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Research Article

Study of Feasibility of Formative Assessment for Continuing Education Programs at Under-Resourced Settings in Myanmar After Military Coup 2021

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Abstract

This study aims to highlight the significance of digital formative assessment, and the tools used to implement the assessment process in low-resource areas following the military coup in 2021. Focusing on these regions in Myanmar, the research emphasizes the development of skilled human resources to provide essential medical laboratory services to vulnerable populations during crises. Over three years, 33 local young participants have enrolled in the blended Medical Laboratory Technology (MLT) training program. Key training modules have been delivered in a hybrid language through an online platform, with feedback provided to enhance learning. Effective teaching and learning platforms can be established using limited resources by leveraging digital formative assessment tools like Google Forms, enabling students to evaluate their learning outcomes. This study serves as a foundation for future modifications and improvements to the online MLT training program, adopting a more comprehensive approach.

Keywords*: Digital formative assessment, Digital formative assessment tools, Low-resource settings, online blended MLT training programs, skilled human resources.*

Introduction

Importance of the Study

In a developing country like Myanmar, where diverse ethnic groups and local languages complicate communication, delivering education through distance learning presents considerable challenges for educators. In a nation where many people are focused on meeting their basic needs, access to higher education is often a low priority, and sometimes not considered a priority at all—especially given the ongoing civil conflict since the military coup in 2021.

Formative assessment is a way to measure students' understanding and efficiency in lessons, and it significantly highlights their learning retention. When applied in practice, these methods are considered effective for evaluating their impact on certification outcomes. (1).

Information and communication technologies (ICT) have significantly influenced open and distance learning (ODL) in developing nations. Access to and utilization of these technologies are shaped by various factors, including geographic location, lack of knowledge and skills, and financial limitations. To meet specific educational needs, access to high-quality education must be enhanced. Integrating these technologies into ODL encourages the emergence of new cultural practices, ideas, and perspectives, while ICT can also shift expectations and elevate standards for both learners and educational institutions. (2).

Institutions must ensure a reliable and adequate technical infrastructure is in place to support e-learning programs. Both instructors and students need appropriate technical skills to effectively use e-learning tools, and instructors should adapt their courses to integrate these tools into their teaching methods. (3).

Purpose of the Study

The purpose of this research, conducted amid the civil war, is to explore the usefulness of effective formative assessment tools to establish a high-quality teaching and learning platform for medical laboratory technology and science subject in remote and crisis areas within Myanmar. The initiative seeks to extend its reach to remote areas, ensuring inclusivity for all, with a focus on diverse ethnic groups and minorities. It is designed to support their long-term human resource development and create career opportunities within their local communities.

Scope of the Study

This study covers the medical laboratory technology training programs following the military coup in Myanmar regarding reaching the learning outcomes and evaluating the effectiveness of online training through formative assessment tools in resource-limited settings. The trainees get the chance to pursue career opportunities and vocational training in local areas while delivering laboratory services for local vulnerable populations during emergency healthcare services provision.

Definitions of Key Terms

CBT	Competency-Based Training
CDM	Civil Disobedience Movement
CSV	Comma-Separated Values
DE	Distance Education
HIV	Human Immunodeficiency Virus

ICT	Information, Communication and Technology
IEP	Interim Education Providers
iOS	iPhone Operating System
ISO	International Organization for Standardization
LMS	Learning Management System
MCQs	Multiple-Choice Questions
MLS	Medical Laboratory Science
MLT	Medical Laboratory Technology
NUG	National Unity Government
ODL	Online Distance Learning
OFAT	Online Formative Assessment Tool
PALM	Pathology And Laboratory Medicine (PALM)
PHS	Public Health Service Provider
QSE	Quality System Essentials
SAQ	Short Answer Questions

Methodology

A retrospective study design was employed, utilizing prepared statements and documentation from the past three years of training programs for students after their enrollment examinations.

Sample of the Study

The participants were recruited as humanitarian volunteers who had completed high school as their foundational education. Each participant was assigned an intake batch number corresponding to their year of enrollment. The training program was aimed at local young individuals, intending to equip trainees and trained staff with the skills necessary to provide learning outputs to vulnerable local populations during emergencies and in long-term care through medical laboratory technology.

The total number of participants in the training programs was 10 in 2022, 28 in 2023, and 33 in 2024, respectively. All participants are local young adults who volunteered for healthcare provision in response to humanitarian needs and expressed a desire to pursue a career path following the military coup.

Instrumentation

The training program employs a blended teaching-learning approach following the military coup in 2021. It combines online training with hands-on experiments and technical laboratory experience provided by skilled local CDM laboratory personnel. An online platform has been established utilizing multimedia and social media tools to engage local participants in conflict-affected and remote areas where access to the internet is often limited. For lectures and training instructions, resources such as YouTube videos, training manuals, and hands-on facilities with limited resources have been made available.

In 2024, a Telegram channel was introduced to facilitate quick interactions between students and the training center. To address challenges related to the English language, all training programs, including assessments, have been developed using a hybrid language approach that incorporates both Burmese and English.

Research Design

This study was retrospective research conducted over nearly three years (2022, 2023, 2024). The first training batch was initiated in early 2022 (during April 2022) and lasted approximately five months as a short course program. The subsequent intakes were modified based on feedback from the previous program, particularly in terms of assessment styles to enhance student engagement. All courses began with essential basic modules focused on immediate and emergency healthcare measures relevant to local regions affected by conflict. Following the completion of the first training batch, the online training center introduced capacity-building programs aimed at providing ongoing education for all trained staff, enabling them to become skilled medical laboratory professionals in their respective regions across Myanmar.

