Personalized Learning Environment (PLE) Approach: Preliminary Analysis in Malaysian's Secondary School

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Abstract— **This paper aims to share the preliminary findings which have made easy the development of Personalized Learning Environment (PLE). It describes types of learning styles in PLE.PLE is a new concept in designing and developing an online learning. PLE is more focused on individual learning rather than the instructor, facilities, resources and tools. PLE has also played an active role in improving the effectiveness of learning. Basically, there are three research instruments gathered to evaluate this research which are questionnaire, interview and prototype development. Phase one is Analysis which includes literature survey and collection of preliminary analysis data. Second phase is Designing and Development which adopt ADDIE model as a basis for multimedia development. The last phase is Testing and Evaluation.**

Keywords-component; PLE; Learning Styles; ADDIE; Methodology; Multimedia

I. INTRODUCTION

Learning processes are continuously being affected by many circumstances such as social trends, technological changes and so on (Ertl, et al., 10, García, 05).Personalized learning is truly a 21st century approach to education that, in practice, through flexibility and choice, honors and recognizes the unique gifts, skills, passions, and attributes of each child, as well as each child's challenges and obstacles to learning. Indeed, traditional learning based on "one size fits all" approach, tends to support only one educational model, because in a typical classroom situation, a teacher often has to deal with several students at the same time (Bachari E. et al., 2011). In order to ensure that learners engage and take responsibility for their own learning, many researchers (Aviram et al., 2008; Gagné et al., 2005; Jung and Graf, 2008; Kim, 2009; Retalis et al., 2004; Trinidad, 2003; Weber et al., 2005) suggested that the differences and distinctiveness of each learners must be taken into account in preparing the learning procedures. Learners interact with other learners by using communication channels provided in the learning environment (Chou et al., 2010). By choice and demand, technology is restructuring education, teaching, and learning, and affects them in ways that impact on everyone (Minocha et al. 2011). Teacher roles are changing rapidly than ever before, and new competencies are required all at a faster pace.

PLE is a new concept in designing and developing an online learning. PLE is more focused on individual learning rather than the instructor, facilities, resources and tools. PLE has also played an active role in improving the effectiveness of learning (X. Gu & X. Li., 2009). PLE has also played an active role in improving the effectiveness of learning (Li and Gu, 2009). PLE is a tool that allows for a learner to engage in a distributed environment consisting of a network of people, services and resources (S.bDownes, 2006).

As mentioned by Clements and Douglas (2008) in their article titled Personalized Learning and Innovation in Education, there are several features about PLE. There are:

1. Engages students in learning process, increased the responsibility and accountability of students. Students are become a creator instead of become a consumers of information.
2. Encourage student ownership of knowledge.
3. Imparts a level of autonomy students desire
4. Provides real life connection
5. Promotes creativity among students
6. Fosters critical thinking, deep learning and understanding
7. Provides a forum for sharing of ideas
8. Develops an interdependence and mutual respect between the teacher and the student.

The subject chosen in this study is Science Form 2. The aims of the science curriculum for secondary school are to provide students with the knowledge and skills in science and technology and enable them to solve problems and make decisions in everyday life based on science attitudes and nobles values. The Integrated Curriculum for Secondary Schools Specifications Science Form 2 is based on Ministry of Educations Malaysia. According to the syllabus, there are ten chapters. The chapters include The World Through Our Senses, Nutrition, Biodiversity, Interdependence Among Living Organism And The Environment and Water And Solution.Other chapters such as Pressure, Dynamics, Support And Movement, Stability and Simple Machine.

II. LEARNING STYLES IN PERSONALIZED LEARNING ENVIRONMENT (PLE)

Personalized Learning Environment (PLE) represents a paradigm shift (Elliott, 2010); an easy-to-use environment based on the idea that learning is a continuous and ongoing process being provided by number of resources and individuals.It seeks to provide tools to support learning of an individual learner which takes place in many contexts and situations (Attwell, 2009). PLE is an environment where people and communities, and tools and resources, interact in a very flexible way. Learning styles are personal qualities that influence the way students interact with their learning environment, peers, and teachers (Alkhasawe, Mrayyan, Docherty, Alashram, & Yousef, 2008).

