

A PROTOTYPE DEVELOPMENT OF PERSONALISED LEARNING ENVIRONMENT FOR NUTRITION TOPIC FOR SECONDARY SCHOOL

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ABSTRACT

In recent years, education field have moved rapidly towards integrating technology or computer in the process of teaching and learning. This is because computer has a great potential for enhance teaching and learning outcomes. Its purpose should be centered on humanity and public interest. The objective of this research is to develop personalised learning as a tool for students since Nutrition is one of the most important topic in Science subject but often difficult subjects to teach at the secondary school education level. Several surveys are developed to know about learning needs and goals and to construct the vision of PLE organization. This study adapted personalised learning method to get involved more closely to the phenomena of learning in such open online environments in which researcher was able as a learner to participate in the various activities of the courses, interact with participants to explore the processes of learning and interaction. The findings show that the prototype is well designed in terms of using personalized learning elements which goes through a series of systematic testing stages. In turn, it is highly anticipated that the creation of the PLENut, would be an alternative approach so that all students could capture, in a richer and more meaningful manner, the concepts of Nutrition. This prototype will be a solution in using a variety of social media in teaching students to become effective self-regulated learners. Besides that, it can contribute to the society by humanizing the innovation and technology through Higher Education 4.0.

Keywords: *Multimedia; Science; PLE*

1. INTRODUCTION

Over the last two decades the use of E-learning technology increased to such an extent that the role of the traditional academic has been forced to change [9]. Today's younger generation, they are being called, have been taught how to use computers and various computer programs both at home and in their elementary and secondary institutions [3]. The use of information and communications technology (ICT) is one of the ways to encourage the process of learning, to support communication in learning settings, assess learning activities, manage resources and to create educational materials [4]. During the process of learning, students communicate, negotiate and talk each other to share their achievements [7]. Thus this is an area that is often described as 'learning technology' or 'technology enhanced learning', and where technologies are framed in terms of their association with learning example 'learning management systems' and 'learning analytics' [8].

Personalization is one of the recurring themes in education and has occupied a large amount of specialized literature, since its appearance in the 1960s [2]. The role of technology continues to play a role in bringing personalized learning to scale, personalized learning has made its way into the classroom. By integrating the principles of personalized learning with the tools of technology, some educators argue that they can create the kind of customized learning environment that has the potential for breaking schools out of the industrial-age model of education and bring about true 21st century school reform [6]. A reassessment of mobile learning, a critical exploration of the ideological underpinnings of national digital strategies, and pedagogical analysis of personalized and adaptive learning [8]. Academic help-seeking is one among many learning strategies students use to improve their learning, including studying more, organizing one's studying, note-taking, outlining notes and readings, reviewing, choosing engaging assignments, and managing expectations including lowering aspirations [1].

Current personalized learning there is a limited personalised courseware tools for e-learning contribute to the lack of students interest in Science. Personalization in online learning remains the focus of attention of many researchers nowadays. The use of multimedia, especially animation elements have the potential to help teachers deliver a scientific concept more clearly, as compared to oral delivery or static illustration [10]. The other problem is student's lack of connection between the formal, non-formal and informal environments in online learning which makes it difficult to improve learning processes [11].

In this paper, we analyse students' performance using PLENut as personalised learning approach in learning a Science course.

2. METHODOLOGY

Samples; Three separate sample pre-test-post-test design were used as a testing procedure in this study which involve form 2 students from secondary school in Melaka.

Design & Development; In the design phase, planning was made to specify the VAK teaching activities and identify learning contents. The questionnaire covers the Nutrition topic in Science subject, preferences types of learning styles in PLENut and checklist for PLENut. The design for PLE elements such as *Content, Communication, Connection, Community, Collaboration, Collection and Creation*. The content of the prototype is based on *Panduan Perkembangan Pembelajaran Murid Sains Tingkatan 2* according to Ministry of Educations Malaysia. 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 [5].

Implementation; The study was conducted by permission of a school administrator. The school administrator referred the researcher to the subject coordinator. The coordinator recommended the first group of respondents who consists of Science teachers based on their 5-year teaching experience to be invited for an interview and self-administered questionnaire with assistance by the researcher.

Instrument; Pre Test, Learning Styles Preferences, Consent Form, Post Test and PLENut Evaluation Form were used in this study. The aim of pre-test is to measure of pre-existing knowledge on the Nutrition topic. The performance scores were calculated using the sum of 50 marks as the scores for 100%.

Data Collection Procedure: Before conducting test for both groups, all students were given pre-test through a set of questions to test their prior knowledge. The students went through the treatment using PLENut for 6 weeks. After treatment 1, all students completed the questionnaire during post-test to see their student's increment. The evaluation that involves testing of *PLENut*. Student performance involve for Visual Learning Styles, Auditory Learning Styles and Kinaesthetic Learning Styles. The testing using a non-parametric which is Pretest and Posttest. The evaluation of student performance use three separate sample pre-test post-test design.

