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Student centred teaching and learning for training calculate a binary code by using binary computer game

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Abstract

This research aims to determine achievement of learner follow with the important idea in teaching and learning management which focus in student centred. It means the teacher has to know the experience management by attached the process with focus to the student get the knowledge by themselves. In this research, binary computer game was taken to create the experience for learning. The result show that taking binary computer game for the tool in experience management to the learner made them success and got the higher academic achievement for the learner with statistically significant.

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Keywords: Student centred, teacher, binary computer game, academic achievement, statistically significant.

1. Introduction

Nowaday, the education is necessary and be the most important for the human because it has a role in all parts of development. It makes the stable and development of the country including the quality develop of the human and the powerful to develop the country. Hence, the educational management today is very important to develop the human to be complete living in many parts such as health, mind, idea, social, moral, knowledge and culture for living happily. Educational management nowaday must to be continuous study though the life. The educational management which makes the learner has the knowledge with the moral means that the learner must have the value are desired the ability in analyze, synthetic, good vision and widely. Then, the educational management is necessary and be the important duty of the school to promote and support the teacher in activity of the management in the study. It should

to manage the education which focus the student centred and good standard in all objectives and provide the teacher who has ability in the teaching with the most effective. The idea and principal of teaching which focus student centred is developed continuously by focusing the learner who can evaluate the benefit from the social, learn together, work together, practice technique using and the method to solve the problem by themselves. They has the freedom and responsible by themselves which the teacher is the person who stimulate, trig and promote the study for the learner. The learner gets the chance to study by themselves. All of above are the important issue to develop the human or learner to be the quality person by activity management which focus in student centred. The important idea in educational management which focusing student centred is that the teachers must know how to manage the experience which provide the process to make the learner can learn, create, build and do to find the answer by themselves, work with the other happily and take their knowledge for the most benefit.

In this paper show that the Student centred teaching and learning research for training calculate a binary code by using binary computer game has the propose to develop thinking skill of the binary code and develop the Instructional Model that allow the learner is enhanced of learning achievement in basic electronics engineering and computer engineering courses who major in Electronics engineering technology and power electronics engineering technology Faculty of Engineering, Undergraduate 2nd academic year in the 1st of the 2011 at Princess of Naradhiwas University.

2. Style or technique focuses on Student centred teaching and learning

2.1. Problem-based learning

The Problem-based learning (PBL) is a student-centered pedagogy in which students learn about a subject in the context of complex, multifaceted, and realistic problems. The goals of PBL are to help the students develop flexible knowledge, effective problem solving skills, self-directed learning, effective collaboration skills and intrinsic motivation. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. The role of the instructor is that of facilitator of learning who provides appropriate scaffolding and support of the process, modeling of the process, and monitoring the learning. The tutor must build students confidence to take on the problem, encourage the student, while also stretching their understanding.

2.2. Project-based learning

The Project-based learning is the use of in-depth and rigorous classroom projects to facilitate learning and assess student competence. Project Based Learning was promoted by the Buck Institute for Education in the late 1990s, in response to school reform efforts of that time. Project-based learning is an instructional method that provides students with complex tasks based on challenging questions or problems that involve the students' problem solving, decision making, investigative skills, and reflection that includes teacher facilitation, but not direction. PBL is focused on questions that drive students to encounter the central concepts and principles of a subject hands-on. Students form their own investigation of a guiding question, allowing students to develop valuable research skills as students engage in design, problem solving, decision making, and investigative activities. Through Project-based learning, students learn from these experiences and take them into account and apply them to the world outside their classroom. PBL is a different teaching technique that promotes and practices new learning habits,

emphasizing creative thinking skills by allowing students to find that there are many ways to solve a problem.

2.3. Inquiry-based learning

Inquiry-based learning is an instructional method developed during the discovery learning movement of the 1960s. It was developed in response to a perceived failure of more traditional forms of instruction, where students were required simply to memorize fact laden instructional materials (Bruner, 1961). Inquiry learning is a form of active learning, where progress is assessed by how well students develop experimental and analytical skills rather than how much knowledge they possess.

2.4. Collaborative learning

Collaborative learning is a situation in which two or more people learn or attempt to learn something together. Unlike individual learning, people engaged in collaborative learning capitalize on one another's resources and skills. More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetry roles. Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other. These include both face-to-face conversations and computer discussions. Methods for examining collaborative learning processes include conversation analysis and statistical discourse analysis.

2.5. E-learning

E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to e-learning.

