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Designing an Interest-Driven Challenge-Based Learning and Alternative Assessment Method for an Educational Technology Undergraduate Course

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Abstract: This paper centers on illustrating the design process of a challenge-based learning and alternative assessment used in the Educational Technology course at undergraduate level at Universiti Putra Malaysia. The learning and alternative assessment design of this course was framed by the two anchoring loops of the Interest-Driven Creator Theory, namely the Interest Loop and the Creation Loop. Each loop was utilized at a different point and time of the course, spreading throughout 14 weeks of the semester. The Interest Loop was implemented in the first half of the semester, overlapping with the Creation Loop which was implemented in the second half of the semester. Several nudges were creatively designed as a mean to stimulate and scaffold learners throughout the course. Every week during class, the learning activities started by applying the Interest Loop. This was done by inviting learners to participate in the challenges, at the same time making sure that the learners can extend the input from the activities to their final project. The objective of such design was to let students learn by doing or completing the weekly challenges given to them during class. Then, the students were guided to complete their final project through a series of workshops and personal group consultation with the course instructor. By designing the course using the Interest-Driven Creator Theory, it was found that the Interest Loop was specifically useful in designing the learning activities at the micro level of the Educational Technology course, while the Creation Loop was specifically useful in designing the alternative assessment at the macro level.

Keywords: Alternative Assessment, Interest-Driven Creator Theory, Challenge-Based Learning, Scholarship of Teaching and Learning

1. Introduction

I believe many 21st Century education enthusiasts and academics around the world are trying their best, and always looking for ways, to improve their teaching approach. Until today, several new methods centering on learners (rather than teachers) have emerged and are being introduced by scholars. For instance – authentic learning, discovery learning, problem based learning, service based learning, community based learning, passion based learning, and challenge based learning – to name a few, are methods that have gained interest among educators. These methods, if necessary, can be viewed as the 'bait' to 'lure' learners to enjoy learning through meaningful experiences, and consequently, gained some desired social skills and score well in examinations.

As an educator, I partake on the same journey as other education enthusiast and academics. Being an academician at the Faculty of Educational Studies, I have benefited a lot being around colleagues who are experts in the learning sciences. Among others, I learned that a good educator must have a theoretical grounding on his/her knowledge that were to be imparted to his/her learners. I specifically benefited from the Technological, Pedagogical, Content Knowledge (TPACK) Framework introduced by Mishra and Koehler (2006). This framework suggest that:

> …thoughtful pedagogical uses of technology require the development of a complex, situated form of knowledge that we call Technological Pedagogical Content

> Knowledge (TPCK). In doing so, we posit the complex roles of, and interplay among, three main components of learning environments: content, pedagogy, and technology.
>
> (Mishra & Koehler, 2006, p. 1017)

The TPACK framework is as illustrated in Figure 1. A teacher knowledge consists of three main components, namely Content Knowledge (CK), Pedagogical Knowledge (PK) and Technological Knowledge (TK). The overlapping of the three components lead to four types of interrelated knowledge, namely Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge and finally, the Technological Pedagogical Content Knowledge (TPACK) emerged from the interplay among the three preceding interrelated knowledge.

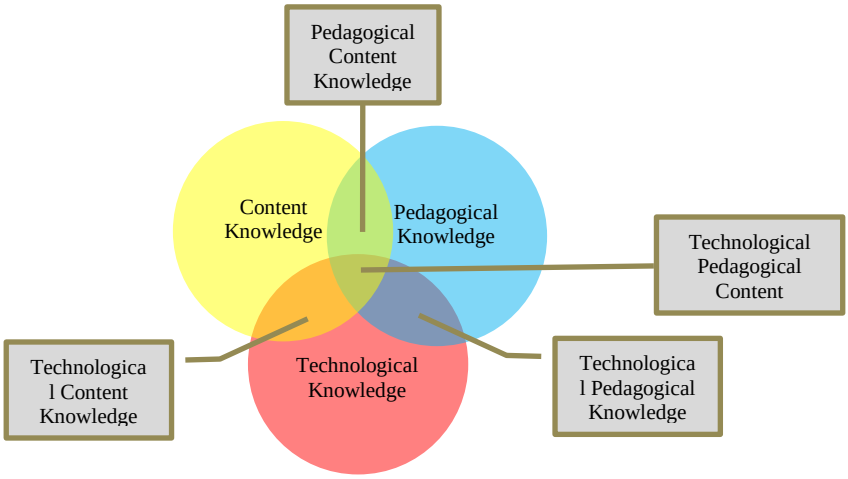

Figure 1. The Technological Pedagogical Content Knowledge Framework (adapted from Mishra & Koehler, 2006, p. 1025).

