

DESIGNING PROBLEM BASED LEARNING (PBL) PROBLEM SCENARIO FOR STATISTIC USING LINEAR AND NON-LINEAR MULTIMEDIA PRESENTATION

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Abstract— Problem Based Learning (PBL) is an instructional method that is known to offer students with knowledge suitable for problem solving. In order to test this assertion the process of problem based learning is described and measured against three principle of learning: activation of prior knowledge, elaboration and encoding specificity. Using PBL method, students' understanding with regards to the problem scenario is very significant process. One of the main defining characteristic of PBL, which distinguishes it from some other method, is that the problem is presented to the students first at the start learning process. Traditionally, problem scenario is presented in a printed text, which is not tempting for student to understand the motive behind it. Information and Communication Technology (ICT) on the other hand has widely accepted in many areas which include education as well. By applying multimedia presentation as a discipline in ICT, it is believed that it could helps in designing the effective problem scenario. The purpose of this study is to design and test the effectiveness of PBL problem scenario for subject Statistic using linear and non-linear multimedia presentation. Linear presentation is known as no navigation control is involved through that process while non-linear presentation uses user interactivity to control the presentation. This paper discusses the early storyboard design and the icons that used.

Keywords- Problem Based Learning, Problem Scenario Design, Statistic

I. PROBLEM BASED LEARNING (PBL)

There is a research and theory suggest from psychological that by having students learn through the experience of solving problem, they can learn both content and thinking strategies. One of the main challenge in PBL, the problem scenario is presented to allow the student formulate the idea to solve it. In PBL, teacher or instructor give task using problem scenario which student should transforms it into the way that they understand with the facilitation of their instructor.

After that, they determine the learning issues and break up to do a research. Then student will come back with information and synthesizing their new findings with the previous knowledge. Finally, student synthesis stages of the problem solving.

Hence the main challenge is, this project is developed based on web and applies PBL approach which focus on ways to present problem scenario that can visualizes problem efficiently. Any subject can be a domain for this research and this paper focus to the subject Statistic for Science Computer student in UTeM.

A. Problem Statement

This project is about the research of 'Designing Problem Based Learning (PBL) Problem Scenario for Statistic Using Linear and Non-Linear Multimedia Presentation'. Issues related to the achievement of students in higher learning institutions in Malaysia have always been of concerned to the society. Reports on students' passive attitudes, lack of motivation, weakness in problem analysis and lack of communication skills has prompted certain authorities to recommend PBL approach in teaching (Sharifah Norul Akmar SZ and Lee Siew Eng, 2005). So PBL is an alternatives approach that can be used to encourage student in learning process. One of the major strengths of PBL is the small group analysis of problem that promotes activation, and elaboration of prior knowledge (Schmidt, 1993).

According to the situation, we need to expose the PBL concept to the student by present the scenario in effective way. Deliver problem scenario in effective way is important which can improve the ability of student to help student comprehend the situation and see the relevance of various contextual elements. In real problem situations very rarely fall into rigid subject areas that require a multi disciplinary approach (Elaine Payne and Lesley Whittaker, 2000).

This project will develop using web as a platform. Student will uses an interactive web based system in their learning process. Evidence that show multimedia is important in education are there were related study of article is seen began to work such as "Producing Interactive Multimedia Courseware for Information Technology in Education: An Initiative at University Teknologi Malaysia" by Baharuddin Aris et al. (1998) and "Integrating

Computers Into The Problem-Solving Process” by Lowther and Morrison (2003).

By using this web student will not passively learning and they will use their creativity to solve the problem. It makes an active learning in a classroom while student solving the task. Besides, it can motivate students to identify and apply research method then communicate effectively.

B. Objectives

There are three objectives of this research in learning process:

1. To test suitability of PBL approach in learning Statistic at UTeM
2. To measure the effectiveness of problem scenario using linear and non-linear technique.
3. To evaluate students attitude in using multimedia presentation PBL problem scenario.

C. Scope

This project is for Science Computer students at UTeM that are taking statistic on 2009 session. The content of this web covered chapter probability for subject Statistic. This topic is chosen because it states a critical problem based on an analysis of different probabilistic settings according to the scenario. Typically, there is lack of interest in learning from college students when taking introducing statistic courses, hence direct involvement in the learning process could be the palliative to that lack of interest (German J.Piego, 2007).

This project is focus on how to design and present PBL problem scenario in effective way to students. This approach can be applied in multimedia application to create a good product for students. This product is developed based on Web-Base. The major authoring tool that is used to develop this project is Adobe Flash CS3.

Faculty		Data Description	Probability	Discrete Random	Continuous Random	Sampling Distribution	Estimation	Hypothesis Testing
FTMK	Mean	2.39	3.93	2.86	3.07	3.26	3.21	3.11
	N	28	28	28	28	27	28	28
Total	Std. Deviation	.832	1.120	.756	.940	.903	.738	1.031
	Mean	2.39	3.93	2.86	3.07	3.26	3.21	3.11
	N	28	28	28	28	27	28	28
	Std. Deviation	.832	1.120	.756	.940	.903	.738	1.031

Figure 1: Means for Difficult Topic

II. LINEAR AND NON-LINEAR PRESENTATION

A. Linear Presentation

Linear multimedia presentation is without any navigation control for the viewer such as cinema

presentation. Linear means that each part of the content is meant to be seen or heard in the same order every time it is experienced. Therefore, the only point of interaction on the recipient side is to stop or forward the story process without being able to influence the story’s narrative path or the plot (Marc Spaniol et.al, 2006).

