Real Application of Transformative Approaches for

Teaching and Learning in the 21st Century

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UNIVERSITI MALAYSIA SARAWAK

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.

Transformative Teaching *via* Workshop Based Approach in Scientific Communication

Zainab Ngaini, Rafeah Wahi

Summary/Synopsis of Project/Initiative

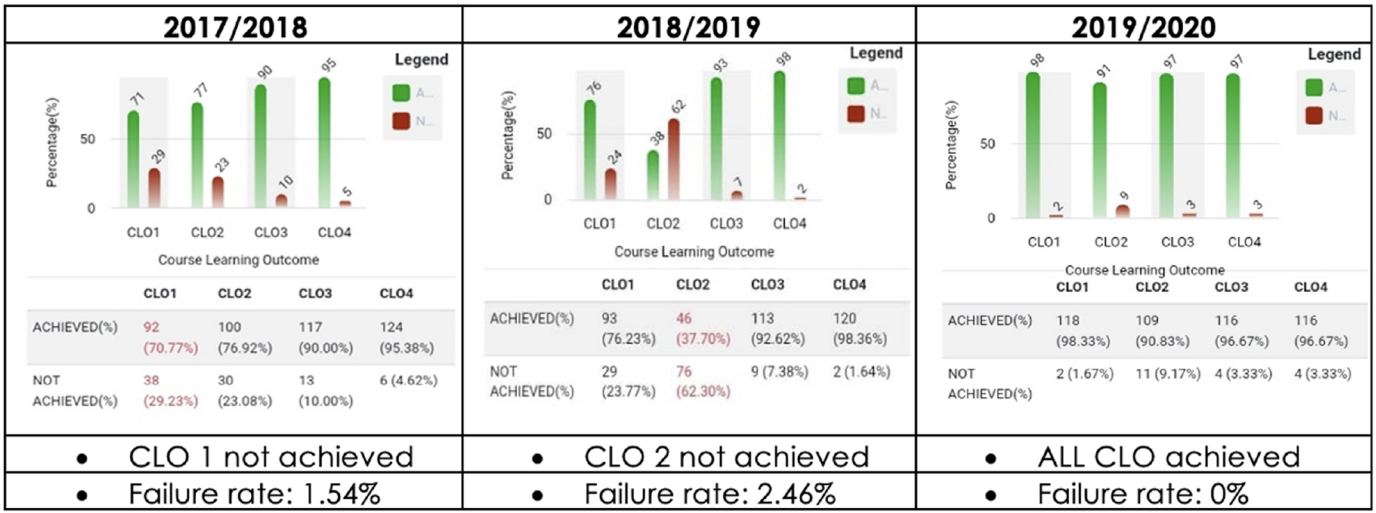
The project was designed based on the Course Learning Outcomes (CLO) analysis (2017-2018) and feedbacks from Final Year Project (FYP) supervisors on weak research proposal writing skills of FYP students. The initiatives involved transforming the typical class lecture into an interactive scientific communication session. Students were exposed to real scientific communication via workshop-style delivery and project-oriented problem-based learning (PoPBL) on proposal writing projects as well as brainstorming/discussion activities during weekly meetings. The initiative is eliminating the traditional lecture and end-of-semester assignment practices. The course delivery was designed by conducting three workshops namely 1-Research Proposal Writing, 2-Research Methodology & Ethics, and 3-Effective Research Presentation. The feedbacks from the students after each workshop was overwhelming. Peer group brainstorming and discussion were conducted in the respective weekly classes, applying the concepts and tips delivered during the workshops. Students' progress on research proposal write-up was assessed in stages throughout the course to provide immediate feedback for continuous improvement by students. Instructors' feedback

was discussed in groups to encourage students to learn from their peers. The final proposal and poster presentation were evaluated after workshop 3, where the students presented their proposals effectively. The course delivery style has remarkably improved the CLO achievements as compared to the past 2-year CLO achievements. Lots of positive feedback were received from students through the course evaluation survey and student's final reflection on their learning.

