



**Real Application of
Transformative Approaches for**

Teaching and Learning in the 21st Century

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Special Dedication

This book is dedicated to UNIMAS academicians who work hard in conducting the best teaching and learning experience. This book is hoped to be an inspiration to educators on how to implement the teaching and learning process more effectively.

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Preface

“It’s not just learning that’s important. It’s learning what to do with what you learn and learning why you learn things that matter.” -Norton Juster

The Real Application of Transformative Approaches for Teaching and Learning in the 21st Century book was produced to appreciate the transformative work of lecturers in teaching and learning. This book is expected to serve as a guide to other lecturers in helping them to improve their teaching approach, delivery, and assessment of their courses. Lecturers can also use this book to develop their ideas and creativity in designing teaching and learning according to current needs and align with the learning outcomes of the course.

Global changes in the twenty-first century have altered the landscape of teaching and learning, particularly in delivery methods, approaches, and assessments. This is due to the fact that the student body is made up of generation Z, who have different styles of learning than that of the lecturers. Conventional methods used by lecturers are no longer an option for today’s students. Therefore, lecturers must transform their teaching and learning in order to be relevant to today’s students.

The combination of transformative approaches introduced becomes the strength of this book's content. Authors combine diverse approaches, delivery, and assessment in teaching to ensure the effectiveness of teaching to students. Moreover, the collaborative approach used provides an alternative for lecturers to minimize the burden on students for courses taken. This approach has the potential to have a greater impact, particularly in terms of student understanding of learning.

The element of creativity incorporated is also a strength of this book. Authors explain some terms and concepts using diagrams and figures to help the reader understand. The steps and procedures for carrying out teaching and transformative approaches are stated in a systematic manner to help the reader understand what is being conveyed.

The book also includes writers from various backgrounds. This distinguishes it as a unique and comprehensive manuscript. Readers are guided through conceptual and practical understanding of teaching and learning methods. The author's presentation of basic concepts and applications can help the reader understand knowledge more deeply and broadly.

Crafting a learning environment where students are able to explore and understand how the physical world works, and to connect complex scientific concepts to their daily lives is vital. It also includes building students' confidence in their ability to solve challenging problems and empowering them to build a better future for themselves and others. CTS is one of a better way of learning that will prepare students towards focusing on being very collaborative, self-motivated and self-directed all the time staying true to the lifelong learning values, which are imperative to carve a better future for the students in their field of choice.

The next project is related to the environmental issues relating to solid waste, wastewater, and hazardous waste viewed in the context of their treatments. This course has been implementing service learning (SULAM) as a part of an immersive learning approach since Semester 2, 2017/2018. In the previous years, i.e. 2017/2018, and 2018/2019, the

course assessment included either a final examination (40%, session 2017/2018), or a mid-term examination (30%, session 2018/2019). Although SULAM implementation in this course has generally improved the CLO achievement since 2017/2018, the pen and paper examination has resulted in some students not achieving the intended CLOs. Instructors were not sure on the effectiveness of examination in creating a deep learning experience for students.

Therefore, in semester 2, 2019/2020, mid-term examination was replaced with case-study analysis to (1) encourage higher order thinking skills among students and (2) cultivate the sense of commitment and responsibility among students to find innovative solutions towards waste management issues. In addition, students' e- SULAM projects as well as group discussion and engagement with target community were implemented on online platforms. Students' reflection on their e-SULAM projects was recorded on their e-portfolio. Implementation of immersive learning through blended learning in this course has resulted in improved CLO achievement as compared to the past two years. Students' reflection on their learning experience in this course implied the effectiveness of immersive learning (blended learning) approach in this course.

Besides that, the project involved transforming the typical class lecture into an interactive scientific communication environment. Students were exposed to the real scientific communication via workshop-style delivery, project-oriented problem-based learning (PoPBL) on proposal writing projects, and brainstorming/discussion activities during weekly meetings. The initiative eliminated the traditional lecture and end-of-semester assignment practices.

Another project is MATHX Project, a new project-based learning instrument that allows digital students to work collaboratively, purposely implemented to develop teamwork and student's management skills. Students translated acquired knowledge to applications and STEM projects. The integration of digital technology used in this project helps students create meaningful and enjoyable learning experiences in Mathematics.

The following project is related to the assessment in learning. In order to improve learning via assessment conduct, assessment must be objective, significant, and magnitude. OSPE has/have been adapted and implemented for Biology students in Centre for Pre-University Studies to assess know-what and know-how practical competencies following the objective and structured manner with direct observation of the students' performance. The assessment provides meaningful learning experience to the students as it can assess all three domains (cognitive, affective, and psychomotor).