B. Non-Linear Presentation

Non-linear content offers user interactivity to control progress as used with a computer game or used in self paced computer based training. Hypermedia is an example of non-linear content. Multimedia presentation can be live or recorded. A recorded presentation may allow interactivity via a navigation system. A live multimedia presentation may allow interactivity via an interaction with presenter.

III. DEVELOPMENT

A. Early Storyboard

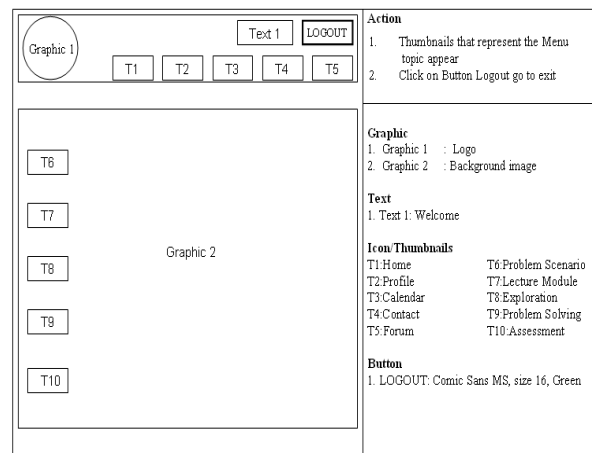


Figure 2: Storyboard for Home Interface



Figure 3: Home Interface

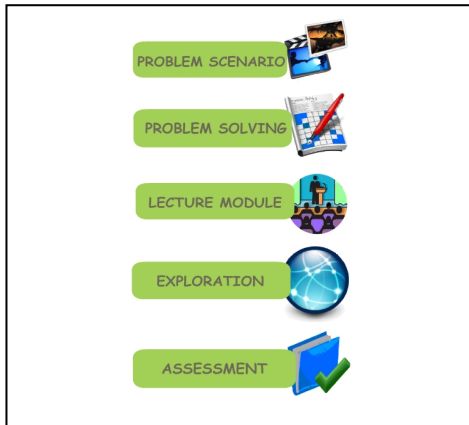


Figure 4: Icons

B. Module

There are five modules contains in this project which are:

- 1) Problem Scenario - This module is the main area which consists of linear and non-linear multimedia presentation. PBL problem scenario is visualizes using both categories and students can choose the suitable one. To help students understand the problem.
- 2) Problem Solving - Aims at enriching the learners understanding about the topic through problem solving activities.
- 3) Lecture Module- This module is for lecture notes. Students get the information by their own learning. To guide and give students explanation about the topic.
- 4) Exploration - To help students get information which students can explore the extra information in this module. Five components in this module namely Glossary, Related Web, Gallery, Extra Notes and Ask Expert
- 5) Assessment - Comprises problem solving questions and students are required to solve them accordingly. To test student understanding about Probability topic.

IV. CONCLUSION

Technology has been suggested as a way to address the challenges for this approach (Min Liu, 2005). Communication and information technologies are undergoing rapid development and continual evolution. There are many media format can be used to visualizes problem scenario. This paper focus on using multimedia technology as an innovative teaching and learning strategy in a Problem Based Learning approach by focusing on how to design problem scenario using linear and non-linear multimedia presentation. The use of linear and non-linear multimedia presentation as a trigger for discussions, play a major role in understanding problem.

ACKNOWLEDGMENT

I would like to acknowledge and extend my heartfelt gratitude to my supervisor, Dr. Faaizah Shahbodin and co-supervisor, Dr. Burairah Hussin for encouragement and support. Most especially to my family and friends for understanding and assistance.

REFERENCES

- [1] H.G Schmidt. "Problem Based Learning: Rationale and Description". Department of Education Development and Research. 1983.
- [2] Payne E., Whittaker L. "Developing Essential Study Skill". Prentice Hall. ISBN 9780139558740, 2000.
- [3] Sharifah Norul Akmar SZ and Lee Siew Eng. " Integrating Problem Based Learning (PBL) in Mathematics Method Course". Electronic Journal of University of Malay (EJUM). Vol 3 No(1), 2005.
- [4] Baharuddin Aris et al. "Producing Interactive Multimedia Courseware for Use of Information Technology in Education: An Initiative at Universiti Technology Malaysia". Journal of Instrution Delivery System. Vol 12 No(3), 1998.
- [5] Min Liu. "Motivating Students Through Problem-based Learning". National Education Computing Conference. 2005.
- [6] Lowther , Deborah L. and Morrison, Gary R. "Integrating Computers into the Problem-Solving Process". Teaching and Learning. No(95), 2003.
- [7] Marc Spaniol et.al. "Web-based Learning With Non-Linear Multimedia Stories". International Cofereneces on Web Based Learning, 2006.