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## Designing To PLEaSE: A Case Study of Personalizing Learning for a Malaysian Secondary School

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### Abstract

*Personalized Learning and Students' Engagement (PLEaSE) is a model used to design virtual learning environments as part of the e-learning initiative of the Malaysian Ministry of Higher Education (MOHE). The key elements in PLEaSE methodology are 1) tailoring content to user needs and learning styles; 2) continuity of learning and out-of-hours learning; 3) supporting anytime, anywhere learning; 4) enabling peer/mentor dialog, 5) assessing learners for learning; and 6) involving learners in their own learning. Having implemented the key elements in the training of pre-service teachers in a higher institution, the same concepts are being extended to the secondary school in Malaysia. This is a work in progress, the aim of this paper is to describe how PLEaSE is used to design learning environments that fulfils the Ministry of Education strategic roadmap for 2020. The design tasks include training pre-service teachers as virtual teachers/mentors for young learners; and designing virtual learning environments. The learning environments are created using a web-based course management system Web and Open Simulator (OpenSim) Web 3D virtual world. An OpenSim virtual world is a type of desktop virtual reality that enables learners to be visually 'immersed' in their learning environments within the presence of communities. Parallel to the concepts envisaged by the Ministry of Education, non-technical teachers are trained to use ICT in ESL classroom. After 14 weeks of training on instructional design and using ICT as learning tools, three out of 80 pre-service teachers are selected to design 3D virtual learning spaces for 13-year-olds students of a Malaysian secondary school. The learning processes involved creation of personalized learning environments for both teachers and learners based on Learner-Centred Design (LCD) philosophy. LCD focus on learners' needs, thus the instructional model of this study is Cognitive Apprenticeship. This model emphasizes learning through modelling, coaching and scaffolding with the final purpose of making learners to model the experts in building their own virtual learning spaces in 3D environment.*

### Keywords:

Secondary education, learners, instructional design

### 1. Introduction

Personal and personalized learning environments have become the trend of future learning in K-12. The 2011 Horizon Report for K-12 (2011) predicts that that Personal Learning Environment (PLE) for schools will be adopted within four to five years, and defines PLE as an approach rather than technology. In Malaysia, the

Ministry of Education envisaged that by the year 2020, learning and learning content will be personalized. In addition, future classrooms are described as to have the following components (MSC 2005, 46-57):

- a. **Teachers:** The task is to train non-technical teachers to create, publish personalized content and post e-learning material online; teachers to become virtual mentors to learners; and teachers in 3 dimensional images are projected to students' homes with online interaction both synchronously and asynchronously.
- b. **Learners:** Each student will have one or several virtual mentors who can be accessed anytime; learners learn in communities that involve parents, teachers, university lecturers, professionals, industry members.
- c. **Tools:** the use of technologies of tomorrow – sophisticated ICT-enabled teaching and learning environment such as virtual learning and tele-immersion technology; the use of virtual reality will be common by 2020.
- d. **Pedagogy:** community-based and constructivist learning using experiential and project-based instructional approaches. Besides that, teachers should create materials that are personalized to learners for the purpose of engaging learners in learning.

For the key components to be common in future classrooms, the initiation should begin in 2011, which is the start of the Fourth Wave Smart school implementation project. Furthermore, current trends of internet usage show increased pattern of 3D virtual world use among kids, teens and tweens (Kzero 2011), as such teaching and learning using virtual reality as learning tools can be implemented. However, the main challenge is to translate the envisaged components into existing classroom practices as we need guidelines to help us design personalised learning environments for Malaysian secondary school learners.

We believe that to enable learners to create their own PLE, as teachers or instructional designers, we need to design formal learning environments that are personalized to the learners' needs. In addition, parallel to the basis of Vygotsky's ideas of Zone of Proximal Development (ZPD), the designed personalized learning environment should allow learners to eventually explore learning independently. As such, we use PLEaSE (Personalized Learning Environment and Students' Engagement) design model/ method for online secondary school learning. This design model is driven by the principles of Cognitive Apprenticeship (CA) as instructional strategies and Learner-Centred Design (LCD) philosophy for designing the virtual learning environment. This is to help us in forming the foundation of our design practice for Malaysian secondary schools online learning.