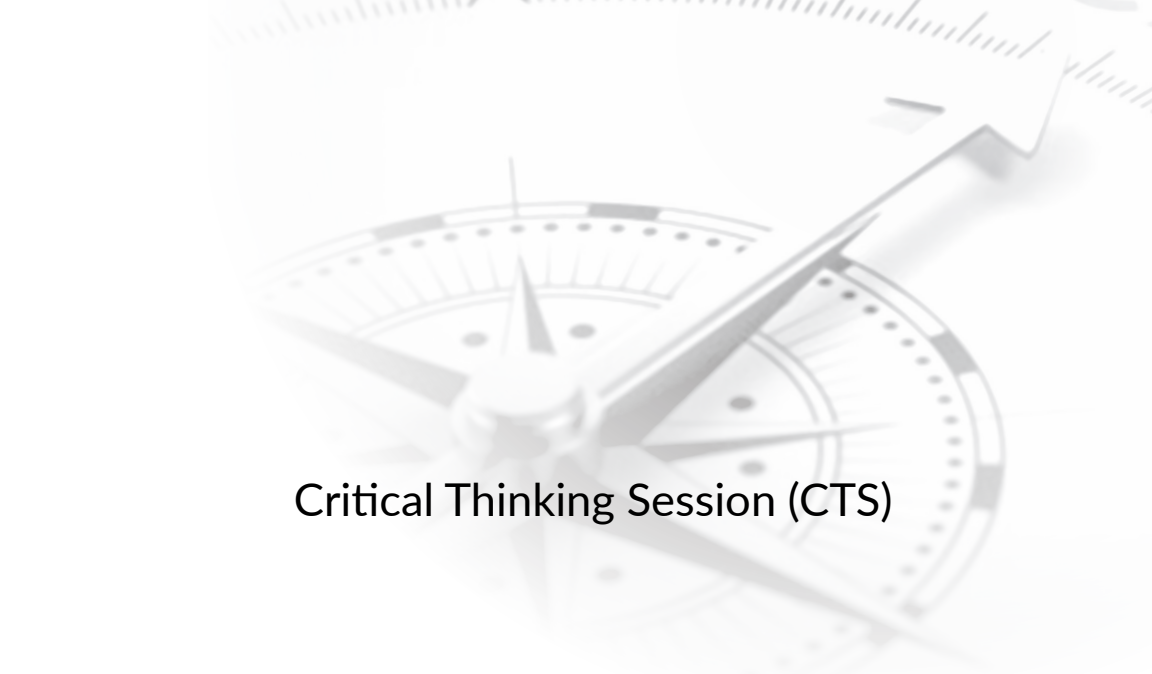
Furthermore, the enriching immersive learning experience during movement control order (MCO) was possible through blended learning substitution method. Finally, one project is related to social media and animation software offering several attractive features that may overcome the limitations of the existing educational portals. The team introduced the use of YouTube, Instagram, and Doodly as supplementary platforms for teaching Environmental Biotechnology in Semester 2 2019/2020 which resulted in excellent academic performance and positive feedbacks from the students.

Finally, this book discussed also describe the course MDP30609 Community Medicine and Public Health posting, the assessment has been modified by adopting the Alternative Assessment method. The Alternative Assessment is regarded as comprehensive, where it assesses the candidates' ability to integrate writing task and performance, divergent thinking in solving problems and enhancement of meaning skills.

Acknowledgement

First of all, we are very grateful to the Deputy Chancellor Prof Datuk Dr Mohamad Kadim bin Suaidi and Deputy Vice Chancellor (Academic and International) Professor Dr Ahmad Hata bin Rasit for their support and opportunity in producing this book. This gratitude also goes to the Director of CALM, Dr Kartini binti Abd Ghani for her encouragement throughout the journey of realizing this book. We would also like to extend our acknowledgments to the Deputy Directors (Teaching Advancement), (Learning Technology), Coordinators and all administrative staffs in CALM for the support.

Thanks to all award recipients who have contributed to the chapters of the book. They are Associate Professor Dr Cheah Whye Lian, Dr Kuryati binti Kipli, Dr Melody Kimi, Mohamad Faizuan bin Mat, Abdul Halim bin Hashim, Dr Chung Hung Hui, Dr Norazlina binti Bateni, Ahmad Alif bin Kamal, Dr Yvonne Michelle Campbell, Nor Hayati binti Jaya, Dr Rafeah Wahi, Professor Dr Zainab binti Ngaini, Norhunaini binti Mohd Shaifullah, Rohaiza binti Daud, Associate Professor Dr Afzan binti Ahmad Zaini, and Dr Nurashikin binti Suhaili. Not to forget to everyone who have been involved directly or indirectly in producing this book, our deepest appreciation goes to all of you.



Critical Thinking Session (CTS)

Nor Hayati Jaya, Nur Rasfina Mahyan,
Nor Amalina Ahmad, Dzetty Soraya Abdul Aziz

Summary/Synopsis of Project/Initiative

CTS in Physics course provides quantitative and analytic skills needed for analysing data and solving problems in the sciences area. It involves crafting a learning environment where students can explore on their own and understand how the physical world works, and to connect complex scientific concepts to their daily lives. This activity requires students to work as a team.