Research Procedure

Basic medical laboratory technology training modules were developed to complement the ongoing training programs, with module-end tests administered at the conclusion of each. Students' performance was evaluated based on their marks, which were combined with hands-on training and clinical internships at local training facilities.

In the first and second batches, open-ended questions were created using Google Forms to assess the trainees' learning capacity, based on previous written examination formats used in national-level laboratory training programs administered by the Ministry of Health and Sports prior to the military coup in 2021. Starting from the third batch, trainees were required to complete online formative assessments that included multiple-choice questions, true/false questions, and matching quizzes based on review questions from international

textbooks on medical laboratory technology (MLT) and medical laboratory science (MLS), as well as materials from online laboratory training websites. Results were based on overall marks and scoring points established in Google Forms.

Data analysis and findings:

Analysis of the Results according to online MLT training program and trainees

From 2021 to 2024, the study was conducted using online platforms where access to higher education was not readily available. This study included 33 participants with a minimum educational qualification of matriculation, comprising both university students and CDM personnel in Myanmar. The demographic and academic details of the participants are outlined in table 1.

Table 1. Trainees overall		**2022**	**2023**	**2024**
Total number of trainees		10	28	33
Gender	Male (%)	2 (20 %)	7 (25 %)	10 (33 %)
	Female (%)	8 (80 %)	21 (75 %)	23 (69 %)
Average age		22.2	24.6	22.9
New Intake		Batch 1, 2	Batch 3,4	Batch 5
CDM personnel		1	7	3
Background education (Matriculation)		5	10	13
Background education (Passed matriculation)		2	8	9
Background education (University students)		2	8	11
Background education (Bachelor holder)		1	5	5
Dropout after end of short course training		4	2	1

Most of the participants are female students, comprising 80% (8 students) in 2022, with the remaining 20% (2 students) being male. The distribution remains similar in 2023 and 2024, with 75% (21 students) female and 25% (7 students) male in 2023, and 69% (23 students) female and 31% (10 students) male in 2024. The average age is 22.2 years in 2022, 24.6 years in 2023 and 23.9 years in 2024 respectively.

Honorary recognition is given to the CDM squad in each local area. The participants include a CDM student from the University of Yangon (1st year, English major) in 2022, along with 7 CDM personnel: 1 student from the Education College, Mandalay (1st year), 1 student from the University of Nursing, Mandalay (2nd year), 1 student majoring in Psychology (1st year), 1 in Botany (2nd year), 1 student from the University of

Technology, Taunggyi (1st year), and 2 CDM personnel from the healthcare sector—1 being an MLT Grade-2 and 1 a public health supervisor (PHS-2). Similarly, in the 2024 intake, 3 CDM personnel participated in the training program: 1 being an MLT Grade-2, 1 from the University of Medical Technology (1st year), and 1 student majoring in Geography (1st year).

Total number of trainees were 10 in 2022, 28 in 2023 and 33 in 2024. Regarding their educational background, in 2022, 5 out of 10 participants had completed high school (matriculation). Among the remaining participants, 2 had passed matriculation, 2 were university students, and 1 was a bachelor's degree holder. In 2023, 10 participants had completed high school, while 8 had passed matriculation, the number of university students increased to 8, and bachelor's degree holders rose to 5. In 2024, the number of participants who had completed high school increased to 13, those who had passed matriculation rose to 9, and there were 11 university students and 5 bachelor's degree holders.

Geographically, there were 7 trainees in the Sagaing region, with 2 dropouts after completing the short course training; 15 in Chin State (3 dropouts after completing the short course); and 17 in Karenni State (2 dropouts after completing the short course), all due to various socio-economic factors.

To implement education and training programs amid the civil war, Myanmar urgently needs a sustainable education system. Simultaneously, training should be designed using effective and pragmatic teaching and learning methods.

In terms of developing skilled human resources, short-term laboratory medicine training in low-resource settings must first be tailored to meet local needs. With ongoing long-term support, sustainability can be achieved, making it essential to establish a viable plan for its implementation. (38)

In addition to the factors aimed at enhancing online teaching quality, it is also crucial to consider and evaluate the indicators of its effectiveness. A study focusing on the effectiveness of online teaching and its quality indicators from a nursing practice perspective highlighted several key factors, including the time spent in the online environment, the number of days actively engaged online, the number of responses provided to students in discussions, and the promptness of responses to students' questions and assignment grading. The study also identified effective online teaching strategies that featured recurring themes, such as collaborative activities like discussion boards, instructor presence, and the use of diverse instructional methods. (39)

Furthermore, a study conducted in a public administration class provides evidence that student performance, as measured by grades, is independent of the mode of instruction. (40) This study addresses the effectiveness of online courses in comparison to traditional classroom learning, focusing on individual student needs, perceptions, and learning outcomes. It concludes that there is no significant difference in performance, as

indicated by final grades, even though assessing performance in online instruction can be challenging and often problematic.

Analysis of the Results according to training modules

Training program amid civil war

Since the 2021 military coup, civil war has been ongoing, and there is a growing demand for basic human resources among local young adults in resource-limited and remote regions of Myanmar.

Training modules shown in table 2 have been innovatively developed by an online training center for use in emergency healthcare and crisis situations on the ground. These modules include essential life-saving laboratory techniques for local trainees, such as emergency blood transfusion, basic laboratory practices, medical ethics, and an introductory module on clinical microbiology, which serves as a foundation for diagnostic laboratory and pathology services. Hands-on training sessions are aligned with the online modules and are conducted by local CDM laboratory personnel, including experienced pathologists and laboratory technicians from each area.

