**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES**

# INNOVATIVE PEDAGOGIES MANUAL

**January 2026**

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**ACKNOWLEDGMENT**

The development of this manual reflects the collective dedication, commitment, and expertise of numerous individuals and institutions who contributed to advancing innovative teaching and learning approaches at the Muhimbili University of Health and Allied Sciences (MUHAS). This initiative was made possible under the coordination of the Higher Education for Economic Transformation (HEET) Project, supported by the World Bank**,** which approved the preparation of this manual as part of broader efforts to transform higher education in Tanzania.

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# 1. INTRODUCTION

## Background Information

Muhimbili University of Health and Allied Sciences (MUHAS) has undergone significant curricula transformations to align with global standards in health professional education. The shift towards competency-based curricula necessitated the adoption of innovative teaching and assessment methods to ensure graduates acquire the requisite skills and competencies to serve the Tanzanian population effectively. Traditional teaching methods were complemented with innovative approaches to address challenges such as large student numbers and limited faculty resources.

The Higher Education for Economic Transformation (HEET) project, funded by the World Bank, is a five-year initiative aimed at revitalizing and expanding the capacity of Tanzanian universities to contribute to innovation, economic development, and labor market relevance. At Muhimbili University of Health and Allied Sciences (MUHAS), the HEET project focuses on enhancing the quality and relevance of health education to meet the evolving needs of the healthcare sector. This includes investing in modern infrastructure, updating curricula, and adopting innovative teaching and assessment methods to produce competent health professionals equipped to address current and future health challenges.

## Objective and Scope

The specific objectives of this Manual are:

i. To equip lecturers with a common understanding of innovative pedagogies, and how they can be incorporated into the curricula.
ii. To equip MUHAS lecturers with a comprehensive understanding of innovative assessment methods aligned with competency-based education.
iii. To guide the integration of these teaching and assessment methods into curriculum review and development processes, enhancing teaching and learning experiences.

## Scope

This Manual serves as a crucial resource for academic staff and curriculum developers at MUHAS, aiming to integrate innovative teaching and assessment

methods into curriculum development and implementation. It provides guidance on effectively applying modern techniques to enhance the quality and relevance of health education, in alignment with the university's strategic objectives and national educational reforms.

**Definition of Key Terms**

***Innovation:*** In the context of teaching, innovation refers to the intentional introduction and application of novel, creative, and effective approaches, methods, or strategies to enhance the learning experience, engage students, and achieve educational objectives.

***Pedagogy:*** Pedagogy is commonly defined as the art, science, or profession of teaching. It involves the strategies, methods, and techniques used by educators to facilitate learning (Shulman, 2005).

***Innovative pedagogy:*** Innovative pedagogy refers to creative and forward-thinking approaches to teaching and learning that go beyond traditional methods. It involves the use of novel strategies, technologies, and methodologies to enhance the educational experience and better meet the needs of diverse learners (Bates & Sangra, n.d.).

***Innovative assessment:*** Innovative assessment methods have been defined as transformative and learner-centred methods of assessment that enhance self-regulation and personalised learning, metacognition, and use of feedback for differentiating instructions and moving learning forward (Bryan & Clegg, 2019).

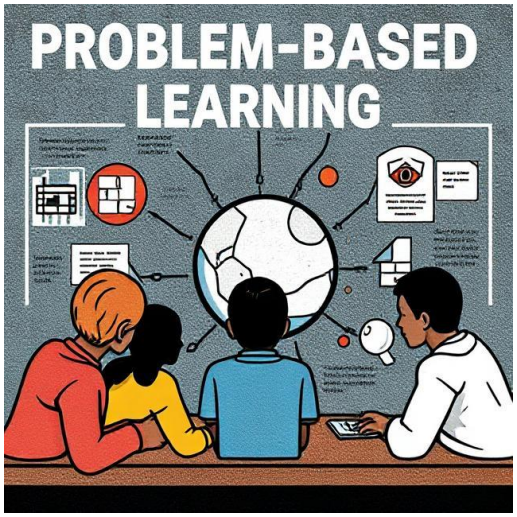
## 2. INNOVATIVE PEDAGOGIES

### Overview of Innovative Pedagogies at MUHAS

At Muhimbili University of Health and Allied Sciences (MUHAS), innovative pedagogies represent a transformative approach to health professions education, moving beyond traditional lecture-based methods to embrace dynamic, interactive, and student-centered strategies (MUHAS-Five-Years-Rolling-Strategic-Plan-2020-). These approaches actively engage students through collaborative projects, problem-based learning, and the integration of digital technologies, fostering critical thinking, creativity, and practical skills essential for healthcare practice. By embedding real-world scenarios and diverse perspectives into the curriculum, these pedagogies enhance adaptability and promote lifelong learning among students. Tailored to accommodate various learning styles and needs, they ensure inclusivity and accessibility in education. Beyond academic knowledge, these methods equip students with vital competencies for their future personal and professional lives (MUHAS-Five-Years-Rolling-Strategic-Plan-2020, Role of Technology in Promoting Efficient Expansion and Quality of Higher Education in Tanzania 2021). While specific innovative pedagogies may vary based on discipline, topic, and learner characteristics, the subsequent section will delve into common methodologies employed at MUHAS, discussing their applications and benefits.

### Types of Innovative Pedagogies at MUHAS

This section introduces types of innovative pedagogies commonly employed across diverse disciplines at MUHAS, demonstrating their broad applicability beyond specific fields. The approaches outlined below can be adapted to various situations, with their effectiveness depending on the learning objectives and context in which they are applied




**Problem-Based Learning (PBL)**

Problem-Based Learning (PBL) is a teaching approach that centres around presenting students with a complex, real-world problem or scenario and guiding them through the process of exploring, understanding, and solving it. The nature of the task in problem-based learning focuses on solving a specific problem or addressing a challenge which serves as the catalyst for learning and exploration. On the other hand, the nature of the task in project-based learning involves the creation of a tangible product or presentation as the outcome of the learning process.

***When to use Problem-Based Learning as a teaching approach***

i. **Developing Complex Problem-Solving Skills.**

Use PBL when learning goals require students to dissect multifaceted clinical or public-health problems, identify core issues and underlying principles, and collaboratively formulate solutions building analytical abilities critical for real-world practice.

ii. **Moving Beyond Rote Memorization to Real-World Application.**

Implement PBL when the majority of tasks call for applying foundational knowledge to realistic scenarios such as community-based case studies or simulated patient encounters ensuring that students learn by doing and see the direct relevance of theory to practice.

iii. **Shifting from Teacher-Centered to Student-Centered Learning.**

Adopt PBL when the pedagogical aim is to reposition educators as facilitators of learning rather than sole knowledge dispensers, empowering students to take ownership of their educational journey in line with MUHAS's eLearning.

iv. **Cultivating Critical Thinking and Informed Decision-Making.**

Choose PBL when the objective is to strengthen students' ability to critically appraise information, synthesize evidence, and make informed clinical judgments skills honed through repeated cycles of problem analysis, solution testing, and reflective debriefing

***Procedures for using Problem-Based Learning as a teaching approach***

Students are presented with real-world health problems and work collaboratively to find solutions, fostering self-directed learning.

**i. Planning and Preparation**

a. **Identify Learning Objectives**

At MUHAS, PBL cases are mapped to the university's competency framework, such as history taking, clinical reasoning, and ethical decision-making to ensure alignment with programme outcomes

b. **Select an Authentic Problem.**

Faculty choose real-world health challenges e.g., balancing resource constraints and patient care in a Tanzanian hospital to spark relevance and rigor.

c. **Prepare Resources.**

MUHAS lecturers assemble locally relevant case materials, journal articles, and access to the LMS-hosted to support student inquiry.

d. **Set Assessment Criteria.**

Clear rubrics are developed for both the PBL process (teamwork, research skills) and product (case report, presentation), reflecting MUHAS's standards for formative and summative assessment.

**ii) Introducing the Problem**

a. **Present the Scenario.**

In the skills lab or classroom, facilitators dramatize the case, such as a simulated maternal hemorrhage using high-fidelity mannequins or standardized patients to engage students.

b. **Facilitate Initial Exploration.**

Small groups brainstorm what they know, what they need to learn, and generate "learning issues," grounded in prior lectures and Tanzanian clinical guidelines.

**iii) Student-Centered Inquiry**

a. **Organize Groups.**

Students are placed in heterogeneous teams (mixing preclinical and clinical years) to leverage diverse perspectives, as shown effective in MUHAS departmental evaluations.

b. **Guide Research and Analysis.**

Facilitators (“tutors”) circulate to prompt deeper questioning, direct students to MUHAS library resources and e-journals, and scaffold data interpretation.

c. **Facilitate Discussions and Debates.**

Groups reconvene in the simulation lab to share findings, critique assumptions, and refine hypotheses under tutor guidance.

**iv) Developing Solutions**

a. **Generate Multiple Solutions.**

Teams propose varied management plans, such as algorithmic treatment pathways for sepsis encouraging creativity within clinical safety parameter.

b. **Evaluate and refine.**

Solutions are critiqued against evidence-based guidelines and local resource availability, with peers and tutors providing feedback for iteration.

**v) Synthesis and Application**

a. **Select and implement.**

Students justify their chosen approach in simulated ward rounds, considering ethical, economic, and cultural factors pertinent to Tanzanian healthcare.

b. **Create Presentations or Products.**

Groups deliver case reports or digital posters via MUHAS’s LMS, integrating multimedia (e.g., patient images, flowcharts) to demonstrate learning.

c. **Reflect on the Process.**

Individual reflective journals are submitted, prompting students to articulate lessons learned and future application in clinical attachments.

**vi) Assessment and Evaluation**

1. **Assess Learning Outcomes.**

Tutors use mini-CEX and group process rubrics during debriefs to evaluate critical thinking, teamwork, and application of knowledge.

2. **Provide Feedback.**

Detailed, timely feedback is given via MUHAS’s e-portfolio system, highlighting strengths and areas for improvement, and linking to follow-up modules.

***Example of using Problem-Based Learning***

**Context**

In MUHAS's Clinical Medicine module, small groups of third year medical students analyze a detailed case of a patient presenting with unexplained fever and weight loss examining history, lab results, and imaging to identify possible diagnoses and management plans.

**Objective**

The primary objective is to develop students' diagnostic reasoning and self-directed learning skills by guiding them through real-world problem exploration, collaborative discussion, and evidence-based solution formulation

***Implementation of Problem-Based Learning***

Integrate PBL sessions into the curriculum, training faculty to facilitate discussions and guide inquiry without direct instruction.

***Advantages of using Problem-Based Learning***

- Enhances critical thinking and problem-solving skills.
- Encourages active learning and knowledge retention.
- Prepares students for real-life clinical scenarios.

**Flipped Classroom**

This involves engaging students to complete the learning outside of classrooms at

their own time and discuss their learning and work during class time. Flipped classroom approach moves passive lectures outside the classroom and conducts more meaningful learning activities inside the classroom.

Flipped classroom is less about simply reversing the lecture and homework order, but rather about re-envisioning the purpose of classroom time (Mazur, 2012).

***When to use flipped Classroom as a teaching approach***

i. **For Complex or Challenging Topics.**

Use the flipped model when course content involves intricate theories or multifaceted concepts that benefit from pre-class exploration students review

articles, video lectures, or case studies on their own, then apply and dissect these ideas collaboratively in class.

ii. **To Foster Active, Student-Centered Learning.**

Adopt flipping when the goal is to transform class time into active workshops discussions, debates, or problem-solving sessions empowering students to take ownership of their learning rather than passively receiving information.

iii. **In Hands-On or Laboratory Courses.**

Implement a flipped approach in lab-based modules (e.g., anatomy dissections, microbiology experiments) by assigning theoretical concepts and protocols as pre-class work; reserve in-class time for practical execution, troubleshooting, and peer coaching.

iv. **When Students Require Greater Flexibility.**

Employ flipped classrooms for cohorts juggling clinical rotations, research projects, or external responsibilities providing 24/7 access to lectures and readings enables students to engage with content at times that suit their schedules.

v. **To Enable Personalized Learning Paths.**

Use flipping to accommodate diverse learning needs: learners can pause, rewind, or skip ahead in video lectures and access supplementary materials as needed, allowing instructors to offer targeted support during interactive class sessions

***Procedures for using flipped Classroom as a teaching approach***

Students study lecture materials independently before class, using classroom time for interactive activities and application of knowledge.

**i. Identify Learning Objectives.**

Determine the specific competencies knowledge, skills, and attitudes that students must achieve by course end, and map these to lecture, lab, and clinical outcomes.

**ii. Develop Engaging Pre-Class Content.**

Curate or produce concise video lectures, readings, and interactive materials that align with your objectives; ensure they are accessible via MUHAS's Moodle LMS and incorporate real-world clinical examples.

**iii. Prepare Students for Independent Study.**

Clearly communicate pre-class expectations what to watch, read, and note and frame them within a “need-to-know” clinical scenario to spark curiosity.

**iv. Create a Pre-Class Rubric or Guide.**

Provide students with a structured checklist or reflection questions highlighting key concepts and practical applications they should identify, supporting self-assessment and focused viewing.

**v. Assign Roles and Accountability.**

Have students assume specific roles (e.g., discussion leader, case analyst) during pre-class work; use MUHAS’s e-portfolio to track completion and contributions.

**vi. Use Class Time for Active Learning.**

Reserve in-person sessions for problem-solving exercises, group discussions, simulation practice, or case debriefs activities that deepen understanding and apply pre-class content.

**vii. Provide Timely, Constructive Feedback.**

Offer immediate verbal feedback during in-class activities and follow up with detailed comments via the LMS or e-portfolio, reinforcing strengths and guiding remediation

***Example of using flipped Classroom***

Students watch a video on pharmacology concepts at home and engage in case studies during class to apply the knowledge.

**Context**

Bachelor of Pharmacy programme, the Pharmacology module piloted a flipped classroom model in which students first watch concise micro-lecture videos on drug mechanisms and therapeutic uses at home.

**Objective**

The objective of this flipped classroom intervention at MUHAS is to cultivate students’ self-directed learning habits, deepen their conceptual mastery of pharmacological principles, and strengthen their ability to apply this knowledge in real-world clinical contexts

***Implementation of flipped Classroom***

Develop and provide access to pre-class materials; design in-class activities that promote discussion and application.

**i) Pre-Class Activities**

- **Activity:** Students access pre-recorded video lectures and digital readings on the LMS covering core pharmacology or clinical concepts at their own pace, with embedded comprehension-check quizzes.
- **Resources Needed:** Video creation/editing tools, Digital articles or case-study handouts uploaded as PDFs, online quizzes for formative assessment

**ii) In-Class Activities**

- **Activity:** Classroom sessions focus on application small groups work through case studies or simulation exercises, solving patient scenarios or interpreting lab data under faculty facilitation.

**Resources Needed:** Simulation lab or clinical skills suite for hands-on practice

**iii) Assessment and Feedback**

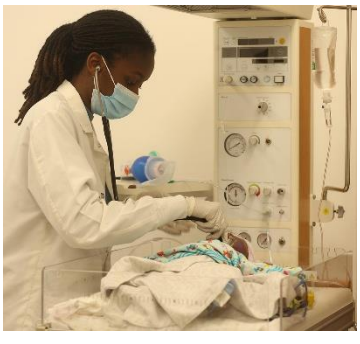
- **Activity:** Student understanding is gauged via project presentations, peer-led debriefs, and concept-application quizzes; faculty provide real-time corrective feedback during activities.
- **Outcome:** This approach yields higher performance gains compared to traditional lectures students demonstrate deeper conceptual mastery, improved critical thinking, and greater satisfaction

***Advantages of using flipped Classroom***

- Promotes student engagement and accountability.
- Allows for deeper understanding through active learning.
- Provides flexibility in learning pace.

**Simulation-Based Learning**

**Simulation-Based Learning (SBL)** is an educational approach that utilizes simulated clinical scenarios to replicate real-world healthcare situations. This method allows students to practice and refine their clinical skills in a controlled, risk-free environment, enhancing their readiness for actual patient care



***When to use Simulation-Based Learning as a teaching approach***

i. When we prepare students for real-life clinical settings in a safe, controlled environment.

   **Example:** Pre-clinical medical and nursing students can practice basic life support, physical examinations, or infection control procedures before hospital rotations.

ii. To expose students to critical or uncommon medical situations they might not frequently encounter during rotations.

   **Example:** Managing cardiac arrest, obstetric emergencies, or pediatric resuscitation using high-fidelity mannequins in MUHAS Simulation Labs.

iii. To allow students to make clinical decisions in real time, assess consequences, and reflect.

   **Example:** Case-based simulations for diagnosing and treating sepsis or managing drug interactions.

***Procedures for Simulation-Based Learning as a teaching approach***

i. **Planning and Design.**

Scenarios are purposefully designed around measurable objectives and a needs assessment, ensuring relevance to MUHAS's competency-based outcomes and local healthcare contexts

ii. **Preparation and Pre-Brief.**

Learners are oriented to the simulation environment, assigned roles, and briefed on objectives and safety; technical equipment checks and psychological safety measures are established to optimize engagement.

iii. **Facilitation and Execution.**

Facilitators guide students through immersive scenarios providing standardized prompts and observing performance while minimizing interruptions to preserve realism and encourage autonomous decision-making.

iv. **Debriefing and Reflection.**

A structured debrief using models like Advocacy Inquiry allows learners to reflect on actions, link performance to objectives, and engage in self-assessment, solidifying clinical reasoning and corrective strategies.

v. **Assessment and Evaluation.**

Learner performance is evaluated both formatively and summatively (OSCE-style stations), while program-level data (surveys, outcome metrics) inform continuous quality improvement of simulation activities

***Example of using Simulation-Based Learning***

Nursing students manage a simulated patient experiencing cardiac arrest, practicing emergency response protocols.