Project Rationale

The project is proposed based on the previous two years' CLO analysis for 2017/2018 and 2018/2019 where a one-time assessment of proposal writing submitted at the end of the semester as an assignment was used (20%). This has caused a lack of immediate feedback for continuous improvement by students. The previous class was delivered via a traditional lecture style. The course learning outcomes (CLO) achievement for the past two years showed that at least one of the CLOs was not achieved and there were students failing this course (Table 1). The critical issues were also observed during their final year project courses, where the students' reported struggles in scientific writing by supervisors and are not able to write and present their final year project research proposals and report efficiently.

Table 1 - Comparison of the CLO achievement for 2017/2018, 2018/2019 and 2019/2020



2017/2018	2018/2019	2019/2020
CLO1 CLO2 CLO3 CLO4 ACHIEVED(%) 92 (70.77%) 100 (76.92%) 117 (90.00%) 124 (95.38%) NOT ACHIEVED(%) 38 (29.23%) 30 (23.08%) 13 (10.00%) 6 (4.62%)	CLO1 CLO2 CLO3 CLO4 ACHIEVED(%) 93 (76.23%) 46 (37.70%) 113 (92.62%) 120 (98.36%) NOT ACHIEVED(%) 29 (23.77%) 76 (62.30%) 9 (7.38%) 2 (1.64%)	CLO1 CLO2 CLO3 CLO4 ACHIEVED(%) 118 (98.33%) 109 (90.83%) 116 (96.67%) 116 (96.67%) NOT ACHIEVED(%) 2 (1.67%) 11 (9.17%) 4 (3.33%) 4 (3.33%)
• CLO 1 not achieved • Failure rate: 1.54%	• CLO 2 not achieved • Failure rate: 2.46%	• ALL CLO achieved • Failure rate: 0%

This course delivery was designed based on Kolb's Experiential Learning Theory where "Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984). Through this philosophy, we helped students to remain focus during learning activities. Students learned the concept and application of scientific communications dynamically and quickly by doing (Figure 1). In this course, the students are thought to solve real problems of writing through knowledge gained during workshops, peer learning discussion, proposal revision, and presenting a research proposal as part of their experiential learning.