Beginning in 2024, the medical laboratory technology modules have been intensified to focus on developing skilled human resources within local communities amid ongoing civil conflict and political instability. There is an urgent need to develop training programs precisely, and to establish a robust quality control process. Consequently, assessing learning outcomes and their effectiveness, along with relevant assessment methods, has become essential for both instructors and students.

Many students faced difficulties in continuing their university education after the coup, with numerous individuals participating in the Civil Disobedience Movement (CDM). During the civil war, distance learning emerged as their primary focus, despite disruptions due to poor internet connectivity in various regions and intentional internet shutdowns enforced by the regime.

The study was conducted during the civil war, which made it unfeasible to conduct pre-tests for each module. However, an enrollment examination was administered prior to the training program, evaluating candidates' proficiency in English, science, and medical laboratory knowledge through Google Forms.

Table 2. Training modules throughout the programs

Year	Qualification	Subject Code	Subject Description	Final marks		Result
				Assessment (%)	Lab Practical	
2022	BLS	BLS 01	Emergency Blood Banking services	*50	*Completed	*Pass
		BLS 02	Basic Laboratory Services, Ethics			
		BLS 03	Introduction to Immunology and Routine Microscopy, Point-of-Care Testing			
		BLS 04	Introduction to General Bacteriology			
		BLS 05	Introduction to General Parasitology			
	Practicum	BLS 06	Clinical internship training 120 hours	Completed		
				Assessment (%)	Monthly reporting	Result
2023	BLS-CB	CB 01	Blood Transfusion Reactions	*60	*Submitted	*Pass
		CB 02	Introduction to Virology, Cytopathology	*20	*Not-submitted	*Fail
		CB 03	Basic Hematology procedures			
		CB 04	Laboratory Management and Introduction to ISO			
		CB 05	Data Entry, Laboratory Report writing			
	Practicum	CB 06	Community Survey Activities, Basic Human Resource Development	Achieved		
				Assessment	Monthly reporting	Result
2024	MLT	HLF Minilab Contest		*75		
		MLT 01	General Bacteriology and Diagnostics for Tuberculosis			
		MLT 02	Systemic Bacteriology and Antimicrobial Resistance			
		MLT 03	Immunology and Diagnostics for Human Immunodeficiency Virus			
		MLT 04	Introduction to Bacic Medical Sciences (Anatomy, Physiology)			
		MLT 05	Diagnostics for Hematological diseases			
		MLT 06	Introduction to Clinical Chemistry and Bacic Metabolic Panels			
		MLT 07	Quality Control for Clinical Chemistry			
				Logbook	Records	Grade
2025	MLT	MLF PT	Final revision	*A	*C	*Pass
		MLT PT	Proficiency Test Examination	*B	*B	*Pass

***Examples have been shown for better explanation.**

Target population of the training program

In this study, training programs are specifically designed for low-resource settings, with a focus on remote and conflict-affected regions such as Chin State, Karenni State, and the Sagaing region, which are impacted by the ongoing civil war. These programs aim to equip local young adults with skills that enhance their career prospects while enabling them to provide essential services to their communities during emergencies and times of need within their local areas.

Kandiko (2020) suggests that developing countries like Myanmar have the potential to present exemplary models that draw upon traditional values, such as inclusion, environmental stewardship, and more sustainable lifestyles. Higher education reforms were advancing steadily until early 2020, when Myanmar was impacted by the global pandemic. Since then, the country has continued to demand education programs in innovative ways. (41)

Using native language for better understanding

Formative assessments were carried out every two months at the conclusion of each Medical Laboratory Technology (MLT) module using Google Forms. Quizzes and multiple-choice questions (MCQs) were created in both English and the students' native language, by the training center, to accommodate their limited English proficiency. At the end of each training module, review questions and quizzes were incorporated to evaluate students' comprehension over the previous two months.

The extensive benefits of dual-language education have important implications for education policy in developed countries like the United States. Studies concluded that the approach leveraged the home language skills of English learners (ELs) as an asset is a promising strategy for educating students who do not have a strong command of English. (42)

Module-end tests utilize various methods, including online quizzes, interactive discussions, assignment submissions, and feedback, tailored to the preferred approaches of each institution. Tools like Google Forms are user-friendly for educators in low-resource environments like Myanmar. Throughout the assessment process during training programs, translating questions into Burmese aids students in better understanding the content. Furthermore, employing a dual-language format (Burmese and English) helps students become more familiar with English terminology as they engage with a broader range of questions and assessments.

Contents Covered in the Curriculum

Pre-recorded videos were created by the training center and organized into a timetable, module by module. All explanations were provided in the native language, utilizing international references and teaching materials, including animations and numerous visuals. The overall curriculum, including all modules, is presented in Table 2.

Regarding the essential modules for the basic medical laboratory staff training program, five modules have been designed to address the provision of emergency and life-saving medical laboratory services for vulnerable local populations facing significant challenges in accessing primary healthcare amid conflicts and crises. The modules include: (1) emergency blood banking services, (2) basic laboratory services combined with medical ethics and social skills, (3) an introduction to immunology and routine microscopy with point-of-care testing, (4) an introduction to general bacteriology, and (5) an introduction to general parasitology. These five modules are delivered through both online and on-ground sessions, followed by a clinical internship training program (module 6) comprising 120 hours.

Capacity-building training programs are conducted as part of continuing education development to ensure trainees' proficiency in managing the following modules:

1. Blood transfusion reactions
2. Introduction to virology and cytopathology
3. Basic hematology procedures
4. Laboratory management, including ISO standards and documentation skills
5. Data entry and laboratory report writing.

Additionally, a community survey module, combined with a human resource development program, has been prepared as an additional module (6) to enhance trainees' competency and efficiency while fostering engagement with the local community.

