Redesigning Assessment for

HOLISTIC LEARNING:
A Quick Guide For Higher Education

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FOREWORD

MINISTRY OF HIGHER EDUCATION

DR. AISAH ABU BAKAR

Assalamualaikum and greetings.

The landscape of higher education in Malaysia has progressively redesigned towards achieving the national higher education agenda manifested in the Malaysia Education Blueprint 2015-2025 (Higher Education). Committed to realising the blueprint, the Ministry has embarked on its own agenda known as Redesigning Higher Education that focuses on enriching students’ learning experiences by relooking at our current ways of assessing students, among other initiatives undertaken.

The publication of this guidebook is, therefore, very relevant to the Ministry’s agenda. It is timely and critically needed as one of the main references exemplifying all sorts of alternative assessment methods undertaken in various academic disciplines by Malaysian academics. The case studies shared in this book are truly precious and invaluable source of information that will enable other academics, scholars, practitioners and researchers to reflect on, and hopefully inspire the process of redesigning, their own teaching practices.

On behalf of the Department of Higher Education, Ministry of Higher Education Malaysia, I would like to commend University of Malaya’s Academic Enhancement and Leadership Development Centre (ADeC) for taking the lead in gathering and documenting the alternative assessment works undertaken by our Malaysian academics and for taking the initiative to publish and share these amazing works with others in printed and digital forms. I would like to thank all writers and contributors of this invaluable guidebook for sharing their practices and insights on alternative assessments. May your sharing generate more interest for others to explore and apply alternative assessments in their own contexts.

Thank you and wassalam.

Aishah Abu Bakar
FOREWORD

DEPUTY VICE CHANCELLOR (ACADEMIC & INTERNATIONAL) UNIVERSITY OF MALAYA

DATO’ PROF. DR. AWG BULGIBA AWG MAHMUD

Assalamualaikum and greetings.

I would like to congratulate University of Malaya’s Academic Enhancement and Leadership Development Centre (ADeC) on the successful publication of this guidebook on alternative assessment. This book is one of the series of products from ADeC’s Redesigning Assessment for Holistic Learning (RAHoLE) Conference 2017.

The conference was the first national conference co-organised by UM through and the Ministry of Higher Education. It featured academicians from various institutions in Malaysia, including our own UM academics who shared their practices concerning various alternative assessments. All of these impactful works on alternative assessments presented in the conference were carefully documented and now published as a guidebook for scholars, teachers, practitioners and researchers who are interested in the topic of alternative assessment.

I truly hope that this book will inspire its readers to apply alternative assessments that are most relevant in their academic settings for the betterment of our students, and our beloved nation as a whole.

Best regards,

Awg Bulgiba Awg Mahmud
As Greek philosopher Heraclitus had noted, the only constant thing in the world is change. Today, the world is facing rapid changes and innovations, especially in technological advancements. Such advancement is globally acknowledged, hence calling for the need to redesign our industry and higher education. Students today are different in so many ways, yet they will soon graduate and most will be entering the working world. Hence, it is also important for us to understand the current employers’ expectation towards graduates and latest assessment methods being used to gauge potential employees’ strengths and weaknesses.

Alternative assessment is designed to enable students to take active roles and become more involved in their own learning. Excellent educator should be able to utilise alternative assessments to trigger students’ higher-order thinking skills, so they do not only memorise information, but are able to assemble them into complex understanding and insights. That sounds very well in theory, but how does it works in practice?

This book provides an overview of five categories of assessments namely peer and self-assessment, group-based assessment, performance-based assessment, portfolio and technology-based assessment. It also documents academic works, in the form of short case studies, in researching and practicing alternative assessments in their unique contexts to provide readers with ease of access and better understanding on application of alternative and innovative assessment. Sharing of these practices also enable readers to find assessments more relevant to the nature of their courses, suitable with their teaching philosophy and of their students learning styles, and the context in which they work. Thus it is hoped that the compilation of experiences in this book is able to shed some light and spark ideas for educators to improve their practice concerning assessment.

Finally we hope that this book will spark interest and ideas that will inspire us to explore various innovative ways of assessing our students and will provide an excellent start to catalyse holistic assessment in our country’s teaching and learning culture.

Thank you.

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Acknowledgements

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Our special thanks goes to RAHOLE 2017 committees whose commitments, contributions and supports have made Redesigning Assessment for Holistic Learning (RAHoLE) Conference 2017 a fabulous success!

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To all contributors and writers of this book, thank you so much for sharing your insights, experiences and actual practices in implementing innovative and alternative assessments to make your students’ learning more holistic and meaningful. May your sharing inspire others to diversify their assessment approaches for the benefit of the nation.

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Chapter 6: Technology-based Assessments

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Chapter 1

INTRODUCTION
INTRODUCTION

Alternative assessment, also called authentic or comprehensive assessment, refers to all sorts of assessments that are used to measure students’ ability and proficiency in performing complex tasks that are related to the intended learning outcomes.

Alternative assessment differs from the traditional standardised testing requirements as it engages students to perform some tasks that usually mimic real-life situations. By applying alternative assessments, teachers are able to observe students’ individual strengths and skills, and use the information to better design their teaching approaches. Therefore, alternative assessment is a process-oriented type of assessment that focuses on the students’ progress and growth over a period of time.

Some examples of alternative assessments are students’ portfolios, project works, problem-based learning, role-playing, journals, writing activities and other activities that involve using rubrics to assess students’ works.

CATEGORIES OF ALTERNATIVE ASSESSMENT

Although there is no solid categorisation of alternative assessment, this book suggests five main categories: peer and self-assessment, group-based assessment, performance-based assessment, portfolio assessment and technology-based assessment.

Peer and Self-assessment

Peer assessment is defined as a process of peers giving feedback on other students’ work in terms of quality and often with ideas and strategies for improvement. Self-assessment, on the other hand, refers to a process of formative assessment during which students reflect on the quality of their work, judge the degree to which it reflects explicitly stated goals of criteria, and revise accordingly.

Group-based assessment

Group-based assessment refers to the assessment of the work done by students working in groups to complete specific tasks, either during a class or over a certain period outside of the class. Instructor will monitor students by following the groups’ progresses and contribution of individual students within a group.
Performance-based assessment

Performance-based assessment is a form of assessment that moves away from the traditional paper-and-pencil assessment. It is based on clearly defined tasks that the students need to perform in a context that mimics the workplace (authentic). It will identify whether the students would be able to support their findings with their knowledge.

Portfolio-based assessment

Portfolio assessment is an on-going process involving the student and teacher in selecting samples of student work for inclusion in a collection, the main purpose of which is to show the student's progress.

Technology-based assessment

Technology-based assessment involves the use of digital technology and modern devices incorporated within the education context to assess students' performance and progress. This type of assessment provides opportunity for the young people to be taking on new participatory and collaborative roles in learning online and outside the classroom.

The following chapters of this book provide more explanations of each category of assessment followed by some examples or cases studies that show its application in a variety of contexts.
Chapter 2

PEER AND SELF ASSESSMENT

Amira Firdaus (UM)
Alina Shamsuddin (UTHM)
Hasmaini Hashim (UTEM)
Jacob John (UM)
Norasmul Akma Ahmad (UM)
Nurul Atira Khairul Anhar Holder (UM)
Paula Hodgson (The Chinese University of Hong Kong)
Renuka V. Sathasivam (UM)
DEFINITION OF PEER AND SELF ASSESSMENT

PEER ASSESSMENT

According to peer assessment expert, Topping (1998), peer assessment is “an arrangement in which individuals consider the amount, level, value, worth, quality, or success of the products or outcomes of learning of peers of similar status” (p. 250). It involves “a set of activities through which individuals make judgements about the work of others ... Beyond making judgements, students may provide feedback and conference about the work they analyse; peer assessment is an umbrella term, encapsulating a number of related activities.” (Reinholz, 2016).

SELF–ASSESSMENT

Self-assessment refers to “the involvement of leaders in making judgements about their own learning, particularly about their achievements and the outcomes for their learning.” (Boud & Falchicov, 1989). It is “an essential element of learning” wherein students are able to “evaluate their own progress” (Cox, Imrie & Miler, 2014, p. 167).
OPERATIONALIZED DEFINITION

PEER ASSESSMENT

Peer assessment* as explored in this book refers to formative assessment practices in which students provide feedback on other students’ work, often with ideas and strategies for improvement. Peer Assessment engages students in activities such as:

- Highlighting positive aspects of their peers’ learning
- Noting areas for improvement in their peers’ work
- Giving constructive comments on how their peers’ may improve their work.

*Some other definitions may differentiate between ‘peer assessment’ and ‘peer feedback’, wherein ‘peer assessment’ is considered a summative assessment practice in which students give marks to other students, while ‘peer feedback’ is considered as formative assessment in which students provide feedback without marks.

SELF–ASSESSMENT

Self-assessment as explored in this book is a form of formative assessment that engages students’ own ability to reflect on the learning process, judge their progress and take action on feedback from peers and instructors. Self-assessment encourages students to:

- Assess their own learning
- Evaluate their own work
- Monitor their own progress
  - Regulate their own learning activities and tasks
  - Seek peer and instructor feedback.
PRINCIPLES OF PEER AND SELF ASSESSMENTS

EDUCATORS
Peer and self-assessment need to be carefully planned:

- Define assessment objectives clearly.
- Ensure (check) alignment between assessment criteria and objective of assessment.
- Design assessment criteria in a way that students will clearly understand it.
- Assess quality of student feedback.

STUDENTS
Peer and self-assessment should include:

- Reflecting upon current work or learning.
- Providing feedback for current improvement.
- Thinking about future work or learning.
- Offering feed-forward for future improvement.
CASE STUDY

What does Self-reflection have Anything to do with My Professionalism?

SUBJECT AREA
Health Sciences

RESEARCHERS
Nurul Atira Khairul Anhar, Chan Choong Foong
University of Malaya, Kuala Lumpur, Malaysia

ISSUE
Cultivating professionalism is more than just delivering a lecture. Therefore, in the professionalism remediation, we emphasise self-reflection so that they can appreciate and internalise the values of professionalism. Interactive lectures and discussions exposed students to types and process of available reflections and on how to reflect.

INNOVATIVE APPROACH / INTERVENTION
Students were asked to reflect upon their professionalism and write reflective essays. In addition, they were involved with fieldwork where they are required to interview patients, healthcare professionals and academic staffs on their views on professionalism and their experiences. Students were then required to submit a written report in describing their findings, feelings and reflections upon completing their fieldwork experience.
DESCRIPTION OF APPROACH

- Interactive mini lectures and discussions exposed students to the various types and processes of reflections and on how to reflect.
- Students were taught the processes of reflection and engaged in a discussion on the importance and the need of constant reflection.
- During the programme, students were required to write a reflective essay and involved with fieldwork, for instance, interviewing patients, healthcare professionals, and academic staff about their view on professionalism and their experiences.
- Once the fieldwork was completed, students were required to submit a written report in describing their findings, feelings and reflections.

RELATED LEARNING OUTCOMES
PO3 – Social Skills and Responsibility; PO4 – Ethics and Values; PO5 – Communication
CASE STUDY
An Adaptive Self-assessment Approach for Engaging Massive Open Online Course (MOOC) Learners

SUBJECT AREA
Mandarin as second language

RESEARCHERS
Hasmaini Hashim, Sazilah Salam, Siti Nurul Mahfuzah Mohamad
Universiti Teknikal Malaysia Melaka (UTeM), Melaka, Malaysia

ISSUE(S)
• In MOOC assessment, the issue is that there was a reduction of interest and activity of students during the session of the course.
• One of the most challenging problems in MOOCs is that it is infeasible for the teaching staff to grade all the assignments in such a large scale.

INNOVATIVE APPROACH
• Adapt self-assessment approach for engaging Massive Open Online Course (MOOC) learning in the second language.
• Propose and implement self-assessment that considers learner requirements or adaptive to learners characteristics.
DESCRIPTION OF APPROACH

- The study was conducted using two separate samples which involve two cohorts of students who took a Mandarin course via MOOC: Cohort 1 consisted of 403 students in Semester 1 2015/2016, Cohort 2 (338 students) in Semester 2 2015/2016, Cohort 3 (327 students) in Semester 1 2016/2017, while Cohort 4 (262 students) in Semester 2 2012/2017.

- For Cohort 1, the MOOC assessment design consisted of 40 e-activities (with online quizzes, essay writing, self-video presentation and audio listening assessment). For Cohort 2 and 3, the MOOC assessment design consisted of 45 e-activities. For Cohort 4, the MOOC assessment design was further improved by embedding 55 e-activities (additional forum e-activities).

- Activities element in this assessment methods were: (i) quizzes, (ii) listening assessment, (iii) forum, (iv) mid-term, and (v) project.

- For the project, students are required to prepare and upload an essay written in Chinese characters, and a self-video presentation of the essay.

- Assessment was divided into three phases; (i) Phase 1 (Implementation): establish learning outcomes or goals, (ii) Phase 2 (Implementation): gather evidence and (iii) Phase 3 (Revise): analyse & interpret and make decision and change.

RELATED LEARNING OUTCOMES

PO1 – Knowledge; PO2 – Practical Skills; PO5 – Communication
CASE STUDY

Professional Behaviour among Dental Students: Comparing Self and Peer vs. Teacher Assessments in Improving Student Performance

SUBJECT AREA
Health Sciences; Dentistry

RESEARCHERS
Jacob John, Prof Roslan Saub, Shani Ann Mani, Norasmatul Akma Ahmad
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ISSUE(S)
- Dentistry graduates are deemed ill-prepared for the real world, despite possessing exceptional knowledge and technical skills, because they cannot get very far without a good understanding of the professional and ethical standards.
- Teachers and students often struggle with this concept because much of the professional and ethical standards are part of the “hidden curriculum”.

INNOVATIVE APPROACH
This project guides students through this curriculum bottleneck by taking them through a battery of formative self- and peer- assessment process.
DESCRIPTION OF APPROACH

- The approach was applied to students who attended a lecture on Code of Professional Conduct and Ethics & Jurisprudence.
- Prior to the first semester, a questionnaire on Professional Behaviour (e.g., work habit; interpersonal attributes; and global items) was administered to a test group. The questionnaire was designed to provide indirect exposure to the “hidden” curriculum.
- Following the questionnaire, the self and peer assessment were conducted in addition to being assessed by a teacher.
- At the end of the first semester, students were given feedback on their peer and self-assessment.
- Students were then asked to conduct self-reflection on the assessment exercise.
- A second round of assessment on Professional Behaviour was later conducted.
- Findings revealed that teachers’ scores were lower than self and peer scores. It was also found that scores increased significantly for “work habit”, and the item showed significant variation between the two phases. On the other hand, there is no difference between the “interpersonal attributes” and “global” items.