The differences of learners include their learning styles, learning orientations, learning rates, cognitive styles, multiple intelligence, talents and many more (Samah et al., 2011). There are many types of learning styles that available in PLE. Figure 1 shows three of the most important types which are auditory, visual and kinesthetic. It is hoped that this study will be able to show how Nutrition topic in Science Form 2 could contribute to the effective teaching and learning especially using PLE approach.

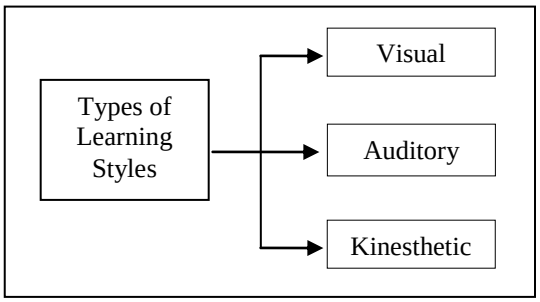

Figure 1. Focus area types of learning styles in Personalized Learning Environment (PLE)

There are three types of learning styles that applied in this study which is 1) Auditory, 2) Visual and 3) Kinesthetic.

i. **Visual:** Students prefer using pictures, images, and spatial understanding**.** Learns best by seeing. But do listen and take notes, reviewing notes frequently. Sit in the lecture hall or classroom where you can hear well. After you have read something, summarize it and recite it aloud.

ii. **Auditory**: Students prefer using sound and music. Learns best by hearing. Use charts, maps, filmstrips, notes and flashcards. Practice visualizing or picturing words/concepts in your head. Write out everything for frequent and quick visual review.

iii. **Kinesthetic:** Students prefer using your body, hands and sense of touch. Learns best by feeling or experiencing. Facts that must be learned should be written several times. Keep a supply of scratch paper for this purpose. Taking and keeping lecture notes will be very important. Make study sheets.

III. PRELIMINARY ANALYSIS

Questionnaires are distributed to find the most difficult topic in Science Form 2 subject. Table 1 shows the findings of preliminary analysis to find the difficult topic in Science Form 2 subject (refer Appendix B). Researcher conducts an interview with Science Form 2 teachers to find the most difficult topic (refer Appendix C). Nutrition is most difficult and also having many subtopics. The subtopics of Nutrition are Classes of Food, The Importance of a Balance Diet, Human Digestive System, Absorption of Digested Food, Reabsorption of Water and Defecation and Healthy Eating Habits.

TABLE I. PRELIMINARY ANALYSIS FINDINGS TO FIND DIFFICULT TOPIC IN SCIENCE FORM 2

	N	Min	Max	Mean	Std. Deviation	Variance
Topic1	90	1	5	2.00	.835	.697
Topic2	90	1	5	3.99	1.117	1.247
Topic3	90	1	4	2.94	.904	.817
Topic4	90	1	5	2.84	.911	.829
Topic5	90	1	5	2.54	.901	.813
Topic6	90	1	5	2.72	1.006	1.012
Topic7	90	1	5	3.11	1.054	1.111
Topic8	90	1	5	3.02	.861	.741
Topic9	90	1	5	2.67	.960	.921
Topic10	90	1	5	2.09	1.098	1.205
N	90					

A set of questionnaire is distributed to 90 students in Form 2 students at SMK Malim, Melaka, Malaysia. The data from the questionnaire are analyzed by using Statistical Package for the Social Science (SPSS) version 17.0. Analysis shows that the difficulty of the Nutrition topic resulted in higher average with total mean = 2.94 and standard deviation = 0.904. Few students have interviewed for the feedback regarding to the Nutrition topic. According to the feedback received, they have to remember the facts that had been taught in this topic. They also were boring with this topic. This boredom became more serious as students have not exposed on how improve the learning processes in this topic.