To ensure proficiency as medical laboratory technology professionals in a country with a high burden of infectious and communicable diseases, such as Myanmar, essential technical modules are delivered with intensive focus. These include:

1. Tuberculosis
2. General and systemic bacteriology
3. HIV in conjunction with immunology
4. Diagnostics to hematological diseases

5. Introduction to clinical chemistry for testing basic metabolic panels
6. Quality control

E-learning program after 2021 military coup

Experience has shown that the decision to incorporate technology in open and distance learning affects not only the teaching and learning landscape but also encourages the development of new cultures, ideas, and understandings. Consequently, the introduction of alternative learning methods as in this study can transform and raise expectations for both users and institutions. Meanwhile, it is essential for institutions to have adequate and reliable technical infrastructure in place to support e-learning activities.

In 21st-century higher education, online and blended learning are becoming more common. Computer-assisted online testing is seen as an effective approach to improving the application of formative assessment in universities. (43) While both instructors and students need to possess the technical skills required to use e-learning tools effectively, instructors should also adapt their courses to seamlessly incorporate e-learning into their teaching methods. (2)

Conversely, the course content was largely unfamiliar to the students since the program was creatively developed using training modules and teaching methods from other countries, delivered through a blended learning platform. While hands-on training was part of the program, it also enhanced the students' progress and comprehension by the conclusion of each training module.

Analysis of the Results according to formative assessment tool: Google form

Assessment plan and learning outcomes

Assessing program learning outcomes in higher education is gaining importance as there is growing scrutiny regarding the effectiveness and sustainability of academic programs. Institutions are required to demonstrate accountability for their use of financial and human resources, along with student performance associated with specific educational outcomes. A comprehensive assessment plan gathers and analyzes both quantitative and qualitative data to showcase student success.

Using an online platform for assessment, also known as e-assessment, can evaluate the outcomes of online education. This approach offers two significant benefits: it significantly decreases the time teachers spend on assessments and enables quick feedback from teachers regarding student learning outcomes. (44)

As a result, e-assessment is expected to be very effective in achieving the desired objectives. Furthermore, utilizing online evaluations through multiple quizzes—each contributing minimally to the final grade—produces better academic outcomes for students than relying solely on traditional exams. Online assessment methods should function as viable alternatives to conventional approaches, offering a neutral experience while yielding superior results compared to traditional assessments. (44)

Effective assessment necessitates a systematic, periodic, and objective approach that employs various measures and assessors to pinpoint strengths and weaknesses. A comprehensive approach distinguishes scoring from grading, emphasizing data collection to assess the effectiveness of courses and instructional methods. (45)

In light of the ongoing crisis in Myanmar, training programs for medical laboratory technology have rapidly developed since 2022, necessitating a continuous process for future recognition and accreditation. From the outset, these programs must be designed to meet the emergency healthcare service needs arising from the civil war.

Formative assessment and students' efficiency

Using the knowledge and theoretical skills gained from formative assessments, trainees were guided to apply their competencies during practical sessions in relevant modules, not only during on-the-job training but also as part of continuing education development programs.

Anwar (2019) and Hussein (2019) suggested that formative assessment serves as a tool to enhance the learning experience, effectively shaping teaching and learning processes to achieve instructional objectives. (46) Tsulaia and Adamia (2020) indicated that formative assessment positively influences the grades students receive in summative assessments. (47)

Research has shown that digital formative assessment (DFA) tools offer several affective benefits, including increased motivation (Bhagat & Spector, 2017; Faber, Luyten, & Visscher, 2017; Ismail et al., 2019; T.-H. Wang, 2008; Youhasan & Raheem, 2019), higher levels of engagement (Bhagat & Spector, 2017; Elmahdi et al., 2018; Gikandi et al., 2011; Ismail et al., 2019), and more positive attitudes toward learning (Bhagat & Spector, 2017). (48)

DFA tools offer several advantages, including reduced scoring time, which allows educators to focus more on active teaching and learning activities. In the study conducted by Çekiç and Bakla (2021), it was noted that many DFA tools, including Google Forms, have mobile versions available for iOS and Android

platforms. As of September 2020, eight of these tools were accessible on Android, enhancing their usability and convenience for both instructors and students. (35)

Formative assessment is typically ungraded and does not factor into summative evaluations. Often referred to as continuous assessment, it takes place during program implementation and emphasizes the development of knowledge and skills. This approach enhances student learning outcomes by actively involving learners in various assessment activities and delivering constructive feedback.

In the Medical Laboratory Technology (MLT) training program, a variety of assessment tools are employed, including logbooks, examination papers, checklists, field reports, and instructors' observations during clinical laboratory practices. These tools are designed to evaluate students' attitudes, skills, knowledge, and ethical awareness regarding the long-term implications of their education. (49) Effective assessment methods are crucial to the learning process. In the MLT training program, assessment concepts were integrated into the curriculum design and implementation, ensuring compliance with established criteria and procedures for assessment tools. (50)

Choosing an Assessment Tool Based on Effectiveness

Assessment tools should be easy to use, freely accessible, and should not require additional monthly or annual subscription fees for online teachers. The study was conducted using Google Forms for training modules.

It is simple to obtain results using marks, and students can provide feedback through the form if it is designed for them. Candidates must remain online throughout the assessment period. Although candidates may be alone, they cannot review their answers or keys unless they know the questions in advance. Since Google Forms must be submitted online, there are some limitations and drawbacks to this method.

