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A Proposed Model of Connectivism Learning Using Cloud-based Virtual Classroom to Enhance Information Literacy and Information Literacy Self-efficacy for Undergraduate Students

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Abstract

Learning in a digital era has been changed into a new paradigm since the development of network and communication technology, such as cloud computing, so learners have to interact with massive amount of the information. Thus, information and personal skills play vital roles in success of learning. Connectivism is considered a new online learning pedagogy giving emphasis to an interactive learning in an online context. The focus of connectivism pedagogy would be on the challenge for learners to improve information literacy and self-efficacy. Virtual Classroom is one of the most powerful tools to conduct an effective online learning. With the change of learning pedagogy, virtual classroom is employed to improve the social interaction capability by using cloud-based tools and platform. The purpose of this research was to propose a model of connectivism learning using cloud-based virtual classroom to enhance information literacy and information literacy self-efficacy for undergraduate students. The model was evaluated by 3 educational technology experts and 2 information literacy experts. The data was analysed using content analysis and descriptive statistics. The research results were as follows: (1) the proposed model has 5 components, namely Virtual Classroom, Cloud-based Tools, Role of Teacher, Learning Resources and Learning Assessment. (2) The model of connectivism learning consists of 4 steps including: (1) Aggregating, (2) Remixing, (3) Repurposing, and (4) Feed Forward. The overall model evaluation scores are very suitable.

1. Introduction

The Blueprint for ASEAN Socio-Cultural Community (ASCC Blueprint) has focused on narrowing the Development Gap and enhancing the well-being of the peoples of ASEAN by promoting and investing in education

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and life-long learning. The Ministry of Education (MOE) has announced a strategic plan to follow the ASCC Blueprint to enhance Thai people's lifelong learning by using ICT, and creating equitable learning opportunity.

In the digital age, learners need an ability to find, access, manage, evaluate and create the information in digital environment surrounded by a massive amount of information. Thus, information literacy has been considered as a core competency to improve learners' lifelong learning quality (SCONUL, 1999; UNESCO, 2008). From the most recent reports on information literacy in Thailand, it was found that the information literacy scores of Thai undergraduate learners were in a middle level (Sirichai, 2010), and in some university, learner's information literacy scores were in a low level (Sirirat, 2012). Since Higher Education requires a higher level of information literacy scores (UNESCO, 2008), Thai undergraduate learners need to develop their information literacy skills. Furthermore, most of learners who succeed in learning should have both confidence and ability. Information literacy research was changed into a new dimension, since Neely (2002) has started to study on information literacy in sociological and psychological aspects. A new psychological factor called information literacy self-efficacy (ILSE) was introduced into information literacy research field by Kurbanoglu et al. (2006). As for the meaning, Information Literacy Self-efficacy is a person's belief in his/her ability to succeed in specific information tasks such as finding, accessing, managing, evaluating and creating information. Open learning environment has been considered a suitable learning environment to develop information literacy and self-efficacy (Bandura, 1977; Taweechart, 2002), so, the new learning theory for digital age called "Connectivism" was proposed by Siemens (2005). This learning theory tries to describe a learning that occurs on the network, and is used to design the first massive online open course (MOOC). After the widely discourse on Connectivism, we can conclude that Connectivism is a learning concept to conduct an online open learning environment, focusing on the learning activities, such as inquiring, resourcing, organizing, criticizing and reconstructing an information (Kop and Hill, 2008; Darrows, 2009; Bell, 2011). To create an online open learning environment, we need a technology to support an online interaction, sharing and connecting between nodes of information (such as learners, experts, communities, websites). From the Gardner's technology hype cycle 2012, cloud computing was a technology on the peak of inflated expectations, and some of researchers started using cloud-based tools to support learning (Behrend et al., 2011; .Aldakheel, 2011; Denton, 2012). Many researchers have supported that cloud computing is suitable for paperless learning environment, and can facilitate most of online learning activities, such as information managing, document sharing, communicating and collaborating. However, the varieties of cloud-based tools can make learners confused in using them, so we need a system that can centralize these tools into practice. Virtual classroom is one of the most well-known systems to simulate environment from a real classroom into a virtual learning environment, and can be equipped with a lot of learning support tools. With the change of learning pedagogy and context, virtual classroom is considered to improve the social interaction capability (Horton, 2012). Thus, the researchers have proposed to improve social interaction capability of a virtual classroom by integrating cloud-based tools into activities section of virtual classroom. In order to fill the gap, the researchers are interested in developing the model of connectivism learning using cloud-based virtual classroom to enhance information literacy and information literacy self-efficacy for undergraduate students.

