

INNOVATION OF MOOC FOR FUTURE TECHNOLOGISTS

Z. Jano¹, H. Hasan¹, A. Mohd Pilus¹, A. Yahya¹
H. Janor² and R. Padfield³

¹Innovative and Sustainable Technical Education Research Group,
Centre for Technopreneurship Development,
Centre for Languages and Human Development
Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya, 76100 Durian
Tunggal, Melaka, Malaysia.

²Faculty of Economics and Management,
Universiti Kebangsaan Malaysia, Bangi 43600, Selangor, Malaysia.

³Faculty of Humanities and Social Sciences,
Oxford Brookes University, Oxford, United Kingdom.

Corresponding Author's Email: zanariahjano@utem.edu.my

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ABSTRACT: Hitherto, MOOC has become one of the platforms in teaching and learning. Long life learning and self-learning skills are essential for students' survival especially in the 4.0 industrial revolution era. Moreover, Problem-based learning (PBL) approach is suitable for the MOOC platform as it offers an innovative technique that engages learners for independent learning and problem solving activities. Hence, MOOC is a tool for PBL implementation. This paper developed MOOC integrated PBL learning (MIPBL) model based on ADDIE's design model. The model was intended for future technologists in critical and creative thinking classroom. The model is beneficial in inducing creative and active participation from learners which subsequently trigger technical competence and soft skills. Future study should focus on the management implication while executing the MIPBL model in classroom.

KEYWORDS: *MOOC; PBL; MIPBL; Learning Model; Technologists*

1.0 INTRODUCTION

In today's industry, employers demand soft skills like problem solving, creative thinking, adaptable and flexible components. With the advent of Industry 4.0 revolution, students must be well equipped with content knowledge, competence, long life learning skills and self-learning skills to reflect advanced technologies [1]. Despite the high expectation among industries, many Asian employees and job candidates lack of Communication skills both verbal and nonverbal, problem solving skills, interpersonal skills, motivation and positive attitude are some of the most important soft skills that the organizations expect from their employees. [2] Besides, a survey conducted by Stanford Research Institute and the Carnegie Mellon Foundation for CEOs of Fortune database yielded that 75 percent of job success in a long term relied on people skills and only 25 percent on technical skills [3].

MOOC is defined as an online open class for mass education based on web-service. M stands for Massive, O as open, O as online and C as course. MOOC is able to change higher education realms. Yet, the literature around MOOC is still scarce to measure its effectiveness [4]. In developing countries, MOOC is still in its infancy stage. A study [5] on MOOC for Mandarin in Malaysia yielded that to sustain Mandarin MOOC is through creating usable content for MOOC and improving the internet connection. In a nutshell, ICT prepares the platform for planning, executing and evaluating performance.

Studies on MOOC have been conducted [6-11]. Most studies found that course contents can be offered through RSS feeds and online students could utilize collaborative tools such as blogs, forum and others.

On a different note, Problem-based learning (PBL) is an innovative approach that requires learners to learn in depth and students will eventually instill essential skills like independent learning and problem solving. ICT is a tool for PBL implementation where the ICT platform such as MOOC is used as a tool for Problem based learning approach.

Both MOOC and Problem based Learning approach are essential to elevate the acquisition of knowledge and skills. Problem-Based Learning (PBL) starts with a trigger or an issue and learners work collaboratively to explore the issue in depth, execute independent learning, share information in groups, apply presentation and writing

skills as well. Lecturer is to scaffold the process of learning. Lecturer acts as both a facilitator and motivator to give guidance for learners throughout the acquisition of knowledge [12]. PBL is proven effective in various domains globally [12-13]. PBL is used interactively in many fields like banking, education, and medicine [13-16]. The benefits of PBL include the inculcation of skills like critical and creative rationale, communication and interaction in team, alternative viewpoints appreciation, reasoned decision-making, self-evaluation and independent learning [17]. Various PBL models are used by many scholars. 5 Ladders is used extensively as a PBL model. Ladder 1 is the discussion that revolves around the triggers used, procedure and reflection [18]. Another PBL model is the 7Cs of Learning Design [19]; Conceptualize, Capture, Create, Communicate, Collaborate, Consider and Consolidate.