3. RESULTS AND DISCUSSION

Table 1 shows 26 students in Visual 1 group scores after measurement (*Sum of Ranks* = 351.00), 25 students in Visual 2 group show scores after measurement (*Sum of Ranks* = 325.00) and 25 students in Visual 3 group show scores after measurement (*Sum of Ranks* = 325.00). The test indicated that all group is significant for Visual 1 group [$z = -4.460$, N-Ties = 3, $p < .05$], Visual 2 group [$z = -4.374$, N-Ties = 0, $p < .05$] and Visual 3 group [$z = -4.374$, N-Ties = 0, $p < .05$]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 1 Comparing pre-test and post-test learning style scores for Visual.

| Group | Post-test scores - Prettest scores | N | Mean Rank | Sum of Ranks | Z | Asymp. Sig. (2-tailed) |
|----------|------------------------------------|----|-----------|--------------|-------|------------------------|
| Visual 1 | Negative Ranks | 0 | .00 | .00 | 4.460 | .000 |
| | Positive Ranks | 26 | 13.50 | 351.00 | | |
| | Ties | 0 | | | | |
| | Total | 26 | | | | |
| Visual 2 | Negative Ranks | 0 | .00 | .00 | 4.374 | .000 |
| | Positive Ranks | 25 | 13.00 | 325.00 | | |
| | Ties | 0 | | | | |
| | Total | 25 | | | | |
| Visual 3 | Negative Ranks | 0 | .00 | .00 | 4.374 | .000 |
| | Positive Ranks | 25 | 13.00 | 325.00 | | |
| | Ties | 0 | | | | |
| | Total | 25 | | | | |

Table 2, 12 students in Auditory 1 group show scores after measurement (Sum of Ranks = 78.00), 12 students in Auditory 2 group show scores after measurement (Sum of Ranks = 78.00) and 11 students in Auditory 3 group show scores after measurement (Sum of Ranks = 66.00). The test indicated that all group is significant for Auditory 1 group [$z = -3.061$, N-Ties = 0, $p < .05$], Auditory 2 group [$z = -3.063$, N-Ties = 0, $p < .05$] and Auditory 3 group [$z = -2.941$, N-Ties = 0, $p < .05$]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 2 Comparing pre-test and post-test learning style scores for Auditory.

| Group | Post-test scores - Prettest scores | N | Mean Rank | Sum of Ranks | Z | Asymp. Sig. (2-tailed) |
|------------|------------------------------------|----|-----------|--------------|-------|------------------------|
| Auditory 1 | Negative Ranks | 0 | .00 | .00 | 3.061 | .002 |
| | Positive Ranks | 12 | 6.50 | 78.00 | | |
| | Ties | 0 | | | | |
| | Total | 12 | | | | |
| Auditory 2 | Negative Ranks | 0 | .00 | .00 | 3.063 | .002 |
| | Positive Ranks | 12 | 6.50 | 78.00 | | |
| | Ties | 0 | | | | |
| | Total | 12 | | | | |
| Auditory 3 | Negative Ranks | 0 | .00 | .00 | 2.941 | .003 |
| | Positive Ranks | 11 | 6.00 | 66.00 | | |
| | Ties | 0 | | | | |
| | Total | 11 | | | | |

According to Table 3, 7 students in group Kinaesthetic 1 show scores after measurement (Sum of Ranks = 28.00), 7 students in group Kinaesthetic 2 show scores after measurement (Sum of Ranks = 28.00) and 7 students group in Kinaesthetic 3 show scores after measurement (Sum of Ranks = 28.00). The test indicated that all group is significant for group Kinaesthetic 1 [$z = -2.371$, N-Ties = 0, $p < .05$], group Kinaesthetic 2 [$z = -2.375$, N-Ties = 0, $p < .05$] and group Kinaesthetic 3 [$z = -2.371$, N-Ties = 0, $p < .05$]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 3 Comparing pre-test and post-test learning style scores for Kinaesthetic.

| Group | Post-test scores - Prettest scores | N | Mean Rank | Sum of Ranks | Z | Asymp. Sig. (2-tailed) |
|----------------|------------------------------------|---|-----------|--------------|--------|------------------------|
| Kinaesthetic 1 | Negative Ranks | 0 | .00 | .00 | -2.371 | .018 |
| | Positive Ranks | 7 | 4.00 | 28.00 | | |
| | Ties | 0 | | | | |
| | Total | 7 | | | | |
| Kinaesthetic 2 | Negative Ranks | 0 | .00 | .00 | -2.375 | .018 |
| | Positive Ranks | 7 | 4.00 | 28.00 | | |
| | Ties | 0 | | | | |
| | Total | 7 | | | | |
| Kinaesthetic 3 | Negative Ranks | 0 | .00 | .00 | -2.371 | .018 |
| | Positive Ranks | 7 | 4.00 | 28.00 | | |
| | Ties | 0 | | | | |
| | Total | 7 | | | | |

4. CONCLUSIONS

This study presents findings on the implementation of a personalised learning approach in secondary school. Results of the study shows that students' learning styles significantly affect student performance in the classroom and to improve teaching methods accordingly. These findings suggest that PLENut model could be used to inform the teachers or academicians about the important components or themes, learners, content and context that needs to be considered when preparing courses.

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