RELATED LEARNING OUTCOMES

PO3 – Social Skills and Responsibility; PO4 – Ethics and Values; PO5 – Communication
CASE STUDY

Assessing Work Ethic of Science Students in Group Assignment for a University Course: A Preliminary Study on Perceived Fairness

SUBJECT AREA
All subjects; Sciences

RESEARCHERS
Ngeow Yeok Meng, Tamil Arasi a/p Muniandy
Universiti Tunku Abdul Rahman (UTAR), Perak, Malaysia

ISSUE(S)
- Short semester of seven weeks has always been a challenge to most lecturers in UTAR to ensure there is teamwork and collaborative learning.
- It is often difficult to ascertain the determinant factors for students to contribute actively to the team.
- It is also difficult for lecturers to fairly assess students’ work ethics in their group work.

INNOVATIVE APPROACH / INTERVENTION
- We study the learning processes for improved student engagement with the intention to instil a sense of belonging to the newly established group, and sense of responsibility towards course work.
- We record how students feel and commit to group interaction throughout the seven weeks of interactions, and how they blend personality and individual learning style intentionally to achieve their shared common goal.
DESCRIPTION OF APPROACH

- Contrary to conventional peer assessment that requires collective consensus, this study uses constructivism approach of keeping track of selected social media (either Facebook or WhatsApp) to illustrate how students make sense of their individual contribution to group assignment.
- Pre- and post-test are complemented by selected personal interviews to find out how students decide on the level of participation in group assignment tasks.
- It documents experiential learning processes for collaborative learning, and creative ways to enhance teamwork for a common goal.
- It examines whether trust and sense of belonging, reciprocally strengthen work ethics.

RELATED LEARNING OUTCOMES
PO3 – Social Responsibility; PO4 – Ethics and Values; PO5 – Communication; PO6 – Problem Solving
CASE STUDY

Medical Biochemistry: Enhancing Achievement of Learning Outcomes through Self-based and Group-based Assessments

SUBJECT AREA
Medicine; Health sciences; Medical biochemistry

RESEARCHERS
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Universiti Kebangsaan Malaysia (UKM), Selangor, Malaysia

ISSUE(S)
Conventional teaching and learning methods in Medical Biochemistry are not fully effective in achieving course objectives.

INNOVATIVE APPROACH / INTERVENTION
- We utilised an interactive peeragogical and heutagogical learning approaches to help students achieve learning outcomes through authentic and purposeful learning.
- We utilise various online platforms for students to acquire knowledge and engage in team-based learning.
- Assessment is conducted throughout the entire process, where at the end of each session, students do their own reflection and improve themselves.
- The interactive learning approaches have helped students to boost their confidence level and improve critical thinking, crucial elements for success in the clinical year.
DESCRIPTION OF APPROACH

- First year medical students were grouped into small groups consisting of 8 to 10 students.
- Each team of students went through up to six interactive learning activities (depending on the module being taught):
  - Meet-the-expert
  - Online quizzes
  - Team-based learning
  - Objective Structured Practical Examination (OSPE)
  - Digital canvas (Padlet)
  - Interactive whiteboards
- Firstly, learning materials (e.g., videos, reading materials, notes) were uploaded into the university’s Learning Management System (LMS).
- Next, each student constructed an individual mind map and shared it with the class via a digital canvas (e.g., Padlet).
- Each group then played a game either through an online quiz or OSPE, depending on the particular module’s learning outcome.
- During a meet-the-expert session, a clinical case was provided and students discussed the case’s cause, effect and case management.
- Students used interactive whiteboards (e.g. Doceri, Educreations) to explain their answers and share among peers.
- At the end of each session, students reflected on their own performance.
- Lecturers then provided feedback to conclude the interactive learning loop.
- When students made use of feedback to make changes to their work, they moved a step closer to achieving the day’s learning aim, making for authentic and purposeful learning.

RELATED LEARNING OUTCOMES
PO1 – Knowledge; PO2 – Practical Skills; PO6 – Problem Solving; PO7 – Information Management
CASE STUDY

Cartoon Strips: Can They be Used as Assessment

SUBJECT AREA
Social science/humanities theory; educational theory

RESEARCHERS
Renuka V. Sathasivam
University of Malaya, Kuala Lumpur, Malaysia

ISSUE(S)
- It is often difficult to capture student attention during theory-based classes
- Written assignments give room to students to “cut-and-paste” without internalising the material they refer.

INNOVATIVE APPROACH / INTERVENTION
- Creating cartoon strips forces students to move out of their comfort zone and create a product requiring higher order thinking skills (HOTS).
- Rubrics allow students to actively participate in the assessment process.
- Students are encouraged to take ownership of their own learning through peer assessment and self-assessment, and to become autonomous and lifelong learners.
DESCRIPTION OF APPROACH

- Students in an educational theories class were asked to illustrate a cartoon strip illustrating a selected theorist’s contribution to the educational field.
- Students’ cartoon strips developed their creative skills besides enhancing their communicative competencies.
- Students subsequently presented their cartoon strips to assessors comprising of their peers.
- The peer assessment process was conducted with the assistance of a rubric. The rubric allowed for the assessment process to proceed more meaningfully as peer assessors were able to focus their feedback on the requirement of the assessment.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>POOR</th>
<th>FAIR</th>
<th>GOOD</th>
<th>EXCELLENT</th>
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<tbody>
<tr>
<td>Content</td>
<td>Shows many unimportant content and information is incomplete. Very difficult to understand the content.</td>
<td>Shows some important content, but highlights unimportant points. Rather difficult to understand the content.</td>
<td>Shows most of the important content, however, at least one conflict/discrepancy is noticed. Rather easy to understand the content.</td>
<td>Shows content that are relevant and very accurate. Very easy to understand the content.</td>
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<tr>
<td>Team work</td>
<td>Team work was not visible. No collective effort was seen.</td>
<td>Team work was slightly visible; however, no collective effort was seen.</td>
<td>Team work was visible and collective effort was seen.</td>
<td>Team work was very visible and team mates helped out each other throughout.</td>
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</tbody>
</table>

Figure 1: Assessment rubric for educational theorist cartoon strip

RELATED LEARNING OUTCOMES

PO1 – Knowledge; PO5 – Communication; PO6 – Problem Solving
RELATED LEARNING OUTCOMES (LOs)

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<tr>
<th>NO.</th>
<th>Case Studies</th>
<th>PO1 Knowledge</th>
<th>PO2 Practical skills</th>
<th>PO3 Social skills and responsibility</th>
<th>PO4 Ethics &amp; values</th>
<th>PO5 Communication</th>
<th>PO6 Problem-solving</th>
<th>PO7 Information management</th>
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ADVANTAGES OF PEER AND SELF-ASSESSMENTS

- Peer and Self-assessment promotes students’ active involvement in the learning process.
- The expectations arising from assessing oneself and one’s peers fosters a sense of responsibility.
- Carrying out peer assessment improves students’ verbal communication skills, negotiation skills and diplomacy.
- The process of assessment trains students to judge the quality of their own and their peers’ work more realistically.
- Peer Assessment can provide more relevant feedback to students who value their peers’ opinions.
Peer Assessment:
- Actively involved in the learning process
- Encourage students involvement and responsibilities
- Help improvise verbal communication skills, negotiations skills and diplomacy among the students
- Accurately or realistically judge the qualities of their own work
- Provides more relevant feedback to students as it is generated by their peers

Self Assessments:
LIMITATIONS OF PEER AND SELF-ASSESSMENTS

1. Students’ judgment can be subjective when carrying out assessment.
2. Both peer and self-assessment can be time consuming for students.
3. Students may not be familiar with assessment criteria.
5. Students have the tendency to award everyone the same mark when conducting peer assessment.
6. Students may feel ill-equipped to perform assessment on their peers.
7. Students can be reluctant to make judgment regarding their peers.
Peer Assessment:

- Judgment can be subjective
- Time consuming for students
- The students may not be familiar with the assessment criteria
- Additional briefing time can increase a lecturer's workload
- Students will have a tendency to award everyone the same mark
- Students feel ill equipped to undertake the assessment
- Students may be reluctant to make judgements regarding their peers

Self Assessment:
THINGS TO CONSIDER WHEN IMPLEMENTING PEER AND SELF-ASSESSMENTS

- **Assessment criteria** must be clarified, for example by providing a valid rubric, checklist, illustrations, etc.
- **Assessment briefing/training** sessions should be carried out before implementing peer or self-assessment to ensure students understand the assessment process and criteria (e.g., via discussion, providing examples of good and bad practices).
- **Students’ capabilities** for performing peer and self-assessment should be taken into consideration (e.g., course level, student background)
- The **learning environment** needs to be safe and conducive for students to feel comfortable with peer and self-assessment.
- **Assessment session** should be appropriately scheduled based on the purpose of the assessment; for example, self-reflection can be done outside the classroom.
- **Feedback** should be given to students regarding their peer and self-assessments
- **Assessment results** should only be shared in a thoughtful manner, for example, cumulative results can be shared but individual students’ reflections/results should not be shared without consent.
- **Feedforward** during the assessment process can be used for future enhancement of students’ existing strengths and improvement of past weaknesses.
BIBLIOGRAPHY


SUMMARY

PEER & SELF-ASSESSMENT is a highly student-centered approach to assessment. Although assessment is conventionally considered as the responsibility and sole right of the teacher, if done correctly, student-led assessment has much to contribute to the teaching and learning process. Students develop and practice fair judgment and a sense of responsibility for their peers’ and their own learning.

Furthermore, this participatory and collaborative form of assessment-for-learning engages 21st century students in a way that is familiar and similar to their everyday life. The 21st century young adults regularly reflect upon their experiences and share their reflections with others via social media, a practice related to self-assessment. They are frequently evaluating content produced by others through “liking”, “rating”, and “reviewing” in social media.

As Malaysian higher education moves towards a more holistic model of education aimed at developing balanced and entrepreneurial graduates, peer and self-assessment will help hone students’ analytical and reflective skills as well as their communication skills. Peer and self-assessment will hone students’ evaluation and social abilities beyond the classroom, and more importantly instill in students the importance of fair judgment and acknowledgement of the responsibility that comes along with passing judgment, for a more equitable society.
Chapter 3

GROUP-BASED ASSESSMENT

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DEFINITION OF GROUP-BASED ASSESSMENT

GROUP–BASED ASSESSMENT

- Group assessment is defined as that which assesses the work of a formal learning group, established to complete a specific task, either during a class or over a period of time outside of the class.
- Group-based assessment is where every effort is made to parse out the performance of the individual to infer his or her underlying abilities as they are observed in the group setting (Poehner, 2009).
- Group-based assessment (GBA) includes in-class group learning, peer assessment, and peer and instructor feedback (Bicen & Laverie, 2009).

OPERATIONALIZED DEFINITION

GROUP–BASED ASSESSMENT

Group-based assessments are useful when considering the need to assess team work or collaborative skill among group members. The collaborative skill required here includes the level of involvement, communication, leadership, quality of contribution among peers, negotiation skill, and ability to influence others.
PRINCIPLES OF GROUP-BASED ASSESSMENTS

• The group referred here often means a small group of usually between two and six students, formed to discuss a particular issue or perform a particular task. The group may be formed by either self-selection or being assigned by the instructor.

• The assessed group work must be carefully planned and the assessment strategy clearly presented to students.

• Assessment of group work should be conducted in such a way that it provides evidence of individual contribution and achievement in line with Quality Assurance Agency (QAA) precepts on assessment of students.

• Assessment should take into account the process as well as the product of the group work.

• The marks and weighting allocated to the group product and the individual contribution should be clearly specified in the assessment criteria. To motivate individual students and discourage the free-rider phenomenon, it is important to assess individual contributions and understanding, as well as group products and processes. In addition to evaluating the work of the group as a whole, individual students should be asked to demonstrate their learning. This can be done via independent write-ups, weekly journal entries, content quizzes, and so forth.

• Marking criteria, including tutor and self/peer assessment criteria where appropriate, should be clearly articulated and provided to the group prior to the start of the group.
CASE STUDY

Manifesting the Understanding of ‘Integration’: Assessing Biomechatronics through Group Exhibition

SUBJECT AREA
Biomechatronics Engineering

RESEARCHERS
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ISSUE
Opportunities for students to ‘learn by doing’ in a theoretical lecture-based course is usually limited, especially when the knowledge content is complex and heavy. Lecturers usually will resort to pen-and-paper based assessment to capture their understanding, which may not be effective.

INNOVATIVE APPROACH / INTERVENTION
In this group exhibition project, students were assigned roles to play from the different engineering domains. Based on their natural interest towards a certain field, they would choose to play their role as either a mechanical engineer, an electronics engineer, a control engineer, a biomedical engineer or a mechatronics engineer.
The domain-based group would be their ‘Expert Group’. They were then introduced to their ‘Company Group’ where the different experts would be working together on a single project. The project is to develop a solution in the form of a prototype for people with disabilities in performing their daily activities. At the end of the semester, they exhibited their prototypes to the public while explaining their individual roles and contribution and how their expertise was integrated into the final solution prototype. The project exhibition would then be assessed by different experts from each engineering field and marks were given for the group component as well as the individual component.

DESCRIPTION OF APPROACH

- Group exhibition project: 30% of final mark
- Week 1: Students were assigned roles to play as engineers from different engineering domains, i.e. EITHER mechanical engineering, electrical engineering, control engineering OR biomedical engineering (their Expert Group).
- Week 2-13: Students then got into ‘Company Groups’ consisting of one mechanical engineer, one electrical engineer, one control engineer and one biomedical engineer each. The project aimed to collaboratively develop a prototype of a device to help people with disabilities.
- Throughout the semester, students consulted the course lecturer in completing the assignment. Quality feedback and support was provided informally and appropriately.
Week 14: They exhibited their prototypes to the public while explaining and demonstrating their individual roles and contribution and how their expertise was integrated into the final solution prototype.

Week 14: The project exhibition was assessed by different engineering experts who came from different engineering backgrounds.

Marks were given for the group report (10%), prototype exhibition (10%) and individual role component (10%), making up 30% in total.

RELATED LEARNING OUTCOMES
PO2 – Knowledge; PO3 – Social Skills and Responsibility; PO6 - Problem Solving
CASE STUDY

JAZZ UP your Poster Presentation with Augmented Reality

SUBJECT AREA
English for Professional Purposes (EPP)

RESEARCHERS
Agelyia A/P Murugan
AIMST University Malaysia

ISSUE(S)
The students, being Generation Z, need to embrace social learning environments that enable them as students to be hands-on and directly involved in the learning process. Lecturers need to transform the classes into highly engaging sessions that would motivate the students’ interest towards learning English Language.

INNOVATIVE APPROACH
A technique to engage the students to do their poster presentation by integrating technological tools was adopted. They were given choices to use any Augmented Reality (AR) applications and also DIY Hologram to make the presentation more interactive and engaging. Lecturers from all the faculties were invited to come and view the students’ poster presentation, which was held at the university hall foyer.
DESCRIPTION OF APPROACH

- Students were given 2 weeks to prepare the poster with some briefing on the augmented reality methods and also videos on the introduction on how to prepare a DIY Hologram.