## **2. Personalized Learning and Students' Engagement (PLEaSE) model**

Personalized Learning and Students' Engagement (PLEaSE) for online secondary school learning (k-12) is part of the PLEaSE research carried out in University of Malaya in fulfilling the e-learning initiative of the Malaysian Ministry of Higher Education (MOHE). There are many dimensions of PLEaSE instructional design models for different instructional problems or settings. We are constantly researching on how best to deliver personalized online instruction, and most

importantly in this study, to realize future classrooms as envisioned by the Ministry of Education. Hence, we have begun our design tasks by adapting available constructs for personalizing online learning. Therefore, the key elements in PLEaSE are based on the constructs outlined by British Educational Communication and Technology Agency (BECTA) for personalizing 21st Century learning (BECTA: ICT Advice 2005-2006). The constructs are to:

- 1) tailor content to user needs and learning styles;
- 2) provide continuity of learning and out-of-hours learning;
- 3) support anytime, anywhere learning;
- 4) enable peer/mentor dialog;
- 5) assess learners for learning;
- 6) involve learners in their own learning.

We have adapted these constructs with relevant instructional models and learning tools. These key components are to promote personalization of learning environment through supports or scaffolding to learners needs such as peer and mentor interaction. Learners are given tasks that are not only based on their learning styles and needs, but also based on the goals of learning that they set. We believe that by involving learners in their own learning will enable learners to gain ownership of what they want to learn. The virtual learning environment can be based on relevant instructional models and learning tools to be used for the secondary school learners. In this study, we chose the Cognitive apprenticeship (CA) as the relevant instructional model; and the online tool is designed based on Learner-Centred Design (LCD).

### 3. Pedagogical aspects of PLEaSE and tools for learning

#### 3.1 Cognitive Apprenticeship

Cognitive Apprenticeship (CA) and its related themes on learning can be used as a guide in designing instructional strategies for Malaysian virtual learning environments. Besides the focus of designing authentic learning environment, Collins (2006) identifies the following key themes in CA:

- a. **Situated Learning:** learners are situated in learning where real-world tasks and related scaffolding are given to the learners in completing the tasks.
- b. **Communities of Practice:** Learners learn and perform tasks in context, within the community that practice the tasks. Learning can be motivating especially when children are engaged to a situation that can make them be what they want to become.
- c. **Communities of Learners:** This notion is an expansion of Communities of Practice, which aims to "advance the collective knowledge and in that way to support the growth of individual knowledge" (Collins 2006, 54).

- d. **Scaffolding:** A form of support that is provided to learners in completing learning tasks. The help system can be in the form of teachers or communities, aside from tools or features that a computer-based software can offer. The idea of scaffolding is to fade the scaffolding once learners are able to accomplish tasks on their own.
- e. **Articulation:** Articulating explicitly what teachers or learners know through any methods such as writing, or verbal interaction.
- f. **Reflection:** Part of making thinking visible in learners is to enable them to compare their way of solving problem with those of an expert or other learners. This method can be enhanced through the use of techniques such as comparing performances of an expert and learners via demonstrations.

### 3.2 Learner-Centred Design (LCD) for designing learning software

According to Quintana et al (2006), in the field of learning sciences, Learner-Centred Design (LCD) philosophy emphasizes on the design of learning software around "learners' goals, needs, activities, and educational contexts". Learners, teachers and experts fully participate in Communities of Practice (CoP) that situate learners within the 'Gulf of Expertise'. In other words, learners use the learning technology to gain expertise of content (e.g. English as a Second Language) from teachers and experts, who facilitate learners to transit across the gulf. In the process of becoming experts, learners will be involved in active learning like observing and modelling the behaviour of the experts. On the part of the teachers or experts, learners will be facilitated through scaffolding framework in an authentic context of practice, for instance, a simulation of hospital setting for the learners to learn the tasks of a nurse during an emergency.

In addition, making visible of expert thinking in LCD can be done through the use of Cognitive Apprenticeship as an instructional model (Quintana et. al., 2006). One of the design framework proposed by LCD is Scaffolded Knowledge Integration Framework when designing software. The software needs to have the following features of scaffolding: 1) make the content accessible; 2) make thinking visible; 3) help students learn from others; and 4) promote autonomy and lifelong learning. The main challenge in the scaffolding framework is the process of 'fading' the support for the learners, especially when learners are interacting with the computer and the content independently.

Both LCD and CA consist of shared themes. As instructional designers, we use the themes in CA to enact personalized learning environment, and themes in LCD to design the virtual spaces where CA is being implemented. The learning tools used in creating personalized virtual learning environment is a 3D OpenSim virtual world.