- Implementation: Invest in simulation equipment; train faculty in simulation facilitation and debriefing techniques.

***Advantages of using Simulation-Based Learning***

- Provides safe environment for skill practice.
- Enhances clinical competence and confidence.
- Allows for immediate feedback and reflection.

**Hybrid Cohort-Based Learning**

Hybrid Cohort-Based Learning (HCBL) merges the traditional face-to-face classroom approach with online learning, offering the interpersonal benefits of in-person teaching alongside the convenience and flexibility of online activities. This method combines synchronous activities like live lectures and discussions, which occur in real-time, with asynchronous activities such as watching pre-recorded videos and completing assignments at the students' own pace. HCBL enhances the adaptability of Massive Open Online Courses (MOOCs) by adding a personal touch through curated study groups and community building, promoting active learning and dedicated support. This approach brings a human element to MOOCs, fostering a deeper connection and engagement in a self-paced learning environment.

***When to use Hybrid Cohort-Based Learning***

i) When one wants to blends online and in-person learning
ii) When one wants to fosters peer support, networking opportunities, and a shared learning experience.
iii) When learners have limited access to in-person learning opportunities
iv) When one wants to offer personalized learning opportunities

***Procedures for using Hybrid cohort-based learning***

i) **Define objectives of the course/lesson:** outline what you want students to learn and be able to do by the end of the course.
ii) **Choose learning management system (LMS):** An LMS can manage course content, assignments, and assessments. It can also provide features that support cohort-based learning, such as discussion forums and group collaboration tools.
iii) **Develop course content:** The course contents should include a mix of synchronous and asynchronous activities. Synchronous activities could include live lectures, discussions, and group projects. Asynchronous activities could include pre-recorded videos, articles, and assignments.
iv) **Recruit and group your students.** When recruiting students for hybrid cohort-based course, it is important to consider their needs and interests. You may also want to group students based on their skill level or learning goals.
v) **Prepare and share Rubric**: This includes the criteria for success in the course. The criteria are the ones that will be used during assessment.
vi) **Set up LMS and course content.** Once you have your students and course content ready, you can start to set up your LMS and course content. This may involve creating assignments, discussion forums, and other learning activities.
vii) **Provide support to students.** It can be a new experience for some students. It is important to provide them with support as they transition to this new learning model. This support could include providing clear instructions, offering feedback on their work, and answering their questions.

***Examples of using Hybrid cohort-based learning***

- A Radiology course delivered entirely online, where students watch recorded lectures, participate in discussion forums, and complete digital assessments.
- A medicine program where theoretical knowledge is taught online, while practical skills are developed during scheduled on-campus lab sessions.

***Implementation of Hybrid cohort-based learning***

- **Technology Integration**: Upgrading LMS platforms and ensuring reliable internet connectivity across campus.
- **Faculty Training**: Providing workshops and resources to help instructors design and deliver effective online and blended courses.
- **Student Support**: Establishing help desks and online resources to assist students in navigating digital learning environments.

***Advantages of Hybrid cohort-based learning***

- **Flexibility**: Students can access materials at their convenience, accommodating diverse schedules and learning paces.
- **Enhanced Engagement**: Interactive online tools and multimedia resources can increase student interest and participation.
- **Resource Efficiency**: Reduced need for physical classroom space and materials, leading to cost savings.

- **Personalized Learning**: Adaptive technologies can tailor content to individual student needs, improving learning outcomes.
- **Resilience**: The ability to continue education during disruptions (e.g., pandemics) through online platforms ensures continuity in learning

**Case study**

A case study is an in-depth, detailed examination of a particular case (or cases) within a real-world context. This

research approach is particularly useful when the boundaries between the phenomenon being studied and its context are not clearly evident, and it often relies on multiple sources of evidence to provide a comprehensive understanding

***When to use a case study as a teaching approach***

i. When the objective is to challenge students with complex, real-world health problems such as diagnosing a patient with atypical tuberculosis symptoms or designing a community intervention for malaria control to foster analytical reasoning and reflective judgment.
ii. When you want students to bridge classroom concepts (e.g., pharmacokinetics, health systems management) with clinical or public health practice by working through authentic scenarios that demonstrate the relevance and impact of their learning.
iii. When subject matter spans multiple health disciplines such as coordinating care for a diabetic patient requiring medical, nutritional, and psychological management thereby encouraging collaboration across medicine, nursing, and allied health.

***Procedures for using Case Study tasks***

i) Pre-Case Preparation
   - **Select engaging cases:** Choose cases relevant to your learning objectives and student interests, covering diverse perspectives and complexities.
   - **Distribute materials:** Provide students with the case study in written narrations, video simulations, or role-playing scenarios, including background information, relevant data, and any supplemental materials.
   - **Introduce the case:** Set the stage by clearly outlining the learning objectives, key questions, and expectations for engagement. Consider guiding questions like "What is the central dilemma?" or "Who are the stakeholders involved?"

ii) Case Analysis and Discussion

- **Individual reflection:** Allocate time for students to individually read and analyze the case, highlighting key facts, identifying problems, and formulating potential solutions.
- **Group discussion:** Facilitate small group discussions, where students share their analyses, debate perspectives, and collaboratively build understanding. Encourage active listening, respectful interaction, and evidence-based arguments. You may utilize online platforms, forums, or collaborative tools.
- **Instructor guidance:** Guide the discussion without giving away answers, prompting deeper analysis, asking critical questions, and clarifying ambiguities.
- **Case study tools:** Utilize supplementary materials like diagrams, timelines, or decision matrices to visualize information and facilitate analysis.

iii) Application and Synthesis

- **Presenting solutions:** Encourage groups to present their findings, recommendations, and justifications for their chosen solutions.
- **Class-wide discussion:** Facilitated dialogue within the larger class, comparing and contrasting different perspectives and solutions. You may invite guest speakers with relevant expertise to provide additional insights.
- **Connecting to theory:** Guide students to connect their case study analysis to relevant concepts, theories, and frameworks from the larger curriculum.
- **Real-world implications:** Encourage students to reflect on the case's broader implications and its relevance to real-world situations.

iv) Assessment and Reflection

- **Individual assessments:** Use individual assignments, essays, or quizzes to assess students' understanding, critical thinking, and ability to apply the case study findings.
- **Group evaluations:** Consider peer evaluations or self-assessments to evaluate group collaboration, communication, and conflict resolution skills.

- **Reflective discussions:** Facilitate discussions where students reflect on their learning experience, identifying challenges, takeaways, and areas for improvement.

***Example of Using Case Study in Bachelor of Dental Surgery***

**Context:**

A university offering a Bachelor of Dental Surgery program, where students are trained in both theoretical and clinical aspects of oral health care.

**Objective:**

To enhance students' clinical decision-making and community-oriented care skills through real-world dental cases, focusing on oral health in patients with systemic conditions, barriers to care, and ethical dilemmas in treatment planning.

**Case**

A 52-year-old male patient visits the dental clinic complaining of bleeding gums and loose teeth. His medical history reveals that he has been living with poorly controlled Type 2 Diabetes Mellitus for 10 years. Clinical examination shows generalized periodontal pockets and significant plaque accumulation. The patient admits to irregular dental visits and poor oral hygiene practices.

**How to Implement**

| Stage | Activity | Expected Outcome |
|---|---|---|
| **1.Pre-Case Preparation** | Instructor provides students with the case file, patient medical and dental history, radiographs, and periodontal charting. | Students understand the connection between systemic conditions (diabetes) and periodontal health. |
| **2. Group Case Analysis** | In small groups, students discuss: diagnosis, risk factors, possible | Develops diagnostic reasoning, |

| | | |
|---|---|---|
| | treatment options, and patient education strategies. | interdisciplinary thinking, and collaborative skills. |
| **3.Role-Playing Simulation** | Students take on roles of dental clinician, patient, and educator. One student interviews the patient while others observe and provide feedback. | Enhances communication skills and empathy in handling medically compromised patients. |
| **4.Treatment Plan Development** | Groups develop a comprehensive treatment plan that includes scaling and root planing, glycemic control counseling, and regular maintenance. | Reinforces integration of clinical knowledge, preventive care, and interprofessional collaboration. |
| **5. Class Presentation** | Groups present their findings and proposed plan to the class, defending their approach using evidence from guidelines and research. | Builds public speaking skills and encourages evidence-based practice. |
| **6.Reflection and Assessment** | Students reflect individually on what they learned, challenges faced during the discussion, and how they might apply the knowledge in real patient care. | Encourages self-assessment, critical thinking, and professional growth. |

***Advantages of using Case Study Innovative Pedagogy***

i) This approach involves group discussions and presentations and therefore promotes communication skills as students articulate their analyses and solutions

ii) As case studies require students to analyze information, evaluate alternatives, and make informed decisions it enables fostering the development of critical thinking skills.

iii) Through the examination of complex problems within case studies, students develop problem-solving skills and learn how to approach challenges in diverse contexts

iv) PromotES interdisciplinary learning amongst students as it involves multifaceted problems that require the integration of knowledge from various disciplines.

v) Provide a bridge between theory and real-world application, allowing students to apply concepts learned in class to actual situations

**Micro-Learning**


Micro-learning involves delivering content in small, focused, and easily digestible units aiming at providing learners with short, targeted bursts of information that can be quickly consumed and retained. The micro-learning units are typically brief, often lasting no more than a few minutes, and can take various forms, including videos, infographics, quizzes, or short text-based modules.

***When to use Micro-learning***

i) When you want to offer on-the-job training, providing employees with quick, targeted information that can be easily applied to their tasks.

ii) Whey you want to use handheld devices to offer mobile learning environments, allowing learners to access content on smartphones or tablets, making learning more accessible and flexible.

iii) When you want to break down complex subjects into smaller, more manageable chunks, aiding comprehension and retention to students.

iv) When you want to deliver learning resources to learners on-demand, allowing them to access relevant content precisely when they need it.

v) When you want to provide a brain-friendly learning approach that prevents information overload.

***Procedures for using Micro-learning***

i) **Define learning objectives**: Clearly define the knowledge, skills, and attitudes learners should acquire through the microlearning program.

ii) **Break down complex topics into micro-modules:** Aim for modules that can be completed within 5-10 minutes, ensuring easy comprehension and digestibility.

iii) **Choose the right format for each module:** Incorporate multimedia elements, such as videos, infographics, or interactive quizzes, to enhance engagement and cater to different learning preferences.

iv) **Create engaging and visually appealing content:** focus on clarity, conciseness, and high-quality visuals to capture learners' attention.

v) **Develop a learning pathway:** Design a sequence of micro-modules that build upon each other, leading learners towards the desired learning outcomes.

vi) **Use a microlearning platform:** Utilise dedicated platforms or authoring tools to create, publish, and manage your microlearning content.

vii) **Promote accessibility and flexibility:** Make your microlearning contents accessible across various devices, including desktops, smartphones, and tablets.

viii) **Monitor progress and measure success:** Provide opportunities for learners to receive feedback on their progress, whether through self-assessment quizzes or instructor feedback, to enhance the learning experience.

ix) **Encourage interaction and collaboration:** Use discussion forums, chat rooms, or collaborative activities to foster interaction and knowledge sharing among learners.

x) **Continuously improve and update the conten**t: Consider incorporating feedback from learners and performance data to refine and optimize learning outcomes.

***Example of using Micro-Learning in Pharmacy***

**Example of Using Micro-Learning in Pharmacy Programme**

**Context:** A university pharmacy program aiming to enhance students' understanding of drug interactions and proper medication dispensing techniques.

**Objective:** To reinforce key pharmaceutical concepts and practical skills through short, focused learning segments that can be accessed anytime.

**Implementation of Micro-Learning in Pharmacy**

**i) Development of Micro-Modules:.**

● **Activity:** Creating concise learning modules (3–5 minutes) focused on essential pharmacy topics, such as drug-drug interactions, dosage calculations, or counseling techniques. Each module includes short videos, infographics, or interactive flashcards.

● **Resources Needed:** A digital content creation team, subject matter experts, and an LMS or mobile learning app for delivery.

**ii) Daily Engagement:.**

● **Activity:** Students are assigned a micro-module daily, such as identifying the risks of combining anticoagulants with NSAIDs. These modules are sequentially structured to build cumulative knowledge.

● **Outcome:** Reinforces continuous, manageable learning that can be easily integrated into students' routines.

**ii) Practical Application Sessions:.**

● **Activity:** Weekly practical labs where students apply concepts from micro-modules, such as analyzing a prescription for interaction risks or conducting mock patient counseling.

● **Resources Needed:** Simulated pharmacy environment, prescription software, and trained facilitators.

**iii) Peer Learning and Discussion:.**

- **Activity:** Structured peer discussions and online forums to review case scenarios or clarify micro-module content. Students collaborate to evaluate different patient interaction cases.

- **Outcome:** Deepens learning through peer feedback, diverse perspectives, and collaborative problem-solving.

***Advantages of Micro-learning***

i) Immediate feedback: Embed formative assessments and quizzes within modules, offering instant feedback and validation of learning progress.

ii) Reduced cognitive load: Short, digestible modules prevent information overload and fatigue, boosting motivation and engagement. Learners can access modules anytime, anywhere, on any device, fitting learning into busy schedules and catering to diverse learning styles encourage learners to start and complete the course more easily.

iii) Enhanced learner engagement and participation: Learners apply knowledge to practical scenarios in real-time, boosting relevance and motivation.

iv) Allows data-driven insights and analytics: it allows monitoring of individual progress and group trends through granular data on completion rates, time spent, and knowledge gaps.

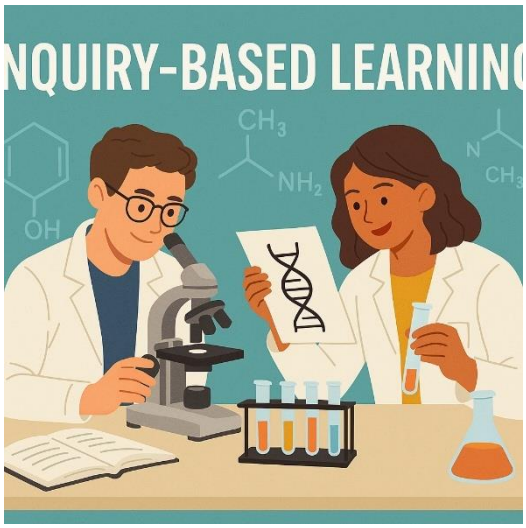
v) It allows learners to acquire and retain information quickly without the need for extended study sessions, making it suitable for busy students.

vi) Enables learners to absorb and retain key concepts more effectively through repeated exposure to bite-sized content as this approach allows to breaking down complex topics into smaller, manageable chunks.

vii) It accommodates diverse learning styles as it allows mixing of multimedia elements such as videos, quizzes, and interactive activities into the learning resources.

**Inquiry-Based Learning**

Inquiry-Based Learning is a teaching method that emphasises active student engagement through questioning, exploration, and investigation.It allows learning by doing, learners build their understanding, development of critical thinking and problem-solving skills, unleash interests of the learner and enables holistic learning.




***When to use Inquiry-Based Learning***

i) When one wants to shifts the focus from teacher to student

ii) When students need to tackle complex, ill-defined problems that require critical thinking and creative solutions.

iii) When you want students to understand the real-world applications of the concepts they are learning as it allows them to explore and apply knowledge in authentic contexts.

iv) When you want to spark curiosity and intrinsic motivation in students. This approach provides an opportunity for students to explore topics of interest and ask their own questions, it can enhance their engagement.

v) When you want to develop research and investigative skills amongst students as this approach provides students with the opportunity to design and conduct their own inquiries, improving their research abilities.

vi) When you have a diverse group of learners with different styles and preferences. Adopting this approach allows students to approach learning in ways that suit their individual needs.

***Procedures for using Inquiry-Based Learning***

i) **Define the learning objectives:** clearly define the knowledge, skills, and attitudes students should acquire through the IBL activity. This provides a roadmap for planning and assessing student learning.

ii) **Select an appropriate topic:** Choose a topic that is relevant, engaging, and appropriate for the students. It should allow for open-ended inquiry

and provide opportunities for students to explore different perspectives and solutions.

iii) **Formulate guiding questions:** Develop open-ended questions that stimulate curiosity and guide student exploration. These questions should be challenging enough to provoke critical thinking but not so complex as to discourage students.

iv) **Design engaging activities:** Plan activities that encourage active exploration, investigation, and collaboration. These can include hands-on experiments, research projects, simulations, debates, or role-playing scenarios.

v) **Provide necessary resources:** Ensure students have access to the resources they need to conduct their investigations. This may include materials, equipment, technology, and information sources such as books, articles, or online databases.

vi) **Support student learning:** offer support and guidance throughout the process. This may involve providing prompts, facilitating discussions, modelling problem-solving strategies, and offering feedback on student work.

vii) **Encourage collaboration and communication**: Create opportunities for students to work together, share ideas, and learn from each other. This can be done through group discussions, collaborative projects, and peer feedback sessions.

viii) **Integrate technology**: Utilize technology tools to enhance the IBL experience. This can include online research platforms, interactive simulations, data analysis software, and communication tools for collaboration.

**Example of Inquiry-Based Learning in a Biochemistry Course**

**Context:**

MUHAS biochemistry department with basic lab equipment but a commitment to active learning and real-life applications.

**Objective:**

To engage students in understanding metabolic pathways and their clinical significance through exploration, questioning, and experimentation.