- AR methods are capable to assist teaching and learning that directly involve the students interacting with 3D models via AURASMA. With the use of AURASMA and DIY Hologram, it is proven that these techniques motivated students and captured their attention towards the lesson. These also helped them to understand their content knowledge better.

- During the poster presentation, the students were evaluated according to the rubrics that focused on assessing Higher Order Thinking Skills. The rubrics consisted of Delivery of Content Knowledge (25%), Language (25%), Technological Method (25%) and Communications Skills (25%).

- Questionnaire was distributed to find out the perspective of the students on the method and assessment used during the poster presentation.

- Most students preferred the method and the assessment used for this assignment. Students were confident and motivated to use the language during their poster presentation.

RELATED LEARNING OUTCOMES
PO2 – Knowledge; PO5 – Communication
CASE STUDY

Malaysian Food and Culture Fest: A WOU Group Assessment Experience

SUBJECT AREA
Comparative religions
Cross-cultural intelligence

RESEARCHERS
Jasmine Selvarani Emmanuel, Chng Lay Kee, Michelle Loh Woon Har
Wawasan Open University

ISSUE(S)
The students in these courses had little knowledge of each other’s culture and religion. This assessment was a hands-on learning experience of cultural and religious awareness for them.

INNOVATIVE APPROACH
To organise the Malaysian Food and Cultural Fest, students were asked to set up hawker style booths that were decorated in tandem with each festival theme that represented the main festivals celebrated by the people in Malaysia including the Peranakan culture, Deepavali, Vaisakhi, Christmas, Chinese New Year and Aidilfitri.
DESCRIPTION OF APPROACH

- Students had to put up for sale food that was usually served during these festivals and write about the cultural history of the food, cultural event or festival. The students also came clad in traditional attire. A total of sixty students participated in this project.

- For this project, the assessment was broken into the initial proposal (5%), implementation of the project (15%), oral presentation (10%) and a reflective essay (5%). The total was 35% of the 50% coursework marks.

RELATED LEARNING OUTCOMES

PO3 – Social Skills and Responsibility; PO5 – Communication; PO8 – Entrepreneurship
CASE STUDY

Group-based Assessment: Using Multimedia Presentation to Promote Collaborative E-learning

SUBJECT AREA
Educational Leadership

RESEARCHERS
Donnie Adams, Humamuddin Abu Samah, Syafizza Norida A. Samat
University of Malaya

ISSUE(S)
Higher education is more than just about learning tangible and measurable skill to measure not only what students learn, but also their propensity to learn.

INNOVATIVE APPROACH / INTERVENTION

- The GBA is a didactical model consisting of eight steps that integrate multimedia presentation with peer assessment to foster collaborative e-learning. In this approach, students are active participants in the assessment process which includes in-class group learning, peer assessment, and peer and instructor feedback. The proposed didactical model foster communication and collaboration among students, encourage creativity, motivation, and dynamism of the e-learning process for both lecturers and students.

- The GBA Didactical Model can be conducted in small and mid-size classes.
**DESCRIPTION OF APPROACH**

- The innovative GBA didactical model consists of eight steps that utilise SPECTRUM, an e-Learning Management System into the learning process.

- Students produced multimedia presentations uploaded to YouTube, which promotes sharing of knowledge beyond the classroom.

| Step 1 | • Instructor discussed the course learning outcomes with students.  
|        | • Students were informed of the expected output of a multimedia presentation at the end of the course.  
|        | • Students were briefed on the criteria in the evaluation rubric  
|        |   o Knowledge and understanding of Leadership Theories  
|        |   o Independent Research and use of Data  
|        |   o Multimedia Application and Presentation  
|        |   o Collaboration and Teamwork.  
|        | • Students were introduced to the GBA procedure on the multimedia presentation  
|        | • Students were introduced to types of collaborative e-learning activities in Spectrum, a Learning Management System (LMS). |

| Step 2 | • Students were formed into heterogeneous groups based on their nationalities, working experience, current employment.  
|        | • Maximum 5 students to a group. |

| Step 3 | • Face to face (F2F) sessions emphasized on discussions and collaborative group work using interactive blended learning approaches (Chat, Discussion; Forum; Presentation; E-learning) via Spectrum.  
|        | • Students swapped their roles (for every F2F throughout the semester - e.g., leader, writer, and presenter). |
### Step 4
- The next step is the GBA process.
- Group-based case study activities were conducted.
- Topics were related to the course, e.g. theories, models, facts, comparison etc.
- Interactions to complete the activity (Chat, Discussion, Forum) were done via Spectrum.
- Instructor gave verbal feedback to each group (e.g., how they can improve their work) for benchmarking/modification purpose.

### Step 5
- Groups modified their case study analysis based on instructor’s verbal feedback.
- Groups created a 3 to 5 minute multimedia presentation of their case analysis such as:
  - Life action audio visual or
  - animation/visual graphic with voice-recorded audio narration or
  - animation / visual graphic with music and subtitles, without voice narration.
- Interactions to complete the presentation were done via collaborative e-learning using Spectrum, Google Drive, WhatsApp.

### Step 6
- Groups submitted the multimedia presentations to the instructor in the next class.
- Groups were given the evaluation rubric and briefed on the GBA process.
- Teams present their multimedia presentations.

### Step 7
- Two stage assessments were employed for the multimedia presentations.
- Formative (e.g., qualitative assessment via verbal feedback by Instructor and students).
- Summative (e.g., quantitative assessment using evaluation rubric by Instructor and students).
Step 8  • Instructor assesses all the evaluation rubrics and grades all multimedia presentations.

* Feedback through e-mail was given at Step 7.
** The rubric for the assessment was broken into five main domains; (1) Knowledge of Leadership Theory/Theories, (2) Independent Research and use of Data, (3) Multimedia Application, (4) Presentation, and (5) Collaboration and Teamwork. Five marks were allocated for each domain. The following formula was used:

\[
\text{Total marks: } \frac{\text{Mark } \times 40}{25} = \text{__________}
\]

** RELATED LEARNING OUTCOMES**

PO4 – Ethic and Values; PO5 – Communication; PO6 – Problem Solving
C A S E  S T U D Y

Gamification of Education: Assessment on Knowledge and Behaviour through Socrative

SUBJECT AREA
Medicine

RESEARCHERS
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University of Malaya

ISSUE(S)
Paper-based assessments are insufficient to provide instant assessment results to enhance student learning when peer tutoring sessions are implemented. Student autonomy and motivation are essential in improving their academic performance.

INNOVATIVE APPROACH / INTERVENTION
Socrative was used as an online platform for students to answer and discuss the questions. Students received instant results and used real-time item analysis in facilitating the discussion. Students also used Socrative to give anonymous feedback to each other on strengths and ways to improve for the next session (e.g. “I hope all students will be punctual”).
DESCRIPTION OF APPROACH

- Each student designed a set of single best answer questions. The questions were compiled into an online quiz using Socrative. In other words, they contributed questions to test each other. Students organised the session. After students completed the quiz, scores were received and the discussion was assisted by the real-time item analysis. Students completed an online feedback to assess their quality of the session.

- The feedback was then discussed among all the students and they would collectively decide what improvements should be made for the next session. Upon completion of the session, more detailed reports provided by Socrative for each individual student that showed their performances in each item were emailed to them. This information would aid them in monitoring their own progress and what would need to be improved in the future.

RELATED LEARNING OUTCOMES

PO3 – Social Skills and Responsibility
CASE STUDY

Assessment of Cognitive Level in Database subject using Problem-based Learning Approach

SUBJECT AREA
Computer Science and Database

RESEARCHERS
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Universiti Malaysia Terengganu

ISSUE(S)
Database is a challenging subject among students because it needs an abstract understanding of several theories, concepts and technical processes. Learning process using traditional lecture mode is inadequate for producing graduates with knowledge of theory and technical skills.

INNOVATIVE APPROACH / INTERVENTION
Students who were taught using problem-based learning (PBL) will retain more knowledge and demonstrate greater critical thinking skill. In addition, assessment integrates seamlessly with PBL. Oral presentation and quizzes are the types of assessment which have been used in PBL in order to provide students an opportunity to practice their communication skills while presenting findings to their peers and groups, as well as to evaluate their cognitive level.
DESCRIPTION OF APPROACH

Ladder 1:
- The students were assigned roles and worked in groups to identify the learning issues using 3 Active Thinking Points (identification of the facts, idea generation and identification of learning issues). They appointed a chairperson, a secretary/scribe, a facilitator, an observer and member.
  - The chairperson moderated the discussion, encouraged participation of all members, and maintained good group dynamics.
  - The secretary/scribe jotted down the notes/points raised by all members, helped the members to order or link their points, and participated as far as possible in the group discussion.
  - The facilitator facilitated the discussion session, asked open questions, encouraged participation of all members, maintained good group dynamics, evaluated group performance and supported the role of chairperson.
  - The observer observed and reported the learning session.
  - The member actively participated the discussion session, listened actively to each other's’ contribution, asked open questions, shared information with each other.

Ladder 2:
- The students embarked on self-directed learning activities based on triggers. The process includes reading, watching videos, summarising the unit and searching for additional and supporting learning materials.
Ladder 3:
- The students were asked to conduct several meetings, reported the results of their self-directed learning to the group and prepared for the presentation at Ladder 4. Students were required to fill up the FILA table. They might revisit the previous ladders in order to refine the outcomes of the group learning.

Ladder 4:
- The students were asked to present the outcomes of their learning. The evaluation was based on cognitive assessment. The presentation could be in many forms, including a parallel presentation, single presentation or a forum discussion.

Ladder 5:
- The final stage of learning for the unit. At this level the students filled in the reflection section in FILA table provided. The reflection covered the learning experiences from Ladder 1 to Ladder 4 and overall learning process.

**RELATED LEARNING OUTCOMES**
PO5 – Communication; PO6 – Problem Solving; PO7 – Information Management
CA S E  S T U D Y

VidCase: An Alternative Assessment Method for the Millennial Students

SUBJECT AREA
Accounting

RESEARCHERS
Noor Liza Adnan, Rokiah Muda, Nur Raihana Mohd Sallem, Wan Karomiah Wan Abdullah, Siti Rokyah Md Zain
Universiti Teknologi MARA (Terengganu)

ISSUE(S)
There is a need to fairly assess students’ analytical and creative skills; and allows the students to enjoy the assessment tasks.

INNOVATIVE APPROACH / INTERVENTION
VidCase (Video Case Study) solves a mystery of a case study using video presentation. It requires a case study that covers the syllabus content and leaves a mystery to be solved. Students are to work in a group of 10 to 12. They need to act and record the solution in a 45-minute video which is to be presented in front of five jurors. Besides the marks earned, winners are also to be awarded based on a few criteria.
DESCRIPTION OF APPROACH

- Students were divided into small groups of 10 to 12. Each group was provided with a case study that has been written in accordance to the syllabus content, but containing a mystery to be solved.

- The solution of the case mystery should lie in the syllabus content, hence would require the students to understand what they have learned in class. Therefore, they needed to read, understand and identify the mystery in the case study and came out with possible solutions.

- Students were later required to act out and capture the scenes of the case study and its solution in a 45-minute video. The video would then be presented on a particular day, named the Movie-Day, in attendance of five jurors who would rate and assess each video.

- Besides the marks earned, winners were also awarded based on a few criteria, such as Best Movie Award, Best Scriptwriter and Best Director.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving; PO7 – Information Management
CASE STUDY

Collaborative Assessment Survey (CAS): A Measure of Group Teamwork

SUBJECT AREA
Education, counselling

RESEARCHERS
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ISSUE(S)
In the 21st century, employers require their employees to be able to work in teams. In order to do this, they need to be able to collaborate as a team on their tasks. Teamwork is an important skill for building interpersonal skills for employability. According to Malaysia Higher Education Blueprint (2015), there is a mismatch in the supply and demand of graduates, with employers reporting that graduates lack the requisite knowledge, skills, and attitudes. At the same time, there does not seem to be many tools to effectively assess teamwork.
INNOVATIVE APPROACH / INTERVENTION

Collaborative Assessment Survey (CAS) instrument to measure team collaboration was designed. The assessment was developed based on a 5-point Likert-scale with total of 29 items, divided into 7 components: member characteristics, process and structure, environment, communication, purpose, process, and resources. The assessment was administered upon accomplishment of a collaborative group task using different types of collaborative tools such as discussion forum and wikis.

DESCRIPTION OF APPROACH

- Students needed to implement a collaborative group task by using online collaborative tools such as wikis and discussion forum.
- Upon completion of a collaborative group task, all the group members were asked to evaluate their members by scoring using the CAS.
- All the scores were recorded and analysed to determine each individual’s score by converting into percentages.
- Finally, each student was required to do self-assessment by reflecting on their individual performance after taking into consideration the comments from their peers.

RELATED LEARNING OUTCOMES

PO2 – Knowledge; PO5 – Communication; PO6 – Problem Solving
RELATED LEARNING OUTCOMES (LOs)

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<th>NO.</th>
<th>Case Studies</th>
<th>PO1 Knowledge</th>
<th>PO2 Practical skills</th>
<th>PO3 Social skills and responsibility</th>
<th>PO4 Ethics &amp; values</th>
<th>PO5 Communication</th>
<th>PO6 Problem-solving</th>
<th>PO7 Information management</th>
<th>PO8 Entrepreneurship</th>
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ADVANTAGES OF GROUP-BASED ASSESSMENTS

1. Group based assessment makes learning more relevant, interesting and enjoyable. Subsequently, students are encouraged to willingly put in extra effort to become deep learners and to be better at managing people. As a result, quality and balanced graduates will be produced. Potential employers will benefit from well-balanced graduates.

2. Encourages reflective practice for both students and lecturers and allow lecturers to assess attitudes, reflection, thinking processes of students and integration of complex skills.