Multimedia technologies are to support PBL which is based on real world issues and problems. Ten design principles for MOOCs based on students' perspectives are determined [20]; Competence based approach, Learner empowerment, Learning plan and clear orientations, Collaborative learning, Social networking, Peer assistance and Quality criteria for knowledge creation and generation, Interest groups, Assessment and peer feedback and Media-technology-enhanced learning.

This study aimed to develop MOOC integrated PBL learning model for future technologists in the Faculty of Engineering Technology. ADDIE design model [21] was used as the basis.

2.0 METHODOLOGY

Document Analysis and Focused Group Interview were utilized in this study. While document analysis involves perusal of subjects and web materials, Focus group consists of Lecturers of a CCT course.

Document analysis comes under a qualitative approach where documents are inferred to provide voice and significance for a given theme [22]. Document analysis includes coding data into themes. Three primary types of documents can be analyzed namely public records comprise the reports of an organization's activities such as student transcripts, annual reports, policy manuals, First-person perspectives of a person's actions, experience and belief such as calendars, incident reports, reflections/journals and Physical Evidence such as brochures, posters, agendas and training modules. In the

present study, two documents were utilized namely ADDIE instructional design model [23] and the Critical and Creative Thinking syllabus. The syllabus was later analyzed to match the ADDIE model. The syllabus for undergraduates of Faculty of Engineering Technology was analyzed in terms of the Learning Outcomes, Learner Analysis, Student Learning Time and Assignment Analysis.

The focus group engenders continuous ideas where a moderator will lead the discussion. The group often comprises 7-10 selected members and discussion sessions on a given topic can take about 1 to 2 hours to accomplish the objectives of the discussion [20]. The focus group consisted of 10 lecturers teaching the CCT course. In terms of demography, they comprised 4 female and 6 male lecturers. In terms of teaching experience, all ten lecturers have been teaching CCT for more than 10 years.

The focus group interview sessions were held three times to gain feedback and develop the final framework. The interview sessions were held in the early May, late May and early July. The duration was 4 hours per session.

3.0 RESULTS AND DISCUSSION

A model was designed based on the interview with the experts and document analysis conducted on the subject materials and documents. The design phase consisted of strategies to be adhered to in the development phase later. ADDIE instructional design model was utilized in designing the teaching model. The ADDIE Instructional Design Model has 5 phases as illustrated in Table 1.

Table 1: Addie instructional design model

The Analysis Phase	Analysing the needs and constraints, learning environments, learning objectives, new skills and the learners' current level. (Interview with experts).
The Design Phase	Outlining strategies/blueprint to reach the instructional goals; content, subject matter experts, user experience, assignments, tests, graphics and media. (Interview and Content Analysis Method).
The Development Phase	Creating the course which is aligned with the blueprint from the Design Phase.
The Implementation Phase	Implementing the course.
The Evaluation Phase	Measuring the effectiveness and efficiency of the training. Formative and summative approaches are used.

The focus group reached a consensus on each session. Session 1 highlighted the Analysis stage in terms of Learning Outcomes (LO), Learner Analysis (LA), Student Learning Time (SLT) and Assignment Analysis (AA) with the respective activities.

Session 2 focused on Design and Development in terms of strategies and Content Development and respective activities. It also stressed on the implementation and evaluation stage. The prototype of the learning model was also discussed. Session 3 focused on the improvement of the model. After reaching a consensus, a finalized learning model was produced. Figure 1 shows the learning model for the MOOC integrated PBL.