**Implementation of Inquiry-Based Learning**

**i) Initial Exploration:**

- **Activity:** Students are introduced to a clinical scenario: a patient presents with symptoms suggestive of a metabolic disorder such as phenylketonuria (PKU). Students are tasked with exploring what could be causing the symptoms at the biochemical level.
- **Resources Needed:** Access to basic biochemistry textbooks, clinical case reports, internet for preliminary research, and support from the instructor for guidance.

**ii) Formulating Questions:**

- **Activity:** Students generate specific research questions like:
  - "What enzyme deficiency leads to PKU?"
  - "How does the buildup of phenylalanine affect neurological function?"
- **Resources Needed:** Class workshops and one-on-one sessions to help refine hypotheses and guide the inquiry process.

**iii) Investigation and Experimentation:**

- **Activity:** Students design simple experiments or simulations to track phenylalanine metabolism, such as:
  - Running simulated enzyme kinetics tests (e.g., using software or enzyme assay kits if available)
  - Comparing metabolic pathways in healthy vs. PKU-affected systems
- **Resources Needed:** Lab access for small group work, enzyme samples or online metabolic pathway simulators, and safety materials.

**iv) Analysis and Conclusion:**

- **Activity:** Students analyze their data to determine how the absence of phenylalanine hydroxylase disrupts the pathway, and present findings on treatment approaches (e.g., dietary restriction of phenylalanine).

- **Outcome:** Students gain a deeper understanding of enzyme function, genetic disorders, and metabolic regulation, while also improving scientific inquiry, communication, and critical thinking skills.

***Advantages of Inquiry-Based Learning***

i) Enables development of critical thinking and problem-solving skills to learners

ii) It encourages students to analyze information, evaluate evidence, and think critically about complex problems, fostering the development of critical thinking skills.

iii) Empower student voice and choice

iv) Foster students' curiosity while encouraging them to ask questions, explore topics, and pursue knowledge independently

v) It allows learners to develop research skills

vi) As it involves collaborative projects, the IBL enhances students' teamwork and communication skills as they work together to solve problems and share findings.

**Experiential Learning**

Experiential Learning is the process of learning by doing. By engaging students in hands-on experiences and reflection, they are better able to connect theories and knowledge learned in the classroom to real-world situations.

Learning through reflection encourages individuals to actively engage in activities, experiments, or real-world situations, and then reflect on their experiences to gain a deeper understanding of the subject matter.

Experiential learning can take various forms, such as internships, fieldwork, simulations, group projects, guest speakers, studio-based learning, labs and experiments as well as apprenticeships and mentorships.

***When to use experiential learning as a teaching approach?***

i) When you want students to apply theoretical knowledge in real-world contexts, promoting a deeper understanding of concepts. In this approach students can conduct field trips, internships, or simulations that simulate authentic situations.

ii) When you want to develop practical skills, this approach puts emphasis on engaging students in laboratory experiments, hands-on workshops, or apprenticeships and therefore enhances skill acquisition and mastery.

iii) When you want to foster teamwork, collaboration, and effective communication is a key learning objective and this can be achieved through group projects, simulations, or team-based activities

iv) When you want to prepare students for professional environments by exposing them to workplace scenarios and expectations through internships, cooperative education programs, or industry-focused projects.

***Procedures for using experiential learning teaching technique***

i) **Identify the learning objectives.** Choose an appropriate experiential activity. There are many different types of experiential activities, such as field trips, simulations, case studies, and projects. Choose an activity that is relevant to the learning objectives and that will engage your students.

ii) **Prepare students for the experience.** Explain the purpose of the activity and what you expect students to do. Provide them with any necessary resources or information.

iii) **Concrete learning**. Learner gets a new experience, or interprets a past experience in a new way. Be available to answer questions and provide support, but allow students to take ownership of their learning.

iv) **Reflective observation** comes next, where the learner reflects on their experience personally. They use the lens of their experience and understanding to reflect on what this experience means. After the

experience, give students time to process what they learned and to connect it to the learning objectives.

v) **Abstract conceptualization**: this happens as the learner forms new ideas or adjusts their thinking based on the experience and their reflection about it.

vi) **Active experimentation** is where the learner applies the new ideas to the world around them, to see if there are any modifications to be made. This process can happen over a short period of time, or over a long span of time. This step bridges the gap between theory and practice, reinforcing knowledge and skills.

vii) **Provide Guidance and Support:** Offer guidance and support throughout the learning journey. Facilitators or educators play a crucial role in helping learners make connections and overcome challenges.

viii) **Assess Learning Outcomes**: Assess and evaluate the learning outcomes. Determine if the objectives were met and identify areas for improvement.

**Example of Using Experiential Learning in Pharmaceutics**

**Context:** A health sciences university where students have access to laboratories, hospitals, and pharmaceutical industries.

**Objective:** To provide hands-on experience in pharmaceutical formulation, dispensing, and patient-centered care.

**Implementation of Experiential Learning**

**i) Clinical and Laboratory Observation**

- **Activity:** Students participate in hospital rounds, observe clinical pharmacists, and conduct basic pharmaceutical compounding in university labs.
- **Resources Needed:** Access to hospital pharmacy units, equipped university labs, and mentorship from experienced pharmacists and faculty.

**ii) Pharmaceutical Formulation Projects**

- **Activity:** Students work on mini-projects involving drug formulation, such as preparing topical creams, capsules, or herbal extracts using Good Manufacturing Practice (GMP) principles.
- **Outcome:** Practical skills in formulation, an understanding of stability and efficacy, and confidence in preparing dosage forms.

**iii) Community Pharmacy Engagement**

- **Activity:** Students spend time in community pharmacies counseling patients, conducting health promotion activities (e.g., on antibiotic use), and gathering patient feedback.
- **Resources Needed:** Partnerships with local pharmacies, supervision by registered pharmacists, and communication tools for patient interaction.

**iv) Reflection and Case Analysis**

- **Activity:** Students document their experiences, present case reports, and participate in reflection sessions analyzing ethical issues, communication barriers, and drug-related problems encountered during practice.
- **Outcome:** Enhanced critical thinking, communication, ethical reasoning, and problem-solving skills in real-life pharmacy contexts.

***Advantages of using Experiential Learning method as a teaching approach***

i) It engages learners, making the educational process more enjoyable and increasing motivation.
ii) It facilitates the development of practical skills as learners actively apply theoretical knowledge in real-world scenarios.
iii) It presents challenges that require learners to develop effective problem-solving skills.
iv) It prepares individuals for real-world challenges by providing practical, applicable skills
v) It bridges the gap between theoretical knowledge and practical application, promoting a holistic understanding.

**Cooperative Learning**

Cooperative learning is an instructional approach where students work together in small groups to achieve common learning goals. It is built on the idea that students can learn more effectively through collaboration and interaction than they can by working alone. It involves positive interdependence, individual accountability, face-to-face interaction, and group processing.

In cooperative learning, students work together in small, heterogeneous groups to complete a problem, project, or other instructional goal, while teachers act as guides or facilitators.

***When to use Cooperative learning?***

i) When tackling complex problems or projects that require multiple perspectives and skills,

ii) When you want students to be innovative in finding solutions collaboratively

iii) When you want to create an inclusive classroom environment that values diversity as you can form heterogeneous groups so as students can benefit from each other's strengths and experiences.

iv) When you want to facilitate the development of social skills, teamwork, communication, and collaboration amongst students.

***Procedures for using Cooperative learning***

i) **Identify the learning objectives for the lesson or unit.** Once you know the learning objectives, you can start to think about how to structure your cooperative learning activities to help students achieve those objectives.

ii) **Choose a cooperative learning strategy.** These includes jigsaw technique, think-pair-share, group projects and others

iii) **Form groups.** When forming groups, it is important to consider students' strengths and weaknesses, as well as their social dynamics.

iv) **Assign roles.** Within each group, you may want to assign students specific roles, such as leader, timekeeper, recorder, and materials manager. This can help to ensure that everyone is participating and contributing to the group's work.

v) **Prepare rubric:** before students begin working, it is important to provide them with clear instructions about the task they are to complete, the cooperative learning strategy they are to use and the criteria for success according to the learning outcome.

vi) **Monitor the groups.** As students work, circulate around the room to monitor their progress and provide assistance as needed.

vii) **Debrief.** After students have completed the task, give them time to debrief and reflect on their experience. This can help them to identify what they did well and what they could improve upon in the future. The instructor needs to be flexible and provide positive feedback.

**Example of Cooperative Learning Activity: Environmental Health Campaign Job Description**

**Target Group:.**Undergraduate or postgraduate students studying Environmental Health Sciences.

**Objective:**

To engage students in collaborative learning through the practical task of developing a professional job description relevant to environmental health practice.

**Implementation of Cooperative Learning**

**Scenario**

A national public health institute is launching an **Environmental Health Campaign** to reduce health risks from poor sanitation and waste management in urban slums. Your team must **develop a comprehensive job description** for the new role of: **"Community Environmental Health Coordinator".** This person will lead local initiatives, coordinate awareness events, and engage community stakeholders.

**1. Team Formation**

Divide students into **groups of 3–5**, ensuring a mix of academic performance, background, or interests to promote diverse contributions.

**2. Role Assignment**

Each team member takes on a specific cooperative role:

- **Project Manager** – Oversees workflow, ensures deadlines are met.
- **Researcher** – Gathers information on similar public health roles, environmental job standards, and best practices.
- **Writer** – Compiles and drafts the job description.
- **Evaluator** – Reviews for clarity, completeness, and public health alignment.
- **Presenter** – Communicates the team's final job description to the class.

If groups are smaller than 5, students may take on dual roles.

**3. Research & Brainstorming**

- Study existing job descriptions from WHO, CDC, or local public health institutions.
- Identify:
    - Key tasks (e.g., hygiene promotion, waste tracking)
    - Qualifications (e.g., Environmental Health degree, fieldwork experience)
    - Skills (e.g., risk communication, community engagement)
    - Work environment (urban/rural, low-resource settings)

**4. Drafting & Revision**

- **Writer** creates the first draft of the job description.
- **Evaluator** leads the feedback and editing process.
- The group revises collaboratively to finalize the document.

**5. Presentation**

- The **Presenter** delivers a 3–5 minute pitch of the job description to the class.
- Visual aids or slides may be used.

**6. Peer Feedback**

- Classmates provide constructive critique based on:

- Relevance to environmental health needs
- Professional clarity and structure
- Feasibility and realism of responsibilities

**7. Class Discussion**

Facilitate an instructor-led discussion on:

- The complexity of environmental health job functions
- Differences between fieldwork vs policy roles
- How cooperative learning helped in understanding public health careers

**Learning Outcomes**

By the end of this activity, students will:

- Understand environmental health career expectations
- Improve collaborative and communication skills
- Gain hands-on experience in designing professional documents
- Reflect on how multidisciplinary roles interact in public health work

***Advantages of Cooperative Learning***

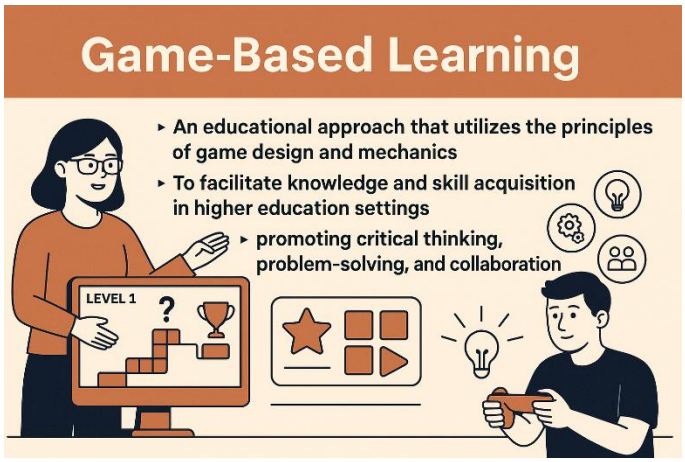
i) When students explain concepts to one another strengthen their own learning
ii) Helps to curb instructional weaknesses of a teacher
iii) Ensures good academic achievement of the group rather than individual
iv) Improved learners' self-confidence and efficacy
v) Reduce instructors' workload and stress
vi) It provides opportunities for students to develop essential social skills, including communication, teamwork, leadership, and conflict resolution, preparing them for real-world interactions.
vii) It promotes appreciation for diversity and fosters an inclusive learning environment as the heterogeneous groups exposes students to diverse perspectives, backgrounds, and abilities.
viii) It instils teamwork skills that are highly valued in professional settings.
ix) Through group discussions, problem-solving activities, and collaborative projects, this approach helps students develop critical thinking skills by considering multiple viewpoints and solutions

**Game-Based learning**

Game-Based Learning (GBL) is an educational approach that utilizes the principles of game design and mechanics to facilitate knowledge and skill acquisition in higher education settings. In GBL, educators use games, simulations, or gamified elements to engage students in active learning experiences, promoting critical thinking, problem-solving, and collaboration.

***When to use Game-based learning***

i) When you want to simplify abstract or technical topics through simulations and interactive scenarios, GBL can make complex concepts tangible and relatable.




ii) When you have specific learning goals such as language practice, bringing scientific concepts to reality, developing leadership, decision-making, and negotiation skills.

iii) When you want to promote intrinsic motivation. games tap into learners' natural desire for challenge, mastery, and progress, driving learners to persevere and improve.

iv) When you are seeking to create a motivating and engaging learning experience, especially for topics that may be traditionally perceived as less interesting.

v) When you want to provide immediate feedback and assessment as games often offer instant feedback on players' actions.

vi) When you want to simulate real-world scenarios for learning, allowing students to apply knowledge in practical contexts.

***Procedures for using Game-based learning***

**i) Define Learning Objectives**

a) Align GBL goals with your overall curriculum and specific learning objectives. What knowledge, skills, or attitudes do you want students to develop?

b) Select game types that complement your objectives. Are there existing games that match your goals, or will you need custom development?

**ii) Choose the Right Game**

a) Consider learner age, interests, and learning styles. Different games appeal to different demographics and cater to various learning preferences.

b) Evaluate the game's educational merits. Look for clear learning objectives, engaging mechanics, and alignment with your content area.

c) Ensure accessibility and inclusivity. Choose games with options for learners with disabilities and diverse backgrounds.

**iii) Integrate GBL with Traditional Methods**

a) Do not treat GBL as a standalone activity. Use it to complement and reinforce learning delivered through other methods.

b) Prepare pre- and post-game activities. Provide context and reflection opportunities to maximize learning outcomes.

**iv) Facilitate Gameplay and Scaffold Learning**

a) Provide clear instructions and support during gameplay. Monitor progress and offer guidance when needed.

b) Encourage reflection and discussion about the learning experiences within the game. Connect game mechanics to real-world applications and concepts.

**v) Assess Learning and Refine Approach**

a) Use assessments aligned with your GBL objectives. Measure knowledge gain, skill development, and attitude changes.

b) Evaluate the effectiveness of the chosen game. Gather feedback from students and instructors to make improvements for future GBL implementations.

***Example of using Game-Based Learning in Pharmacy***

**Context:**

At MUHAS, students enrolled in a Bachelor of Pharmacy program often face challenges in understanding the mechanisms of drug action, drug interactions, and pharmacokinetics. These are core components of the Pharmacology course, which

requires not only theoretical understanding but also application to clinical scenarios.

**Objective:**

To enhance comprehension of complex pharmacological principles such as drug classifications, mechanisms of action, therapeutic uses, and side effects through interactive, game-based learning experiences that simulate real-world decision-making and critical thinking in clinical settings.

***Implementation of Game-Based Learning***

Lecturers introduce a digital pharmacology simulation game, where students take on the role of pharmacists in a virtual hospital. Students are presented with simulated patient cases involving specific symptoms, lab results, and medication histories. They must decide which medications to prescribe, identify potential interactions, and adjust dosages based on patient-specific factors.

Additional game features include:

- **Timed quizzes** on drug mechanisms and uses.
- **Team competitions** where student groups manage virtual wards and earn points for correct drug management.
- **"Escape room" challenges** where students solve clinical puzzles based on pharmacological knowledge.

***Advantages of Game-based learning as a teaching approach***

i) Games inherently capture students' interest and motivation, making the learning process more enjoyable and increasing engagement.

ii) Games provide immediate feedback, allowing students to learn from their mistakes and reinforcing correct actions, contributing to a more effective learning experience.

iii) Many games require players to think critically, solve problems, and make decisions, contributing to the development of critical thinking skills.

iv) GBL has been associated with improved retention and recall of information due to the interactive and experiential nature of games.

v) Games tap into intrinsic motivation, making learning enjoyable and encouraging students to actively seek knowledge.

vi) GBL provides a safe and engaging environment for learners to experiment, make mistakes, and learn from consequences without real-world risks


**Design Thinking**

Design Thinking, initially rooted in design, is a collaborative, human-cantered problem-solving approach widely used across various fields. It involves understanding real-world experiences and feedback, integrating creativity, critical thinking, and communication to find innovative solutions.

***When to use Design thinking***

i) When one wants to empower students to become active participants in the learning process.
ii) When one wants to commercialise students' innovative ideas.
iii) When the teachings focus on equipping learners with practical experiences.
iv) When one wants to cultivate students' creativity and innovation.
v) When students need to address complex, ill-defined problems that require creative and innovative solutions.