3. Enables lecturers to monitor the development of collaborative learning over time.

4. Appropriate assessment would produce students who are competent, creative, motivated, and self-regulated.

5. Working in a group for a particular assessment promotes sharing of knowledge beyond the classroom.

6. It transforms classrooms into a rich, student-focused, and interactive knowledge environment.

7. Students are encouraged to apply proactive ways and strategies in working together.

8. Group-based assessment has good potential in empowering students to think differently, to think creatively and reflect on their own values.
LIMITATIONS OF GROUP-BASED ASSESSMENTS

1. Time management is crucial in a particular group based assessment. Timeline should be clearly communicated among group members and the lecturer.
2. Crafting effective triggers or problems for PBL might require several considerations in terms of practicality, time limit, and suitability to the project.
3. Lecturers need to be skilled in providing, encouraging and sustaining motivation and engagement.
4. There is a risk of assessment being subjective due to different students having different attitudes, beliefs and approaches in doing tasks.
5. Peer influence and friendship may affect the scoring.
6. Students may cheat and create their own ‘gang’ against other members.
7. The free-rider syndrome might affect the group dynamics and thus the assessment should be able to address this.
8. Group-based assessment can be time consuming. The groups need to be continuously monitored and provided with feedback and assistance.
9. Element of conflict within groups can affect morale and cause members to withdraw in some ways.
THINGS TO CONSIDER WHEN IMPLEMENTING GROUP-BASED ASSESSMENTS

- Explain to the groups why working in groups is worth the while and the challenges.
- Provide clear expectations for group members, by setting ground rules.
- Increase individual accountability by combining group assessments with individual assessments.
- Teach students conflict-resolution skills and reinforce them by discussing hypothetical team conflict scenarios.
- Assess group processes via regular reports, self-evaluation, peer evaluation, as well as with other external assessors.
- As the assessment method can be very fluid in nature, the students need to know that the basic rule, deadlines and expectations do not change in the middle of the semester without their consent. Changes in rules and expectations can be very disruptive as it affects their planning and their time management, as they may also be taking other courses in the same semester.
- One must distinguish individuals’ abilities from what they are able to do when working with others on the grounds that the group setting only obscures the true focus of assessment, which is the individual (Webb, 1992).
BIBLIOGRAPHY


SUMMARY

GROUP–BASED ASSESSMENT is a collaborative learning that involves group work. Assessing group product as a whole as well as individual will engage learners to actively participate in a group. The aim is to prepare learners for work life. Through this method, students are able to develop both communication and interpersonal skills. Participating in group work will help students to clearly articulate ideas while avoiding miscommunication. Collaborative learning also promotes diversity and exchange of ideas.
Chapter 4

PERFORMANCE-BASED ASSESSMENT

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Nurhanis Syazni Roslan (USM)  
Azita Laily Yusof (UITM)  
Amiza Mat Amin (UMT)  
David Yoong (UM)  
Noor Akmal Shareela Ismail (UKM)  
Nor Adila Ahmad (PSAS)
DEFINITION PERFORMANCE-BASED ASSESSMENT

PERFORMANCE–BASED ASSESSMENT

• Performance-based assessment is a form of assessment that moves away from the traditional paper-and-pencil assessment. It is based on clearly defined tasks that the students need to perform in a context that mimics the workplace (authentic). The task must be able to elicit the students’ knowledge, skills, attributes or attitudes. As the assessment of performance is subjective, a predetermined criterion (rubric) is necessary in order to guide the assessor in rating the task reliably (Hibbard, 1996).

• Performance-based assessments are useful in that they:
  o Apply knowledge and skills in the real world context.
  o Motivate students to become autonomous learners.
  o Involve creation of performance and products.
  o Stimulate soft skills upon task execution.
PRINCIPLES OF PERFORMANCE-BASED ASSESSMENT

- Complex task: Assessment should involve higher order thinking skills across all three learning domains i.e. cognitive, affective and psychomotor.
- Authentic: Assessment should mimic the real world context.
- Alignment: Assessment should relate to intended learning outcomes.
- Well-defined rubric: It is important to guide the assessors who will rate students’ performance. Additionally share the performance rubrics with the students so that they know what needs to be done to fulfil the expectations.
- Performance-based assessment can be either a process or product-oriented.
CASE STUDY
SOLO-based Task to Diagnose Adult Learners’ Statistical Literacy in the 21st Century

SUBJECT AREA
Statistical literacy

RESEARCHERS
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ISSUE
The recent previous studies revealed that statistical literacy level of Malaysian students is still unsatisfactory in general. Hence, the need for developing a sound diagnostic tool to systematically identify students’ weaknesses and strengths are crucial.

INNOVATIVE APPROACH / INTERVENTION
The SOLO (Structure of the Observed Learning Outcome) model is designed mainly to classify the quality of structure responses in a variety of disciplines from primary to tertiary education. The categorisation of structure response with increasing level of abstraction makes it suitable as a diagnostic tool. The characteristic of four levels of structure response, namely unistructural, multistructural, relational and extended abstract can be adapted to provide a useful template of generalised task that leads the adult learner from the basic skills of data retrieval to the advanced skills of critical analysis.
DESCRIPTION OF APPROACH

The bar graph above shows the public and private preschool enrolment rate from 2012 to 2015.

<table>
<thead>
<tr>
<th>Level</th>
<th>Example of Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unistructural</td>
<td>How many students enrolled in private preschool in 2012?</td>
<td>Only single relevant feature of bar graph is required to give response. The skill involved is rudimentary as students just identify the notable data points.</td>
</tr>
<tr>
<td>Multistructural</td>
<td>How does the number of enrolment of students in public preschool change from 2012 to 2015?</td>
<td>Several points of data need to be taken into consideration to give response without making a whole generalisation. The trends of data points are recognised</td>
</tr>
<tr>
<td>Relational</td>
<td>How does the relationship between the number of enrolment of students in private preschool change with the number of enrolment of students to public preschool from 2012 to 2015?</td>
<td>The information in bar graph is interrelated and integrated. Comparison needs to be made between the two data sets to establish the causality.</td>
</tr>
<tr>
<td>Extended abstract</td>
<td>“In 2020, we aim that all Malaysian children will receive their education in public preschool.” What do you think about this statement? Explain your answer.</td>
<td>The data set might be generalised in a new and more abstract situation. The data set is evaluated based on their own explanatory hypotheses and prediction to reach the logical and critical conclusion.</td>
</tr>
</tbody>
</table>
• The structure response of the four levels increases in complexity in terms of capacity of information required and relationship of information. The higher the level of structure response, the larger amount of information and the integrated of information are needed.

RELATED LEARNING OUTCOMES
PO6 – Problem Solving
CASE STUDY
Assessing Core Manipulative Skills in a Biochemistry Lab Practical Test

SUBJECT AREA
Biochemistry lab test

RESEARCHERS
Mariam Taib, Azila Adnan, Hazlina Ahamad Zakeri, Muhamad Fairus Noor Hassim, Aziz Ahmad
School of Fundamental Sciences, Universiti Malaysia Terengganu. Malaysia

ISSUE(S)
- Biochemistry course has been in the curriculum for the Bachelor of Science (Biological Science) programme in UMT since 2001. Lab practical class is one of its important components. For almost 15 years, students’ performances in the lab were assessed using their lab reports.
- This resulted in many students not knowing how to perform basic core manipulative skills in Biochemistry such as serial dilution and construction of standard curve when they undertook their final year projects (FYP).

INNOVATIVE APPROACH
To overcome this problem, and together with the enforcement of Constructive Alignment through iCGPA in 2015, the assessment was directed to performance-based, through lab practical test.
DESCRIPTION OF APPROACH

- Four tasks were given in an hour. The tasks required application of knowledge, skills and strategies for execution.
- The learning outcome measured was solely the MQF2-Technical Skills, which include P2 (Guided Response) and P3 (Mechanism). Students were assessed based on the process of completing the tasks and also the final products, through observation and product submission.
- A rubric was used, with two sub-attributes and five descriptors:

<table>
<thead>
<tr>
<th>Sub-attributes</th>
<th>Very poor</th>
<th>Poor</th>
<th>Satisfactory</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The ability to execute the task (use of appropriate equipment/instrument/procedures as instructed in the manual)</strong></td>
<td>Cannot even identify the appropriate procedures</td>
<td>Can identify but cannot use the appropriate procedures</td>
<td>Can use the appropriate procedures but with lack of confidence</td>
<td>Can use the appropriate procedures with confidence</td>
<td>Expert in using the appropriate procedures</td>
</tr>
<tr>
<td><strong>The ability to acquire/produce results/outputs (physical product/skill that is tangible)</strong></td>
<td>Fail to produce the required results/products</td>
<td>Able to produce the required results/products but with low quality/precision</td>
<td>Able to produce the required results/products with acceptable quality/precision</td>
<td>Able to produce the required results/products with good quality/precision</td>
<td>Able to produce the required results/products beyond the quality/precision required</td>
</tr>
</tbody>
</table>

Table 1: Rubric for Lab Practical Test for Biochemistry Course - Practical Skill (PLO2)

RELATED LEARNING OUTCOMES

PO2 – Practical Skills
CASE STUDY

Semi-Reality Simulated Patient (SRSP) Assessment Technique in Enhancing Students’ Learning Experience for Medical Nutrition Therapy for Picky-eater Children with Special Health Care Needs

SUBJECT AREA
Medical nutrition therapy, children

RESEARCHERS
Nur Hana Hamzaid, Roslee Rajikan, Suhaina Sulaiman, Zahara Abd Manaf
Faculty of Health Sciences, Universiti Kebangsaan Malaysia

ISSUE(S)
Case-study labs under medical nutrition therapy topics are commonly conducted through case presentation between students and the preceptor/lecturer. This method, however, is less effective when applied to children related nutrition therapy cases because no children are directly involved in the assessment process. Therefore the SRSP assessment method is aimed at increasing the effectiveness of teaching and learning assessment process focusing on children-related nutrition therapy cases.

INNOVATIVE APPROACH
The Semi-Reality Simulated Patient assessment technique (SRSP) was developed. It is an authentic assessment that combines the essence of simulated patient assessment and virtual reality assessment technique in catering to this issue while enculturing the design thinking.
DESCRIPTION OF APPROACH

The SRSP key stakeholders:
- The 'Wee-Judges'.
- Children age 3-6 with normal development.
- Normal-eater and picky-eater.

Steps:
1. Case studies were given prior to the lab.
2. The ‘wee-judges’ go for an on-site visit where students were to briefly interview about their food preferences.
3. Students cooked & presented their cooked meal to the ‘wee-judges’ based on their calculated requirement assessed by evaluator (faculty). Here the students were to convinced the ‘wee-judges’ to eat the prepared meal based on the nutritional value of the meal.

4. The SRSP assessment is competition-based.
   - The ‘wee-judges’ evaluated the food based on their preferences on the appearance (i.e., Which food I feel like eating first?) and taste (i.e., Which food taste the best?) using pictorial rubric.
   - The winner of the competition later received a token prepared by the ‘wee-judges’ (e.g. novel thank you card).

RELATED LEARNING OUTCOMES

PO4 – Ethics and Values; PO5 – Communication; PO7 – Information Management
CASE STUDY

Simplified Thematic Engagement of Professionalism Scale (STEPS): A Performance-based Assessment to Nurture Professionalism Growth in Clinical Year

SUBJECT AREA
Professionalism assessment, workplace-based assessment

RESEARCHERS
Nurhanis Syazni Roslan, Muhamad Saiful Bahri Yusoff, Ahmad Fuad Abdul Rahim
Universiti Sains Malaysia, Kubang Kerian, Malaysia

ISSUE(S)
Realising that professionalism definition is influenced by cultural aspect and social contract, School of Medical Sciences USM began the initiative of assessing professionalism by conducting a study on understanding professionalism in Malaysian context.

INNOVATIVE APPROACH / INTERVENTION
Based on the obtained data, the Simplified Thematic Engagement of Professionalism Scale (STEPS) was developed using multiple short encounters format that confers many advantages, especially in terms of sampling and promoting professionalism growth.
DESCRIPTION OF APPROACH

- STEPS assessment was conducted as workplace based or ‘in-vivo’ assessment.
- It was proposed that STEPS will be either faculty or students driven in order to make it constructive and authentic.
- Two STEPS forms were embedded in the logbook of each clinical posting to allow the assessment to be carried out in any workplace context such as bedside teaching, outpatient, tutorials or even group work.

RELATED LEARNING OUTCOMES

PO3 - Social Responsibility; PO4 - Ethics and Values; PO5 - Communication
C A S E S T U D Y
Implementation of Practical Work in Engineering Study

SUBJECT AREA
Mini project, drive test measurement.

RESEARCHERS
Ainnur Eiza Azhar, Azita Laily & Norsuzila
Faculty of Electrical Engineering, Universiti Teknologi MARA Shah Alam

ISSUE(S)
Following mini project session, students are expected to work in groups to conduct drive test measurement and prepare report.

INNOVATIVE APPROACH / INTERVENTION
The drive test uses NEMO Drive Test Tool. It is a well-known device that the telecommunication industries use to measure coverage, signal strength and interference in both indoor and outdoor environments. Students need to explore their own data collected during the drive test measurement as shown in Figure 1.1 and 1.2.

Figure 1.1: Group discussion session
Figure 1.2: Students’ activity during drive test measurement
DESCRIPTION OF APPROACH

Task:
The students were given manual featuring the methodology tasks to be performed based upon time as shown in Figure 1.3. For effectiveness of the mini project implementation, students must obtain skills not only assessed through practical skills, but also on teamwork.

![Figure 1.3: Sample of mini project manual](image)

DESCRIPTION OF APPROACH

Performance Evaluation:
- Rubrics have been developed for evaluation purpose.

RELATED LEARNING OUTCOMES

PO2 – Practical Skill; PO5 – Communication; PO6 – Problem Solving
CASE STUDY

Assessment of Practical Competency in Food Microbiology Course

SUBJECT AREA
Food microbiology, practical competency

RESEARCHERS
Amiza Mat Amin
Universiti Malaysia Terengganu, Terengganu, Malaysia

ISSUE(S)
Assessment of a practical test in food microbiology course was designed to ensure that the students are competent in performing basic food microbiological techniques including using a compound light microscope and performing aseptic techniques.

INNOVATIVE APPROACH / INTERVENTION
Once the tasks or questions for practical test were prepared, a rubric was generated to assess the students’ performance for each task. The students’ practical competency for each task was assessed by the lecturer or his assistants by observation at a designated working station.
DESCRIPTION OF APPROACH

1. Three tasks were designed and 4 stations were set up for each task.
2. The assessment must be meaningful, instructive and able to detect areas of concern.
3. Analytical rubric (Table 1 & Table 2) for each task has been designated and assessment attributes have been firstly generated, followed by attribute gradations.
4. Articulating the gradations of the rubric was quite challenging.
5. Recommended thinking of the words to create the gradations are "yes", "yes - but", "no-but", and "no".
6. Assessment was carried out by observation.
7. It was found that 97% of students were competent in practical test (obtained scores higher than 50%).