In my five years of teaching undergraduate courses at the university, I found that the Challenge-Based Learning method echoes my teaching philosophy. After attending a number of intellectual discourses about the Interest-Driven Creator Theory at the International Conference on Computers in Education organized by the Asia Pacific Society for Computers in Education (APSCE) for the past three years, I felt that this theory complements my methods of Challenge-Based Learning. This paper therefore illustrates my three years of teaching experience with Interest-Driven Challenge Based Learning Framework. Reflecting on the TPACK Framework, I arrived to my own version of TPACK (Figure 2) that resonates my teaching philosophy. However, I must warn that this TPACK is only applicable to my own journey of scholarship of teaching and learning. Nevertheless, it *might* resonate to other academics and therefore *might* be transferrable or adaptable to them.

Figure 2 illustrates how I positioned the Interest-Driven Creator Theory onto my TPACK framework. Note that a fourth knowledge component is added, which is the Interest-Driven Creator Theory, and the pedagogical knowledge is now Challenge-Based Learning method. The overlapping of these four components contribute to the emergence of a *theoretically informed TPACK*, or Interest-Driven TPACK. The inclusion of Interest-Driven Creator Theory into my own TPACK solidifies my learning design as it gives meaning to every challenge that is implemented into the learning process.

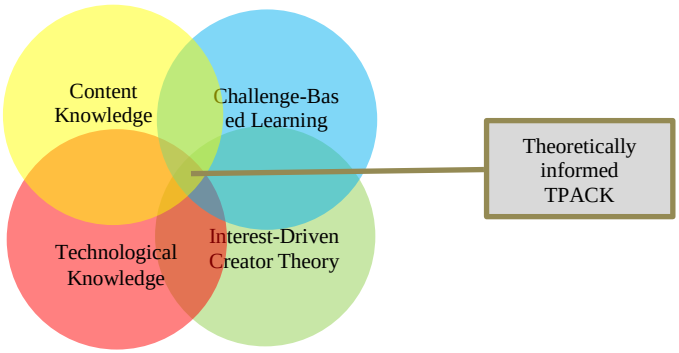

Figure 2. Positioning the Interest-Driven Creator Theory on the TPACK Framework

By having a theoretically informed TPACK, I felt that it has become easier for me to practice my learning design onto the courses that I am teaching and this gave rise to my pedagogical stance. Hence, the design of Interest-Driven Challenge Based Learning and Alternative Assessment ensues.

2. The Learning Issue and Objectives of the Design

Learners today have instant access to technologies and the web, thus instructors play a vital role to augment students' learning experience by leveraging technologies they use commonly in their daily lives. As most of my learners are pre-service teachers, I always asked them, "What kind of a teacher do you want to become?" and "How do you want to be remembered as a teacher?" These two questions are essential to prepare them for this course and concretize their self-efficacy as future teachers. Thus, pedagogical paradigm ensues and this warrants for a change in the instructional design for 21st century learners.

This Interest-Driven Challenge Based Learning and Alternative Assessment Design aims (i) to let learners be autonomous life-long learners and have ownership on their learning through intentional guided events and workshops to trigger their interest and creation ability, and fill their knowledge gaps, (ii) build resiliency and future competencies among learners, and (iii) ultimately to achieve the course outcome and beyond. Based on the challenge-based learning framework and the Interest-Driven Creator Theory that foregrounds the instructional design of this course, I believe that learners can optimize their innate ability better and enjoy learning, thus have an imprinted effect on their memory retention, and consequently perform better in examinations.

3. The Design of Interest-Driven Challenge Based Learning and Alternative Assessment

Challenge-based learning encourages learners to be actively engaged in learning through collaborative hands on activities, by leveraging common technologies they use in their daily lives to solve real-world problems (Apple Inc., 2010). These are meant to augment learners to develop deeper knowledge of the subjects understudy and extend it to a larger crowd. The Challenge-Based Learning Framework, as developed by Apple Inc., is as follows (Figure 3). This framework can be understood by its five stages of implementation (Apple Inc., 2010), namely:

<table>
<tr><td colspan="3">Big Idea</td></tr>
<tr><td colspan="3">Essential Question</td></tr>
<tr><td colspan="3">The Challenge</td></tr>
<tr><td>Guiding Questions</td><td>Guiding Activities</td><td>Guiding Resources</td></tr>
<tr><td colspan="3">Solution: Implementation</td></tr>
<tr><td colspan="3">Assessment</td></tr>
<tr><td colspan="2">Publishing Student Samples</td><td>Publishing Student Observations</td></tr>
</table>

Figure 3. The Challenge Based Learning Framework (adapted from Apple Inc., 2010)

Stage 1: From big idea to the challenge. Learners are given a premise of current issues related to them, that they can help solve. The teacher should give questions that would guide them in finding solutions to the problem. At the same time, learners are encouraged to leverage commonly used technology in their tasks to solve the problem.