***Procedures for using Design thinking***

i) **Empathize:** Students gather information about the problem through research, observation, and interviews. It involves research, interviews, and observation to learn more about the people (customers, users, students, stakeholders). It involves putting oneself in the shoes of the user to gain insights into their experiences and challenges.
ii) **Define:** Students clearly define the problem and identify the key challenges. Students clearly articulate the problem or challenge based on the insights gained during the empathy phase. Students should define the

problem in a human-cantered way, focusing on the needs and desires of the users.

iii) **Ideate:** Students brainstorm a diverse range of potential solutions.

iv) **Prototype:** Students create and test rough models of their solutions to gather feedback. Prototyping allows for quick and inexpensive testing of concepts, helping to identify strengths and weaknesses.

v) **Test:** Students refine their solutions based on user feedback and data analysis. Students gather feedback on prototypes from users and stakeholders. The testing phase is iterative, allowing for continuous refinement of ideas based on real-world insights.

**Example of Using Design Thinking**

**Context:**

MUHAS students and faculty identify low TB screening rates in peri-urban communities despite available services. Community members cite stigma, fear of diagnosis, and lack of awareness as major barriers.

**Objective:**

To develop culturally appropriate, community-informed strategies that increase TB screening through Design Thinking methodology.

**Implementation of Design Thinking**

**i) Empathize**

- Activity: Students conduct interviews and shadow daily life in communities affected by TB. They talk to patients, local leaders, and healthcare workers.
- Outcome: Students understand the stigma attached to TB, fear of isolation, misconceptions about transmission, and trust issues with public health messaging.

**ii) Define**

- Activity: In class, students synthesize findings to pinpoint the core problems.
- **Problem Statement:**
- *"How might we reduce stigma and increase trust to encourage early TB screening in peri-urban communities?"*

**iii) Ideate**

- Activity: Students brainstorm a variety of solutions:

- Community storytelling campaigns from TB survivors
- Integration of TB screening into other community events like markets or festivals

- Outcome: Multiple culturally rooted ideas are generated.

**iv) Prototype**

- Activity: Students choose to prototype:
  - A mobile TB education van with audio-visual storytelling
  - A community ambassador program using trained former TB patients
- Outcome: Models and storyboards are created and reviewed by stakeholders.

**v) Test**

- Activity: Prototypes are piloted in 1–2 communities. Students gather feedback through surveys, focus groups, and observation.
- Outcome: The ambassador program gains strong community traction and trust.

**vi) Reflection and Iteration**

- Activity: Teams reflect on pilot findings, adapt the program (e.g., offer private TB screening spots, tweak messaging language).
- Outcome: More culturally sensitive and scalable solutions are created.

**vii) Community Involvement**

- Activity: Community members co-host TB awareness events and help select local ambassadors.
- Outcome: The initiative builds ownership, sustainability, and trust.

***Advantages of Design thinking***

i) It encourages students to analyze problems, think critically, and consider multiple perspectives and therefore promotes a deeper understanding of complex issues and challenges.

ii) Fosters creativity and innovation as it emphasizes divergent thinking and creative problem-solving. It encourages students to explore unconventional ideas and innovate to address challenges.

iii) Equips students with problem-solving skills applicable to real-world scenarios, helping them transition seamlessly into professional and academic environments.

iv) Encourages multidisciplinary thinking, helping students bridge gaps between different fields of study and apply diverse perspectives to problem-solving.

v) Allows educators to conduct ongoing assessment of students' learning. Students receive constant feedback throughout their learning journey

**AI-Driven Learning**

AI-driven learning refers to the use of artificial intelligence tools and systems to enhance medical and health sciences education. It enables personalized learning, adaptive assessments, and data-driven teaching to support students in fields like medicine, nursing, dentistry, pharmacy, and allied sciences.

***When to use AI-Driven Learning***

AI-driven learning is most effective in situations where students need safe, realistic, and adaptive environments to build clinical competence:

i. **Preparation for real-life clinical settings**

- Use AI simulations to let students practice in a safe, controlled space before patient exposure.
- ***Example:*** Pre-clinical medical and nursing students practice basic life support, infection control, and physical exams before hospital rotations.

ii. **Exposure to rare or critical medical situations**


- Train students on scenarios they may not frequently encounter in rotations.
- ***Example:*** Managing cardiac arrest, obstetric emergencies, or paediatric resuscitation using AI-powered high-fidelity mannequins in MUHAS Simulation Labs.

iii. **Developing real-time decision-making and reflection**

- Enable learners to make critical clinical decisions, assess consequences, and reflect.

- *Example:* AI-driven decision-support for diagnosing and treating sepsis or managing complex drug interactions**.**

***Procedures for Using AI-Driven Learning***

i. **Planning and Design**

- Identify competencies from MUHAS's competency-based curriculum.
- Develop AI-driven scenarios aligned with local healthcare needs.
- Define measurable learning objectives and assessment criteria.

ii. **Preparation and Pre-Brief**

- Orient learners to the AI/simulation environment.
- Assign clinical roles and set expectations.
- Conduct technical checks and establish psychological safety for risk-free learning.

iii. **Facilitation and Execution**

- Faculty facilitators guide learners through immersive scenarios.
- AI systems provide adaptive prompts and feedback in real-time.
- Instructors minimize interruptions, preserving realism and encouraging autonomous decision-making.

iv. **Debriefing and Reflection**

- Use structured models (e.g., Advocacy-Inquiry, Plus-Delta) to analyze performance.
- Encourage learners to self-assess, reflect on actions, and connect with objectives.
- Highlight clinical reasoning, teamwork, and corrective strategies.

v. **Assessment and Evaluation**

- Learners are evaluated both formatively (feedback during training) and summatively (e.g., OSCE-style assessments).
- Program-level metrics (surveys, learner outcomes, performance analytics) guide continuous quality improvement.

- **Example of Using AI**
- Scenario: Nursing students manage an AI-powered virtual patient experiencing cardiac arrest.

***Implementation of AI-Driven Learning***

- Infrastructure: Ensure stable internet and computer labs at MUHAS.
- Integration: Embed AI features into the existing Moodle LMS or through simulation labs.
- Faculty Training: Train lecturers to use AI dashboards for monitoring student progress.
- Pilot Programs: Start with one department before scaling across all faculties.
- Student Orientation: Introduce students to how AI systems personalize their learning without replacing human teachers.

***Advantages of using AI-Driven Learning***

- Provides a safe, controlled environment for practicing clinical skills.
- Builds clinical competence and confidence before real patient interaction.
- Exposes learners to rare or high-stakes medical scenarios.
- Delivers immediate, personalized feedback through AI analytics.
- Encourages reflection and self-directed learning.

**Innovative Pedagogies for students with Special Needs**

This chapter explores transformative approaches that are reshaping the educational landscape for learners requiring additional support due to physical, cognitive, or learning differences. It opens a critical dialogue on how institutions can effectively respond to the diverse needs of these students through innovative and inclusive teaching strategies. It explores the principles of Universal Design for Learning (UDL), assistive technologies, and adaptive learning environments that support all students, particularly those with special needs. The focus is on how these pedagogies not only benefit learners requiring specific accommodations but also enrich the learning experience for the entire student body.

**Universal Design for Learning**

Universal Design for Learning (UDL) is a framework that emphasizes providing multiple means of representation, action, expression, and engagement to address the diverse needs of all students, including those with disabilities. The principles of UDL are organized around three main areas: providing multiple means of representation (to give learners various ways of acquiring information and knowledge), multiple means of expression (to provide learners alternatives for

demonstrating what they know), and multiple means of engagement (to tap into learners' interests, offer appropriate challenges, and increase motivation).

Examples of UDL in practice include:

i) Providing course materials in multiple formats (e.g., text, audio, video) to cater to different learning preferences.

ii) Implementing various assessment methods (e.g., written assignments, presentations, exams) to allow students to demonstrate their understanding in different ways.

iii) Creating interactive and flexible classroom environments where students can choose different ways to engage in learning activities.

**Assistive Technology Integration**

Assistive Technology Integration in education refers to the systematic inclusion and use of various assistive technologies to support the learning needs of students with disabilities. This integration encompasses a wide range of tools, devices, and software designed to assist students in overcoming barriers to learning and participation in educational activities. This includes everything from screen readers and speech-to-text software for those with visual or learning disabilities, to specialized wheelchairs and communication devices for those with physical or speech impairments. Some examples of UDL in practice include:

**Text-to-Speech and Speech-to-Text Software**

Text-to-speech software helps students with dyslexia, visual impairments, or other reading challenges access written materials more easily and supports their comprehension. Conversely, speech-to-text software helps students who have difficulty with writing, such as those with dysgraphia or physical impairments to dictate essays, assignments, and even exam answers, which the software converts into text. Examples of text-to-speech software include Natural Reader and Voice Dream Reader, and speech-to-text application is Dragon NaturallySpeaking.

**Screen Readers and Magnification Software**

Screen readers are essential for students with significant visual impairments. These programs read aloud the text that appears on the computer screen, including web content, emails, and documents. They also provide navigation cues

to help users interact with their computers. Magnification software, on the other hand, is used by students with low vision to enlarge text and images on the screen, making them easier to see and work with. Example screen readers technologies include JAWS (Job Access with Speech) and NVDA (NonVisual Desktop Access) while the popular screen magnification software is ZoomText.

**Adaptive Keyboards and Alternative Input Devices**

Students with physical disabilities, such as those with limited hand mobility or fine motor skill challenges, may find it difficult to use a standard keyboard or mouse. Adaptive keyboards with larger keys, alternative layouts, or touch-sensitive surfaces can make typing more accessible. Similarly, alternative input devices like trackballs, joystick mice, or touchpads can be easier for some students to operate than a traditional mouse. Examples of these technologies include devices such as IntelliKeys keyboard and the Trackball Mouse.

**Differentiated Instruction**

Differentiated Instruction is an approach where teachers proactively modify curriculum, teaching methods, resources, learning activities, and student products to address the diverse needs of individual learners and small groups of learners to maximize the learning opportunity for each student in the classroom. This approach is rooted in the belief that educational settings should recognize and accommodate different learning styles, interests, and abilities, offering multiple paths to learning. Examples of Differentiated Instruction include:

i) Grouping students by shared interest, topic, or ability for assignments and projects, which allows each group to work at a pace that suits them best.

ii) Varying the levels of support for activities within the classroom, such as providing more intensive instruction or more advanced materials to different groups of students based on their needs.

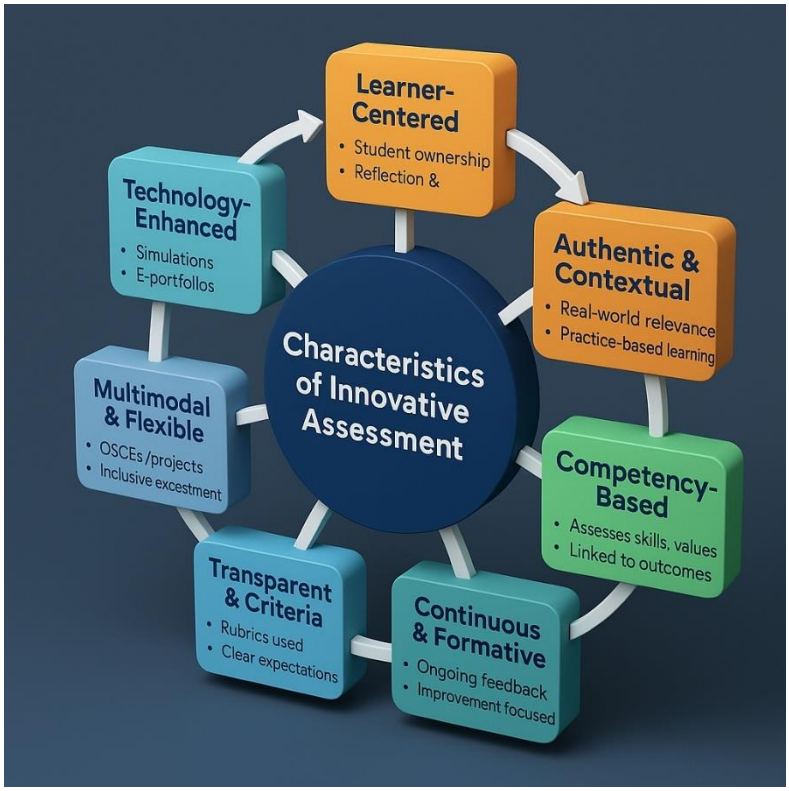
iii) Offering choice in how students demonstrate their understanding of a concept, such as through essays, presentations, artistic projects, or multimedia.

## 3. INNOVATIVE ASSESSMENT METHODS

### Introduction

In this chapter, we explore a suite of innovative assessment techniques specifically tailored to the MUHAS environment moving well beyond traditional written exams and quizzes to methods that mirror the real-world demands of health professions education. For each approach, we provide guidance on how MUHAS lecturers can implement it within existing modules, align it with programme competencies, and leverage institutional resources (e-learning platforms, simulation facilities, community partnerships). We also highlight the advantages improved clinical reasoning, deeper reflective practice, enhanced student engagement, and stronger links to Tanzanian health priorities that make these strategies vital for preparing graduates capable of meeting the country's evolving healthcare needs.

### Characteristics of Innovative Assessment




### Selected Innovative Assessments Methods

This chapter highlights 10 selected innovative assessment methods, offering a concise description of each method, guidance on their application, and their advantages.

## Innovative Assessment Methods

### Self-Assessment

Self-assessment in educational settings involves students critically evaluating their learning progress using specific criteria. This technique enhances metacognition and self-regulation by encouraging learners to reflect on their strengths, weaknesses, and areas for improvement (Earl & Katz, 2006; Andrade, 2019). Self-assessment method enables students to critically evaluate their own learning progress using defined criteria, promoting metacognition and self-regulation. It helps learners identify their strengths and areas for improvement, thereby fostering academic integrity and self-directed learning. This process supports academic integrity, enhances clinical reasoning, and aligns with MUHAS's mission to produce skilled professionals who can adapt to diverse healthcare environments

### When to Use Self-Assessment

#### i) When Developing Metacognitive Skills

In the context of health and allied sciences, students must constantly reflect on their clinical reasoning, diagnostic strategies, and patient interaction approaches. Self-assessment encourages this reflection by prompting students to evaluate their thought processes, assess what strategies worked or failed, and understand why. At MUHAS, this metacognitive ability is crucial for training future clinicians, pharmacists, public health professionals, and researchers to adapt effectively in complex and evolving healthcare systems.

#### ii) When Promoting Formative Assessment and Feedback

Self-assessment complements formative assessment strategies employed at MUHAS. Through structured self-evaluation tools such as learning portfolios, reflection logs, and rubrics, students can detect gaps in understanding and correct them early. For instance, during clinical rotations or lab-based practicals, students benefit from immediate feedback and can take proactive steps to improve their clinical or technical performance before final evaluations.

#### iii) When Promoting Personalized Learning Experiences

Given the diversity in student learning styles and professional pathways (medicine, nursing, dentistry, pharmacy, etc.), MUHAS emphasizes personalized learning.

Self-assessment empowers students to tailor their study plans, focus on weaker competencies (e.g., pharmacokinetics, community health, or surgical skills), and seek out appropriate learning resources or mentorship. This personalization ensures that each student meets both academic requirements and professional standards expected in their specific discipline.

**iv) When Connecting Learning to Real-World Contexts**

MUHAS places strong emphasis on community-based education and service (COBES) and problem-based learning (PBL). Self-assessment supports these models by encouraging students to reflect on how theoretical knowledge translates into real-life clinical or public health scenarios. For example, a student might reflect on their role in a community malaria intervention program, evaluating what they learned and how they applied epidemiological principles in a rural Tanzanian setting.

***How to use Self-assessment***

**i) Setting the Stage**

Clearly defined learning objectives: Ensure students understand what they are expected to learn and the criteria for success. This provides a framework for self-evaluation.

Introduce self-assessment tools: Explain the purpose and benefits of self-assessment. Provide students with clear and accessible tools like rubrics, checklists, or reflection prompts.

**ii) Choosing Effective Tools**

Offer a range of self-assessment options to cater to diverse learning styles and preferences. Consider rubrics, checklists, reflective prompts, peer reviews, or self-questioning strategies. Begin with simple, structured tools and gradually move towards more complex and open-ended self-assessment tasks as students' confidence and skills grow.

**iii) Utilizing Feedback and Reflection**

Feedback loops: Encourage students to use self-assessment data to revise and improve their work. Provide personalized feedback to guide their learning and address any misconceptions.

**iv) Building Self-Regulation Skills**

Promotes students' ability to set goals, understand, control, and self-monitor their own learning. This fosters autonomy and promotes ownership of their learning process. Assist students in developing strategies to overcome challenges identified through self-assessment.

**v) Building a Positive Learning Environment**

Create a safe space: Encourage open and honest self-assessment without fear of judgment. Focus on growth and progress over perfection. Recognize and celebrate students' efforts and learning achievements, not just final outcomes.

***Advantages of Self-assessment***

i) **Enhanced Intrinsic Motivation**

Self-assessment empowers students to take ownership of their learning process, fostering accountability and motivation to improve. Reflecting on their progress helps students set specific learning goals, develop metacognitive skills, and become more deliberate learners.

ii) **Improved Critical Thinking and Reflection**

Analysing strengths and weaknesses: Self-assessment encourages students to critically analyse their performance, identify areas for improvement, and celebrate their strengths and ultimately avoids mass and surprise failure of learners. Analysing their self-assessments allows students to adapt and refine their learning strategies, leading to more effective approaches.

iii) **Provides Learning and Feedback**

Self-assessment data provides valuable insights into individual student needs and learning gaps, allowing for personalized instruction and differentiation. Instructors can use self-assessment results to provide more targeted and constructive feedback, focusing on specific areas for improvement.

iv) **Building Confidence and Resilience**

Recognizing and celebrating improvement through self-assessment builds confidence and promotes a growth mindset, encouraging students to persevere through challenges. Self-assessment fosters a safe space for students to experiment and learn from mistakes, reducing anxiety and fear of failure.