<table>
<thead>
<tr>
<th>Question 1</th>
<th>Attribute</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using a compound light microscope, please identify the bacteria on the slide given to you in terms of shape and either it is gram positive or gram negative.</td>
<td>Adjustment of the magnification of microscope by using the objective lenses from low to high magnification and use oil immersion</td>
<td>Adjustment of the magnification of microscope by using the objective lenses from low to high magnification and use oil immersion are poorly demonstrated</td>
<td>Adjustment of the magnification of microscope by using the objective lenses from low to high magnification and use oil immersion are moderately demonstrated</td>
<td>Adjustment of the magnification of microscope by using the objective lenses from low to high magnification and use oil immersion are demonstrated properly</td>
</tr>
<tr>
<td>Adjust the iris diaphragm properly and effectively</td>
<td>Adjustment of the iris diaphragm is poorly demonstrated</td>
<td>Adjustment of the iris diaphragm is performed, but not proper/effective</td>
<td>Adjustment of the iris diaphragm is demonstrated properly and effectively</td>
<td></td>
</tr>
<tr>
<td>Able to identify both the shape of microbe and its gram staining</td>
<td>Unable to identify both the shape of microbe and its gram staining</td>
<td>Able to identify either the shape of microbe or its gram staining</td>
<td>Able to identify both the shape of microbe and its gram staining</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Analytical rubric
**Question 2**
You are given a nutrient agar (NA) and a bottle of bacteria culture. Perform a correct streaking technique in order to get a single colony from the culture.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilization of inoculation loop by flaming it and it was cooled briefly before use</td>
<td>Improper sterilization of inoculation loop and it was not cooled briefly before use</td>
<td>Improper sterilization of inoculation loop or it was not cooled briefly before use</td>
<td>Proper sterilization of inoculation loop by flaming it and it was cooled briefly before use</td>
</tr>
<tr>
<td>Performed the streaking using proper aseptic technique</td>
<td>Aseptic technique was poorly demonstrated during streaking</td>
<td>Aseptic technique was partially demonstrated during streaking</td>
<td>Aseptic technique was properly demonstrated during streaking</td>
</tr>
<tr>
<td>Streaking technique was poorly demonstrated</td>
<td>Streaking technique was partially demonstrated</td>
<td>Streaking technique was properly demonstrated</td>
<td></td>
</tr>
</tbody>
</table>

**Question 3**
Perform the correct technique of sub-culturing with the broth culture given to you.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilization of inoculation loop by flaming it and cooled it briefly before use</td>
<td>Improper sterilization of inoculation loop and it was not cooled briefly before use</td>
<td>Sterilization of inoculation loop was partially done or was partially cooled briefly before use</td>
<td>Proper sterilization of inoculation loop by flaming it and cooled it briefly before use</td>
</tr>
<tr>
<td>Sub-culturing using aseptic technique</td>
<td>Aseptic technique was poorly demonstrated during sub-culturing</td>
<td>Aseptic technique was partially demonstrated during sub-culturing</td>
<td>Aseptic technique was properly demonstrated during sub-culturing</td>
</tr>
</tbody>
</table>

Table 2: Analytical rubric

**RELATED LEARNING OUTCOMES**

PO 6 – Problem Solving
CASE STUDY
Managing and Accounting for Learning Outcomes

SUBJECT AREA
Curriculum design, learning outcomes management.

RESEARCHERS
David Yoong
University of Malaya, Kuala Lumpur, Malaysia

ISSUE(S)
- Having served as a programme coordinator, I noticed that many of my colleagues had problems in preparing and aligning their students’ learning outcomes.
- Misalignment of learning outcomes causes students not to know what they are being assessed for, and how they are being assessed.

INNOVATIVE APPROACH / INTERVENTION
I developed a recursive system to help colleagues overcome alignment problems. The system has several steps.
### DESCRIPTION OF APPROACH

**Step 1: Map the assessment components.**

- The example below shows how the CLOs, PLOs, and assessment techniques align with one another in one of my courses.
- Information is disseminated to students at the beginning of course.
- It is best to provide students with best examples, together with rubrics.

<table>
<thead>
<tr>
<th>Research proposal submission (40 marks - 30%) – Deadline: Week 15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COURSE LEARNING OUTCOMES</strong></td>
</tr>
<tr>
<td>Students should be able to prepare systematic research proposals (CLO) - Total: 30/30%</td>
</tr>
<tr>
<td>Purpose: Research proposals are important to secure grants and to solicit approval from an ethics body among others. Learning how to prepare research proposals will improve the candidate's success rate of proposal acceptance.</td>
</tr>
<tr>
<td><strong>TASK INSTRUCTIONS</strong></td>
</tr>
<tr>
<td>- Students are required to prepare a systematic written research proposal</td>
</tr>
<tr>
<td>- Length: 2,500-3,000 words</td>
</tr>
<tr>
<td>- The research proposal should be an original piece of research involving primary data collection</td>
</tr>
<tr>
<td>- The proposal must have i) a working title, ii) cogent problem statements with identifiable gaps, iii) a clear research purpose and questions, iv) a review of relevant literature, v) relevant methods and a discussion of methodology, vi) references.</td>
</tr>
<tr>
<td>- State your name, ID number and assignment title</td>
</tr>
<tr>
<td><strong>ASSESSMENT CRITERIA</strong></td>
</tr>
<tr>
<td>- Provide related problem statements based on real social issues related to the research's objectives (PO7) (5 marks)</td>
</tr>
<tr>
<td>- Develop appropriate research questions (PO3) (5 marks)</td>
</tr>
<tr>
<td>- Review related literature (PO7) (10 marks)</td>
</tr>
<tr>
<td>- Plan your research methods for data collection and analysis and consider their advantages and disadvantages (PO6) (15 marks)</td>
</tr>
<tr>
<td>- Communicate appropriately with clarity (PO5) (5 marks)</td>
</tr>
</tbody>
</table>

**Important timeline of assessment**

**What students must do**

**How students are assessed**

**What students are supposed to learn**

**Why is this CLO is important**
Step 2: Develop a learning infrastructure around the assessments and carry out assessments.

- Activities that stimulate learning e.g. group discussions, problem solving tasks and debates are carried out in class and in online environments.

Step 3: Inform students of their scores timely.

- It is imperative that students receive feedback, as soon as possible (at most 2 weeks after date of assessment).
- In my class, I provide quantitative and qualitative feedback.

Step 4: Analyse the scores to see if the problem lies with the curriculum execution.

- Granular data from Step 2 is aggregated using spreadsheet to answer these questions:
  - Has the course been successful in terms of having students passing it, and at what level?
  - What components need more attention?
- Feedback from stakeholders (industry members, students) is obtained to see how the assessments can be further improved.
- After post-mortem analysis, the information is used to feed into Step 1 again.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

Medical Biochemistry: Enhancing Achievement in Learning Outcomes through Performance-based Assessments

SUBJECT AREA
Formative assessment, interactive learning

RESEARCHERS
Noor Akmal Shareela Ismail
Pusat Perubatan Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

ISSUE(S)
Conventional teaching and learning method in Medical Biochemistry was reported to be less effective in achieving its objectives, therefore interactive learning serves as a nuanced approach to enhance the learning outcomes among students.

INNOVATIVE APPROACH / INTERVENTION
• We are testing students’ comprehension of Medical Biochemistry through various online platforms such as: online quizzes (Kahoot! and iFolio), Objective Structured Practical Examination (OSPE)-based practical session, team-based learning, Educreations and Padlet.
• Subsequently, the learning outcomes are holistically assessed through performance-based assessments.
**DESCRIPTION OF APPROACH**

**Step 1:** Translate real-case scenario into interactive learning.

![Diagram showing interactive learning approach with materials uploaded online via iFolio, including meet-the-expert, case-based learning, online quizzes, task-based learning, OSPE-based practical, digital canvas, interactive whiteboards, and feedback from lecturer.]

**Step 2:** Learning materials were uploaded on the in-house online platform iFolio. These consisted of videos, reading materials and notes.
Step 3: An individual mind map must be constructed by each student and will be uploaded on Padlet.

Step 4: During interactive session, each group will complete tasks through online quizzes during class or OSPE-based practical.

Step 5: Feedback from the lecturers to end the loop of interactive learning. Continuous feedback is important for improvement in order to produce graduates who are reflective, critical thinkers, good team players and assertive communicators.

RELATED LEARNING OUTCOMES
PO5 – Communication; PO6 – Problem Solving; PO7 – Information Management.
CASE STUDY

Applying Performance-based Assessment on Ordinary Differential Equation using Augmented Reality (I-DE-AR)

SUBJECT AREA
Ordinary differential equation, augmented reality

RESEARCHERS
Nor Adila binti Ahmad, Siti Janariah binti Jantan, Azia Idayu binti Awang
Politeknik Sultan Azlan Shah, Perak, Malaysia

ISSUE(S)
- Students who learn ordinary differential equations are dependent on memorised procedures to solve problems, follow a similar pattern of learning in Pre-calculus Mathematics, and follow model procedures given in the textbook or by a teacher.
- Students seem quite unable to relate their well-developed manipulative skills to realistic context problems to the real-world situations.

INNOVATIVE APPROACH / INTERVENTION
We developed a tool to expose the students to previous knowledge, hint to solve and the example to find solution, named (I-DE-AR).
DESCRIPTION OF APPROACH

**Step 1:** Expose students to theory of ordinary differential equation (ODE) using module and I-DE-AR.

- Students will be taught the theory and types of first order differential equation by using module I-DE-AR.
- A few simple questions will be given to strengthen the theory.

**Step 2:** Students will be given task to solve engineering application concerning differential equations.

- Students will be given authentic tasks that relate to real life and job scope.
- The tasks include group discussion, presenting and applying the theory in engineering.
- Students will be exposed to a Rubric Table to make them aware of the ability needed in order to achieve a good score.

**Step 3:** Interpreting Students’ Performance by using rubric that matches with the LOD.

- In time the discussion was held, lecturers will observe their verbal communication, writing communication, leadership and teamwork by using rubric table as shown on Table 1 and Table 2.
<table>
<thead>
<tr>
<th>NO</th>
<th>CRITERIA (Leadership)</th>
<th>0</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7-8</th>
<th>9-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kepercayaan dan keyakinan diri (L1)</td>
<td>Tidak memuaskan</td>
<td>Memerlukan penambahbaikan</td>
<td>Memuaskan</td>
<td>Sederhana</td>
<td>Baik</td>
<td>Cemerlang</td>
</tr>
<tr>
<td></td>
<td>Kepercayaan dan keyakinan diri (L1)</td>
<td>Tidak mempunyai keyakinan diri yang sangat rendah dalam membuat pertimbangan terhadap semua analisis penyelesaian</td>
<td>Mempunyai keyakinan diri yang rendah dalam membuat pertimbangan terhadap semua analisis penyelesaian</td>
<td>Mempunyai keyakinan diri yang sederhana dalam membuat pertimbangan terhadap semua analisis penyelesaian</td>
<td>Mempunyai keyakinan diri yang tinggi dalam membuat pertimbangan terhadap semua analisis penyelesaian</td>
<td>Mempunyai keyakinan diri yang sangat tinggi dalam membuat pertimbangan terhadap semua analisis penyelesaian</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kepercayaan dan keyakinan diri (L1)</td>
<td>Tidak mempunyai langsung rasa percaya terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
<td>Mempunyai rasa percaya yang sangat rendah terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
<td>Mempunyai rasa percaya yang rendah terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
<td>Mempunyai rasa percaya yang sederhana terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
<td>Mempunyai rasa percaya yang tinggi terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
<td>Mempunyai rasa percaya yang sangat tinggi terhadap idea sendiri dan orang lain semasa analisis penyelesaian</td>
</tr>
<tr>
<td></td>
<td>Kepercayaan dan keyakinan diri (L1)</td>
<td>Tidak menghargai langsung kemampuan diri sendiri dan orang lain semasa sesi perbincangan kumpulan</td>
<td>Memandang rendah kemampuan diri sendiri dan orang lain semasa sesi perbincangan kumpulan</td>
<td>Memandang kemampuan diri sendiri dan orang lain semasa sesi perbincangan kumpulan</td>
<td>Memandang tinggi kemampuan diri sendiri dan orang lain semasa sesi perbincangan kumpulan</td>
<td>Memandang sangat tinggi kemampuan diri sendiri dan orang lain semasa sesi perbincangan kumpulan</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Kejujuran (L2)</td>
<td>Tidak mempunyai langsung sifat kejujuran semasa sesi perbincangan kumpulan</td>
<td>Memiliki sifat kejujuran yang sangat rendah semasa sesi perbincangan kumpulan</td>
<td>Memiliki sifat kejujuran yang rendah semasa sesi perbincangan kumpulan</td>
<td>Memiliki sifat kejujuran yang sederhana semasa sesi perbincangan kumpulan</td>
<td>Memiliki sifat kejujuran yang tinggi semasa sesi perbincangan kumpulan</td>
<td>Memiliki sifat kejujuran yang sangat tinggi semasa sesi perbincangan kumpulan</td>
</tr>
<tr>
<td>3</td>
<td>Dorongan (L3)</td>
<td>Tidak mempunyai motivasi dan dorongan pada diri sendiri</td>
<td>Memiliki motivasi dan dorongan yang sangat rendah dalam menyelesaikan analisis dalam soalan</td>
<td>Memiliki motivasi dan dorongan yang rendah dalam menyelesaikan analisis dalam soalan</td>
<td>Memiliki motivasi dan dorongan yang sederhana dalam menyelesaikan analisis dalam soalan</td>
<td>Memiliki motivasi dan dorongan yang tinggi dalam menyelesaikan analisis dalam soalan</td>
<td>Memiliki motivasi dan dorongan yang sangat tinggi dalam menyelesaikan analisis dalam soalan</td>
</tr>
</tbody>
</table>

Table 1
## RELATED LEARNING OUTCOMES

PO5 – Communication
RELATED LEARNING OUTCOMES (LOs)

http://jpt.mohe.gov.my/images/yootheme/icgpa.png
<table>
<thead>
<tr>
<th>NO.</th>
<th>Case Studies</th>
<th>PO1 Knowledge</th>
<th>PO2 Practical skills</th>
<th>PO3 Social skills and responsibility</th>
<th>PO4 Ethics &amp; values</th>
<th>PO5 Communication</th>
<th>PO6 Problem-solving</th>
<th>PO7 Information management</th>
<th>PO8 Entrepreneurship</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SOLO-Based Task to Diagnose Adult Learners’ Statistical Literacy in the 21st Century</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Assessing Core Manipulative Skills in a Biochemistry Lab Practical Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Simplified Thematic Engagement of Professionalism Scale (STEPS): A Performance-based Assessment to Nurture Professionalism Growth in Clinical Year</td>
<td></td>
<td></td>
<td>/</td>
<td>/</td>
<td></td>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Implementation of Practical Work in Engineering Study</td>
<td></td>
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<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Assessment of Practical Competency in Food Microbiology Course</td>
<td></td>
<td></td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Managing and Accounting for Learning Outcomes</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Medical Biochemistry: Enhancing Achievement in Learning Outcomes through Performance-based Assessments</td>
<td></td>
<td></td>
<td>/</td>
<td>/</td>
<td></td>
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ADVANTAGES OF PERFORMANCE-BASED ASSESSMENTS

The advantages of performance-based assessment towards education and community:

General Advantages:

1. The early exposure to the real-world problem (authenticity) may allow student to be more prepared in stepping into the working world.
2. May provide student with clearer view of assessed components.
3. Can enhance student in active learning.
4. Encourage the development and enhancement of soft skills upon task execution.
5. Can promote student creativity.
6. Can be less subjective when rubrics are used.
7. May stimulate ‘thinking on their feet’ skill among students.
8. May allow faculty to have a clearer picture of student’s understanding.
9. May be useful to faculty in assessing the process of knowledge application into practice.
10. Can serve as an on-site feedback to students.
A. In Semi-Reality Simulated Patient (SRSP) assessment techniques,

- The students are able to effectively apply the knowledge learned in lab settings, while acquiring the skills needed in becoming a professional health practitioner. With the guide from preceptor/lecturer, techniques in conveying theory into practice were also established.
- This SRSP assessment technique is suitable in any discipline that involves the participation of children. This technique is good in giving opportunities to the students to practice their knowledge, communication skill and professionalism. Students also enjoy this SRSP assessment technique.