In general, e-learning techniques encompass a blend of various teaching strategies. (51) Assessment tools such as self-assessment quizzes, discussion forums, and tutoring facilitate additional and collaborative learning opportunities. (52)

Assessment tool and Google form: Teacher's choice

Education and assessment are interconnected, as educators integrate them to reach desired learning objectives. With technological advancements, teachers can track student progress using online formative assessments. (53)

Generally, formative assessment is believed to have benefits in reinforcing information and stabilizing previously learned material, which may have been overlooked due to insufficient knowledge or practice, thus highlighting its impact on long-term memory retention. (54)

The feasibility of using Google Forms as an assessment tool is highly beneficial due to its user-friendly interface, making it easy for both educators and students to navigate. It is also cost-effective, as it does not require any subscription fees. One of its most notable features is the automatic grading system, which significantly reduces the workload associated with manual marking.

Additionally, results can be easily exported to Excel spreadsheets, facilitating efficient data management and integration into larger databases. Google Forms supports a variety of question types, including multiple-choice, short-answer, and matching questions, and it also enables the collection of student feedback. Furthermore, the tool allows for the setting of specific timeframes for assessments, making it a flexible option for administering timed quizzes.

Using Google Forms during the study not only helps in maintaining a comprehensive database but also allows for easy integration of all module assessments into a larger framework. This functionality assists instructors in compiling total marks at the end of the training program, streamlining the evaluation process.

Google form with various question formats

Compared to the 2022 question formats, which included short-answer questions that made it challenging to assign precise marks and evaluate performance, the 2023 format featuring multiple-choice questions (MCQs) offers a more straightforward and objective grading process. This shift enhances the overall assessment strategy, as scoring points can be integrated into upcoming certification and provided through academic transcripts.

To effectively test learning outcomes and students' capacity to fulfill the objectives of the training programs, the online training center has prepared between 50 to 100 questions after every module. A time limit is set in the student instructions, which they must adhere to. However, participants face challenges with internet connectivity, as Google Forms requires stable access to function properly. As a result, students need to take assessments in locations with reliable internet, which may not always be conveniently close to their local areas.

The online training center analyzes the results of formative assessments and oversees students' overall efficiency, as the questions primarily test learners' understanding of the material covered in each module. Scores, ranging from the lowest to the highest, can serve as a benchmark for test results and students' learning

outcomes. Furthermore, the progress of students over serial test-taking can be easily tracked through an Excel spreadsheets database, enabling instructors to monitor improvements and identify areas needing further support.

Both students and teachers concur that Google Forms has a beneficial impact on learning, even though there are risks of cheating and certain limitations. Nevertheless, English language instructors are advised to utilize online formative assessments to monitor student progress and adopt measures to reduce cheating during online evaluations. (53)

The free version of Google Forms is highly functional and suitable for implementing formative assessments, as it offers user-friendly features like quiz creation and basic response monitoring. This accessibility makes it ideal for teachers, schools, or regions with limited resources. However, the requirement for an internet connection can be a significant drawback, especially for users in less technologically developed or economically disadvantaged countries.

Question style

Multiple-choice questions (MCQs) are straightforward to grade, and there is an abundance of reference materials available online and in review books for subjects such as Medical Laboratory Technology (MLT) and Medical Laboratory Science (MLS). This makes it practical for instructors to integrate these questions into the curriculum, particularly when aligning them with training modules in low-resource environments. In the study, short answer questions were used in the 2022 training programs, but this format was replaced with MCQs in 2023 and 2024.

MCQs can effectively assess the same constructs as short answer questions (SAQs) when evaluating higher-order cognitive skills. (55)

Higher-order learning can be evaluated using multiple-choice questions (MCQs) in various formats, such as single best answer, multiple true-false, and script concordance tests. However, open-ended short-answer questions (SAQs) offer a more direct assessment of students' understanding, enabling them to express their knowledge in writing. This approach enhances reliability and validity by minimizing cueing effects and improving discrimination among responses.

While multiple-choice questions (MCQs) may not effectively capture knowledge, as they often rely on recognition rather than recall, certain formats may emphasize lower order thinking skills. In contrast, short-answer questions (SAQs) assess students' capacity to synthesize information rather than just recognize correct

answers. This approach provides greater validity and is more effective for evaluating higher-order cognitive skills such as interpretation, problem-solving, and reasoning. (56)

Multiple-choice tests offer several advantages among different item types or test formats. However, short-answer questions, which are open-ended, are considered more suitable for assessing inferential skills. While students tend to perform significantly better on MCQs than on SAQs, a combination of both formats can effectively measure inferential comprehension of key concepts. (57)

Assignments and feedback evaluations

Providing answer keys along with detailed feedback in both the native language and English offers multiple advantages for students in Medical Laboratory Technology (MLT). After receiving Google Form submissions, these keys and feedback are emailed to supervisors in each training area. First, this practice reinforces learning by enabling students to review correct answers and understand their mistakes. The dual-language approach improves comprehension, ensuring that students can grasp complex concepts more effectively in their native language while also enhancing their English proficiency, which is crucial for their field.

Furthermore, this method fosters better retention of information and encourages the development of critical thinking skills, as students can engage more actively with feedback and correct answers. Over time, it aids in language acquisition, technical knowledge, and overall academic performance.