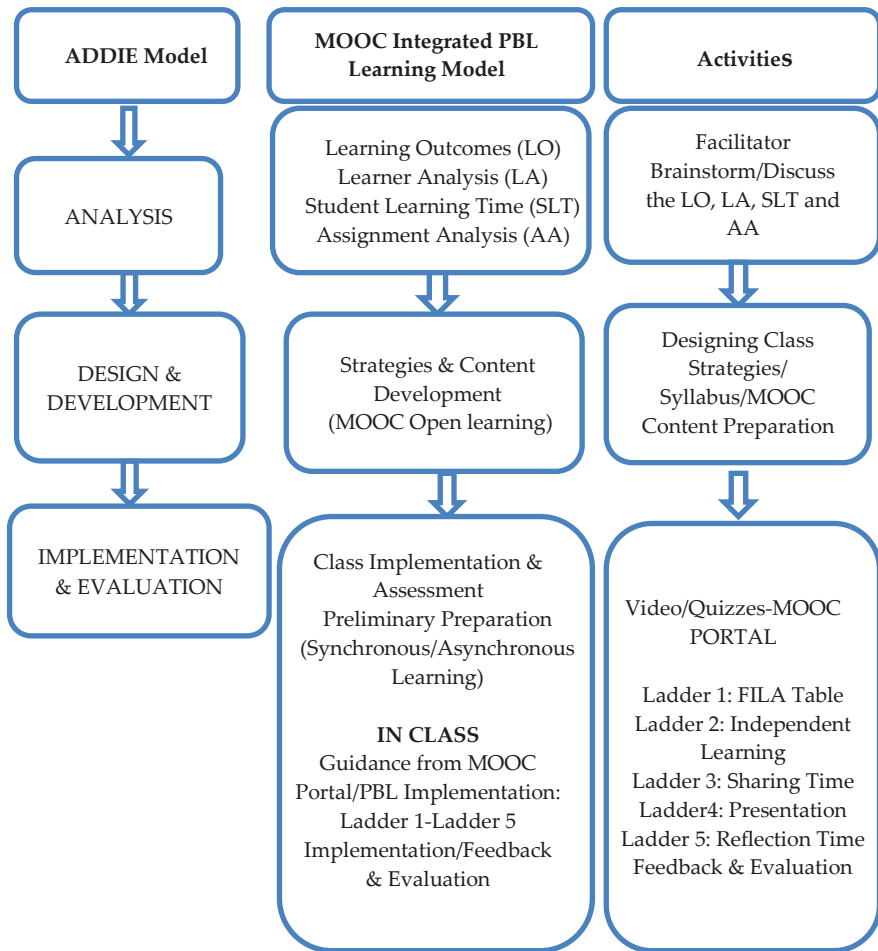


Figure 1: Learning model for MOOC integrated PBL

The framework illustrated the structure of the course and the overview of assignments. These elements generate students' comprehension of the course requirements. There were seven modules with the same layout, a promotional video that gives an overview of the course, seven mini video presentation, quizzes for each module, activities with distinctive and comprehensive description, and rubrics for the exercises to guide students.

Several respondents stated *"this MOOC glued us in the team where we work collaboratively [R1-R4]"*. Learners utilize a chatroom to share and revise their work as well as their peers'. A sense of community is established through the social network offered by the course.

MOOC is essential to scaffold students' e-learning. The MOOC has few ways which correspond to ADDIE's teaching model. Analysis includes learning outcomes, learner analysis, student learning time and assignment analysis. These elements are crucial to be analyzed at the initial stage. The activities involve facilitators brainstorm and discuss all the elements.

Design and development involve strategies and content development of the MOOC. The preparation is related to the syllabus and analysis in the first stage. Short videos of less than 10 minutes create small chunks of information which enable students to maintain focus on the module. There is a quiz after each lecture so that the students could check their progress in learning. Besides, interactive interface is included to create exercises that are exciting through i-studio application, Powtoon, Adobe Flash and others. Another strategy is to have animation through the presentation. A lecturer stated that *"Every assignment consists of very comprehensive instructions of the tasks that the students must complete [R2-R6]"*.

Implementation and Evaluation stage provide templates and clear rubrics as a guide for learners. Students are given a real world problem for each week. Reflection videos related to triggers used in classroom were prepared and assignments were devised for Ladders 1 to 5. Hence, learners are guided step-by-step to move from one ladder to another without feeling by a big task.

Lecturers provide feedback continuously to ensure students are always on the right track through questioning throughout the process. Rubrics are designed clearly and concisely to guide students in their task completion. In summary, hard work is needed in the part of lecturers and students to ensure the process of learning is successfully

secured. Several respondents reflect that despite the great amount of work that are invested in the PBL process and MOOC, the standard structure gives the emotional support to them to proceed and venture into new discovery [R7-R10].

4.0 CONCLUSION

In conclusion, this study designs a MOOC integrated PBL learning model (MIPBL) in enhancing soft skills utilizing the ADDIE design model. The model is beneficial for tutors, policy makers and administrators of MOOC and PBL. Future study should focus on the implementation of this model in classroom.

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