B. In Innovative Differential Equation using Augmented Reality (AR),

- Performance-based assessment can be applied in various teaching and learning session as it can be applied using many other AR based application that can be downloaded through play store and apple store. The possibilities are limitless as it is up the educator to apply the concept in their lectures to make it interesting and facilitate their students.
- Innovative Differential Equation using Augmented Reality(AR) will produce ‘print AR’ which can be used by publishers to supplement and update information in textbooks or in other print materials (Hawkinson, 2014).
C. In Simplified Thematic Engagement of Professionalism Scale (STEPS),

- Formative component has been designed to ease effective feedback practice using feed up (Where am I going?) – feedback (How am I going?) – feed forward (Where to next?) framework (Hattie & Timperley, 2007). This has improved the gaps in feedback practice where almost 90% of the students obtained meaningful feedback for their professionalism growth. STEPS has also served as a censoring tool for early detection of students with professionalism problem.

- STEPS format can be replicated in other academic disciplines where assessment constructs are multi-dimensional and students’ assessment in real-life situations is very important such as in nursing and engineering.

- STEPS has the potential to be used as 360 degree assessment where different assessors (including patient, peers and allied health members) can be engaged to assess and give feedback on students’ professionalism.

D. Structure of Observed Learning Outcome (SOLO)-based task

- Is structured in hierarchical manner, in order to help educators to identify the specific statistic concept that the student has not mastered. SOLO also helps in detecting possible causes of the students’ problems in mastering statistical concepts.

- The SOLO-based task allows the educators to administer it in different formats, either in computer-based, written test or interviews.

- The SOLO-based task not only provides useful information enabling the educators and students to have a better understanding of their statistical literacy (e.g. point analysis, trend analysis and message analysis), it also leads the students to easily detect their strengths and weaknesses.
E. Interactive Learning,

- comprises of 1) Meet-the-expert, 2) Online quizzes, 3) Team-based learning, 4) Objective Structured Practical Examination (OSPE) based practical, 5) Digital canvas (padlet) and 6) Interactive whiteboards
- can be applied in various academic disciplines depending on the number of content experts. If the faculty only has just ONE content expert, team-based learning and online quizzes can be fully utilised as a tool in interactive learning (Ismail, 2016). Feedback loop is crucial in facilitating learning. OSPE-based practical is more applicable in replacing wet laboratory where students can perform both practical and application sessions without going into the lab (Ismail et al., 2017).
- Parallel to the fourth industrial revolution that relates with new and emerging technology such as machine learning, 3D printing, big data and intelligent robotics will definitely influence the future jobs (Hellebrand, 2017). This is parallel to the principles in Education 4.0, where with good and innovative education; we can produce graduates with higher marketability.
LIMITATIONS OF PERFORMANCE-BASED ASSESSMENTS

1. Some minor obstacles hinder performance based assessment. These include creating an awareness of the benefits of performance based assessment among the general academic community, and finding ways to simplify the process of conceptualising the management of learning outcomes. These are solvable issues that would take some time and funding to address.

2. Clear classification of response when implementing in qualitative procedures, such as interview.

3. Provide the clear and detailed descriptions of the structural organisation of statistics knowledge at each level.

4. Students were found not assertive enough to participate in the discussion. This is because they found lack of information / reputable resources. Therefore, during the first interactive session, they are taught how to find information only pertinent to the learning outcomes.

5. Time consuming.

6. Not suitable for big classes.

7. Dealing with children is sometimes quite challenging. They are unpredictable especially in giving the needed cooperation. Therefore, interview session with the children or the parents prior to the practical session is helpful in getting the most information about the children’s preferences. Using of simple words helped in getting the children to participate in the assessment session.
THINGS TO CONSIDER WHEN IMPLEMENTING PERFORMANCE-BASED ASSESSMENTS

Before the course begins:

- Determine the course learning outcomes (CLOs) and programme learning outcomes (PLOs) in a course before the course begins.
- Use the feedback from the curriculum review to improve areas of assessments.
- The assessment should be as authentic as possible (i.e., based on real-world issues).
- Ensure that appropriate assessment techniques are used to capture learning data.
- Align CLOs and PLOs with the assessment techniques, ensure that all declared CLOs and PLOs are accounted for i.e. the distribution of scores are clearly stated.
- Consult the MQF for appropriate action verbs in the CLOs and PLOs.
- Ensure that assessments are not over-burdening students, so take into account of the Student Learning Time and Credit Hours, and do not over-declare CLOs and PLOs.
- Develop detailed and specific rubrics.
- Develop the learning infrastructure around the assessments.
During the course:

- Provide students with as much detail as possible of the assessment expectations at the start of the course.
- Provide best examples/model answers.
- Provide assessment rubrics to students.
- Consider having industry members and/or clients as assessors for related CLOs and PLOs for authentic assessment.
- Set the stage for stimulating learning and conduct lots of students-centred hands-on activities.
- Ensure that assessments are spaced out appropriately throughout the course to avoid causing unnecessary stress on students.
- Ensure that students get quality feedback – preferably both quantitative and qualitative feedback.
- Gather responses from students and clarify any query they may have; this will enhance their learning experience.

At the end of the course:

- Aggregate the scores and map the scores to the respective CLOs and PLOs; this helps in accounting for iCGPA.
- Gather feedback from industry members and students.
- Determine areas for improvement in the assessments and curriculum.
- Use the information to improve the assessment and curriculum.
BIBLIOGRAPHY


SUMMARY

PERFORMANCE–BASED ASSESSMENT allows students to apply their knowledge in a real-world context. It is performance target where the intended learning outcomes are according to genres of performance. Task assigned allows student to demonstrate their skills as well as strategies. This help develop the holistic students and employable graduates.

Three elements instructors should consider in implementing this assessment are before the course, during the course and after the course. The following are the three element instructors should consider for a successful assessment:

- Before the course
  - The instructor should determine the CLO to ensure the student will not be burdened by the task.

- During the course
  - Provide in depth details and guidelines to stimulate the learning process.

- End of the course
  - Retrieve feedback from industry or community related to student performance.
Chapter 5

PORTFOLIO-BASED ASSESSMENT

Zahiruddin Fitri Abu Hassan (UM)
Joharry Othman (IIUM)
Sheila Cheng (AEU)
Syamsul Nor Azlan Mohamad (UITM)
D’oria Islamiah Rosli (UTHM)
Angela Rumina Leo (MSU)
DEFINITION OF PORTFOLIO-BASED ASSESSMENT

PORTFOLIO-BASED ASSESSMENT

- A portfolio is “a purposeful collection of student work that exhibits the student’s efforts, progress and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for judging merit and evidence of student self-reflection” (Paulson, Paulson, & Meyer, 1991, p. 60).

- A portfolio can be viewed from two perspectives: as product and as process. “As a product, it holds the work records and documents a learner has produced during a course or program, and represents an edited collection of their learning achievements. As a process-oriented tool, it enables learners to monitor their own learning systematically, by reflecting upon their learning experience” (Teaching @UNSW, 2017).

OPERATIONALIZED DEFINITION

PORTFOLIO-BASED ASSESSMENT

A collection of purposeful, cumulative and progressive learner’s work: digital or non-digital, over a period of time through flexible learning (formal, informal and non-formal learning) by reflecting and ensuring that learning has taken place.
PRINCIPLES OF PORTFOLIO-BASED ASSESSMENT

Principle #1: Learning Outcomes
Students are guided by clearly articulated individual, course, programmatic, or institutional outcomes in their collection, selection, reflection upon, and presentation of “artefacts” (various electronic documents) in the e-portfolio.

Principle #2: Digital Environments
Students develop digital literacies in composing, collaborating, and record-keeping, and consider the rhetorical implications of circulating e-portfolios to both public and private audiences.

Principle #3: Virtual Identities
Students represent themselves through personalised information that conveys a web-savvy and deliberately constructed ethos for various uses of the e-portfolio. Students manage those identities by having control over artifacts and who sees them through privacy and access tools.

Principle #4: Authentic Audiences
Students engage in audience analysis of whom intend to read their portfolio/e-portfolios, not only to accommodate faculty, but also employers, issuers of credentials, family, friends, and other readers. Students coordinate access to their e-portfolios with faculty, programs, the institution, and other readers.
**Principle #5: Reflection and E-portfolio Pedagogy**
Students create “reflective artefacts” in which they identify and evaluate the different kinds of learning that their e-portfolios represent. In particular, students may explain how various forms of instructive feedback (from faculty, Writing Centers, peers, and other readers) have influenced the composition and revision of their various e-portfolio artefacts, making teaching methods and learning contexts more transparent to their readers.

**Principle #6: Integration and Curriculum Connections**
Students link artefacts in a flexible structure that synthesises diverse evidence and ideas, invites linear or non-linear ways to read and evaluate e-portfolios, and makes connections to portfolio-related evidences and relationships distributed across the Internet. Students may therefore use linking to represent how e-portfolio artefacts inter-relate with other courses in the larger context of whole-curriculum learning.

**Principle #7: Stakeholders’ Responsibilities**
Students receive the necessary support from faculty, program directors, and university administrators who not only use e-portfolios for assessment purposes and program improvement, but also keep informed about what resources are essential for implementing, maintaining, and accessing e-portfolios.

**Principle #8: Lifelong Learning**
Students are able to adapt their e-portfolios for various purposes/uses beyond their academic careers, enabling their various readers, in turn, to track their learning longitudinally.
CASE STUDY

An Alternative Way in Assessing Portfolios-based on Saaty’s Analytic Hierarchy Process (AHP)

SUBJECT AREA
Management Sciences

RESEARCHERS
Sheila Cheng, Heng Loke Siow
Asia e University

ISSUE
This study proposes a qualitative approach in assessing experiential portfolios.

INNOVATIVE APPROACH / INTERVENTION

- AHP is a systematic tool to analyse decision-making problems based on Mathematics and Psychology. It provides a rational framework, relates elements to overall goals, and helps decision makers find the best decision that suits their goals.
**DESCRIPTION OF APPROACH**

- Adapting from the AHP’s nine-point scale pairwise comparison matrix, the portfolio which may consist of only or combination of formal, informal and non-formal learning is considered as one factor while the benchmark against the CLOs, the other factor, a ten-point scale is developed to help the Assessor to evaluate the degree of similarity and accuracy of portfolio to the CLOs.

<table>
<thead>
<tr>
<th>Saaty’s pairwise comparison matrix</th>
<th>Proposed Portfolio Assessment</th>
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<tbody>
<tr>
<td>Scale value Sij relating i to j</td>
<td>Meaning</td>
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<tr>
<td>1</td>
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<td>7</td>
<td>SAME</td>
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<td>9</td>
<td>EXACTLY</td>
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Note: Where i and j are two different factors. E.g. two different job offers. Scale values 2, 4, 6 and 8 lie midway between the definitions for their nearest values given above.

**RELATED LEARNING OUTCOMES**

PO1- Knowledge; PO2- Practical Skills; PO5 - Communication; PO6 – Problem Solving; PO7 – Information Management
CASE STUDY
Implementation of Patchwork Assessment for Learning

SUBJECT AREA
Education & Social Sciences

RESEARCHER
Angela Rumina Leo
Management & Science University

ISSUE(S)
- Student’s ownership of their own learning.
- The need to redefine the nature of assessments in higher education based on further realisation that the world is looking forward to future-ready graduates with rich employability skills.

INNOVATIVE APPROACH
The “patchwork”, an assessment approach based on the four dimensions of productive pedagogy; “intellectual quality”, “relevance”, “social support”, and recognition of “difference”.

DESCRIPTION OF APPROACH
Winter (2003) stated, “the essence of a patchwork is that it consists of a variety of small sections, each of which is complete in itself, and that the overall unity of these component sections, planned in advance, is finalized retrospectively, when they are ‘stitched together’.” Refer to Figure 1.
The patchwork assessment consists of three integrated parts; namely academic literacy, feedback, and reflection.

In patchwork assessments, academic literacies are exercised and assessed through completion of a variety of small task segments, varied in style and genre.

Feedback, on the other hand, serves as a conversation that tracks the process of improved comprehension over time.

Reflection is a final retrospective commentary, written as a result of self-evaluation of the tasks and analysis of the peer feedback through critical reflexivity; in addition to the reviewed and edited assignments before submission.

Figure 1: Social & Reflective Layer of Patchwork.

RELATED LEARNING OUTCOMES
PO2 – Practical Skills; PO3 – Social Skills and Responsibility; PO5 – Communication; PO6 – Problem Solving; PO7 – Information Management.
CASE STUDY
Multi-dimensional Assessment Design for Undergraduate Building Pathology Course

SUBJECT AREA
Building Pathology

RESEARCHER
Zahiruddin Fitri Abu Hassan
University of Malaya

ISSUE
- Challenges in getting the students to connect prior knowledge from previous courses with the current module.
- Building students’ portfolio beyond the text-based output into video presentation that best demonstrate the aspects of knowledge the students need to build.

INNOVATIVE APPROACH / INTERVENTION
- Designing learning experience for students to build up communication skills alongside the cognitive and psychomotor aspect of the course using various assessment methods.
- The use of video portfolio to capture different angles of defect manifestation in the built environment.
DESCRIPTION OF APPROACH

- Students are informed and introduced to the educational principles behind learning activities new to them. This is to reduce their anxiety level and assure students that the activities were designed to achieve the specific course outcomes.

- One of the assessment activities is the defect portfolio video presentation. The purpose of using video for this assessment is because building defect and degradation often manifest itself through a multitude of different causes, and the effects are sometimes different depending on the context or situation.

- A 3-dimensional analysis is always needed, i.e. appreciation of the design, the construction method and the context of the degradation mechanism.

- The analysis is to be presented by the students using the format of a video. The advantage of using videos is that students can show the defects from different angles and tell a history of the defects being presented.

- The information gathered and interpreted from a visual inspection is the main skill a professional building surveyor possesses. It is crucial that students can develop this skill very early on.