### 3.3 The tools: Open Simulator 3D environment

OpenSim has the feature for learners to create their personal learning environment. The 3D environment is a virtual world that is "A synchronous, persistent network of people, represented as avatars, facilitated by networked computers" (Bell 2008, 2).

Among the features of virtual worlds are 3D avatars, objects and spaces; communicative tools such as Instant Messenger and text or audio chats; links to external web pages; and content creation tools for instance in building 3D objects in the virtual world. In education, virtual world can afford learners to be visually immersed with other avatars who can be teachers, peers or experts.

#### 4. Personalizing Malaysian Virtual Learning Environment/ spaces

##### 4.1 Training of the virtual mentors

80 pre-service teachers were trained to fulfil the envisaged future classroom stated in the Smart School Roadmap. The objectives of the training were to prepare a group of Communities of Practice for the virtual learning environment for secondary school learners.

The phase served as part of analysis phase for the project. PLEaSE model is used to guide the design of virtual learning environment. Creating a PLE is part of the assessment used for the learners, with learners in groups created their personal virtual learning environment using social network software: Ning. The pre-service teachers were modelled and coached to create personalized learning environment. They were trained on Technological, Pedagogical and Content Knowledge (Mishra and Koehler 2006); and instructional design for creating virtual learning environments for 13 year-old students. After 14 weeks of training, three teachers were chosen to further develop the virtual learning environment for the young learners. These three teachers have been trained to build objects in the virtual world, and to design the virtual spaces based on Cognitive Apprentices strategies. The teachers are facilitated by an expert of the OpenSim virtual world. CA strategies- modelling, coaching (and scaffolding), articulating and reflecting- are implemented within the virtual space. The teachers are then given the chance to explore and create relevant virtual spaces for the young learners. The result is the creation of a 3D pyramid, a tunnel and a river, and a zoo. As part of assessing their to-be learners, each teacher prepared rubrics for the content.

##### 4.2 The context: young Malaysian secondary school learners

The subject taught is a technology literacy classroom (Information and Communication Technology Literacy: ICTL) that uses English Language as the medium of instruction. It is a compulsory programme for 13-14 year olds in Malaysian secondary school. Classes are carried out once a week, at the period of three hours per session. Several recommended outlines in the ICTL guideline are approaches such as project-based learning and self-directed learning.

##### 4.3 The personalized virtual spaces

Malaysian Multi-User Virtual Learning Environment (MUViLE) is the virtual space that consists of personal spaces for teachers and learners. The personalized virtual

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learning space is designed to facilitate the learning of technology that takes into account the learners' needs. These young learners will be co-creators of the virtual learning space; thus making the process of learning personalized to each learners. MUViLE has the following personalized characteristics:

**1) tailor content to user needs and learning styles;**

Learner profile that will be filled up by learners, the purpose is to identify learning and tool preferences, so that the content can be personalised. Different learning styles can be catered in the virtual space, as the virtual world consists of rich multimedia.

**2) provide continuity of learning and out-of-hours learning;**

The communicative tools that is available in virtual world, where learning goes beyond the classroom walls. Communities, represented in avatars, can be involved in the learning processes.

**3) support anytime, anywhere learning;**

The presence of virtual mentors and the availability of the virtual world make learning accessible to learners. Support or scaffold from the virtual mentors, peers and experts can help learners perform and continuously improve their learning.

**4) enable peer/mentor dialog;**

The communicative tools and the ability to link to external web pages can afford various peer and mentor dialog that learners can obtain in the process of learning. As such, possible tools are prepared for learners, and blogging made available as part of monitoring learning. Learners can observe how an expert-in the form of avatar- perform tasks; articulate and reflect their understanding through interactions with the virtual mentors and expert.