The skills of self-reflection, critical thinking, and goal setting acquired through self-assessment equip students for lifelong learning and adaptation.

**Example of Self-Assessment Tool in Microbiology and immunology Course**

| Component | Description | Your Response |
|---|---|---|
| **Knowledge Rating** | Rate your understanding (1 = Poor, 5 = Excellent): | |
| Gram-positive vs. Gram-negative bacteria | | |
| Mechanisms of bacterial pathogenicity | | |
| Innate vs. adaptive immunity | | |
| Antigen presentation pathways (MHC I & II) | | |
| Complement system activation pathways | | |
| Immune evasion strategies by pathogens | | |
| Laboratory diagnosis of bacterial infections | | |
| Immunological assays (e.g., ELISA, Western blot) | | |
| **Reflection** | Which topic(s) do you feel least confident about? Why? | |
| | Example of a pathogen's immune evasion strategy | |
| | Action plan to improve understanding | |

| | | |
|---|---|---|
| **Self-Test** | Choose the correct answer: | |
| 1. Which component defends early against viruses? A) B cells B) T cells C) **NK cells** D) Neutrophils | *Your answer:* | |
| 2. Main bacterial adhesion structure? A) Capsule B) Flagella C) **Pili** D) Endospores | *Your answer:* | |
| **Goal Setting** | One specific learning goal before next class/test | |

**Peer-Assessment**

Peer-assessment involves students evaluating each other's work using established criteria and offering constructive feedback. This approach promotes collaboration, learner autonomy, and motivation, while helping students develop critical thinking and evaluative skills. Effective peer assessment requires clear guidance from instructors and the use of transparent rubrics to ensure fairness and consistency (Topping, 2009; Liu & Carless, 2006).

***When to use peer-assessment***

i) When you want learners to receive the insights beyond the instructor's viewpoint, promoting a richer learning experience and enhancing critical thinking skills

ii) When the goal is to help students develop skills like critical thinking, problem-solving, and communication, peer feedback can provide different perspectives and encourage deeper engagement with the material.

iii) When you want students to refine their work. For projects, assignments or research proposal where formative feedback is most important, peer assessment can offer valuable insights from multiple peers before the final

product is submitted. This can help students improve their work through iterative feedback loops.

iv) When the learning objectives are clearly defined and specific criteria for assessment are provided, students can more effectively assess and provide feedback on each other's work.

***How to use peer-assessment***

**i) Set the stage**

a) Choose the right assignment: Select an assignment that is well-suited for peer assessment. It should have clear learning objectives, specific criteria for assessment, and be something that students can meaningfully evaluate in each other's work.

b) Create a rubric or guidelines that students will use to assess each other's work. This rubric should outline the key aspects of the assignment and the expectations for quality.

c) Train your students: Make sure students understand the process and how to provide effective feedback. This includes modelling good feedback practices, discussing the difference between constructive and negative feedback, and providing examples of strong and weak feedback.

**ii) Implement the assessment**

a) Randomize or pair up students: To ensure fairness and objectivity, randomly assign students to review each other's work or pair them up strategically

b) Provide clear instructions: Give students clear instructions on how to complete the peer assessment. This should include how to access each other's work, how to use the rubric, and how to submit their feedback.

c) Set a timeline: Establish a clear timeline for the peer assessment process. This will help students stay on track and prevent last-minute scrambling.

**iii) Debrief and reflect**

a) Discuss the feedback: Once students have received feedback from their peers, take some time to discuss it as a class. This is an opportunity to

clarify any misunderstandings, identify common areas of strength and weakness, and share insights gained from the process.

b) Reflect on the experience: Ask students to reflect on their experience with peer assessment. What did they find helpful? What was challenging? What could be improved next time? This feedback can help you refine your approach for future use.

**Example of Peer Assessment in Internal Medicine**

**Context:**

Senior internal medicine students during clinical rotations at hospital are involved in case presentations, patient interviews, and clinical reasoning exercises.

**Objective:**

To enhance clinical communication, diagnostic reasoning, and professional behaviour through structured peer-to-peer evaluation.

**Implementation of Peer Assessment**

1. **Clinical Case Presentations**
    - Students present real patient cases to small groups.
    - Peers assess clarity, diagnostic reasoning, use of evidence, and patient-centeredness.
2. **Structured Peer Feedback**
    - Using a standardized rubric
        - History-taking skills
        - Logical flow of differential diagnosis
        - Communication and empathy
        - Use of clinical guidelines
    - Peers offer **constructive feedback**, e.g., “Consider more focused questions to rule out cardiac causes.”
3. **Reflection and Discussion**
    - Presenters reflect on peer comments.
    - Facilitated group discussion fosters deeper understanding of complex cases.
4. **Faculty Oversight**
    - Faculty review and moderate feedback to ensure quality and accuracy.

**Outcomes**

- Improved diagnostic and communication skills
- Enhanced teamwork and mutual learning
- Increased self-awareness and professional growth
- Builds habit of reflective clinical practice

***Advantages of peer-assessment***

**For Students**

i) Develops critical thinking, learning skills and communication skills: By analysing and providing feedback on others' work, students improve their communication, critical thinking, problem-solving, and analytical skills.

ii) Deepens understanding: Through explaining or critiquing someone else's work, students often solidify their own understanding of the material.

iii) Promotes accountability and peer pressure: The prospect of peer review encourages students to take ownership of their work and contribute actively to group projects.

**For Instructors**

i) Reduces workload and saves time: Peer assessment can alleviate some of the assessment burden, leaving teachers more time for individual support and feedback and at the same time used to identify learning gaps and misconceptions.

ii) Promotes active learning and student-cantered approach: Peer assessment shifts the focus from teacher-cantered instruction to student-driven learning and collaboration.

iii) Develops independent learners: By empowering students to assess and reflect on their own and others' work, peer assessment fosters independent learning skills

**Role Play**

Simulated or role-playing tasks allow students to actively demonstrate the connections between key concepts by engaging in practical, experiential learning. These tasks often involve enacting real-world scenarios to showcase understanding and are particularly effective for assessing problem-solving, communication, teamwork, and critical thinking skills (Nestel & Tierney, 2007;

Errington, 2011). Role-play promotes active participation and timely feedback from peers and instructors, making it especially valuable in team-based learning environments or contexts with limited assessment time. For role-play assessments to be effective, educators must provide clear guidance, select appropriate scenarios, foster a safe and supportive space, and use a well-structured rubric or checklist to measure learning outcomes (Poorman, 2002; Rao & Stupans, 2012).

***When to use Role play***

**i) Developing Skills**

a) *Communication and collaboration:* Role-playing scenarios can assess students' ability to communicate effectively, listen actively, collaborate, and negotiate in diverse situations

b) *Critical thinking and problem-solving:* By tackling simulated real-world problems or ethical dilemmas through role-play, students hone their critical thinking and problem-solving skills

c) *Empathy and perspective-taking:* Stepping into different roles allows students to develop empathy and understand diverse perspectives, enriching their learning experience

**ii) Assessing Specific Learning Objectives**

a) *Language speaking and comprehension:* Role-playing in simulated conversations can assess students' fluency, pronunciation, and comprehension in foreign languages

b) *Historical understanding:* Re-enacting historical events can bring learning to life and assess students' grasp of historical concepts and perspectives

c) *Scientific or medical procedures:* Simulating scientific experiments or medical procedures through role-play can assess students' practical skills and knowledge application

***How to use Role play***

**i) Choose the right scenario**

The first step is to choose a scenario that is relevant to the learning objectives of your lesson. For example, if you're teaching about informed consent in clinical practice, students can role-play a conversation between a doctor and

a patient with limited health literacy. The scenario should be challenging enough to require students to think critically.

**ii) Give students clear instructions**

Once you have chosen a scenario, you need to give students clear instructions on what they are supposed to do. This includes what role they will play, what their goals are, and what the rules of the role-play are. You may also want to provide them with some background information on the scenario.

**iii) Give students chance to prepare**

Give your students some time to prepare for the role-play. This may involve researching their role, developing a character, and practicing their lines. You can also provide them with props or costumes to help them get into character.

**iv) Conduct the role-play**

Once your students are prepared, it's time to conduct the role-play. Allow your students to improvise and be creative, but make sure that they stay on track and focus on the learning objectives. You may want to walk around the room and observe the role-play, taking notes on what you see.

**v) Debrief and assess**

After the role-play is over, take some time to debrief with your students. This is a chance for them to reflect on what they learned and what they could have done differently. You can also use this time to assess their performance based on the criteria you established beforehand.

**Example**

**Course:** *Medical Nursing.*

**Target Group:** BSc Nursing Year 3 students

**Learning Objectives:**

- Demonstrate effective nurse-patient communication in a clinical setting.
- Apply principles of therapeutic communication and empathy.
- Recognize and respond to signs of patient anxiety or fear.
- Implement nursing interventions for patients with chronic illness.
- Reflect on the importance of holistic care and patient-centered practice.

**Scenario:**

**Situation:** A patient recently diagnosed with type 2 diabetes mellitus is hospitalized for the first time. The patient is visibly anxious, expresses fear about lifelong

medication, and is non-compliant with dietary restrictions. The nurse is responsible for providing emotional support, health education, and encouraging treatment adherence.

**Roles:**

- **Student 1:** Medical Ward Nurse
- **Student 2:** Hospitalized patient with new diabetes diagnosis
- *(Optional roles: Relative, nursing supervisor, ward nurse)*

**Instructions:**

**1. Preparation:**

Students will be assigned roles and the scenario 2 days before the session. Each student should:

- Review communication techniques for managing patient anxiety (e.g., open-ended questions, active listening, non-verbal cues).
- Read about diabetes care, including lifestyle education and medication adherence.
- Prepare talking points and emotional responses appropriate to the role (e.g., as a fearful patient).
- Review nursing ethics and patient education strategies outlined in their MUHAS clinical practice guides.

**2. Role-Play:**

- Conduct the role-play in a simulated hospital ward setup or skills lab.
- The nurse must greet the patient, assess their emotional state, listen actively, explain diabetes management, and address concerns empathetically.
- The patient expresses emotional distress, non-compliance, and questions the necessity of treatment.
- Focus is on therapeutic communication, building trust, and delivering clear patient education.

**3. Debriefing and Assessment:**

After the role-play, engage the class in a structured debrief to:

- Evaluate how well the nurse used empathy and active listening.

- Discuss whether the nurse’s approach encouraged treatment adherence.
- Reflect on the emotional and psychosocial aspects of chronic illness care.
- Suggest alternative approaches for handling patient resistance or anxiety.
- Use a rubric to assess:
    - Clarity of communication
    - Use of therapeutic language
    - Patient-centeredness
    - Emotional intelligence

***Advantages of Role play assessment***

**For Students:**

i) Develops diverse skills: Role-play goes beyond recall and memorization, fostering skills like communication, collaboration, critical thinking, problem-solving, decision-making, and empathy. By taking on different roles and perspectives, students learn to communicate effectively, listen actively, negotiate, and adapt to changing situations.

ii) Promotes reflection and metacognition: Analysing their own and others' performances in role-plays encourages students to reflect on their learning process and develop metacognitive skills, leading to more independent learning and confidence.

**For Faculty**

i) Provides dynamic and insightful assessment: Role-play allows teachers to observe students' skills in action, gaining a more holistic understanding of their abilities beyond written tests or projects. It can reveal strengths and weaknesses not readily apparent in other assessment methods.

ii) Creates a supportive and interactive learning environment: Role-playing can break down traditional classroom hierarchies and foster a more interactive and supportive learning environment where students feel comfortable taking risks and learning from each other.

iii) Role play offers valuable data for differentiated instruction: Analysing student performance in role-plays can provide valuable data for teachers to tailor their instruction to individual needs and learning styles, promoting differentiation and personalized learning.

**Portfolio and E-Portfolio**

Portfolio assessment involves students compiling a purposeful collection of work that documents their learning progress, achievements, and reflective thinking over time. Initially consisting of physical artifacts such as essays and project reports, portfolio assessment has evolved into digital or e-portfolios, which may include multimedia elements like videos, presentations, graphics, and text-based reflections (Barrett, 2007; Abrami & Barrett, 2005). This method supports longitudinal evaluation, promotes student ownership of learning, and fosters metacognitive awareness. For portfolio assessment to be effective, instructors must provide clear learning goals, criteria for evidence selection, and use a detailed rubric for consistent and meaningful feedback (Buyarski & Landis, 2014).

***When to use Portfolio for assessment***

**i) When the learning process matters than final assessment**

a) Long-term projects or processes: If a project unfolds over time, with incremental steps and revisions, a portfolio showcasing the evolving work can capture the learning process more effectively than a single final examination

b) Developing complex skills: When multiple skills, like critical thinking, problem-solving, and communication, are intertwined in the learning process, a portfolio can present evidence of their simultaneous growth.

c) Interdisciplinary learning: A portfolio can encompass artifacts from different disciplines, providing a holistic view of how students connect and apply knowledge across domains.

**ii) When diverse strengths need expression**

a) Multiple intelligences and learning styles: Students who learn visually, through kinesthetic experiences, or with written expression can all contribute compelling evidence of their learning in a portfolio, going beyond standardized test scores.

b) Personal relevance and choice: Portfolios allow students to incorporate projects and artifacts that resonate with their interests and experiences, fostering ownership and motivation.

c) Showcasing hidden talents: Some students might excel in areas not readily assessed through traditional methods. A portfolio can offer them a platform to showcase hidden talents and unique contributions.

**iii) When reflection and self-assessment are valued**

a) Developing metacognition: The process of selecting, reflecting on, and analysing work for the portfolio prompts students to become aware of their learning strengths and weaknesses, fostering metacognitive skills.

b) Promoting self-directed learning: Portfolios can be used as tools for students to set learning goals, track progress, and make adjustments, contributing to self-directed learning.

c) Building confidence and self-advocacy: By presenting their portfolio, students learn to articulate their learning journey and accomplishments, building confidence and self-advocacy skills.

***How to use Portfolio for assessment***

**i) Define Learning Objectives and Assessment Criteria**

- Align the portfolio contents with specific learning objectives of the unit or course. This ensures focused collection and evaluation of relevant work.
- Establish clear criteria for assessing the portfolio entries, using rubrics or checklists. Include aspects like quality, relevance, reflection, and demonstration of desired skills.

**ii) Choose Portfolio Content and Format**

- Offer student choice within set parameters when selecting portfolio entries. This fosters ownership and engagement while ensuring alignment with learning objectives.
- Provide flexibility in presenting the portfolio. Allow for diverse formats like physical folders, digital platforms, or a combination.

**iii) Guide Students Through the Process**

- Provide scaffolded support throughout the portfolio development process. Offer templates, and prompts to guide students in selecting and reflecting on their work.
- Encourage regular self-reflection and peer feedback within the portfolio creation process, promoting metacognition and collaborative learning.

**iv) Provide Effective Feedback and Assessment**

- Provide continuous feedback throughout the portfolio development, not only during final summative evaluation. This allows students to adjust and improve their work.
- Use clear and constructive language in your feedback, focusing on specific areas for improvement and highlighting strengths.

**v) Celebrate and Reflect on Learning**

- Celebrate student achievements and the learning demonstrated through their portfolios. This motivates and reinforces the value of the assessment process.
- Utilize the portfolio review as an opportunity for both student and teacher reflection on learning progress and areas for future improvement

**Example:**

**Course: Clinical Pharmacy Practice**

**Objective:**

To assess students' ability to integrate pharmacological knowledge with patient-centered care, clinical decision-making, and communication skills through a semester-long portfolio project.

**Assessment Overview:**

Students will compile a professional portfolio or e-portfolio (using Moodle) throughout the semester. The portfolio will include written analyses, visual materials, and recorded reflections that demonstrate clinical competency and growth.

**1. Patient Case Analysis**

**Task:**

- Analyze a real or simulated patient case (e.g., hypertensive diabetic patient on polypharmacy).
- Identify potential drug interactions, contraindications, and medication errors.
- Propose a revised pharmaceutical care plan and document the rationale.

**Deliverable:**

- A 1,500-word report with clinical notes, drug charts, and medication review form**.**

**2. Public Health Education Project**

**Task:**

- Design a patient-centered health education intervention on a common community issue (e.g., antimicrobial resistance or rational drug use).
- Develop health materials.

**Deliverable:**

- Pamphlet, infographic, or video recording (3–5 minutes) uploaded to e-portfolio.
- Include a reflection on communication challenges and cultural sensitivity.

**3. Clinical Logbook & Reflection**

**Task:**

- Maintain a weekly clinical log during ward rounds or community placements (up to 5 entries).
- Reflect on patient interactions, lessons learned, and improvements made.

**Deliverable:**

- A digital logbook and summary reflection (500–800 words) with insights into growth areas and ethical dilemmas encountered.

**4. Final Presentation**

**Task:**

- Present your portfolio to instructors or peers in a simulation of a clinical review board.
- Discuss key takeaways and professional development.

**Deliverable:**

- A 10-minute oral presentation with PowerPoint or a recorded video presentation, uploaded to e-portfolio.