2. Methodology

This research is divided into 2 phases which are (1) The study on related theories, research, and experts' opinion, (2) Evaluation on the proposed model.

2.1 Phase 1: Study on a related theories, research, and experts' opinion.

The study in this phase includes the study of theories and research on the Connectivism, Virtual Classroom, Cloud Computing, Information Literacy and Information Literacy Self-efficacy, to be used as guidelines in determining learning processes and components of the model. The model will be designed after the reviewing of document, then an interview will be conducted to get an opinion towards the model from seven experts.

2.2. Phase 2: Evaluation on the proposed model.

After gathering all of information and modifying the model, three educational technology experts and two information literacy experts were selected to evaluate the model by using five scale model evaluation form. The expert selection criteria are (1) the experts must have more than 5 years of experience in the educational technology / information literacy field, (2) the experts must have a related work in educational technology / information literacy field, and (3) the experts must have an experience in designing or teaching with undergraduate student.

3. Results

3.1 Phase 1: Results of the study on related theories, research, and experts' opinion.

From the study on the related document, it was found that the Connectivism has four main activities (Kop, Fournier and Mak, 2011; Trna and Trnova, 2013), and the experts were asked to criticize Connectivism learning process to find the core concepts of Connectivism. The results indicated that the learning process of the model consisted of four steps as follows:

1) Aggregation: In the first step, learners have to find the main topic to study from communication tools, then list the topics and keywords to conduct searching strategies. After accessing to the information, learners have to store and organize information by using collaboration tools.
2) Remixing: In the second step, leaners have to transfer the prior knowledge to decide which information should be used in their work, then evaluate the quality of information by using data gathering tools, and sharing the information with friends by using collaboration tools.
3) Repurposing: In the third step, learners have to read and summarize the important information from the resources by using content creation tools, after gathering enough summary, learners have to analyse and synthesize the data to generate a new information by using content creation tools, and then evaluate the their work and revise.
4) Feed-forward: In the final step, learners have to publish their work by using presentation tools, and sharing their work with classmates to exchange the opinion, and then feed-forward their work to the social network by using communication tools to get a feedback on their work. After the feed-forward process they have to reflect their thinking and feeling about the feedback, and plan to develop their ability in the next project.

From the study on the related document and opinion of the expert, found that the component of the model consisted of five core components as follow:

*1) Virtual Classroom: T*he study of Virtual Classroom of Secker (2004), Jeekortok (2006), Parker and Martin (2010) and Lu (2011), the researchers have a conclusion that virtual classroom components should support at least four online main stream activities. Thus, the components of virtual classroom should consist of four sections: (1) Learning Resource Section (2) Activity Section (3) Evaluation Section, and (4) Management Section. Most of the experts are agreed with these components.
2) Cloud-based Tools: Breeding (2012) has categorized cloud-based tool for library and information literacy learning into five categories as follows: (1) Collaborative tools, such as Google Drive, Social Bookmarking, (2) Data gathering tools, such as Survey Monkey, Poll Everywhere, (3) Content creation tools, such as Wiki, Camtasia Studio, (4) Presentation tools, such as Flickr, Youtube, and (5) Communication Tools, such as Facebook, Twitter. Most of the experts agreed with these tools, but there were some recommendations about the criteria of selecting these tools. The criteria should include the usability principle to evaluate the usability of tools before use.
3) Role of Teacher: Siemens (2010) mentioned about seven roles of teacher in network learning environment consisting of: (1) amplifying the interesting information for the learners via the network, (2) Curating the information that suitable for learner experience, (3) Guiding the way and recommend some important connection (e.g. experts, communities), (4) Aggregating learners information and monitoring, (5) Filtering and eliminating the resources that doesn't belong to the learner's study, (6) Modelling and demonstrating the correct way of study, and (7) Making learners feeling like you have a presence online by building a various channel of communication. Most of the experts agreed with these roles.
4) Learning Resources: Siemens (2005) stated that "Learning is a process of connecting diverse nodes, knowledge sources, or accessing existing networks". As for the meaning, learning resource in Connectivism

learning can be anything that can be accessed and connected by learners to get information. In our model of learning, all information form a various nodes can be acceptable. Most of the experts agreed with these learning resource, but some recommend that the learners should use five criteria to ensure the quality of information as follows: (1) Authority, (2) Accuracy, (3) Objectivity, (4) Currency, and (5) Coverage.

