DESIGN OF AN INTELLIGENT CLOUD LEARNING SYSTEM TO DEVELOP DIGITAL LITERACY AND COLLABORATIVE LEARNING SKILL

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Abstract - This study was conducted to research and develop an Intelligent Cloud Learning System (ICLS) to develop digital literacy and collaborative learning skill. The aims of this study were 1) to design an ICLS to develop digital literacy and collaborative skill and 2) to evaluate an ICLS. The research method was divided into two phases. The first phase involved the design of the model: 1) to study, analyze, and synthesis the content; 2) to arrange the Intelligent Cloud Learning System process; and 3) to summarize the results. The second phase involved the model evaluation. The sample group in this research consisted of seven experts in the fields of design cloud learning system, information technology, algorithm and instructional design. These experts were selected by purposive sampling. Data were analyzed using arithmetic means and standard deviations. The process of developing an ICLS has four components. The model helps to develop digital literacy and collaborative learning skill. The experts agreed with the overall model and had a learning activity that was appropriate at a very good level.

Index Terms - Cloud Learning, Digital Literacy, Collaborative Learning Skill, Intelligent Tutoring System

I. INTRODUCTION

Developing countries in the digital age in the social sphere is another important activity to accelerate the development of digital literacy skills for lifelong learning and education. In particular, the development of digital intelligence (DQ), which is a set of intellectual, emotional and social intelligence. For the digital age (Digital Citizens). In order to create immunity for confronting challenges and adapting to society in the digital age. Specifically, enhancing the skills of using digital technology or digital literacy is a fundamental issue in the development of human resources for a coherent digital society. To develop the foundation of personnel to be ready and skilled in using technology creatively.

The development of teaching styles requires the adaptation of techniques and teaching methods in line with current change. Characteristics of digital learners with collaborative and independent learning styles. It requires a proper learning style, such as Connectivism. This is a learning theory in the digital world that supports the gathering of information from the sources of knowledge that exist together. By collaborating with each other and creating new knowledge. By linking knowledge. Available from the new learning environment for learning benefit. It can be integrated with the current cloud technology to play a very important role in learning. It also enhances the skills of learning and collaboration through online collaboration.

II. RESEARCH OBJECTIVE

The purpose of this study were:

A. To design of an intelligent cloud learning system to develop digital literacy and collaborative learning skill.
B. To evaluate of an intelligent cloud learning system to develop digital literacy and collaborative learning skill.

III. CONCEPTUAL FRAMEWORK

The conceptual framework of this research integrated five components in the design of the Intelligent cloud learning model. The components are the cloud learning[1], intelligent tutoring system (ITS)[2][3], connectivism, collaborative theory and digital literacy as shown in Figure 1.



Fig.1. Conceptual Framework of an Intelligent Cloud Learning System to Develop Digital Literacy and Collaborative Learning Skill

IV. SCOPE OF THE STUDY

A. Population:
The study's population included experts in design cloud learning system, information technology, algorithm and instructional design.

B. Samples:
Experts were chosen using purposive sampling of individuals with more than 10 years of experience in relevant fields.

C. Variables of the study:
1) The independent variable was an Intelligent Cloud Learning System to Develop Digital Literacy and Collaborative Learning Skill.
2) The dependent variable was the evaluation of the model's appropriateness.

V. RESEARCH METHODOLOGY

This research had 2 phases.

A. The first phase:
The first phase was to develop an ICLS to develop digital literacy and collaborative learning skill, with the process as follows:
1) To study, analyze, and synthesis documents and prior research relevant to the elements of Cloud Learning, Intelligent Tutoring System, Connectivism, Collaborative Learning and Digital Literacy.
2) To develop an ICLS to develop digital literacy and collaborative learning skill by using data collected from studies and analyses of relevant documents and research.
3) To present an ICLS to develop digital literacy and collaborative learning skill to advisors and experts for consideration by means of in-depth interviews.
4) To create the tools for evaluating the appropriateness of the model.

B. The second phase:
The second phase of the research was an evaluation of an ICLS to develop digital literacy and collaborative learning skill, with a method as follows:
1) To present the developed an ICLS to the seven experts from the fields of design cloud learning system, information technology, algorithm and instructional design.
2) To improve an ICLS according with experts' suggestions.
3) To present an ICLS in the form of a diagram with report.
4) To analyze the results of the evaluation of the model by mean ($\bar{x}$) and standard deviation (S.D.). The evaluation form was built on a 5-point Likert scale: very good, good, moderate, poor and very poor.