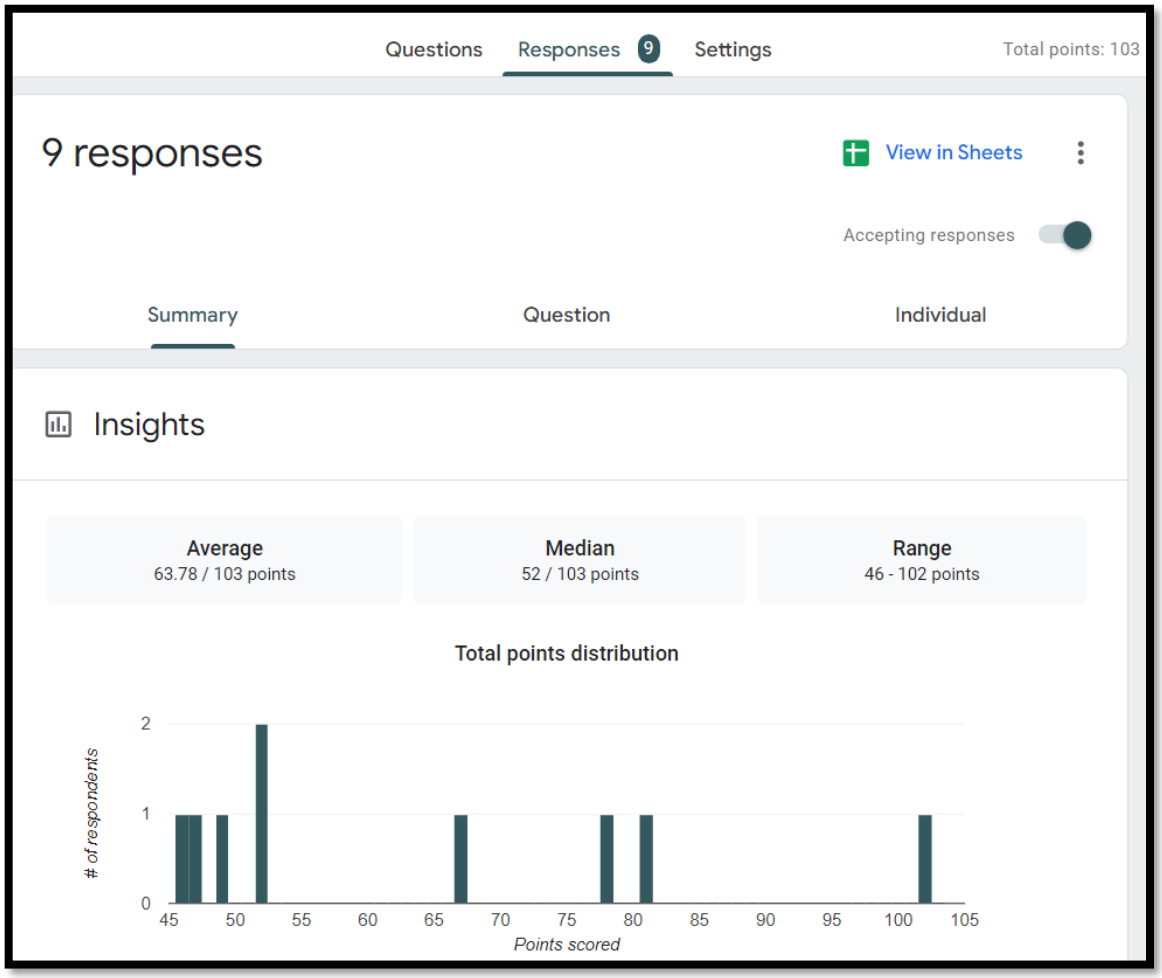

Figure 1. Overall dashboard for teachers' review and record keeping at module end assessment