5) Learning Assessment: There are two assessment types in this model: (1) Formative Assessment will be conducted during the learning process by using information literacy rubric to assess learners and (2) Summative assessment will be conducted by using information literacy test and ILSE self-assessment before and after using the model.

3.2. Phase 2: Evaluation on the proposed model.

The evaluation scores of the proposed model from three educational technology experts and two information literacy experts, were summarized in Table 1.

Table 1: Experts' evaluation scores of the proposed model

|	Overall	Components of the Model	Model Procedure	Supporting Tools	Learning Assessment	Usability of the Model
Mean ($\overline{\mathbf{X}}$)	4.23	4.40	4.53	4.60	4.15	4.55
Interpretation	Very Suitable	Very Suitable	Most Suitable	Most Suitable	Very Suitable	Most Suitable

Note: 4.5 - 5.0 = Most Suitable, 3.5 - 4.49 = Very Suitable, 2.5 - 3.49 = Suitable, 1.5 - 2.49 = Less Suitable, 1.0 - 1.49 = Not Suitable

From Table 1, the proposed model overall score was at a "very suitable" level, The highest score items were supporting tools, usability of the model, and model procedure, which indicated that most of the experts strongly agreed with using cloud-based tools and Connectivism learning method to enhance information literacy and information literacy self-efficacy of learners, and the experts believed this proposed model can be used in a real context. The illustration of the proposed model is shown in Appendix A.

Acknowledgements

Appendix A. The Illustration of the proposed model
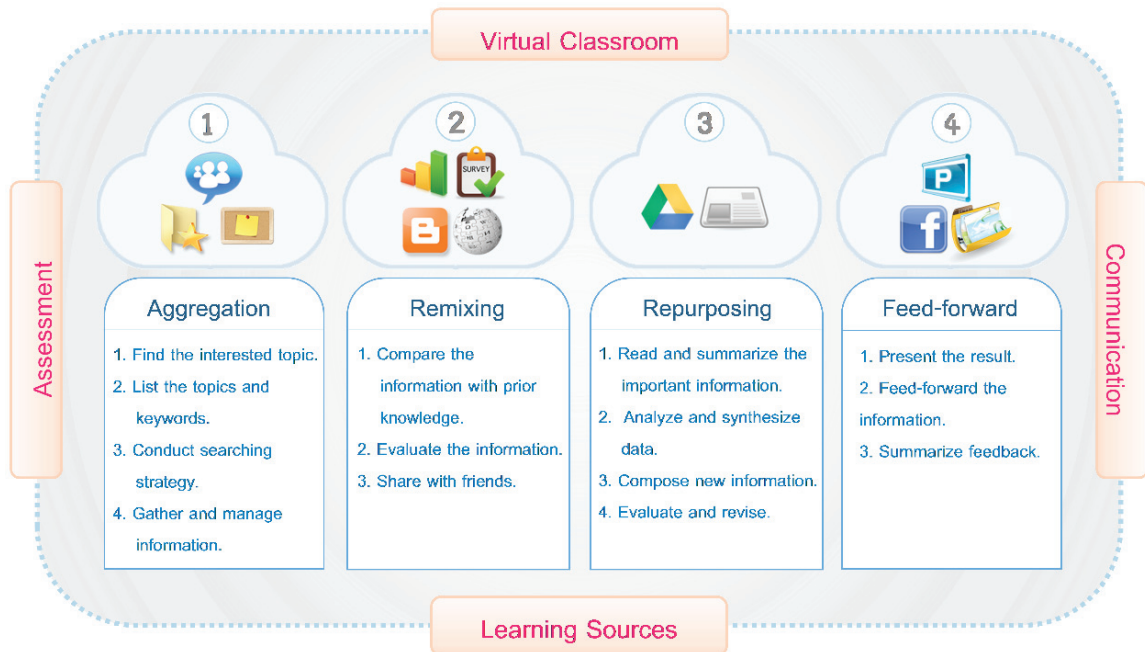
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