**Grading Rubric / Criteria**

| **Assessment Criteria** | **Weight (%)** |
|---|---|
| Clinical Reasoning & Application | 40% |
| Communication & Health Literacy | 20% |
| Organization & Digital Presentation | 15% |
| Reflective Practice & Ethics | 15% |
| Final Presentation Quality | 10% |

***Advantages of Portfolio***

i) Provides a comprehensive view of student learning: Portfolios are not limited to a single test or project, but rather showcase a collection of student work over time. This allows instructors to see a broader picture of a student's strengths, weaknesses, and progress in a particular subject or skill area.

ii) Encourages student reflection and metacognition: As learners assemble their portfolios, they are forced to reflect on their work, identify areas for improvement, and set goals for future learning. This metacognitive process can be just as important as the learning itself.

iii) Promotes learners' ownership of learning: Portfolios give learners a sense of ownership over their learning. They are not simply completing tasks for the instructor, but rather creating a collection of work that represents their efforts and accomplishments.

iv) Portfolio can be used to assess a variety of skills and learning outcomes: Portfolios are not limited to assessing content knowledge. They can also be used to assess critical thinking skills, problem-solving skills, communication skills, and other important learning outcomes.

v) Portfolio can be adapted to meet the needs of individual students: Portfolios can be differentiated to meet the needs of individual students. For example, a student who is struggling with a particular concept might be asked to include more work-in-progress pieces in their portfolio, while a student who is excelling might be asked to include more challenging work.

**Open-Book Examination**

Open-book examinations permit students to consult textbooks, notes, and online resources during assessments. This approach shifts the focus from rote memorization to the application, analysis, and synthesis of knowledge. Research has shown that open-book exams can reduce test anxiety and fear, as they encourage students to develop skills in information retrieval, organization, and critical evaluation (Heijne-Penninga et al., 2008). Instructors often select this format to assess higher-order thinking, such as critical reasoning, problem-solving, and the ability to integrate complex ideas. Open-book assessments are especially effective for subjects that require deep understanding and the practical application of concepts.

***When to use Open-Book Examination assessment***

i) When assessing higher-order thinking skills: When the goal is to measure critical thinking, analysis, problem-solving, and research skills, OBEs provide an avenue for students to demonstrate their ability to utilize knowledge in authentic scenarios.

ii) Encouraging deeper understanding: Beyond rote memorization, OBEs encourage students to engage with the material on a deeper level, connecting concepts, evaluating information, and forming reasoned arguments.

iii) Matching real-world applications: Many professions and situations involve readily available resources. OBEs mimic this environment, asking students to apply knowledge using available materials, mirroring workplace or research demands.

iv) Reducing test anxiety that affects learners' performance: For some students, knowing they have access to resources can alleviate test anxiety and allow them to focus on applying their understanding rather than fretting about memory lapses.

***How to use Open-Book Examination***

**i) Design Meaningful Questions**

a) Focus on application and analysis: Craft questions that go beyond simple retrieval of information Require students to analyse, synthesize,

evaluate, and apply knowledge to solve problems or answer complex questions. Ensure that the questions are Artificial intelligence resistant to avoid duplication from the internet sources.

b) Variety is key: Include a mix of question types (e.g., short answer, essay, case studies) to assess different skills and prevent information overload.

c) Provide clear instructions and expectations: Provide clear instructions and expectations for accessing and utilizing resources during the exam.

**ii) Prepare Students & Manage Resources**

a) Train students on OBE strategies: Teach students effective search techniques, information evaluation skills, and note-taking strategies for utilizing resources during the exam.

b) Provide a list of allowed resources: Specify which resources are permitted (e.g., textbooks, notes, internet access) and any restrictions (e.g., specific websites, collaboration).

c) Consider providing some resources: In specific cases, providing a curated set of resources to guide students towards relevant information.

**iii) Time Management and Exam Setting**

a) Practice time management: Encourage students to practice using resources efficiently within the exam timeframe to avoid getting overwhelmed.

b) Consider an open environment: Depending on the subject and resources allowed, an open environment (e.g., library) might be suitable to facilitate resource access.

c) Maintain academic integrity: Implement clear plagiarism prevention measures, such as software tools, to ensure fair and ethical use of resources.

**iv) Grading and Feedback**

a) Assess both content and resource utilization: Evaluate not just the final answer but also the student's ability to identify, access, and critically utilize relevant resources.

b) Provide specific feedback: Offer constructive feedback on resource selection, information analysis, and application of knowledge, helping students improve future performance in OBEs.

**Example: Open-Book Examination in Epidemiology**

**Assessment Area:** Epidemiology and Biostatistics

**Instructions:**

This open-book exam allows the use of textbooks, lecture notes, calculators, and any approved course materials. The focus is on your ability to apply epidemiological principles, critical thinking, and data interpretation to real-world public health challenges.

**Duration:** 3 hours

**Questions:**

**1. Case Study Analysis:**

- You are provided with a case study involving an outbreak of tuberculosis (TB) in an urban district. The case includes background data, transmission patterns, and demographic profiles.
- You are required to:
    - Identify the type of epidemiological study most appropriate for further investigation.
    - Calculate and interpret the incidence rate, attack rate, and relative risk based on the provided data.
    - Discuss potential confounders and biases that could affect the study.
    - Propose a data-driven intervention to control the outbreak.
- Your answer should show an understanding of study design, data analysis, and application of epidemiological tools in outbreak investigation.

**2. Ethical Dilemma:**

- You are part of a surveillance team investigating an increase in HIV cases in a rural setting. A local official requests access to individual-level data containing names for “public safety.”
- Analyze the ethical implications of sharing this data:
    - Discuss relevant principles such as confidentiality, informed consent, and beneficence.
    - Apply public health ethical frameworks to justify or refute the request.
    - Propose an ethical and professional response in line with international public health standards.

**3. Data Analysis and Interpretation:**

- You are provided with a dataset from a cohort study investigating the link between smoking and the development of cardiovascular disease (CVD) over 10 years.
- Tasks:
    - Calculate and interpret risk ratios, odds ratios, and confidence intervals.
    - Identify whether the results show a statistically significant association between smoking and CVD.
    - Briefly explain the assumptions behind the statistical tests used and any potential limitations.
- Your response should reflect solid knowledge of epidemiological metrics and the ability to draw valid conclusions from data.

***Advantages of Open-Book Examination***

**i) Deeper Understanding and Application:**

Promotes analysis and synthesis: OBEs move beyond rote memorization, encouraging students to analyse, synthesize, and evaluate information. OBEs require students to utilize resources effectively, mirroring professional skills and problem-solving strategies.

**ii) Enhanced Engagement and Motivation:**

Increased interest and participation: The ability to access resources can make the exam process more engaging and less anxiety-provoking for some students, boosting their participation and focus allowing them to perform at their best and showcase their full understanding.

**iii) Development of Valuable Skills:**

Research and information literacy: OBEs require students to effectively search for, evaluate, and utilize information from diverse sources, fostering essential research and information literacy skills.

Communication and collaboration: In some cases, OBEs can involve group work or peer review, promoting communication and collaboration skills alongside individual knowledge application.

Time management and resource utilization: Students learn strategies of time management and resource utilization within the exam timeframe, preparing them for similar challenges in future professional settings.

**Observation**

Observational assessment involves systematically monitoring students' engagement with ideas, task execution, and progress in learning outcomes. Instruments such as checklists and anecdotal records are commonly used to collect evidence of student learning over time (McMillan, 2014). This approach is particularly beneficial for tracking developmental learning, assessing practical and interpersonal skills, evaluating collaborative efforts, and identifying learning styles to support differentiated instruction (Brookhart, 2011). Observational assessments provide the advantage of real-time feedback and support the improvement of learning outcomes by offering a more holistic view of student performance. They also contribute to increased validity and reliability in assessment results when applied consistently (Popham, 2017). For effective implementation, instructors must utilize well-defined rubrics or checklists to ensure a structured, objective, and transparent evaluation process.

***When to use Observation Assessment***

**i) When Evaluating Practical Skills and Performance**

a) Hands-on activities: Observing students conduct laboratory experiments, perform artistic demonstrations, or engage in physical activities like sports or dance provides valuable insights into their practical skills and technique.

b) Communication and presentation skills: Witnessing students participate in debates, deliver presentations, or lead group discussions offers direct feedback on their communication skills, confidence, and ability to engage an audience.

c) Social and emotional learning: Observing students interact with peers, navigate social situations, and demonstrate interpersonal skills (e.g., empathy, collaboration) can be an effective way to assess social and emotional learning development.

**ii) Providing Formative Feedback and Personalized Support**

a) Real-time feedback: Observing students in action allows for immediate feedback on their performance, offering opportunities for course correction and targeted support during the learning process.

b) Identifying individual strengths and weaknesses: By observing individual students closely, Instructors can pinpoint specific areas where students excel and where they might need additional support or guidance.

c) Differentiating instruction: Based on observation findings, Instructors can tailor the teaching approaches to cater to individual learning styles and needs, promoting personalized learning environments.

**iii) Gathering Rich Qualitative Data**

a) Beyond test scores: Observation assessments offer a holistic approach to evaluation, capturing aspects of learning that might not be reflected in traditional testing, such as creativity, problem-solving abilities, and collaboration skills.

b) Understanding thought processes: Observing students while they work on tasks can reveal their thought processes, strategies, and approaches to problem-solving, providing valuable insights into their learning journey.

c) Complementing other assessment methods: Observation can be used alongside other assessment methods like questionnaires, portfolios, and tests to create a comprehensive picture of student learning and progress.

***How to use Observation Assessment***

**i) Define lesson objectives:**

Identify learning objectives or behaviours you want to observe and assess? (e.g., critical thinking, collaboration, presentation skills). Determine purpose of assessment: Is it for formative feedback, grading, or diagnostic purposes?

**ii) Developing Clear Criteria:**

Develop observation rubrics: Create clear and measurable criteria aligned with your learning objectives. Use a scale to rate student performance (e.g., excellent, proficient, developing). Focus on observable behaviours: Avoid vague criteria like "enthusiastic" and focus on specific, observable actions (e.g., participates actively in discussions, asks clarifying questions).

**iii) Organizing the Observation Process**

Select observation methods: Decide how you'll observe individually, in groups, during specific activities, or throughout the learning process. Train observers (if applicable): If involving other observers, ensure they understand the criteria and observation process to reduce subjectivity. Communicate with students: Inform students about the observation assessment, explaining its purpose and expectations.

**iv) Conducting the Observation**

Maintain objectivity: Observe carefully and objectively, documenting specific behaviours and avoiding personal biases. Use effective data collection tools: Take notes, record video (with consent), or use checklists to capture accurate and detailed observations. Focus on strengths and areas for improvement: Observe both positive and negative aspects of student performance.

**v) Providing Feedback and Analysis**

Provide the observations: Discuss the findings with students individually or as a class, providing constructive feedback and suggestions for improvement. Analyse your data: Identify patterns and trends in your observations to inform your teaching practice and identify areas for adjustment. Reflect and refine: Evaluate the effectiveness of your observation assessment process, making adjustments as needed to improve future implementation.

**Example: Observational Assessment for OB/GYN Clinical Students**

**Procedure:**

1. **Scenario:**

   Each student develops a **mini-executive summary** for an innovative solution addressing a challenge observed during their OB/GYN clinical rotation. Ideas may focus on maternal health, antenatal care, reproductive health education, access to safe delivery services, or postpartum follow-up.

2. **Observation:**

   Students deliver their pitch (3–5 minutes) to a panel composed of OB/GYN faculty, midwives, clinicians, and public health professionals. The presentation should reflect both clinical insight and practical innovation.

3. **Observation Criteria:**

- **Clarity and Conciseness:** Is the maternal/reproductive health issue clearly presented and the solution well-articulated?
- **Value Proposition:** Does the student effectively explain the clinical impact and value for patients, providers, or health systems?
- **Confidence and Delivery:** Is the student's communication clear, confident, and aligned with clinical professionalism?
- **Audience Engagement:** Does the student engage the panel by using real patient insights, data, or empathy-based storytelling?
- **Handling Questions:** Can the student respond to clinical, ethical, and feasibility-related questions with competence?
- **Professionalism:** Is the student appropriately dressed and presenting with the demeanor expected of a future healthcare provider?

***Advantages of Observation Assessment***

**i) Real-time and Dynamic Feedback**

a) Immediate insights: Observing students in action allows for instant feedback on their performance, enabling course correction and targeted support during the learning process.

b) Beyond test scores: Observation captures aspects of learning not reflected in tests, such as creativity, problem-solving strategies, and group dynamics.

c) Identifying individual needs: By closely observing individual students, instructors can pinpoint specific areas where students excel and where they might need additional support or guidance.

**ii) Holistic Assessment of Skills**

a) Evaluating practical skills: Observing students perform hands-on activities, presentations, or artistic demonstrations provides valuable insights into their practical skills and technique.

b) Assessing social, emotional learning and talents: Witnessing student interactions, social problem-solving, and collaborative efforts reveals their development in important social and emotional areas. However, instructor may discover learners' hidden talents that need to be developed.

**iii) Personalized Learning and Adaptability**

a) Differentiated instruction: Based on observation findings, instructors can tailor their instructional approaches to cater to individual learning styles and needs, promoting a personalized learning environment.

b) Formative assessment and feedback: Ongoing observation allows for continuous feedback and adjustment of teaching methods based on student progress and understanding.

c) Identifying potential learning gaps: Observation can help identify areas where students are struggling or misunderstand concepts, allowing for interventions and scaffolding to bridge the gaps.

**iv) Building Relationships and Engagement**

a) Positive communication: Observation can be used as a platform for positive interaction between instructor and learner, fostering trust and building stronger relationships.

b) Active learning and participation: Observing students' engagement in activities and discussions can promote a more active and participatory learning environment.

c) Encouraging reflection and self-assessment: Students themselves can observe their peers and reflect on their own performance, promoting self-assessment and metacognitive skills.

**Exhibitions**

Demonstration or exhibition assessments provide students a platform to exhibit their learning in various forms, including oral presentations, media performances, and exhibitions. This method enables students to present their work in diverse settings, ranging from classrooms to conferences and community events (Earl & Katz, 2006; Ramsey et al., 2000). Particularly effective for assessing practical skills in performance-based fields and project-based activities, it allows students to showcase projects or prototypes before their real-world application.

***When to use Exhibitions***

**i) When dealing with complex or multi-faceted concepts**

Exhibitions allow students to go beyond simple recall of facts and demonstrate understanding of complex relationships, processes, or perspectives. For example,

an exhibition on the causes and effects of climate change could involve creating visuals, writing explanations, and even designing interactive elements to showcase the understanding of the science, social, and economic implications.

**ii) Appropriate for creative and critical thinking skills:**

Exhibitions provide a platform for students to be creative in presenting their learning, encouraging them to think critically about the topic, analyse information, and draw conclusions. An exhibition on historical figures could involve creating fictional dialogues, writing poems, or designing clothes to represent different perspectives and interpretations.

**iii) Collaboration and communication skills:**

Working together on an exhibition allows students to develop teamwork, communication, and problem-solving skills. They need to share ideas, delegate tasks, and present their findings effectively to an audience. An exhibition on endangered species could involve students researching different animals, creating collaborative visuals, and presenting their findings to other students through interactive activities.

**How to use Exhibitions**

**i) Define Learning Objectives and Choose an Exhibition Theme**

Clearly outline the learning objectives you want students to achieve through the exhibition. This will guide the development of the exhibition theme and format. Choose an engaging and relevant theme that connects to the course or topic and student interests.

**ii) Plan and Research**

Brainstorm different types of exhibits students can create. This could include; interactive elements, performances, digital presentations, or even history exhibits. Guide students in conducting research to gather information and develop the content. Encourage them to use diverse sources like books, articles, interviews, and multimedia resources.

**iii) Design and Create Exhibits**

Provide students with clear guidelines and expectations for the exhibition format and presentation. This includes things like size limitations, presentation requirements, and deadlines. Provide chance for students' creativity to shine.

Encourage them to design the exhibits using visuals, multimedia elements, and interactive components to engage the audience.

**iv) Presentation and Celebration**

Provide a platform for students to display their exhibits to their peers, teachers, and even the wider community. Use the exhibition as an opportunity for celebration and reflection. Encourage students to share their learning experiences and receive feedback from the audience. Make the exhibition process enjoyable and engaging for students.

***Advantages of Exhibitions***

**i) Exhibitions for knowledge and skills in real world**

Exhibitions require students to apply their knowledge and skills in a real-world context, creating a more authentic assessment experience. Students can express their understanding through visuals, writing, presentations, or even performances, catering to visual, kinaesthetic, and auditory learners.

**ii) Provide opportunity for deeper Learning and critical Thinking:**

Exhibition promotes research and information literacy: Students actively engage in investigation, analyse information from diverse sources, and develop strong research and critical thinking skills.

**iii) Encourages creative problem-solving:**

Designing and executing an exhibition requires students to think creatively, solve problems, and make decisions about content, presentation, and audience engagement.

**iv) Collaboration and Communication:**

Exhibition develops teamwork and communication skills. Working on an exhibition task together fosters collaboration, communication, and negotiation as students plan, delegate tasks, and present their findings.

**v) Improves presentation and public speaking skills:**

Students gain valuable experience presenting their work to an audience, developing confidence and clear communication skills

**vi) Connects students to their community:**

Exhibitions can be shared with a wider audience, building connections between the classroom and the larger community and offering students a platform to share their

voices and ideas. This open doors for students to market their ideas and ability to the industry.

**vii) Multiple Benefits for Diverse Learners:**

Exhibition caters to different learning styles and abilities. Students can choose how to express their understanding, be it through visuals, hands-on activities, or written explanations, making the assessment more inclusive and accessible.