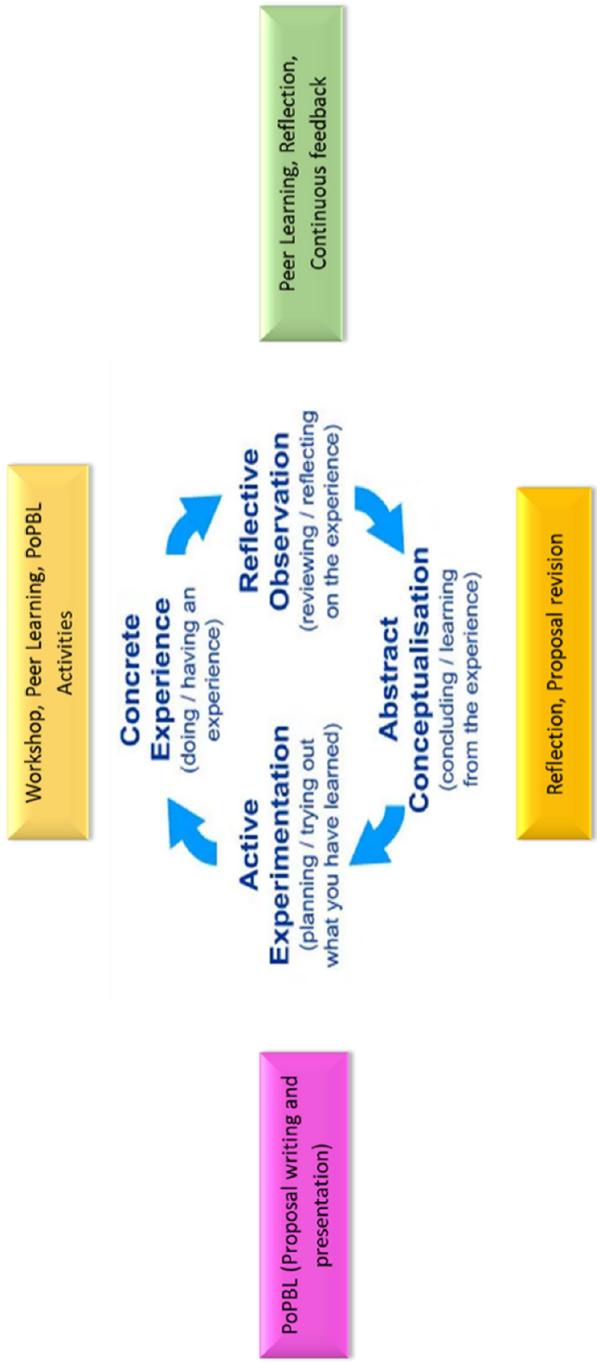


Figure 1 - Kolb's Experiential Learning Theory

Transformative Approach

The steps taken on the implementation of the approach are as follows.

a) Students are given or need to propose a research title via eLEAP activity.
b) Workshop 1 - emphasize the characteristic of research, writing skills and quick tips to search for articles.
c) Students started to write a draft and conducted peer-discussion during class.
d) Submission of draft via e-Portfolio eLEAP to monitor the student's progress and writing.
e) The students are prompted to submit the first write-up for 10% evaluation.
f) Facilitators read, graded and commented during class discussion and improvement.
g) Workshop 2 - emphasize the correct research methodology in writing proposals and ethics in research
h) Students exposed to chemical drawing and Turnitin for similarity index before final submission for 10% evaluation.
i) Workshop 3 – emphasize effective presentation, does and don'ts in oral and poster presentations, and interactive activities.
j) Students are prompted to submit a presentation for evaluation (oral and poster) either by zoom or pre-recorded PowerPoint.

The students enjoyed the peer group evaluation of the proposals write-up during tutorial class (Figure 2). Introducing chemical software and Turnitin has brought awareness to the students on unethical plagiarism act by copying and pasting during draft preparation. The workshop approach has brought students to experience the real scientific writing for the upcoming semester FYP and postgraduate's interest in the near future (Figure 2).

Figure 2 - Student's engagement in peer group discussion and workshop

Students have also engaged in immersive learning during the preparation of research proposals and proposal presentations. A step-by-step proposal writing guidance and literature review was introduced. The submission of draft via e-Portfolio eLEAP enabled monitoring of each student's progress in writing. Facilitators commented during class discussion for improvement to be made. The discussion could also be in various PoPBL approaches (Figure 3).