Stage 2: Setting the foundation. At this stage, learners formulate questions that can help them solve the issue. This step works best with learners working in groups and collaborate. The

instructor should remind the learners that they have the options to use multi resources to devise their plan for activities and resources.

Stage 3: Identifying a solution. The learners should arrive at a solution plan by now and have a solid foundation to begin prototyping or experimenting with their solutions. Several research and documentation are done at this stage.

Stage 4: Implementation and evaluation. Learners have implemented their solution plan and assess what worked or what didn't work from the plan. At this point, learners will have to decide what they want to assess and determine whether they had progressed in addressing the challenge.

Stage 5: Publishing results and reflections. Throughout the whole project planning and implementation, learners document their work in the form of audio visuals and share their work in a public domain, highlighting on the process done, how it was implemented and their own reflections. The institution is encouraged to organize a public event as an avenue for learners to share and celebrate their efforts.

I have been teaching the Educational Technology course for undergraduates for the past five years, and every semester, the course design was updated to ensure that this course keeps abreast with the current and emerging trends in educational technology. Moreover, the Educational Technology course is a compulsory course for all undergraduate students at the Faculty of Educational Studies.

The learning and alternative assessment design of the Educational Technology course was developed with the spirit of Challenge-Based Learning, and framed by the Interest-Driven Creator Theory, anchoring on its first two concepts namely Interest and Creation Loop, to infuse teaching spirit to the learners (pre-service teachers).

An original design was produced through this mesh-up that combines workshops, events, gamification and role-plays as guide and nudges (and as "hoarding boards") to lead learners (and curb from mistakes) to progress and complete their final projects. The instructor's role shirts as facilitator and project manager, overlooking learner's progress and providing relevant resources to them. This approach was meant to reduce cognitive load but at the same time, provide meaningful learning experience, enhance memory retention, and celebrate learners' heterogeneity.

This was done by applying the Interest Loop at the micro level of learning design, which is by inviting learners to participate in bite-sized challenges through role-play and gamification approach while making sure that students can extend the input from the activities to their final project. The objective of such design was to let students learn by doing. Borrowing the concepts of Challenge-Based Learning, these activities leverage on technologies that are already available to the learners (Apple Inc, 2010), namely their own smartphones.

Next, the instructor takes role as the project manager to help students complete the coursework and the final challenge (project) by applying the Creation Loop. The Creation Loop is specifically helpful in macro designing the course as it is more applicable for long-term assessments at the time this paper was written. Students were guided through a series of workshops and events, and personal group consultations with the instructor. The design of alternative assessment is also specifically useful in revoking learners' passivity in classroom activities and replace it with learners' initiative, self-discipline and choice (Janisch & Akrofi, 2007).

Figure 4 provides the complete Interest-Driven Challenge Based Learning and Alternative Assessment framework I developed for the Educational Technology course, together with lineup of activities that are meant to provide learners with meaningful experience and immerse them in the learning process. Note that the Interest Loop is implemented at the first half of the Challenge-Based Learning Framework (from the Big Idea to The Challenge). The lineup of Lecture Activities for the Challenge-Based Learning method are all designed to help *trigger* learners to look for more information, *immerse* them into the learning process, and allow them to *extend* their newly constructed knowledge to the daily ordinaries (Chan et al., 2018). These bite-sized challenges are given to learners mostly throughout the first half of the semester, allowing learners to see themselves and set their minds

as teachers (they are currently pre-service teachers undergoing training at undergraduate level). The challenges act as nudges to help learners progress with their coursework and final project. As learners go through this Interest Loop, they became more invested into their own courseworks and final projects.

In the second half of the semester, learners have shifted to the second half of the Challenge-Based Learning Framework (from Solution and Implementation to Assessment). The Creation Loop occurs at this stage, anchoring the macro design of the course and helping learners finish up their coursework and final project. At this stage, learners are already able to *imitate* readily available projects or come up with ideas that are built on their newly constructed knowledge at the micro level. Learners start to *combine* their knowledge, tools and media to create a prototype of a project that they have chosen to do. Finally, a special event is conducted at the end of the semester to let learners *stage* their projects by demonstrating them to the public. Learners are also required to write an ePortfolio on any free online platform, reflecting on their learning experience throughout the semester as a mean to understand their thinking process and experience, and whether they synchronize with the desired learning outcomes; as well as determine the effectiveness of the Interest-Driven Challenge Based Learning and Alternative Assessment Framework.