**Oral Examination**

Oral examinations are a dynamic and effective way to assess students' mastery of learning outcomes and their ability to articulate academic work on specific topics. They are particularly useful for evaluating complex knowledge, skills, and attributes that are challenging to measure through other methods. Oral exams test not only students' understanding but also their communication and presentation skills, which are vital in today's competitive job market (Akimov & Malin, 2020). With advancements in digital technology, oral exams have evolved to include digital formats, enhancing their versatility.

***When to use Oral Examination***

i) **When assessing depth of understanding:** Oral examinations allow for probing questions and follow-up discussions, revealing a student's grasp of nuances and underlying concepts beyond surface knowledge.

ii) **When assessing critical thinking and communication skills:** Students must think on their feet, articulate their thoughts clearly, and respond to unexpected questions, showcasing their ability to analyse, synthesize, and explain information effectively.

iii) **When assessing interpersonal and professional skills:** In scenarios like simulated interviews or presentations, oral exams assess students' confidence, composure, and ability to interact effectively in professional settings.

iv) **Ideal for language courses:** Testing speaking and listening skills is crucial in language learning, and oral exams provide a natural platform for demonstrating fluency and comprehension.

v) **For performance-based subjects:** For skills like music, drama, or public speaking, oral exams showcase practical abilities and allow for immediate feedback on technique and execution.

vi) **For small class sizes:** In a friendly setting, oral exams can personalize the assessment experience, allowing for tailored questioning and a deeper understanding of individual student progress.

***How to use Oral presentation***

**Before the exam:**

i) Set clear learning objectives: show what learners need to know and be able to do by the end of the oral exam?

ii) Develop appropriate questions: Your questions should be clear, concise, and aligned with your learning objectives. Avoid yes/no questions and encourage students to elaborate on their answers.

iii) Create a supportive environment: Make sure the room is quiet and free from distractions. Set clear expectations for learners' behaviour and let them know how they will be graded (Rubric)

iv) Practice with students: Give learners opportunities to practice answering questions in a low-pressure environment. This will help them to feel more comfortable and confident during the actual exam.

**During the exam:**

i) Establish rapport: Start by greeting the student and making them feel welcome. Use open-ended questions to get the conversation started.

ii) Ask probing questions: Don't be afraid to ask follow-up questions to get a deeper understanding of the learners' knowledge.

iii) Give learners time to think: Do not rush. Give learners time to collect their thoughts and formulate the answers.

iv) Provide feedback: Let the learners know how they are doing throughout the exam. Offer constructive feedback and give them opportunities to clarify their answers.

**After the exam:**

i) Debrief with students: Give students feedback on their performance and discuss what they did well and what they could improve on.

ii) Reflect on your own practice: Think about what worked well and what you could do differently next time.

**Example**

**Assessment Area:** *Human Physiology (e.g., Cardiovascular, Respiratory, or Neurophysiology)*

**Objective:**

To assess students' understanding of complex physiological mechanisms, their ability to apply theoretical knowledge to clinical or real-life scenarios, and their ability to communicate ideas clearly and professionally.

**Procedure:**

**1. Preparation:**

Students will prepare for the oral examination by:

- Reviewing core physiological concepts, mechanisms, and clinical relevance (e.g., textbooks, lectures, case studies).
- Selecting a real-life or clinical condition relevant to physiology (e.g., hypertension, diabetic neuropathy, sleep apnea, hypoxia at high altitude, etc.).
- Preparing a 5–7-minute explanation of the condition with physiological underpinnings and implications.

**2. Oral Examination:**

- Each student will have a 15–20-minute one-on-one oral exam with the instructor.
- The student begins with a short presentation on their chosen physiological condition, explaining:
    - Normal physiology of the system involved
    - Pathophysiological changes in the chosen condition
    - Potential diagnostic or therapeutic considerations
- The instructor will then engage the student in discussion, with probing questions such as:
    - What compensatory mechanisms does the body initiate in this condition?
    - How does this condition affect homeostasis?
    - What diagnostic indicators are associated with this physiological change?

- Can you describe how drugs or lifestyle interventions alter the underlying physiology?
- How might this condition present differently in different populations (e.g., elderly, pregnant women, athletes)?

**Assessment Criteria**

| **Criteria** | **Indicators** |
|---|---|
| Knowledge and understanding | Demonstrates accurate and comprehensive understanding of physiological principles and disease mechanisms. |
| Critical Thinking and Analysis | Applies knowledge to analyze clinical implications and physiological responses. |
| Communication and Presentation | Presents ideas clearly, confidently, and logically, using appropriate terminology. |
| Professionalism and ethical considerations | Demonstrates scientific integrity, preparedness, and respectful dialogue. |
| Engagement and participation | Responds thoughtfully to questions and actively participates in academic discussion. |

***Advantages of Oral examination***

**i) Assess higher-order thinking skills:**

Oral exams go beyond memorization and recalling, allowing instructors to assess a learners' ability to analyse, synthesize, and evaluate information. Instructors can as follow-up questions to probe deeper into the learners' understanding and realise how they can apply their knowledge to new situations.

**ii) Provide immediate feedback:**

Different from written exams where feedback is delayed, oral exams allow instructors to provide immediate feedback to learners. This can help them identify areas where they need improvement and make adjustments in their thinking on the spot.

**iii) Promote personalized learning:**

Oral exams can be tailored to individual students' strengths and weaknesses. This allows instructor to personalize the assessment and ensure that it is fair and appropriate for each student.

**iv) Enhance student engagement:**

Oral exams can be more engaging than written exams for some learners. The interactive nature of the assessment can help to keep learners focused and motivated.

**Debates**

Debates provide a dynamic platform for instructors to assess a wide range of student skills, such as critical thinking, communication, research, critical analysis, persuasive argumentation, and public speaking. This method not only allows educators to observe students' critical thinking and decision-making skills but also evaluates their ability in active listening and engaging in constructive dialogues. Debates encourage in-depth research and credible information sourcing, enhancing student engagement and promoting teamwork and collaboration in a stimulating learning environment. They are particularly effective in assessing how students apply theoretical knowledge to real-world scenarios.

***When to use Debate***

**i) Assessing critical thinking and argumentation skills**

Debate forces learners to think critically about a topic, analyse evidence, and construct persuasive arguments. They must also learn to anticipate and counter opposing viewpoints, which strengthens their ability to think on their feet and adapt their arguments.

**ii) Promoting collaboration and teamwork**

Debate typically involves teams working together to research, prepare, and present arguments. This fosters collaboration, communication, and leadership skills as students learn to divide tasks, support each other, and present a unified front.

**iii) Addressing complex and controversial topics**

Debate can provide a safe and structured environment for students to explore complex and controversial issues from multiple perspectives. This can deepen their understanding of the topic, challenge their assumptions, and encourage them to develop informed opinions.

**iv) Developing public speaking, communication and persuasive skills**

Debate requires students to speak confidently and persuasively in front of an audience. This can help them overcome stage fright, improve their public speaking skills, and learn to communicate their ideas effectively.

**v) Assessing understanding of a subject**

Preparing for a debate often involves in-depth research and analysis of a topic. This can be a valuable way to assess students' understanding of a subject and their ability to apply their knowledge to real-world situations.

***How to use Debate***

**i) Planning and Preparation**

a) Define Learning Objectives: include all knowledge skills and attitude that students need to demonstrate through the debate.

b) Select a Debate Topic: Choose a topic relevant to the course or topic and age-appropriate for the students. Consider their interests and prior knowledge when making the choice.

c) Establish Roles and Responsibilities: Decide whether students will debate individually or in teams. Assign roles like proposer, opposer, and moderator if applicable.

d) Provide Guidelines and Rubrics: Clearly outline expectations for research, argumentation, evidence use, rebuttal techniques, and respectful conduct during the debate. The rubric need to include the aspects that will be used for assessment, the criteria and weight.

**ii) Implementation**

a) Research and Preparation: Provide students with time and resources to research the assigned positions. Guide them on effective research practices and critical evaluation of sources.

b) Argument Construction: Help students develop strong arguments supported by evidence. Encourage them to consider different perspectives and anticipate counter-arguments.

c) Rehearsals and Practice: Offer opportunities for students to practice their arguments and delivery in a supportive environment. Provide constructive feedback and suggestions for improvement.

**iii) Assessment**

a) Observation and Evaluation: Observe students' performance during the debate, paying attention to their argumentation skills, evidence use, rebuttal techniques, communication clarity, and respect for opposing viewpoints.

b) Self-Reflection and Peer Feedback: Encourage students to reflect on their own performance and provide constructive feedback to their peers. This can deepen their understanding of the debate topic and assessment criteria.

c) Rubric-Based Assessment: Use a pre-defined rubric to evaluate students' performance against established criteria. Ensure the rubric aligns with your learning objectives and provides clear evaluation points.

***Advantages of Debate***

i) Debate allows deeper understanding and cultivation of critical thinking and argumentation. It forces students to delve deeper than surface-level knowledge. They must research various perspectives, analyse evidence, and construct logically sound arguments, leading to a more comprehensive understanding of the topic.

ii) Communication and Public Speaking Skills: Debates provide a platform for students to practice clear and concise communication, both listening and speaking. They gain confidence in expressing their ideas to an audience and overcome public speaking anxieties.

iii) Identification of Strengths and Weaknesses: Observing students during debates can help instructors identify individual strengths and weaknesses in critical thinking, communication, and collaboration. This information can be used to tailor instruction and provide targeted support.

iv) Develops Student Leadership Skills: Debates can provide opportunities for students to take on leadership roles, whether as team leaders or by confidently presenting their arguments. This fosters leadership skills and builds confidence in their abilities.

**Project-Based Assessment**

Project-based assessments involve complex, time-bound tasks that can be individual or group-based, assessing skills such as research, problem-solving, and communication. Instructors find them particularly useful in various contexts: for collaborative, interdisciplinary synthesis; engagement with complex, multi-perspective problems; application of theory to real-world scenarios; and promoting

self-directed learning. Successful implementation involves defining clear project objectives aligned with curriculum outcomes, designing the project with detailed scope and timelines, providing ongoing support and resources, and assessing the work with comprehensive feedback using structured rubrics or checklists for evaluating mastery of learning outcomes.

***When to use Project-based assessment***

**i) Assessing Higher-Order Thinking Skills**

When an instructor wants to assess students' ability to apply knowledge, solve problems, think critically, and communicate effectively, project-based assessment is ideal. It allows students to demonstrate these skills in a more authentic and meaningful context than traditional assessments.

**ii) Assessing 21st-Century Skills**

Project-based assessment is well-suited for assessing collaboration, communication, creativity, and digital literacy. Students engage in teamwork, communicate their ideas, think creatively to solve problems, and use technology to create products or presentations.

**iii) Promoting Deeper Learning**

Projects encourage students to engage deeply with content, make connections across disciplines, and construct their own understanding. This leads to more meaningful and lasting learning than memorization.

**iv) Increasing Student Engagement and Motivation**

Students often find projects more engaging and motivating than traditional assignments because they have more control over their learning and can see the real-world relevance of their work.

***How to use Project-based assessment***

i) **Identify Learning objectives:** Clearly define the specific knowledge, skills, and attitude you want students to demonstrate through the project. Ensure alignment with course content and learning objectives.

ii) **Design Engaging Projects:** Create projects that are authentic, meaningful, and relevant to students' interests or real-world issues. Offer choices in project topics or approaches to foster student ownership.

iii) **Establish Clear Expectations:** Provide students with a detailed rubric or checklist outlining the project's requirements, assessment criteria, and timelines. Communicate expectations for quality work, collaboration, and self-management.

iv) **Provide support:** Break down the project into manageable tasks and provide guidance throughout the process. Provide instruction, resources, and support to help students to navigate challenges and develop the skills.

v) **Incorporate Feedback and Reflection:** Provide regular feedback to students throughout the project, allowing them to revise and improve their work. Encourage students to reflect on their learning process, identifying strengths, weaknesses, and areas for growth.

vi) **Assess Student Performance:** Assess student work using the established rubric or checklist, providing feedback on both the final product and the learning process. Consider multiple assessment methods, such as presentations, portfolios, peer evaluations, and self-assessments.

vii) **Celebrate Success and Share Learning:** Provide opportunities for students to showcase their projects to authentic audiences, such as community members, experts, or other classes. Encourage reflection on the learning experience and the value of project-based assessment.

***Advantages of Project based Assessment***

i) Deeper Learning: Projects encourage students to engage deeply with content, make connections across disciplines, and construct their own understanding.

ii) Development of 21st-Century Skills: Projects promote the development of crucial skills for the 21st century, such as collaboration, communication, creativity, critical thinking, and problem-solving. Students learn to work effectively in teams, communicate their ideas clearly, think creatively to solve problems, and use technology to create and present their work.

iii) Improved Self-Confidence and Reflection Skills: Working on projects allows students to showcase their strengths and talents, leading to increased self-confidence.

iv) Rich Data for Assessment: Project-based assessments provide a diverse set of data points to evaluate student learning, going beyond traditional

test scores. Educators can observe students' collaboration, communication, problem-solving, and presentation skills in action, gaining a more holistic understanding of their strengths and weaknesses.

**Rubric for Assessing Research Proposal**

| Criterion | Exceptional | Good | Satisfactory | Needs Improvement |
|---|---|---|---|---|
| Introduction (15 Marks) | Described research problem from global to local context, key concepts variables and relationships explained, provided data to support the claims. (13-15 Marks) | Described research problem from global to local context, key concepts variables and relationships explained, no data to support the claims. (9-12 Marks) | Described research problem from global to local context, no details on variables data to support the claims. (6-8 Marks) | Described research problem from global contexts but lacks local context details and data to support the claims. (< 5 Marks) |
| Problem/Questions (20 Marks) | Research questions are clear, well defined, focused and appropriately narrow in scope. The statement of the problem is realistic and clear and related to the significance and purpose of study as indicated. (17-20 Marks) | A clear and concisely state question researchable in the available time. The statement of the problem can be understood. (12-16 Marks) | Appropriate question/topic capable of being researched in the available time. (8-11 Marks) | Limited research question aimed primarily at describing events/incidents. (< 7 Marks) |
| Literature Review (25 Marks) | Literature review is explicitly based on conceptual framework, clearly connected with the problem statement, methodology | Literature review is based on conceptual framework and is clearly connected with the problem statement, | There is a limited range of sources consulted. Inadequate | No conceptual framework is evidenced. There is limited use of literature and evidence of |

| Criterion | Exceptional | Good | Satisfactory | Needs Improvement |
|---|---|---|---|---|
| | and conclusion. The review is extensive with strong links between issues arising from the literature and the research question.<br>(20-25 Marks) | methodology and conclusion. The review largely depends upon secondary sources.<br><br>(14-19 Marks) | understanding of issues and insights in the field of study.<br>(10-13 Marks) | misunderstanding of arguments in literature.<br><br>(< 9 Marks) |
| Methodology<br>(25 Marks) | There is clear indication of approach and design that guide the study. Strong links made between the research questions, review of literature and the design and conduct of the study. Clearly described a process which others can follow. (20-25 Marks) | The study approach and design are somehow linked to the purpose of the study. Well-chosen methods, techniques, and there is a process described for others to follow. (14-19 Marks) | The approach and design of the are not linked to study purpose. Described procedure would be difficult for others to follow. (10-13 Marks) | Approach, design, methods and techniques not suited for the problem being studied. Unclear description of process.<br>(< 9 Marks) |
| References<br>(15 Marks) | Comprehensive list of references including both primary and secondary sources. Good in-text citations and use of APA style.<br>(13-15 Marks) | Comprehensive list with good in-text citations but inadequate use of APA styles in reference list.<br>(9-12 Marks) | Comprehensive list but with inadequate use of APA styles in-text and in reference list. | Limited use of primary and secondary sources and inadequate use of APA style.<br>(< 5 Marks) |

| Criterion | Exceptional | Good | Satisfactory | Needs Improvement |
|---|---|---|---|---|
| | | | (6-8 Marks) | |

**AI-Driven Analytics**

AI-driven analytics is the use of artificial intelligence technologies such as machine learning, natural language processing, and data mining to collect, analyse, and interpret large volumes of educational data in order to assess student performance, learning behaviours, and outcomes. It enables personalized feedback, predictive insights, and data-informed decision-making in academic environments (Ifenthaler & Yau, 2020; Zawacki-Richter et al., 2019).

**How to Use It:**

1. **Data Collection:**
    - Gather data from digital learning platforms, electronic assessments, student management systems, or simulation labs.
    - Data may include quiz scores, attendance, engagement metrics (clicks, time on task), written responses, etc.
2. **AI Analysis:**
    - Use machine learning models to detect patterns in performance (e.g., struggling students, knowledge gaps).
    - Apply natural language processing (NLP) to assess open-ended responses or clinical notes.
    - Use predictive models to forecast future performance or risk of failure.
3. **Feedback & Intervention:**
    - Provide real-time, personalized feedback to students based on analysis.
    - Alert instructors to students needing support.
    - Adjust teaching strategies based on class-wide insights.

**When to Use It:**

- In large classes where manual assessment is time-consuming.
- For online or blended courses using Learning Management Systems (LMS).
- When you want to assess competency over time or detect patterns in learning.
- During clinical training (e.g., radiology, internal medicine) using digital logs, simulation tools, or case write-ups.

- To evaluate self-directed or competency-based learning paths.

**Example in Health Sciences:**

**Scenario:**

In a Clinical Pharmacology course at a medical school, students complete weekly online case studies. AI algorithms analyse student inputs, drug choice rationales, and timing to:

- Score accuracy
- Assess clinical reasoning through NLP
- Compare with expert decision trees

**Usage:**

- The system flags common errors (e.g., dosage miscalculations).
- Instructors receive heat maps of group performance.
- Students receive tailored learning resources.