Table 3 shows the frequencies for Topic 2 which is Nutrition in Science subject. 40% agree and 38.9% strongly agree that Nutrition is the hardest topic compared to other topics. Only 3.3% states that Nutrition is the easiest topic followed by easy which is 12.2%.

TABLE II. FREQUENCIES FOR TOPIC 2 NUTRITION

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Easiest	3	3.3	3.3	3.3
Easy	11	12.2	12.2	15.6
Middle	5	5.6	5.6	21.1
Hard	36	40.0	40.0	61.1
Hardest	35	38.9	38.9	100.0
Total	90	100.0	100.0	

TABLE III. STUDENTS NEED INTERNET FOR THEIR STUDY

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	36	40.0	40.0	40.0
Agree	35	38.9	38.9	78.9
Middle	16	17.8	17.8	96.7
Not Agree	2	2.2	2.2	98.9
Strongly Not Agree	1	1.1	1.1	100.0
Total	90	100.0	100.0	

Table 4 shows the analysis of the students need internet for their study. Based on the statistic, it shows that 40% strongly agree and 38.9% agree that students need internet for their study. Only 2.2% not agree and 1.1% strongly not agree of using internet in their study. Majority of students associates learning with acquiring information by assessing internet. They also extremely value, useful tools which help them to plan their tasks, save time, simplify complicated tasks and definitively, have fun.

IV. RESEARCH METHODOLOGY

This study will involve both quantitative and qualitative methodologies. There are five main components in the study:

1. Preliminary Analysis
2. A literature review
3. Focused group interviews
4. Questionnaire survey
5. Testing

There are three main phases involved in this study:

A. Phase 1: Analysis

This phase defined the requirement of project, independent of how this project is accomplished. We have defined the problem that occur and the deliverable product of the end project. Focused group interviews, literature survey and Questionnaire survey will be conducted to verify requirement.

B. Phase 2: Design and Development

This phase consists of design and development of product based on the requirement. This phase used the ADDIE method to complete the project. ADDIE is stand for analysis, design, development, implementation and evaluation.

i. Analysis

Analysis what is the problem statement, target user, objectives, ID, contents and user requirement and preliminary testing will be carried out.

ii. Design

Draw a layout and storyboard for the application. Design the game engine and portal structure. The details problem solving step and intelligent pedagogical agent will be design to help student learning.

iii. Development

Develop a multimedia application based on the layout and storyboard. All the multimedia element, game engines, problem scenarios set, and web portal will be developed. All character, video, animation, and web elemen will be integrated in package

iv. Implementation

Implement the application to the target area.

v. Evaluation

This stage provides final review checkpoint for the project to measures how well the project achieved its goals.

C. Phase 3: Evaluation

This phase is the activities that require improvement for increasing the research result. Final documentation will be prepared and project will be launch.

V. RESEARCH IMPORTANCE

At the end of the study, hopefully this research will contribute to the advancement of knowledge via:

1. *Students*
   - Self directed learning
   - Active involvement among students
2. *School*
   - Propose new learning environment
   - Learning experience
3. *Personalized Learning Environment (PLE) field*
   - Propose new PLE model framework
   - Added value to learning environment
   - Added value to the field of PLE especially stages of learning

VI. CONLUSION

The decision of adopting applications, the development of matching learning activities, integrating technologies in instruction are all roles and activities that directly contribute to the successful implementation on PLE. The integration of functions in the learning environment is very important to ensure that the external conditions of learning are provided to students. Therefore the learning environment must be suitable according to their students learning styles, preferences and needs in learning.

Application has an interesting interactivity which the users can easily understands the contents. With this application, user can improve their skill and knowledge because it is a teaching material that provided as individual access material. It can help them to learn and apply when they want because it can be use by group or as personal materials. Recommendations for future research include of results of this study from learning technologies practitioners, students, teachers and the people involved in PLE research in order to develop student's PLE competencies and roles.

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