4. Conclusion

I have been practicing Interest-Driven Challenge-Based Learning and Alternative Assessment method for the past three years for the Educational Technology course. Each semester, similar activities were carried out, and it just became better every semester as new methods and activities emerged and woven into the learning and alternative assessment design. As I develop the design, I intended for the methods to be transferable to other courses that I teach, and implemented at a larger scale. Furthermore, this approach leverages materials, tools and technologies (like smartphones and free mobile apps) that are common and easily accessible to many of us. However, I must emphasize again that it is only specific to the instructional design for the Educational Technology course that I found the Interest Loop is helpful in designing the course at a micro level, and the Creation Loop is beneficial in designing the course at a macro level. Therefore, this shall not be generalized to other courses' designs and any situations.

Applying the Interest-Driven Challenge-Based Learning and Alternative Assessment method has resulted in swift and systematic implementation for activities that promotes challenge-based learning, and adaptable to other instructors if they wanted to adopt this method. Following this method has allowed me to scaffold my learners at the beginning of the semester by giving appropriate nudges and assesments, and it also allows me to remove the scaffold towards the end of the semester and watch the learners blossom cognitively and affectively, and take flight into their own learning. I believe that continuous assessments are lenient ways of guiding learners (and not punishing in nature) and play a vital role in developing learners' knowledge, competencies and skills.

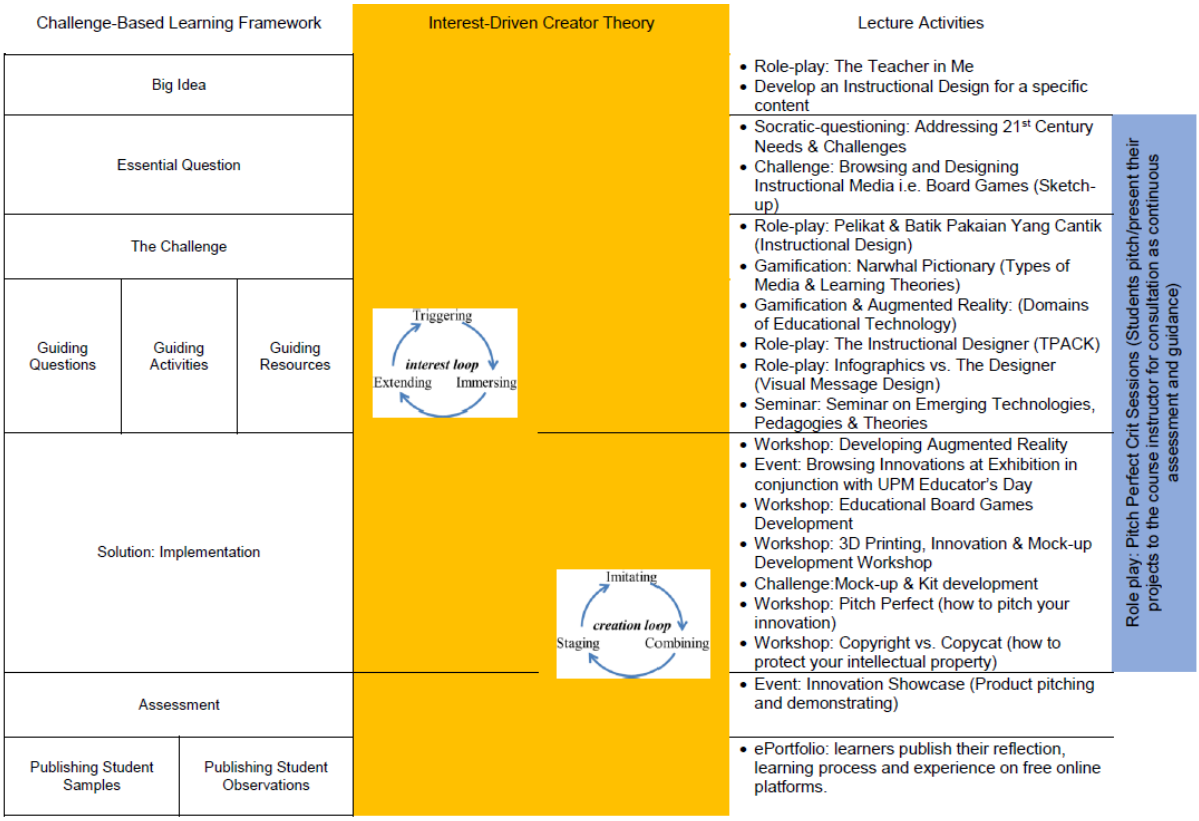

Figure 4. Interest-Driven Challenge Based Learning and Alternative Assessment framework for Educational Technology Course for Undergraduates

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