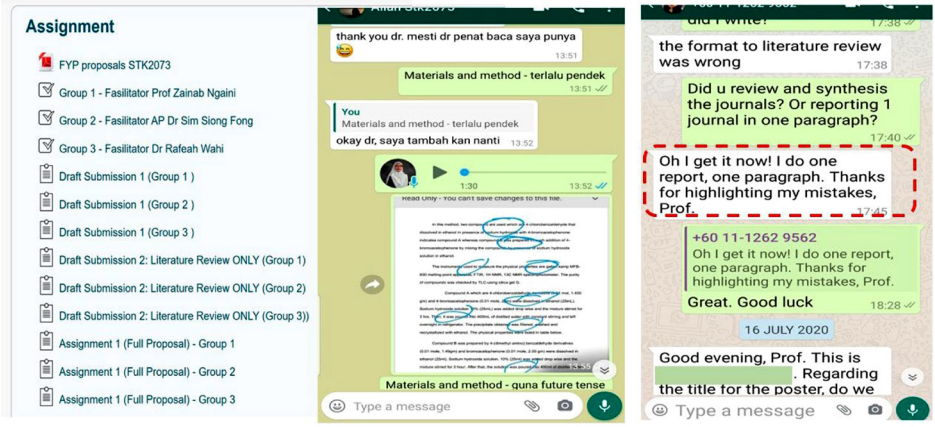


Figure 3 - Immersive learning in proposal writing

Impact on Students' Learning

This project has increased students' performance in terms of knowledge particularly from the three workshops, where the topics are mainly based on the Learning Units (Figure 4). All students could seek information and knowledge from other facilitators via direct interaction during the workshop, and the assigned group facilitator for continuous interactive peer discussion and brainstorming in their weekly classes. This project has also increased students' performance in terms of skills (Figure 4) relevant to the course from the implementation of e-portfolio assessment, where the students can monitor their writing progress based on the submission of the proposal write-up via e-portfolio (eLEAP).

Figure 4 - Impact on student's performance in terms of knowledge and skills

Students were required to fill up the feedback forms after each workshop. The responses were amazing and excellent. Most comments requested for additional hours and felt that the workshop was enjoyable in acquiring the knowledge and for its' interactive mode. The satisfaction of the transformative approach for this course was expressed in the student reflection at the end of the semester (Figure 5).

Figure 5 - Student positive reflection towards the course

	Comments/Suggestion for Improvements
1	Professional and good lecturer... I hope i can doing fyp with Prof Dr zainab
2	still can manage even it is hard.
3	I would like to say thank you for teaching me through out this semester.
4	Thank you for teaching us.
5	My lecturer provides sufficient feedback that helps me improve my performance in the course. Thank you.
6	No
7	The instructor's serious efforts to make sure students will be able to produce a good FYP proposal, poster and presentation should be applauded. Thanks to her, I am now no longer in the dark when it comes to producing a decent research proposal, poster and presentation slides; the workshops are extremely helpful.
8	The guidelines provided really helps to understand and improve more in the course.
9	No comment
10	I like the class overall.
11	The course instructor was amazing.
12	The lecturer is very good at teaching and explaining. This lecturer puts in effort to prepare the lecture slides
13	Great class as always with Prof
14	thank you so much Prof Zainab
15	Overall, this course has been great. The course instructor has always been understanding and determined for her students. Keep it up.
16	Lecturer encourages us to write proper proposal and gave us detail explaination about poster and proposal presentation.
17	Clear example on good proposal need to be present

G omments Extracted from STK2073 Student's Final Reflection

2. What did you do throughout this course to achieve your learning goals? Are you satisfied with your learning strategy? What would you differently if you have the chance to do so? *

Throughout this course, it really help me in reading so many articles without getting bored or tired easily. And also i learn so much about research, how to write a proposal, how to identify articles, journal proposal, article review and more. Im very satisfied with the learning process i have been through this semester

2. What did you do throughout this course to achieve your learning goals? Are you satisfied with your learning strategy? What would you differently if you have the chance to do so? *

learned about proposal making , research ethics, communication while presenting about scientific info and amazing new application used in data analyzing. i am satisfied with the learning strategy. if i have the chance to change something, it would be a chance to submit proposal written more to fix mistakes in proposal that affects our grade.

The course is very much related to the Learning Outcome Clusters of MQF 2.0 which emphasized Cluster 2 on cognitive skills during proposal writing and peer discussion and Cluster 3A/3B/3C on functional work skills on practical, interpersonal and communication during the proposal and poster presentation by the students. In addition, Cluster 5 MQF 2.0 on ethics and professionalism research proposal has also been embedded throughout the courses (MQF, 2007).

Improvement Project/Initiative in Future

Students' attitudes towards learning shouldn't be limited to a classroom basis. The improvement of the project must involve upgrading the social skills among students beyond the classroom via presentations in a seminar attended by participants from other programs and lecturers. This initiative is meant for early exposure to the real seminar or symposium.

Related Learning Outcome Clusters MQF 2.0

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