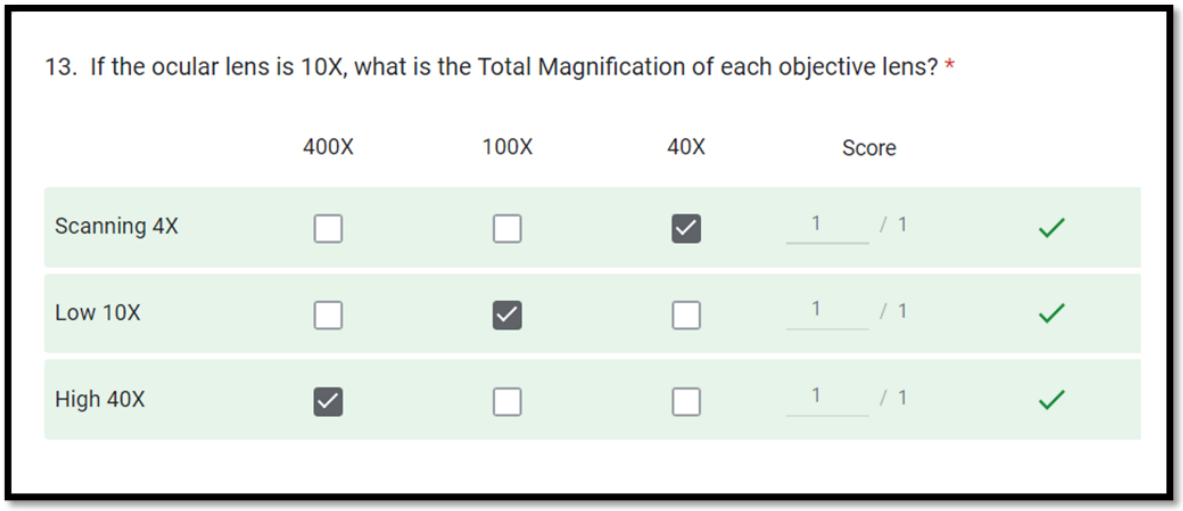

Figure 2. Matching questions format in Google form

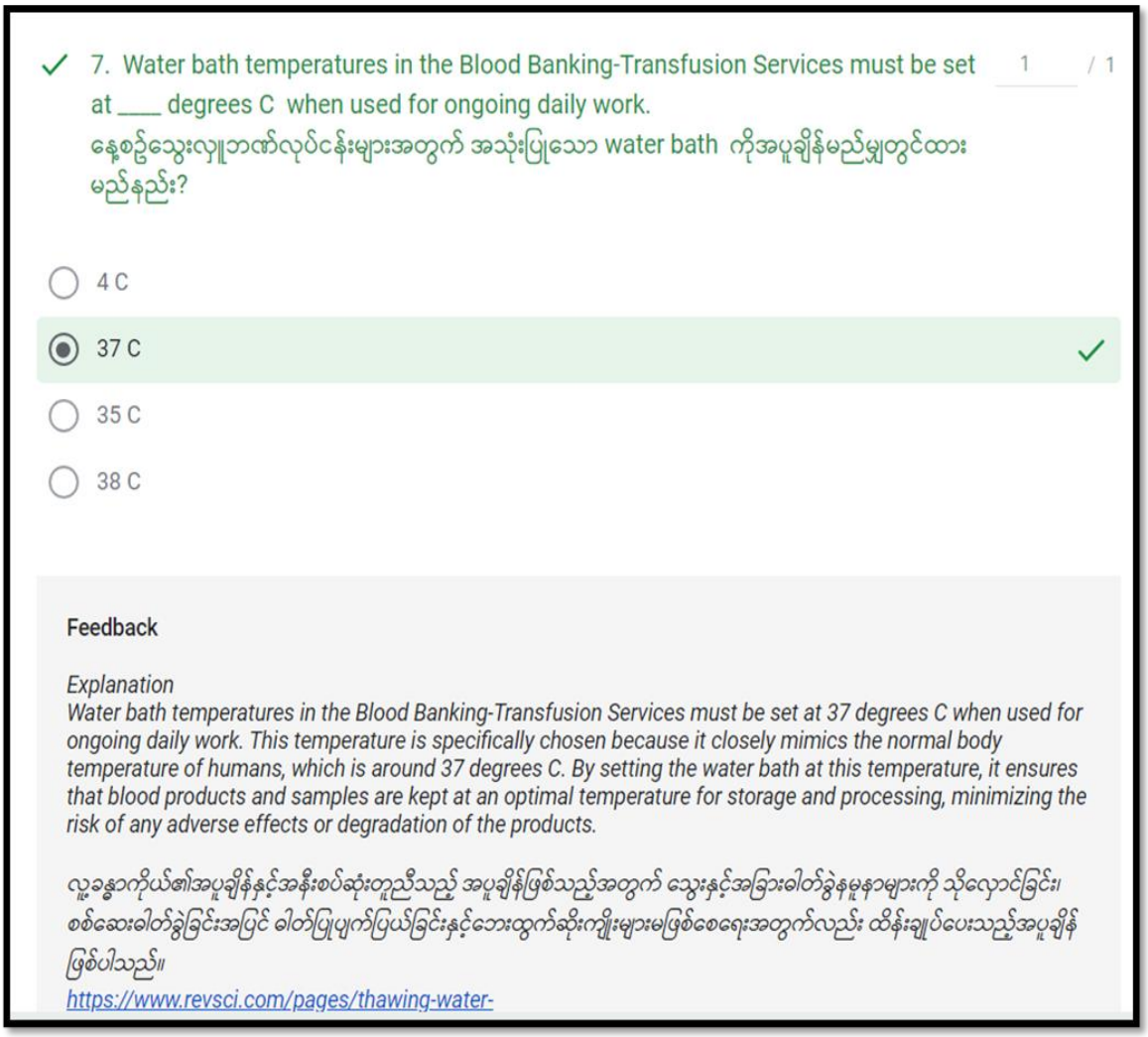

Figure 3. Keys with resource and materials to study more (external link attached) along with feedback using hybrid language