Group work can be more effective than lecturing in some contexts because students work harder and are able to understand the concepts in greater detail (Carlsmith & Cooper, 2002). It also includes building students' confidence in their ability to solve challenging problems and empowering them to build a better future for themselves and others. CTS is one of the better ways of learning that will prepare students towards focusing on being highly collaborative, self-motivated and self-directed at all times and staying true to the lifelong learning values, which are imperative to carve a better future for the students in their field of choice.

Project Rationale

Most of the current assessment is exam-oriented which focuses more on memorization and lack of soft skill such as critical thinking and problem-solving skill (Synder & Synder, 2008). This new assessment will focus on how the student construct their own knowledge and develop the critical and analytical thinking, as well as problem-solving skill in a small group. CTS can train students into becoming a self-directed person.

Philosophy of Teaching and Learning

CTS is used as one of the assessment items in the Physics course. It is a teaching method in which complex real-world problems are used to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. CTS as a group activity helped to develop criticality of learners and the students may be better able to integrate basic science knowledge into the solutions (Savin-Baden, 2003). CTS also helps to develop students' inquiring ability in the learning process and stimulates them to acquire knowledge through engagement in a real problem. CTS is also able to further promote the students not as receivers of information, but as learners that can construct their knowledge through collaborative learning among group members and come upon an agreement of understanding of the problem.

Approach

From the CTS project, students must discuss the solution only with their own group members and submit an essay writing. They will also provide an infographic based on their finding for a particular trigger (problem statement). Their understanding, analytical skills and problem-solving skill will be transformed into digital form which require them to reconstruct the original idea.

a) ESSAY WRITING SUBMISSION

- Students will be working in groups to complete this task. Group members are predetermined by the course coordinator.
- Each group will be assigned with ONE (1) trigger. Students will be given ONE (1) set of question based on the assigned trigger in eLEAP.
- Students MUST discuss the solution only with their own group members and submit an ESSAY .
- For the submission part, students must follow a set of format, as stated below.
 1. Title page: The title page should contain:
 - a. Trigger's title
 - b. Group number
 - c. Group members with matric numbers
 2. Font size: Use 'Times New Roman' with size of 12 for the text and 14 for headings.
 3. Paragraph: 1.5 space for all the essay paragraphs.
 4. Number of paragraphs: One paragraph for one question. Please rewrite the questions before answering each one.
 5. Number of pages: Minimum 2 pages, maximum 3 pages
 6. Reference: Provide at least four (4) references in APA format.
 7. The documentation must be submitted in one PDF file. Any appropriate diagram/picture to support the explanation is allowed.

b) INFOGRAPHIC SUBMISSION

- Students will be working in the same group to complete this task and are required to create an infographic to explain the concepts related to the assigned trigger.
- The objective is to convey complex information and visualize ideas in a manner that is easily understood and can be quickly consumed by the readers.
- Students are required to create the infographic by using any one of these free online infographic makers (Piktochart, Canva or Venngage).
- The content of the infographic will be based on the specific instructions given by the person in charge for the particular trigger.

Students' Engagement/Involvement

Through CTS session, the students actively discussed within their group on the problem given and are able to understand and apply the concept of physics to solve the problem within the time provided. During the presentation in class and also video presentation, they are very enthusiastic in sharing their solution and were also able to demonstrate the physics concept for the given problem.

Students engaged in immersive learning

Since the students are given the triggers two weeks before the presentation, the students have enough time to discuss all the triggers with their own group members. From the discussion, students have improved their performance in terms of knowledge acquisition. Students who participated in the CTS not only enriched and expanded their knowledge, but also achieved a higher level of motivation than the control group. CTS involves active engagement of students and places students in realistic, problem-solving environments that serve

to make connections between the classroom and real-life experiences. These activities are designed to promote a deep level of understanding of the content that is meaningful to the learner and encourage high collaboration between the students.

Improvement Project/Initiative in future

In the future, it is suggested that the lecturer requests for progress report from the group that should be supported by evidence. Students should report individually on how the group is working together, including the contributions of each of the group members. Also, students should additionally provide what they could have contributed so that the group will be able to function even more effectively.

Related Learning Outcome Clusters MQF 2.0

Cluster 2

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The highest appreciation is expressed to the Centre of Pre-University Studies, especially the Director, AP DR Muna Binti Sabri and the Deputy Director, AP DR Ruhana Binti Hassan for giving us the opportunity to carry out this assessment at the Pre-University level. Many thanks to the members of the team who are very committed in ensuring that this activity can run smoothly. Also, thank you to all parties involved directly and indirectly throughout this project.

Keywords

Critical thinking session, collaborative learning, self-directed

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