**Advantages of AI-Driven Analytics**

- **Personalized Learning:** Tailors learning experiences based on individual student performance, preferences, and learning styles.
- **Early Identification of At-Risk Students:** Predictive models can identify students who may struggle, allowing for early intervention and support.
- **Data-Informed Decision-Making:** Empowers educators and administrators to make strategic decisions based on real-time and historical data trends.
- **Real-Time Feedback:** Provides instant feedback to students, enhancing engagement and learning efficiency.
- **Scalability:** Capable of analysing data from thousands of learners simultaneously, making it ideal for large institutions.
- **Improved Assessment Accuracy:** Analyses diverse data points (e.g., engagement, interaction patterns, test scores) to provide a holistic view of student progress.
- **Efficiency in Administrative Tasks:** Automates grading, reporting, and trend analysis, freeing educators to focus more on instruction.
- **Supports Adaptive Learning Systems:** Integrates with adaptive platforms to adjust content delivery in real-time based on learner needs.

- **Enhances Curriculum Development:** Identifies content areas needing improvement or better alignment with learning outcomes.

## 4. IMPLEMENTATION STRATEGY FOR INNOVATIVE TEACHING AND ASSESSMENT

### Integration of innovative teaching and assessment methods in the curriculum

The integration of innovative pedagogies into curricula is a strategic priority under the Higher Education for Economic Transformation (HEET) Project. This process entails more than simply adding new teaching techniques, it involves fundamentally rethinking how knowledge is delivered, absorbed, and assessed within health professions education. Innovative pedagogies such as problem-based learning, flipped classrooms, experiential learning, simulation-based learning, and digital technologies are being systematically embedded across MUHAS programmes to enhance critical thinking, clinical reasoning, and real-world application of knowledge.

The successful integration of these approaches requires alignment with the MUHAS Curriculum Development and Review Frameworks. Curriculum review teams, guided by HEET priorities, must ensure that each innovation is intentionally mapped to learning outcomes, programme competencies, and national qualification standards. A structured, institution-wide strategy for embedding these pedagogies is key to ensuring quality, consistency, and sustainability in teaching and learning transformation.

### Normal Learning Matrix and Course Matrix

At MUHAS, the Normal Learning Matrix and Course Matrix serve as critical tools for quantifying and aligning learning activities across programmes and NQF levels. These matrices help determine the percentage of time allocated to diverse teaching and learning methods including those that are innovative.

Curriculum teams are expected to document clearly the allocation of educator hours across teaching modalities such as lectures, seminars, practical’s, simulations, and assessments. It is essential that time devoted to innovative pedagogical approaches (e.g., case-based discussions, community-based learning, group projects) is explicitly reflected.

**Programme Assessment Strategy**

MUHAS promotes a competency-based assessment framework that combines both formative and summative evaluation strategies. In line with HEET reforms, programme assessment strategies must integrate innovative assessment methods that align with the evolving learning outcomes of health professions education.

Each programme's assessment plan should clearly identify the types of assessments used ranging from traditional written exams to Objective Structured Clinical Examinations (OSCEs), student portfolios, simulations, reflective journals, and peer-assessment tools. Both formative (ongoing feedback, low-stakes evaluations) and summative (end-of-course or high-stakes assessments) components should be described. The integration of these innovative methods ensures that MUHAS graduates are not only knowledgeable but also clinically competent, reflective, and ready for interprofessional and community-centered practice.

**Courses Descriptions**

Curriculum development teams should provide relevant information depending on the need of a specific course especially regarding innovative pedagogies. Each specific team will provide information based on the content of the specific course as demonstrated below:

**Teaching and Learning Activitie**s (may include):

- Lectures, Tutorial, flipped classroom, Project Based Learning
- Field Visit, Case study, Laboratory works, Guest lectures, micro-learning units
- Research projects, Peer teaching and learning, Etc.

**Assessment Methods**

Curriculum reviews and development teams should be considerate when deciding on this aspect. Specifically, teams should be aware that Instructors may use multiple assessment methods in assessing mastery of learning outcomes. Given that innovative assessments are learner centred, more weight on assessment should be on assessment *as* and *for* learning. The following is an example of grading options that can be considered:

- 100% CA and 0%UE,
- 50% CA and 50%UE
- 40%CA and 50%UE

Assessment methods to be used depend on the design of the course. Teams may as well consider implementing innovative assessment methods identified in the section 3 of this manual.

**Mode of programme delivery**

Depending on the intended mode of programme delivery, be it face-to-face, blended, outreach, distance, online, etc, there are technologies that must be required to support the implementation of the programme. For example; for the blended learning mode, developers will need to provide for the learning management system that will support online learning. The developers will also need to establish the means at which learners will access resources remotely such through the use of synchronous and asynchronous tools like Zoom, Google classroom, google meet, webinar, Skype, and Emails.

**Facilities and Support Services**

For all courses that uses innovative pedagogies that requires specific software, equipment and tools need to be reflected in this section as outline below:

**i) Equipment**

| **Resource** | **Current Availability** | **Quantity & Student Ratio** | **Notes / Additional Needs** |
|---|---|---|---|
| **High-Fidelity Mannequins** | MUHAS Simulation & Skills Lab | 12 units; 1 mannequin per 5 students | Supports simulation-based learning for emergency protocols, maternal health, and basic care scenarios. |
| **Radiology & Imaging Lab** | Teaching laboratories at Muhimbili National Hospital & ORCI | 2 labs; 1 imaging station per 6 students | X-ray, ultrasound, CT simulator consoles essential for diagnostic medicine modules. |
| **Virtual Simulation Software** | Laerdal LLEAP, Touch Surgery, Body Interact | Unlimited concurrent users | Enables remote access to patient scenarios; supports blended learning and |

| | | | |
|---|---|---|---|
| | (via MUHAS LMS) | | pandemic-resilient training. |
| **Computer Workstations** | Computer Labs: 250 PCs with MS Office, SPSS, MATLAB | 3 labs | Required for data analysis, e-portfolio development, and online assessments |
| **Advanced Computational Workstations** | -Nvidia RTX 3060<br>-Nvidia RTX 3080<br>-Nvidia A4000<br>-Macbook pro M1 chip<br>-Mini super computer | 15 PC | AI model training, VR developing<br>M1 chip for AI/ML |
| **Laboratory Equipment** | Microbiology & Biochemistry labs | 1 unit per lab bench (4 students) | Core for practical modules |
| **Network Administration Kits** | Switches, routers, patch panels, cabling supplies | | |

**ii) Information and Communications Technology**

MUHAS ICT infrastructure, governed by its 2017 Security and ICT Policy, underpins all digital-enhanced learning Key features and ratios, it also essential for providing help desk and support during implementation of technology. It provides campus wide network and fibre backbone installed with internet with > 900 Mbps bandwidth with dedicated e-learning bandwidth to support teaching and assessment.

**Learning Management System (Moodle)**

The e-learning platform serves as a comprehensive hub for course materials, quizzes, e-portfolios, and virtual patient modules, supporting unlimited course

enrolments, while integrated lecture capture and Zoom video conferencing licenses facilitate flipped classroom pre-recordings and remote guest lectures.

**Specialized Software Tools, Assistive technology and software with special need**

Specialized software tools play a crucial role in enhancing innovative pedagogies and supporting students with special needs. To foster inclusive education, assistive technologies such as text-to-speech speech-to-text, and screen readers provide vital access for students with visual, mobility, or learning challenges. Additional tools like screen magnifiers, closed-captioning services, and Braille displays further ensure accessibility. Adaptive hardware, including specialized keyboards, trackballs, and sip-and-puff devices, supports students with physical disabilities. These technologies must be integrated with institutional systems, supported by well-trained ICT and library staff, and governed by centralized licensing to ensure equitable access and sustainability.

Table below summarize the implementation strategies for strengthening with special needs,

| **Pedagogical Approach** | **Implementation Strategy** | **Action Steps** | **Responsible Units** |
|---|---|---|---|
| **Universal Design for Learning (UDL)** | Embed UDL principles in curriculum design to offer flexible learning pathways. | -Faculty training on UDL<br>-Redesign materials with multimodal delivery<br>-Flexible assessments (written, oral, visual) | Curriculum Committee, Expert |
| **Assistive Technology Integration** | Centralize access and support for assistive devices and software. | -Conduct student needs assessments<br>-Train users and | DICT, Dean of Students |

| | | | |
|---|---|---|---|
| | | staff<br>-Maintain partnerships with tech providers | |
| **Text-to-Speech / Speech-to-Text** | Embed TTS/STT tools in teaching and assessments. | -Integrate tools like Dragon, Google Read and Write<br>-Use in note-taking and assessments<br>-Provide orientation and practice sessions | DICT, Academic Departments |
| **Screen Readers & Magnification Tools** | Provide accessible software for visually impaired students. | -Install JAWS, NVDA, ZoomText<br>-Train staff and students<br>-Ensure digital resources are screen-reader compatible | Library, DICT, Accessibility Team |
| **Adaptive Keyboards / Input Devices** | Provide hardware accommodations for students with motor challenges. | -Procure adaptive tools (e.g., one-handed keyboards)<br>-Ergonomic assessments<br>-Designate accessible stations in labs | Procurement, DICT, Dean of Students |

| | | | |
|---|---|---|---|
| **Differentiated Instruction** | Apply varied instructional strategies tailored to students' needs. | -Use tiered tasks, flexible grouping, and student choice<br>-Peer-assisted learning<br>-Formative assessments to guide instruction | Faculty |
| | | | |
| Software and tools for online teaching and assessment | Provide Software | Procure software and tools | Procurement, DICT. |

**Alignment with Institutional Strategic Plan**

The implementation of innovative teaching and assessment at MUHAS is align with to the university's Five years rolling Strategic Plan 2020-2025. This ensures that the teaching and assessment manual reflects institutional goals such as academic excellence, curriculum reform, and national education standards like those from the Tanzania Commission for Universities (TCU).

**Maintenance and Sustainability**

To maintain momentum, MUHAS must institutionalize regular review cycles for the teaching and assessment manual ideally every five years. Innovation goals should be embedded into departmental workplans and budgets. Continuous feedback and lesson-learned reviews should inform iterative improvements to both tools and strategies, ensuring that innovation remains responsive to both student and faculty needs.

**Stakeholder Engagement**

Involving both stakeholders are essential for effective implementation. Faculty, students, alumni, administrative staff, and teaching hospitals should participate in the co-development and review of the manual. Tools such as surveys, focus groups, and consultative workshops can help gather input on priorities and

challenges. Administrative staff be engaged to support the practical integration of innovative practices across teaching and assessment systems.

**Local Adaptation**

To guarantee the sustainability of the manual, teaching departments should choose the pedagogies that best fit their specific context. Customization fosters ownership and enhances the applicability of the manual across various settings, contributing to its long-term viability. Additionally, departments must establish a detailed plan for implementing innovative pedagogies in each course or module progressively throughout the semesters.

Furthermore, the implementation of certain pedagogies outlined in the manual will require the procurement of specific tools and the development of particular skills. Both instructors and learners must be equipped with the necessary skills and tools. Therefore, a dedicated budget should be allocated for the adoption and implementation of the manual, ensuring that the required resources are mobilized and dedicated to this purpose.

**Motivation and Incentives**

Incentives are vital for encouraging academic staff to embrace innovation. The institutional should introduce mechanisms such as teaching awards, research grants for pedagogical innovation, and promotion criteria that recognize excellence in education. Similarly, students should be motivated to engage in innovative assessment through transparent criteria, constructive feedback, and opportunities for reflection and self-assessment. These incentives foster a culture of engagement and accountability among all participants.

**Capacity Building**

Building capacity among faculty and support staff is key to sustainable innovation. This includes conducting regular training sessions, seminars, and peer mentoring programs on areas such as authentic assessment design, the use of educational technology, and delivering effective feedback. It is also critical to train operational staff including IT, library, and administrative personnel so they can provide the necessary technical and logistical support for academic units implementing new teaching and assessment methods. This is illustrated below

| Category | Target Group | Capacity Building Activity | Focus Area | Frequency | Facilitators/Support Units |
|---|---|---|---|---|---|
| 1.Training Workshops | Faculty Staff | -Hands-on workshops on innovative assessment methods -Conduct regular professional development on inclusive pedagogy and use of assistive technologies. | Authentic assessment, case-based learning | Quarterly | Curriculum Committee, QA Unit, External Experts |
| 2.EdTech Integration | Faculty & IT Support Staff | Training on e-learning platforms and virtual tools (e.g., Moodle, Zoom, e-portfolios) | Use of technology in teaching and assessment | Quarterly | DICT, E-learning Coordinators |
| 3.Peer Mentoring | Faculty Staff | Peer-led mentoring sessions and lesson demonstrations | Feedback techniques, simulation-based learning | Monthly | Senior Faculty, Teaching Excellence Team |
| 4.Interdepartmental Seminars | Faculty & administ | Joint seminars on pedagogical innovation | Team-based learning, cross-functional support roles | Annually | DVC Academic, Heads of Departments |

| | | | | | |
|---|---|---|---|---|---|
| | rative Staff | and support processes | | | |
| 5.Continuous Professional Development (CPD) | Academic Staff | Certification courses in instructional design and assessment | Educational leadership, curriculum design | Annually | Human Resources, External Providers |
| 6.Technical Skills Training | IT, Library, Admin Staff | Technical support workshops focused on education platforms | Backend support for teaching/assessment tools | Quarterly | ICT, Library, QA Office |
| 7.Feedback Literacy | Faculty | Training on giving/receiving student feedback | Formative feedback, student engagement strategies | Every Semester | QA Unit, CPD Office |
| Educational technologist | IT staff | Training staff | Instructional designers Graphic designers | Annually | |
| Software and tools for online teaching and assessment | Faculty | Procure software and tools | | Annually | DICT, Procurement |
| 8.Learning Communities | All Staff | Formation of communities of practice (CoPs) | Sharing best practices in pedagogy | Ongoing | Academic Leadership Team |

**Collaborations and Partnerships**

Strategic collaborations can enhance both capacity and innovation. MUHAS should strengthen partnerships with local health institutions and the Ministry of Health to ensure relevance and resource sharing. Engagement with regional and international universities allows for benchmarking and academic exchanges, while

partnerships with NGOs and donors can fund pilot programs. The private sector, especially in technology, can provide digital tools and infrastructure to support teaching and assessment innovation.

**Monitoring and Evaluation (M&E)**

An effective M&E framework is critical to track implementation progress and impact. MUHAS should define clear key performance indicators (KPIs) such as student performance trends, faculty adoption rates, and the reliability of new assessments. Tools like evaluation dashboards, course reviews, and tracer studies can support this. M&E findings should inform ongoing curriculum review and professional development initiatives, creating a feedback loop for continuous improvement.

The Institute need to periodically revise and update the manual to align with evolving needs and contexts. While the specific timing and approach for these updates fall under the discretion of the experts, it is recommended that the manual undergo a review at least once every five years to ensure its continued relevance and effectiveness.

## 5. CONCLUSION

In conclusion, MUHAS's concurrent focus on innovative learning and assessment methods under the HEET towards a comprehensive redesign of health professions education to meet the evolving healthcare needs in Tanzania and in world wide. Through incorporating problem-based learning, simulation-based education, flipped classrooms, and digital technologies into the curriculum, MUHAS equips educators and students to perform within advanced clinical environments and promote active, self-directed. Concurrently, the use of advanced evaluation techniques such as OSCEs, e-portfolios, community engaged projects, and interprofessional case presentations ensures that the evaluation is realistic, formative, and competency-based (Assessment and Monitoring of Teaching Practices at MUHAS, 2020). The systemic integration of these innovations into MUHAS's Curriculum Development and Review Framework promotes national qualification standards and Tanzania Commission for Universities' guidelines conformity(Assessment and Monitoring of Teaching Practices at MUHAS, 2020). Continuity monitoring and evaluation of teaching practices, based on institutional research and quality assurance units, promotes iterative improvement and sustainability of pedagogical and assessment. Above all, these transformations ensure a culture of lifelong learning, reflective practice, and evidence-based teaching that supports MUHAS's vision of graduating competent and versatile health professionals. As MUHAS embarks on these integrated strategies, graduates will be better equipped not only to pass exams but to lead, innovate, and improve health outcomes across Tanzania and the globe. Finally, the comprehensive application of innovative teaching and assessment at MUHAS becomes a benchmark for quality, relevance, and impact in higher education, linking with the university's national development goals and international leadership in health.

## 6. CUSTODIAN

Deputy Vice chancellor -Academic will be the custodian of this manual.

## 7. OTHER INSTITUTIONAL RELEVANT DOCUMENTS:

i. MUHAS Guidelines for External Examiners, **2020**
ii. Assessment and Monitoring of Teaching Practices at MUHAS, **2020**
iii. Assessment Handbook, **2017**
iv. Quality Assurance Policy, **2017**
v. MUHAS curricula
vi. Competency based programs-Undergraduate Prospectus.
vii. Five Year Rolling Strategic Plan 2020/2021 To 2024/2025

## 8. KEY STAKEHOLDERS

The main stakeholders of these criteria are:

a. All MUHAS students
b. All MUHAS academic staff
c. Heads of Academic Departments
d. Deans and Directors
e. Visiting students/ researchers
f. MUHAS research collaborators
g. Associated teaching hospitals
h. MUHAS technical staff who interact with students
i. Adjunct staff

## 9. REVIEW DATES

To be reviewed every five years

## 10. CONTACT PERSON

Director, Directorate of Quality Assurance (DQA)

**APPROVAL**

This manual will be used after senate approval.

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