VI. RESULT

The results of this research are divided into 2 parts.

A. The first part:
An ICLS to develop digital literacy and collaborative learning skill is illustrated in Fig.2. This model had 4 components on cloud technology as follows:
Component 1. Student Module: This component consisted of ability, efficiency, progress, learning patterns, history of learn, and history of test. In this component, the learner hadto monitor their own efficiency and see their own learning paths.
Component 2. Pedagogical Module: In this component, the instructor had to insert teaching styles, teaching techniques, teaching strategies and feedback for learners. This component consisted of environment, suggestion for activity, describe the process, work and reason for assistance, learning materials, and follow and evaluate activity.
Component 3. Knowledge Base Module: This component consisted of knowledge management system (ICLS) and knowledge database. This component is an intelligent workflow that analyzes the learning paths that best comfortable with the learning level of individual learners. Through the algorithms, the paths are calculated from the learning outcomes of the learners in each unitand presented.
Component 4. Interface Module: This component is a part of the communication between the users through the cloud technology for access and access to collaborative areas.This component consisted of user interface through the website.

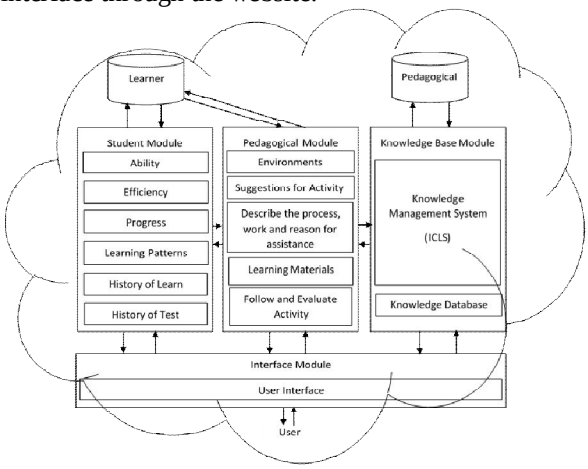

Fig.2. An Intelligent Cloud Learning System for Digital Literacy and Collaborative Learning Skill

B. The second part:
Evaluation of the appropriateness of an ICLS was constructed by the 7 experts presented in Table 1.
Table 1 shows that the seven experts agreed with the overall appropriateness in list of an ICLS that had very good results (mean= 4.48, S.D. = 0.51). The appropriateness of the sequences of the model's components that were clear and continuous were ranked as very good (mean =4.71, S.D.=0.49). An Intelligent Cloud Learning System had the possibility to develop the practical system

Table 1. Appropriateness Evaluation of an Intelligent Cloud Learning System to Develop Digital Literacy and Collaborative Learning Skill

Evaluation Lists	Results		Appropriateness Level
	$\bar{x}$	S.D.	
Intelligent Cloud Learning concepts that are fundamental to the development of instructional systems	4.29	0.49	Good
Intelligent Cloud Learning components of (1) inputs (2) process of Intelligent Cloud Learning (3) output (4) feedback	4.57	0.53	Very Good
The sequences of the model's components that were clear and continuous	4.29	0.49	Good
Each element has a consistent relationship with each other	4.43	0.53	Good
The composition of intelligent cloud-based elements is well-suited for simplicity.	4.71	0.49	Very Good
An overview of the intelligent cloud model features. It covers the needs and objectives of the research.	4.57	0.53	Very Good
Summary	**4.48**	**0.51**	**Good**

DISCUSSION

The results of the evaluation of an ICLS model were related to Bai, Y., Shen, S., Chen, L., &Zhuo, Y. 's research, which stated that cloud learning was effective and beneficial for collaborative learning skill. Other research written by G.-J. Hwang and Jacovina, E. J., & McNamara, D. S.states that intelligent tutoring system was effective for comfortable of level learners.

RECOMMENDATIONS FOR RESEARCH RESULT'S APPLICATION

Educational institutions should prepare infrastructures for network systems to access the internet for using online social media and cloud technology.

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