams.
- They have a sufficing user internet broadband wired or wireless access via corporate internet connectivity or individual mobile data with 800kbps as a minimum, preferably from 1.5 Gbps tested via speedtest.net.

5.3. Phase 3: Doing Exams

5.3.1. Punctuality

- Observing scheduled time and coming in timely

5.3.2. Main OREX Access

- Access to respective V.C. software (Zoom) links activated at the time of relevant exam.

5.3.3. Exam invigilators

- Respond to randomly allocated interviewers (2) in the presence of an observer for a fair assessment.

5.3.4. Session recording

- Provide consent to recording Audio-visual of the examination session for using it as evidence in the event of seeking an appeal and other related purposes.

5.3.5. Virtual Exam venue (Zoom)

- Live identification in a virtual room (Zoom) via a printed or online OREX Visa Card (OVC) that bears essential student data like a traditional Exam Hall Ticket.
- Ensuring a virtual venue (Zoom) surroundings are free from any possible assistance during the exam.
- Having access to V.C. software (Zoom) for live exam sessions at home or the workplace provided reliable internet connectivity and could talk and be seen.

5.3.6. Guidance on critical matters in a live OREX session

- Speaking loudly, fluently, confidently, and elaborately to prove the competency of the subject.
- They are maintaining & adhering to the high level of academic integrity, exam rules & guidelines, including actions leading to irregularities resulting in exam cancellation, suspension of studies, or discontinuation.

5.3.7. Access to OREX questions

- Able to listen and, where necessary, view questions

5.3.8. Response to questions

- Respond to main and follow-up questions that probe to clarify and provide elaborative answers to reflect on learning outcomes, competencies & world of practice.

5.3.9. External examiners

- The possibility of external examiners engaging in some OREX sessions randomly.

5.3.10. Learner support

- Access to online and, where possible physical support during the examination.

5.3.11. Reconnect to real-time session

- In case of unintended disconnection, click again on the used V.C. software (Zoom) link to re-join.

5.3.12. Signing out/leaving the virtual room (Zoom)

- Click on 'leave' in V.C. software (Zoom)

5.4. Phase 4: Post Exams

5.4.1. Quality of examination results

- Students should know that their exam results are going through the approval process at departmental & faculty levels to ensure any irregular issue is ironed out.
- Students should know that their exam results go through an external exam process via live or recorded OREX sessions and summarised record sheets.

5.4.2. Exam results availability

- Timely notified when exam results are ready
- Able to access exam results relatively fast in SARIS

5.4.3. Exam results appeal

- Having a guide on how to apply OREX-related appeal
- Access to recorded evidence from the session when required to support OREX-related appeal

5.4.4. Lesson learned

- Learning from weakness during prep & live sessions, especially on responses to main & follow-up questions & improving performance as climbing a studying ladder.

6. Conclusion and Recommendations

6.1. Conclusion

This study aimed to investigate experience from the newly used Online Oral Examination (OREX) intervention and approach at OUT from a student's perspective to develop a framework that can lead us to a sustainable OREX ecosystem. The results show diversified experience and how beneficial the approach to the summative assessment is despite limited access to technologies and connectivity in the country. It was interesting to see different ways learners could access OREX-related digital platforms during this online oral examination. Most applauding is the use of smartphones, which is a good sign for this OREX approach due to the country's widespread use of such devices.

Based on the literature, results, and discussion, an online oral examination ecosystem framework was developed from a student perspective. This kind of intervention, if used well, might assist students in being conversant with the best way to optimize OREX use and stand out to do well in associated exams and motivate the development of competencies required in the job market. Also, on the same basis, several recommendations are made on what could be improved for a sustainable online oral examination from a student viewpoint.

The study's outcome has implications for policymakers and practitioners in the Universities and supporting parties in aligning existing policies, strategies, and practices to allow maximum appropriation of the proposed framework and recommendations. The implication is also to researchers in terms of using these findings as to the basis for testing the proposed framework while considering the recommendations. Also, it implies investing further in how each shown phase, component, and element can be practiced to benefit students in achieving better results in their courses and overall program learning outcomes.

6.2. Recommendations

This study presents recommendations from the viewpoint of analyzed quantitative and qualitative collected data and a framework proposed for further improvement to a sustainable online oral examination practice from a student perspective.

- Students should be aware and act on the overall OREX requirements provided by an institution and other factors that influence the exam, such as punctuality and meeting minimum equipment (desktop, laptop, tablet, or

smartphone with visual audio). Other factors are good internet connectivity & aspects described in a framework.

- Students should address questions with objective answers, solve problems creatively, and be prepared to interact professionally to portray and demonstrate required competencies along with the six Bloom's taxonomy levels, especially the higher level on which the OREX questions are based. i.e., apply, using the information in new situations; analyze, drawing connections among ideas; Evaluate, which justifies a decision; and create, produce original work [6].
- The first two levels should also be considered by students as the foundation, i.e., Remember, which deals with recalling facts and basic concepts, and Understand, which explains ideas or concepts. When used appropriately to write learning materials and their delivery, it eventually produces a sound, market-ready & employable graduate.
- Students should acquire and leverage devices they have to increase efficiency in preparing for and doing OREX exams that involve access to Moodle for OREX review

questions and course materials. Also, the OREX system for access to exam schedules and session links, the Zoom platform as a virtual exam room, and WhatsApp as a social media for efficient communication.

- Students should note that technology, in and of itself, does not necessarily result in a fundamental improvement in educational practice. In this case, concerning preparing and doing the online oral examination, the focus should be on learning outcomes that ensure they are ready for online oral exams and competency-oriented knowledge, skills, and attitude required in the market.
- Students need to be oriented and acquire digital literacy on how to participate effectively in online oral exams where online training and orientation are used efficiently & cuts down costs.

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