2.6. concept map

concept map is a diagram showing the relationships among concepts. It is a graphical tool for organizing and representing knowledge. Concepts, usually represented as boxes or circle, are connected with labeled arrows in a downward-branching hierarchical structure. The relationship between concepts can be articulated in linking phrases such as "gives rise to", "results in", "is required by," or "contributes to". The technique for visualizing these relationships among different concepts is called "concept mapping". Concept maps are used to define the ontology of computer systems, for example with the object role modeling or Unified Modeling Language formalism

2.7. Jigsaw

In education, jigsaw is a teaching technique invented by social psychologist Elliot Aronson in 1971. Students of an average sized class (26 to 33 students) are divided into competency groups of four to six students, each of which is given a list of subtopics to research. Individual members of each group then

break off to work with the "experts" from other groups, researching a part of the material being studied, after which they return to their starting group in the role of instructor for their subcategory. The jigsaw strategy is a cooperative learning technique appropriate for students from 3rd to 12th grade. It is also used extensively in adult English Second Language (or ESL) classes. The strategy is an efficient teaching method that also encourages listening, engagement, interaction, peer teaching, and cooperation by giving each member of the group an essential part to play in the academic activity. Both individual and group accountability are built into the process. In ESL classrooms jigsaws are a four-skills approach integrating reading, speaking, listening and writing

3. Method

The methodology consisted of 5 steps as follows:

- step 1 - The test was prepared for binary code.
- step 2 - the target group was tested with a test binary code.
- step 3 - The binary computer game was used by the target group for 2 hours.

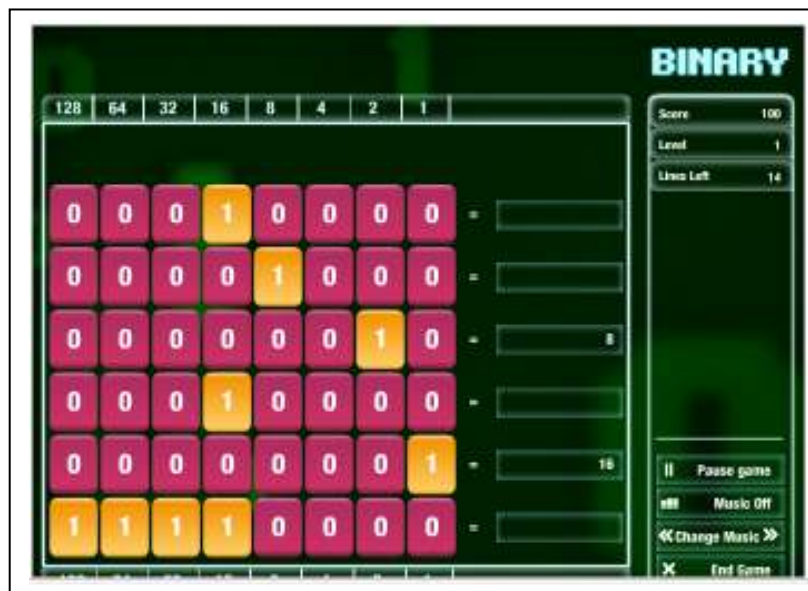


Figure 1. The binary computer game

- step 4 - the target group was tested with a test binary code again.
- step 5 - The result was analyzed to compare the difference before and after using binary computer game in Instruction. The target group comprised 20 learners who major in Electronics engineering technology and power electronics engineering technology Faculty of Engineering, Undergraduate 2nd academic year in the 1st of the 2011 at Princess of Naradhiwas University.

4. Results

Table : presents the result of the comparison between before and after using binary computer game in teaching and learning

Students No.	Pre-test	Post-test	D	D ²
1	15	20	5	25
2	13	17	4	16
3	10	18	8	64
4	12	19	7	49
5	16	22	6	36
6	14	21	7	49
7	13	19	6	36
8	16	23	7	49
9	14	20	6	36
10	12	15	5	25
11	17	24	7	49
12	13	19	6	36
13	15	21	6	36
14	16	22	6	36
15	14	20	6	36
16	16	21	5	25
17	13	16	3	9
18	17	24	7	49
19	19	25	6	36
20	15	21	6	36
			$\sum D = 119$	$\sum D^2 = 733$

The step for testing

- step 1 : detection the data related with fundamental agreement of t-test in Paired Samples using.
- step 2 : establish the hypothesis for the test.

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 > \mu_2$$

- step 3 : establish a = 0.05
- step 4 : calculate the statistic value 't' form

$$t = \frac{\sum D}{\frac{\sqrt{(n \sum D^2 - (\sum D)^2)}}{n-1}}$$

- step 5 : calculate t value from the table by calculating df value from the formula.

$$\begin{aligned}
 t &= \frac{119}{\sqrt{\frac{(14,660-14,161)}{19}}} \\
 &= \frac{119}{\sqrt{\frac{499}{19}}} \\
 &= 23.2
 \end{aligned}$$

t critical value when $\alpha = 0.05$, degrees of freedom = $n - 1 = 19$, one-tailed test = $t_{(0.05,19)} = 1.7291$

The results of the experiment

$$t \geq t_{\text{critical}}, \text{reject } H_0$$

$$t < t_{\text{critical}}, \text{accept } H_0$$

It means the teaching with novel technique make the student has increase knowledge with the significant at the level 0.05

5. Conclusions and suggestion

Teaching-learning management which focused in student centred is the important pattern for lecturer nowadays. It stimulates students to develop themselves in the highest level related to each power and potential.

Because in the social nowadays, there are many technologies in the teaching-learning management. Then, teaching-learning which focused student centred is one pattern can make students success better achievement. From the result above, it presents that taking computer technology (binary computer game) to practice in binary calculate skill. It effects the students create better skill in binary calculation.

There is suggestion to create computer game for the study in every subject in Engineering Program because of the study with binary computer game make the students happy, challenge in their idea and not boring. Also, it can practice idea skill for better study.

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