- Video also allows the student to practice their communication skills and the video portfolio is a ready-made e-Portfolio item through which the student can market themselves to potential employers.

RELATED LEARNING OUTCOMES

PO1- Knowledge; PO2- Practical Skills; PO5 - Communication; PO6 – Problem Solving; PO7 – Information Management
RELATED LEARNING OUTCOMES (LOs)

http://jpt.mohe.gov.my/images/yootheme/icgpa.png
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<th>NO.</th>
<th>Case Studies</th>
<th>PO1 Knowledge</th>
<th>PO2 Practical skills</th>
<th>PO3 Social skills and responsibility</th>
<th>PO4 Ethics &amp; values</th>
<th>PO5 Communication</th>
<th>PO6 Problem-solving</th>
<th>PO7 Information management</th>
<th>PO8 Entrepreneurship</th>
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ADVANTAGES OF PORTFOLIO-BASED ASSESSMENTS

1. It is generic and structured in nature and could be applied to any specialisation of disciplines.
2. By utilising a collection of evidence in learning, portfolios assist learners to self-evaluate while stimulating their meanings and experiences.
3. The individual portfolio may be presented as proof of learning and as reference for future employment. With evidence of recognitions and achievements carried along by graduates, these would facilitate stakeholders in hiring potential employees.
4. e-Portfolio assessment encourages active and formative as well as summative learning as it is also adapted to online modes of interaction and collaboration.
5. Students become not only engaged builders of new knowledge but also involve in becoming active lifelong learners, thus taking control of their own learning.
LIMITATIONS OF PORTFOLIO-BASED ASSESSMENTS

1. There is a need to have access to a computer with adequate software.
2. Before the implementation of e-portfolio, the students will need to be empowered with online skills to help them manage the resources.
3. Motivation has to be sustained despite distractions from the computing environment as well as the surrounding.
4. Readiness to engage in online conversation as a method of learning can be a challenge to students.
5. Awareness and realization of the students as to the importance of having an online portfolio; ensuring success have to be retained for a considerable amount of time.
THINGS TO CONSIDER WHEN IMPLEMENTING PORTFOLIO-BASED ASSESSMENTS

Learning Objective:
Using the Bloom, Simpson, Krathwohl’s Affective Domain Taxonomy as a guide to measure learning outcome, evaluators test the learners according to the set of objectives that can measure their knowledge and ability.

Problem-Focused:
Plan authentic questions based on real-world situations. Usually in project-based activities, the facilitator will design a question based on a problem in the real environment. Thus, some important aspects related to the outcome such as problem triggers, learning context, prior knowledge and skills that enable the learners to gain experience in project-based learning should be taken into consideration.

Hands-on activities:
Students are directly involved in the planning process and activities that comprises students’ analytical skills, creativity, critical thinking, problem-solving and ICT skills due to prior task or assignment. These skills help learners to experience raised self-reflection, stimulated creativity, improved active learning, increased peer communication and improvised facilitator-student relations.

Reflect and Assess:
Allow students to communicate with peers to reflect on their learning. In addition, reflecting and assessing help learners improve the quality of the tasks, raising interaction and exchange among them, and further reflecting on their own learning. This learning effect is valuable for the academic growth and progress.
**Decision-Making:**
Allow students to apply decision-making based on findings. The tasks were formulated to test and evaluate the learners in decision making with several or numerous findings around them. The complexity of the activity allows the learners to produce different solutions and assumptions that restrict them to make a solid decision. This process involves active exploration to identify and construct new knowledge.

**Leadership and teamwork skill:**
Work as a unit and accomplish the task given by showing their capability as a leader and members. The best criterion for project-based activity is the adaptation of social learning concept that can encourage the learners to develop their roles as a leader and a teammate in a group. It requires an agreed upon decision and full support from all parties concerned; from the top management to the support staff. It needs to be made known to all relevant parties.


Samples of E-Portfolio being used in the classroom:

https://pathbrite.com/drjoe/folio
https://pathbrite.com/course/PxgT-PMaPhgP/edp3501
https://pathbrite.com/course/PxgT-PMoPP6P/edp3501
https://pathbrite.com/course/PxgT-PMiPvRP/edp3501k
https://pathbrite.com/course/PxgT-PMIPfLT/edp4390k
https://pathbrite.com/course/PxgT-PMCPbTP/edp1101k
SUMMARY

It is hoped that having a clear purpose and realisation of the importance and benefits of a portfolio; electronic or otherwise, institutions of higher learning in Malaysia may seriously adopt and use it for the betterment and improvement of student learning, impactful instructor instruction, and program effectiveness. E-Portfolio is considered performance based assessment while it falls under the scope of alternative assessment. And when ‘real life’ tasks are suitably incorporated in it, then this constitutes authentic assessment as well.

It is high time that Malaysian educators and academics alike embrace this challenging shift toward fulfilling MOE’s aspiration to prepare today’s graduates with the necessary 21st century skills. Once this kind of assessment is successfully introduced and practiced as part of the “assessment for learning” methodology, then our tertiary education will have ample evidence to assure that both ‘assessment of learning’ (AoL) and also ‘assessment for learning’ (AfL) is being practiced. This in turn would make it possible and easier to achieve “constructive alignment” at higher levels of cognitive achievement and standards.

The emphasis on producing more creatively, critically, and innovatively thinking graduates would be better realised, not just for the sake of all stakeholders, but also for potential employers who are demanding quality graduates. Thus this noble pursuit is the way forward to redesigning assessment for improved and holistic learning.
Chapter 6
TECHNOLOGY-BASED ASSESSMENT

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Rozieela Mohamed Sharib (PSAS)
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DEFINITION OF TECHNOLOGY-BASED ASSESSMENT

TECHNOLOGY–BASED ASSESSMENT

- Technology-based assessment is adaptation of online and technology-based testing that is engaging, interactive, and better reflects the world students live in every day (Pearson Education, 2017).

- The term ‘Technology-Based Assessment’ (TBA) as used in this book refers to the use of electronic – both offline and online systems, applications and software to:
  - Assess students’ progress, work and performance.
  - Assess students individually and in groups.
  - Enable peer and self-assessment.
  - Enable real-time and automated feedback.
  - Improve the efficiency, variety, flexibility and quality of implementing assessment.
PRINCIPLES OF TECHNOLOGY-BASED ASSESSMENT

- TBA involves the use of various digital devices such as desktops, laptops, portable and/or smart communication devices including smart mobile phones, iPads or through the use of electronic gaming devices.

- For educators, TBA can be utilised in:
  - Constructing their assessment tasks.
  - Delivering assessment tasks to relevant students.
  - Recording and providing feedback and grades to students.
  - Recognising students’ understanding and abilities on tested materials.

- For students, TBA is helpful in:
  - Analysing students’ responses.
  - Providing feedback on the quality and relevance of their responses.

- TBA can use a multitude of formats, including:
  - Text documents and/or portable document formats.
  - Multimedia formats such as sound, video or images.
  - It can also involve complex simulations or games.

- TBA can also be undertaken by students individually, in small and/or large groups.

- TBA can be conducted in synchronous or asynchronous environments depending on the purposes and needs.
**CASE STUDY**

**QR Code Manual Laboratory Card (MLC)**

**SUBJECT AREA**
Engineering; Science; Labwork

**RESEARCHERS**
Hisyamsani Idris and Normawati Abdul Rahman
*Politeknik Sultan Azlan Shah, Perak, Malaysia*

**ISSUE**
The use of QR Code has actually been widely used in various fields. However, QR Code is less used in educational institution in the country. Polytechnic itself aims to produce not only skilful k-workers but also those competent in using technology.

**INNOVATIVE APPROACH / INTERVENTION**
The QR Code MLC is purposely invented for improving the conventional style of manual lab sheet as continuous assessment for the engineering science course DBS 1012 in polytechnics. This incorporates the latest technology in teaching approach (m-learning) that encourage student to actively participate during laboratory work session. The learning materials embedded in QR code followed the sequence of laboratory process step by step in QR codes or all in one sheet. The innovation enables a fast, suitable, effective, and user-friendly mode for student to access and utilise mobile learning in conducting laboratory work using QR Code.
DESCRIPTION OF APPROACH

- Students are required to install QR code scanner and Google Sheet apps in their mobile devices before laboratory session.

- Students need to download a set of QR code that represents one lab work sheet, via e-learning portal (CIDOS), WhatsApp group or any other file sharing platform.

- All group members have their own task which involves using phone as a QR code display, scanning the QR code, using the laboratory equipment and viewing information such as instructions, diagrams, tables, tutorials and demonstration videos. Students will record the experimental result online.

- Real-time data monitoring is done by lecturer to ensure the results reflect the correct experimental procedures.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

MyFIGO - My Fun and Interesting Google Classroom

SUBJECT AREA
Engineering; Science; Labwork

RESEARCHERS
Roziela Mohamed Sharib
Politeknik Sultan Azlan Shah, Behrang

ISSUE(S)
- Traditional methods result in less active participation from the students.
- On-paper continuous assessments such as quizzes, tests and theoretical exercises need to be marked manually which delay the process of evaluating the progress and growth of the students in the course.

INNOVATIVE APPROACH
MyFIGo is applied to DBS1012 Engineering course in Politeknik Sultan Azlan Shah. It is an integrated application that utilises Google Classroom as the main platform and developed using various web 2.0 tools. This approach allows educators and students to reflect and create a continuous improvement plan from any unsatisfactory result.
DESCRIPTION OF APPROACH

- In MyFIGo, lecturers will upload their lecture notes in advance by using:
  - Google Slides for slide presentations,
  - YouTube for videos, and
  - PDF files for handouts.
- Forums and group discussions were created in Padlet. Quizzes, tests and reinforcement exercises were generated using BookWidget, which is the extension application in Google Classroom. These questions are in the form of multiple choices and structures.
- Lab works will be given to students in groups via Google Classroom with the Google Docs lab instructions as their template.
- Students will submit their reports that consisted of findings and data via the Google Docs provided for grading.
- Report grading will be done according to a laboratory rubric with the help of Doctopus and Goobric.
- In some tasks, students will create videos using PowToon instead of reports. The submission and grading processes are similar to the lab work reports.

RELATED LEARNING OUTCOMES

PO5 – Communication; PO7 – Information Management
CASE STUDY

The Assessment of E-Project-based Learning in Developing Skill-based Courses for Massive Open Online Course: "MOOC in MOOC" technique

SUBJECT AREA
Poster production

RESEARCHERS
Anuar bin Mohd Yusof
Universiti Malaysia Kelantan

ISSUE
Limited facilities and trainers at the faculty to conduct and to assess studio-based learning in large numbers of students.

INNOVATIVE APPROACH / INTERVENTION
- Gamification is used to increase learner’s motivation to complete the tasks given. This method emphasises instructor’s systematic design that highlights students’ level of knowledge, the concept of persuasion and appreciation (reward).

- Based on constructive philosophy by Dewey and Vygotsky, student-centred learning approaches in blended-learning were introduced. Through eProjBL Model, the course has been developed through KLU strategy (Know-Learn-Use) on each module with the challenges in MOOC. Assessment of each module was created based on gamification approach, which helps the learners to maintain engagement.
DESCRIPTION OF APPROACH

- The Course Assessment was developed according to the gamification arranged through the framework of the eProjBL model. This model is used as a base for this course. Poster production skill course by using Adobe Photoshop was used as evaluation, which included three learning outcomes as indicators. This course was designed and became a "Learning Object" for the other courses in the Faculty of Creative Technology and Heritage such as Computers and Art course and Computer Graphics 2D course as a pioneer for the “MOOC in MOOC” technique.

- The activities in the course were designed by integrating Web 2.0 tools such as Powtoon, Biteable, GoAnimate, Coggle, Popplet, Canva, and Google apps. The creativity of learners can be highlighted.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

Easy Marking with ForAllRubrics

SUBJECT AREA
Introduction to Research Methodology

RESEARCHERS
Annafatmawaty Ismail
Politeknik Ungku Omar, Ipoh

ISSUE(S)
- The growing number of students in most classrooms in polytechnics and limited time factor make conducting an effective assessment using the traditional rubric challenging.

INNOVATIVE APPROACH
- Easy marking with ForAllRubrics.
- It can be accessed from multiple devices (such as laptops, tables and smartphones).
- It helps the educator to evaluate students’ performance (such as analysing the trends) and provides real-time feedback.
- It has a mobile version that allows educator to work offline, allowing it to be used without internet connection.
- By only clicking on the sync menu (whenever you are able to connect to the internet), the work will be updated.
- Thus, it makes the process of constructing and marking an assessment easier and interesting.
DESCRIPTION OF APPROACH

- In order to create the rubrics online, educator should register ForAllRubrics account via the website.
- Once logged in, there will be a dashboard where educator can create or upload the rubrics and the name of students.
- Educator can provide a real-time feedback to the students through email.
- A variety of report can be produced whether by class or individuals.

RELATED LEARNING OUTCOMES
PO5 – Communication; PO7 – Information Management
CASE STUDY
Continuous Assessments through eLecture Exercises and eQuizzes

SUBJECT AREA
Entrepreneurial Skills

RESEARCHERS
Teh Ya Yee
Sunway College, Kuala Lumpur

ISSUE
The former Entrepreneurial Skills (ES) assessments were not effective. The three contributing factors identified:

- Results of MPU subjects are given in a separate slip which does not affect students’ final grade and does not appear in their transcripts.
- Students generally are not highly motivated to attend classes. They put minimum effort in completing their assessment.
- Students, particularly Gen Z, may prefer more contemporary assessment formats.

INNOVATIVE APPROACH / INTERVENTION
To encourage learning, conventional assessment approach was changed to the more contemporary mix mode to include eLecture exercises and eQuizzes.
DESCRIPTION OF APPROACH

- 50% of the assessment requirements were transferred to the eAssessment format, comprising four eLectures and three eQuizzes.
- Assessments were conducted fully on an online platform.
- This mixed method of combining class assessments as well as online work was able to meet the different learning styles of the students.

<table>
<thead>
<tr>
<th>eLecture Exercises</th>
<th>eQuizzes</th>
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<tbody>
<tr>
<td>Using Edpuzzle, questions were inserted in the videos to test on students comprehension</td>
<td>Using Google Form, Multiple Choice Questions (MCQs) are made accessible online for 24 hours for that week’s lessons</td>
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<tr>
<td>Students answer the questions posted to them intermittently as they watch the videos</td>
<td>Student can complete the assessment at the time of their convenience</td>
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<tr>
<td>Skipping or fast forwarding the video is not permitted to ensure full delivery of the information</td>
<td>Tests students comprehension of the previously learnt content by saving F2F contact time and with lesser anxiety</td>
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one open ended question is included in each eLecture to evaluate students comprehension of the content and ensure individual responses are received.