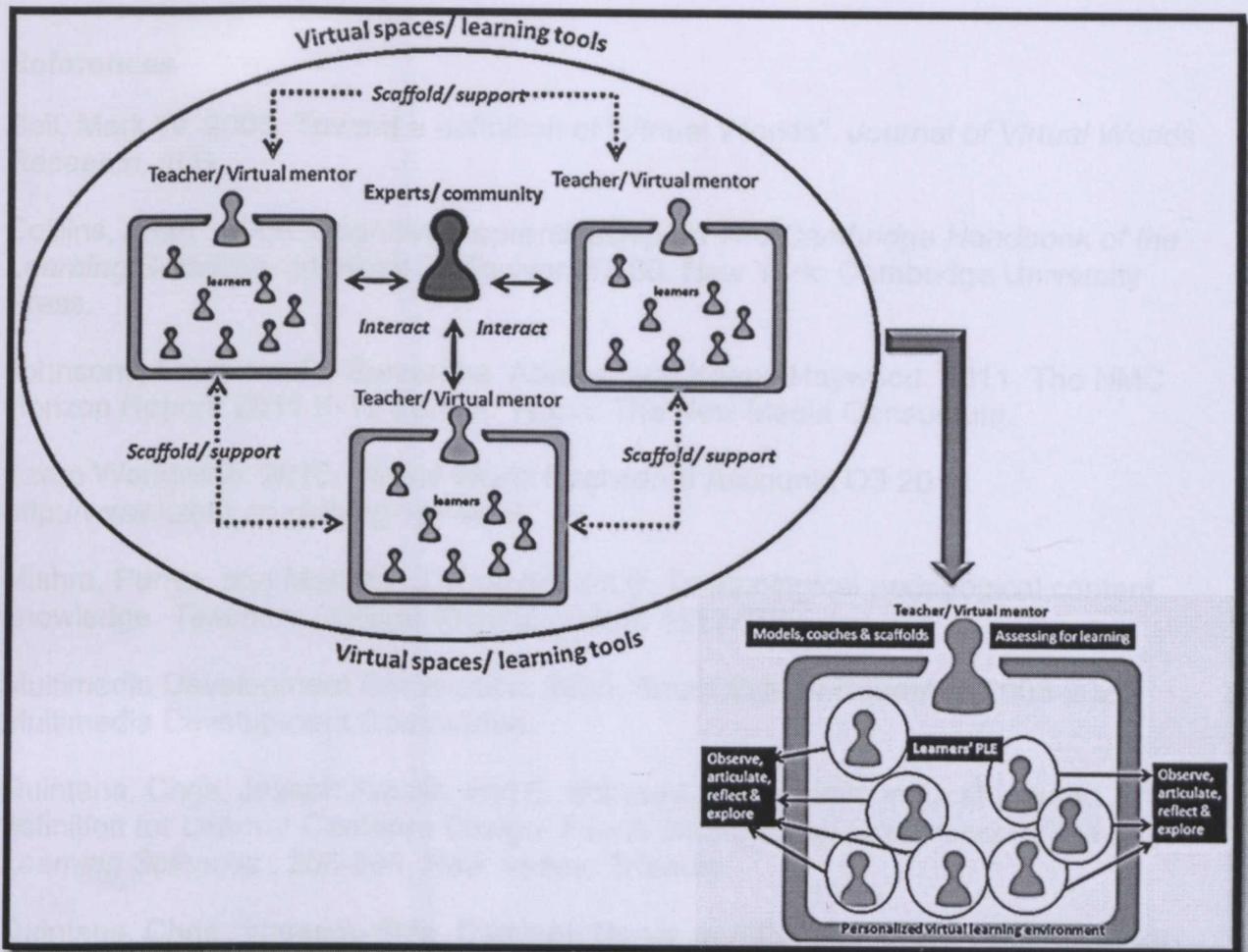
**5) assess learners for learning;**

The performance can easily be assessed synchronously and asynchronously. The use of communicative tools, and 3D objects that can be built can be assessed by other avatars. Performance can be improved by editing the 3D spaces or objects.

**6) involve learners in their own learning**

Based on CA methods, once mastering certain performances, learners can explore by creating their personalised virtual learning spaces. They can set their learning goals and gain ownership of their learning.

The approach of personalization can be illustrated as in Figure 1.



**Figure 1 Malaysian Personalized Learning Environment**

#### 4.4 Initial findings:

Findings from the learner profiles show that learners prefer to use tools that involve 3D animations; video making and games. The finding confirms that the learners are ready to use advanced tools like desktop virtual reality. In addition, after a week of introduction to the designed virtual world, three young learners have started building their personal virtual environment, without having to undergo training on how to build in virtual world. These findings can help the instructional designers to plan and focus on learning the skills rather than learning about the technology.

#### 5. Conclusion

This study is a work in progress. It is hoped that the virtual learning environment designed will facilitate learning and promote the personalization of Malaysian future classroom, as envisaged by the Ministry of Education in the Smart School Roadmap 2020.

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