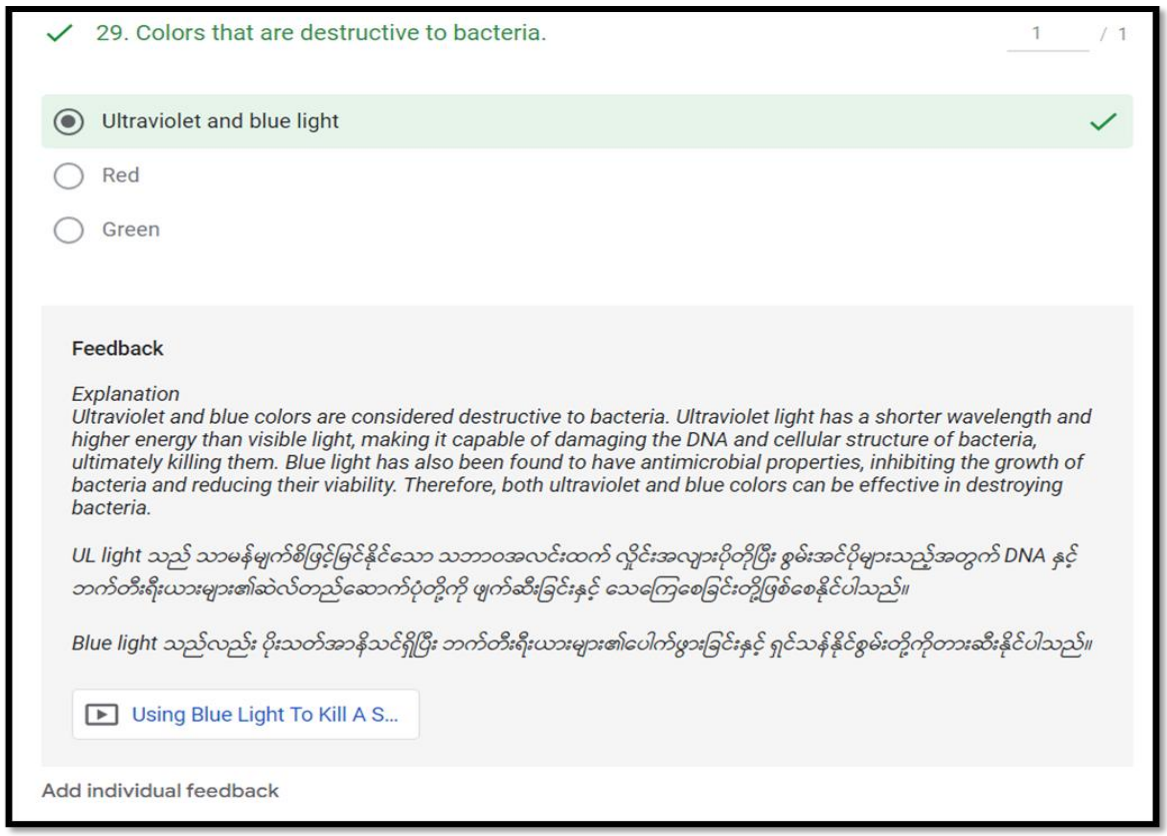

Figure 4. YouTube link to study more, along with explanation using hybrid language

Suggestion and conclusion:

Limitations:

The limitations of the study in low-resource settings, particularly in conflict-affected regions with a limited number of participants from local areas, could include the following:

1. Sample size and generalizability: A small or non-representative sample from local areas may reduce the ability to generalize the findings to a broader population. If only a few participants from specific regions are included, the results might not reflect the experiences or perspectives of all those affected by the conflict in the wider region.

2. Selection bias: In conflict zones, access to participants can be difficult due to safety concerns, displacement, or lack of infrastructure. This could lead to selection bias, where certain groups (e.g., those from urban areas or with access to resources) are overrepresented, and others (e.g., those in rural or isolated regions) are underrepresented.

3. Data collection challenges: Limited access to local areas and populations may hinder comprehensive data collection. In some conflict zones, logistical issues such as transportation, security, and communication difficulties may make it impossible to reach certain groups, leading to incomplete or skewed data.

4. Ethical and safety concerns: Conducting research in conflict-affected regions may pose ethical challenges, including risks to the safety of both participants and researchers. These safety concerns could limit the scope and depth of the study, as certain areas may be deemed too dangerous for data collection.

5. Cultural and contextual factors: In conflict-affected settings, cultural and social dynamics may affect how participants respond to surveys or interviews, potentially influencing the validity of the findings. The experiences of those from different ethnic or social groups may also vary significantly, yet a small or homogeneous sample may not capture this diversity.

6. Resource constraints: Low-resource settings often face challenges such as limited funding, inadequate research infrastructure, and a lack of trained personnel. These limitations may affect the quality of data collection, analysis, and interpretation, and may limit the ability to conduct comprehensive longitudinal studies or repeated measurements.

7. Impact of conflict on participation: Ongoing conflict may influence participants' willingness or ability to engage in research. Fear of retaliation, distrust of outsiders, or trauma from past experiences may lead to lower participation rates or incomplete data from affected individuals.

These limitations need to be acknowledged when interpreting the study results, and strategies should be developed to mitigate their effects, such as enhancing outreach efforts, ensuring participant confidentiality, or using mixed methods approaches to compensate for limited quantitative data.

Conclusion

A robust and effective assessment process should also involve faculty development, policy revisions, or curriculum adjustments. However, if no action is taken after meeting external requirements, the process can be flawed. Likewise, having an assessment plan alone is insufficient; the process must be continuous, add meaningful value, and be deeply integrated into the program's and institution's culture and practices to improve student learning.

To implement the program for remote areas of Myanmar could be challenging, therefore training programs and relevant institutions should collaborate with academic partners both locally and internationally for better outcomes of the students as well as their quality control of their education.

Recommendations:

From this study, we have learnt that more useful assessment tools are required although this is a part of students' competency test for continuous learning process. To answer the research questions, things to evaluate can be implicated as follows:

1. Are common assessment tools (e.g., Google Forms) suitable for module-end tests in training programs?

Formative assessment can be designed as module-end tests in training programs for online medical laboratory technology students, particularly during their continuing education amid the ongoing civil war.

2. Are formative assessment tools used in vocational training programs to contribute toward certification at the end?

At the conclusion of the training programs, online formative assessments (OFAs), specifically Google Forms used in this study, play a crucial role in evaluating participants' qualifications and competencies, as they contribute to certain aspects of the summative assessment.

3. Can the formative assessment method be applied to young students who have completed their high school education?

Young individuals in remote areas can pursue higher education through online blended teaching and learning programs that incorporate formative assessment methods.

First, implementing distance education requires ensuring that any technology used is both educationally effective and socially oriented. Cost is a crucial factor, covering not only the purchase of hardware and software but also the training of staff to develop the skills needed to effectively use the new technologies. If training is not feasible, funding should be allocated to hire staff with the necessary expertise.

Second, access to these technologies must be affordable and accessible to students as well. While universities can provide DE technologies for staff, the cost of access for students such as internet fees and mobile devices: all of which must be factored into the overall cost equation. Additionally, those using these technologies should ideally have the skills and knowledge required to use them effectively.

Thirdly, implementing new teaching and learning strategies necessitates corresponding changes in organizational structures, such as creating new units or integrating existing ones focused on producing distance education materials. These structural adjustments come with cost implications, including the challenge of limited resources available for researching, designing, implementing, and supporting distance education initiatives.

Fourthly, the most significant challenges to using online assessments were time constraints and internet connectivity issues. Teachers should also expect some instances of cheating during online tests, making it crucial to raise students' awareness of ethical behavior and remind them that cheating will not benefit them in future summative assessments.

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