Two sets of questions for each eQuiz were developed as a control measure to encourage students own attempt with little or no reference from their peers.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

Task Completion using VoiceThread to Enhance Language Skills in Multimedia English Classroom

SUBJECT AREA
English Communication

RESEARCHERS
Mahani Mohamad
Universiti Sultan Zainal Abidin

ISSUE(S)
In traditional classrooms, assessment of verbal communication has been a task based exercise. Utilising digital storytelling, the group of students are given a task completion by developing a tall story based on the prompt given via VoiceThread.

INNOVATIVE APPROACH
- The course synopsis states that students’ language skills will be enhanced using relevant technology. One way to create this awareness is by introducing different mobile applications and web 2.0 educational tools that can be used to help enhance the four language skills: reading, writing, listening and speaking. VoiceThread is one of the web-based applications introduced.

- Project based assessment is designed as a way to familiarise the students to the tools thus creating awareness by completing a set of task individually and collaboratively in a group.
DESCRIPTION OF APPROACH

- Learners are required to find images using Google or Flickr, then select and download relevant and interrelated public domain photos.
- Create storyline based on those photos using PowerPoint.
- Upload Digital Storytelling Project and narrate story using proper voicing on VoiceThread.
- Set to view only option.
- Provide references to the source of the media used in the project.

RELATED LEARNING OUTCOMES

PO5 – Communication
CASE STUDY

Reflection in a Blog: Scaffolding to Formative and Summative Assessment

SUBJECT AREA
Educational Technology

RESEARCHERS
Rosseni Din, Nabilah Othman, Nor Laila Che Murad, Huzaimi Alias, Umi Azmah Nasran & Mohd Khalid Nasir

Universiti Kebangsaan Malaysia

ISSUE
There is a need for methods to encourage students to apply the knowledge learnt.

INNOVATIVE APPROACH / INTERVENTION
Every week, students will complete a task. Task accomplishment is spelled out by uploading the finished product onto the “Peer Content” area and reflecting on the process in their individual blogs. Incomplete task can be uploaded in the Facebook Group for a more private consultation between the group and facilitators. Facilitators and peers can comment on learners’ progress via MOOC, Facebook, YouTube or the WordPress blogging platform for reflections.
DESCRIPTION OF APPROACH

- Learners produce a report of their overall processes which includes describing the roles of individuals, time taken to complete a task, results of the assignment, etc.

- Learners are required to describe and express their emotions during face-to-face (F2F) class, individual task, group project and discussions within their group.

- Learners submit their reflections by assigning different mood.

- Learners report their experiences before and after the task has been completed. This will allow learners to measure their own performance on whether they are able to complete the task successfully.

- In the end of the assessment, learners are expected to produce an action plan and immediate effect in relation to the new knowledge or information gained. Learners share their thought on whether they would use information in the near future.

RELATED LEARNING OUTCOMES

PO5 – Communication
C A S E S T U D Y

Formative to Summative in One Go: Getting to the Final Destiny with EduTechnovation Day

SUBJECT AREA
Video production

RESEARCHERS
Rosseni Din, Nabilah Othman, Nor Laila Che Murad, Huzaimi Alias, Umi Azmah Nasran & Mohd Khalid Nasir
Universiti Kebangsaan Malaysia

ISSUE(S)
There is a need for methods to motivate and reward learners to perform certain desired behaviours.

INNOVATIVE APPROACH
Gamification is applying the science and psychology of gaming in a non-game context. This study use the concept of gamification to complete learners project from (i) proposal, (ii) storyline, (iii) storyboard, (iv) video drafts and summarise them into a completed video with poster and oral presentations to be competed in the EduTechnovation Day.
DESCRIPTION OF APPROACH

- In this course we want learners to gain knowledge, values and transferable skills at each stage of the projects and contribute learning objects from the final product to the online community sharing space as useful shared-knowledge.
- We offer badges for those who contribute a certain number of posts; or they may work to level up to the next reward that provides recognition among other learners for their accomplished task.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

Redesigning Formative Assessments for Land Law using Augmented Reality

SUBJECT AREA
Law

RESEARCHERS
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Taylor’s Law School, Faculty of Business and Law, Taylor’s University Lakeside Campus, Subang Jaya, Malaysia

ISSUE
A qualitative survey was conducted in exploring students’ experience in learning UK Land Law. The results of the survey have shown that students need to ‘see’ the law instead of ‘hear’ the law in order to be able to grasp a solid understanding of UK land law.

INNOVATIVE APPROACH / INTERVENTION
The assessment for UK Land Law was altered to include Augmented Reality (AR) as part of the formative assessment. By incorporating AR learning in the classroom, it can make the students to become more curious, engaged and interested to learn land law. Students were also provided with an opportunity to familiarise with the use of technology in learning land law.
DESCRIPTION OF APPROACH

- Augmented reality was done outside the classroom. The students were advised upfront that there were three (3) pit stops that they need to uncover throughout their journey in learning Land Law. At the first pit stop, the assessment requires the students to inquire with the staff at the Academic Office for the first clue on the topic of ‘Easement’. Once they have asked the correct staff at the Academic Office, they will receive an envelope containing issue on the topic of ‘Easement’.

In order for the students to resolve the issue on ‘Easements’, they need to direct themselves to the second pit stop. The second instruction will require the students to use AR mobile platform (namely ‘Layar’) by scanning the poster on ‘Easement’. Once they have viewed the two-dimensional videos that appeared on their mobile phones, they will be able to advise the client and provide a summary of their understanding on the law pertaining to Easement.

RELATED LEARNING OUTCOMES

PO6 – Problem Solving
CASE STUDY

Wiki as an Online Reflection Tool in Pre-service Teachers’ Teaching Practicum

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<td>Self-reflection; Wiki</td>
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RESEARCHERS

Farrah Dina Yusop & Siti Mariam Muhammad Abdul Basar

Department of Curriculum and Instructional Technology, Faculty of Education, University of Malaya

ISSUE

Pre-service teachers undergoing teaching practicum are required to write weekly progress, which will be shared with their course instructor. However, time constraint often limits the face-to-face meetings between pre-service teachers and their course instructor, in which feedback will be given based on their reflections.

INNOVATIVE APPROACH / INTERVENTION

In this exploratory case study, wiki was utilised as a self-reflection tool and lesson plan repository for six pre-service teachers who were undergoing their teaching practicum assessment. Through Wiki, the students were able to write their weekly progresses and also interacted with their peers and course instructor directly in the Wiki. The course instructor would also leave immediate feedback and monitor students’ progress without having to wait until the end of the practicum period.
DESCRIPTION OF APPROACH

- Students were instructed to upload their daily lesson plans detailing the activities conducted with their students to the course wiki.
  - These included learning objectives, content to be delivered, methods of assessments, and teaching and learning materials such as videos, notes, and worksheets.
- They were also required to post their weekly self-reflections to the class wiki as a platform to share their thoughts and concerns, as well as to get support from supervisor and peers.
- Figure 1 displays a print screen of one student’s self-reflection in the wiki.

RELATED LEARNING OUTCOMES

PO5 – Communication; PO7 – Information Management.
C A S E S T U D Y

Authentic Service-learning as a Means to Nurture Civic-minded Professionals

SUBJECT AREA
Instructional design

RESEARCHERS
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ISSUE
Service-learning has been highlighted as an effective teaching approach in educating students as agents of change (Furco & Billig, 2002; Stein, Isaacs & Andrews, 2004). Hence, authentic service-learning approach should be practiced in university.

INNOVATIVE APPROACH / INTERVENTION
This case study applied authentic service-learning approach embedded in a series of postgraduate instructional design and technology (IDT) course as part of the Master in Instructional Technology program at a Malaysian research intensive university.
DESCRIPTION OF APPROACH

- Following the Civic-Minded Instructional Designers (CMID) framework (Yusop & Correia, 2012), students in this course were required to develop appropriate and relevant instructional solutions to real-life social problems experienced by socially and/or economically disadvantaged populations such as women, children, elderly and poor people based on their IDT knowledge and skills. Some examples of projects they worked on were:
  - educating teenagers on protecting themselves against becoming sexual victims;
  - developing an educational kit to educate highly-stressed teachers on stress management; and
  - creating electronic audio books for blind college students.

- At the end of the course, students were required to present their instructional solutions to a group of panel consisting of other students and members from industry.

RELATED LEARNING OUTCOMES

PO3 Social skills and responsibility; PO4 Ethics & values; PO5 – Communication; PO6 – Problem solving.
RELATED LEARNING OUTCOMES (LOs)

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<th>NO.</th>
<th>Case Studies</th>
<th>PO1 Knowledge</th>
<th>PO2 Practical skills</th>
<th>PO3 Social skills and responsibility</th>
<th>PO4 Ethics &amp; values</th>
<th>PO5 Communication</th>
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<th>PO7 Information management</th>
<th>PO8 Entrepreneurship</th>
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<td>QR Code Manual Laboratory (MLC)</td>
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<td>MyFIGo – My Fun Interesting Google Classroom</td>
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<td>The Assessment of E-project-based Learning in Developing Skill-based Courses for Massive Open Online Course: “MOOC in MOOC” Technique</td>
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ADVANTAGES OF TECHNOLOGY-BASED ASSESSMENTS

- TBA improves students’ **digital literacy and engagement** especially through formative assessments and adaptive feedback.
- Some TBA systems support adaptive assessments, which results in efficient **adaptive learning** environment for students.
- Allows teachers to provide **real-time feedback** to students.
- Personalised feedback can be delivered to the individual student, which results in more **personalised learning**.
- TBA system records students’ assessment practices, thus allowing **learning analytics** to be conducted.
- TBA improves **efficiency** in delivering, marking, managing assessment processes.
- Gives better **flexibility** as assessments can be conducted at anytime and anywhere.
- TBA system is **time saving** for lecturers as feedbacks can be automated.

Figure 1: Advantages of applying Technology-Based Assessments
LIMITATIONS OF TECHNOLOGY-BASED ASSESSMENTS

- Online TBA systems are highly dependent on internet availability, connection and speed.
- TBA systems require basic digital literacies and competencies on the lecturers’ part.
- Commercial TBA systems will involve some costs to the institutions.
- TBA systems need to be compatible with other digital devices used by lecturers and students including desktops, smartphones or tabs.
THINGS TO CONSIDER WHEN IMPLEMENTING TECHNOLOGY-BASED ASSESSMENTS

- **Curriculum** should be aligned with relevant learning outcomes.
- **Activities** should vary, focusing both on lower and higher order thinking skills.
- **Communication** of digital assessment should be clear, concise and free from ambiguity.
- **Marking** schemes should be weighted more on the student’s learning process and output, and less on the use of technology.
- **Feedback** should utilise appropriate technology to ensure that it is timely and constructive.
- **Accessibility** for special needs should be addressed.
- Educator’s **digital literacy** is critical for success.


Gurhan Durak, E.Emre Ozkeskin, Murat Ataizi. (2016). QR Codes in education and communication. Turkish Online Journal of Distance Education, 17(2).


SUMMARY

In brief, technology-based assessment is to incorporate electronic systems and software in formal education. It is used to assess and evaluate the progress of student. This assessment provides opportunity for the young people to take on new participatory and collaborative roles in learning online and outside the classroom.

However, there are several challenges in implementing technology-based assessments including internet access, competency of the educator, cost management and device compatibility.

The following are several components to be considered in overcoming these challenges:

- It is important for the top management of a university to provide support in terms of providing facilities for both the student and instructor.
- Workshops and trainings are required to ensure the instructor competence in dealing with digital technology and devices.
- Even though digital technology is used in daily life, students may have difficulties in relating technology with learning and critical thinking. Thus, instructor should demonstrate and guide students to adapt technology with learning.
Chapter 7

CONCLUSION

Amira Firdaus (UM)
CONCLUSION

This alternative assessment quick guide for higher education presented five forms and modalities that higher education instructors may use to assess students’ subject matter learning and soft skills development: peer and self-assessment, group-based assessment, performance-based assessment, portfolio-based assessment, and technology-based assessment.

The three dozen (36) case studies illustrating the five (5) different types of assessment featured in this guide come with both advantages and limitations. Each assessment type and every assessment design offered specific advantages over others. While each approach and design presents its own set of limitations -- some being more difficult to implement, some being less robust -- a common set of advantages of the five approaches we featured are that students are often active participants in the assessment process, and not just passive “recipients” of instructions to complete, or mere “subjects” upon whom a test is administered. Each of the assessment approaches featured earlier involves active participation by the student. Active participation is an essential element of student-centered learning and contributes to the development of “holistic, balanced, and entrepreneurial” graduates, the kind of graduates that the Malaysia Education Blueprint (Higher Education) 2015-2025 aspires for the nation.

Designing assessment to facilitate holistic learning among students requires creativity and effort on the part of instructors. University lecturers with backgrounds in instructional design and others who have taken the time to learn strategies for assessment may find it slightly easier than many who have neither the training nor the exposure.

It is our hope that the case studies featured in each chapter have provided readers with quick and easy reference to inspire and instruct those of us with less knowledge and experience in alternative forms of assessment.

Novices will be able to thumb through the case studies and their related learning outcomes to find one design, or several designs to use as a template or guide to design their own alternative assessment. More experienced instructors will hopefully be able
to use these case studies as building blocks or inspirations for designing assessments that fully utilise the advantages of the different types of assessment we featured, while addressing and overcoming the limitations we noted.

At this juncture, it is necessary for us to add a caveat to the heavily “alternative” and “holistic” foci of this guide book. The current emphasis on new innovative forms of assessment is not a call to abandon “traditional” or “conventional” ways of training and testing students – drilling exercises, written assignments, quizzes and examinations, and so forth. These assessment methods that many of us experienced as students and may still be used as instructors are still useful and relevant.

When designing assessment, we need to be mindful of the goal(s) of a particular assessment (e.g. learning outcome) – whether it is to develop a particular soft skill; evaluate student mastery of topic; scaffold student’s learning; provide opportunities to practice a skill; deepen knowledge of a topic, and so forth. It is also imperative that we consider the usefulness and the feasibility of the things we ask students to do in the assessment. Do they have the skills, required to perform all the tasks we set up. Have we trained them sufficiently? Did we provide the needed resources, or taught students how to obtain those resources?

These questions are important not only for alternative forms of assessment but also conventional assessments.

Indeed, several case studies in this guidebook integrate or combine such traditional methods for evaluation with novel forms of assessment. When we practice alternative forms of assessments or create new innovative ways to assess learning, we do so not merely to do “something different”. Indeed, the pursuit of change for change itself should not be an ultimate goal. When designing an assessment event, it does not matter so much whether a type of assessment is old and supposedly “outdated”, or alternative and new. What is important is the learning and soft skills that students gain from doing or participating in an assessment event. These student outcomes are what define holistic education. And alternative assessments – whether designed as novel and new assessment events, or enhancing traditional methods to be more interactive – are essential for realising holistic learning among our students.
Redesigning Assessment for Holistic Learning: A Quick Guide For Higher Education

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