

# A Synthesis of Collaborative Learning and Virtual Team to Develop Multi-User Interactive Learning

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**Abstract** - This paper aims to study the learning processes associated with multi-user interactive learning. The study is a synthesis of related researches on collaborative learning and virtual teams. There is the process of analyse to procedure of virtual team working using collaborative learning. Then, the synthesis process of multi-user interactive learning procedure has five steps: 1) the engagement phase, 2) the exploration phase, 3) the transformation phase, 4) the presentation phase, and 5) the reflection phase. The details of each step are presented in the form of a diagram. To develop a multi-user interactive learning management system further.

**Keywords** - Collaborative Learning, Virtual Team, Interactive Multiuser, Learning Management System

## I. INTRODUCTION

Thailand has put into place a particular vision. "Information and Communications Technology is a key driving force in leading Thai people towards knowledge and wisdom and leading society towards equality and sustainable economy" [1] in the Information and Communications Technology 2011-2020 framework (ICT 2020), Thailand refers to the development and implementation of economic and social activity on the basis of knowledge

and wisdom, with all citizens being able to participate equally in the development process. The aim is to move the country towards balanced and sustainable growth [1, 4]. The two aims are consistent with the strategy of the Ministry of Education which wishes to encourage teaching and learning using information and communications technology with the purpose of enhancing teaching and learning being to build the capacity of the country. The study focused on the development of the information and communications technology as a tool for learning [2, 24].

Collaborative learning involves focusing on the learning environment by learning together in small groups [4, 25]. Group members jointly rely on, and are responsible, for group learning [5]. The common goals are the exchange of learning, the sharing of learning resources, interaction, joint success and allowing the students to learn how to share with others [4]. The principle of shared knowledge relates to the knowledge obtained by the students themselves through the practice of sifting information as part of the process of thinking and working as a group. The possession of knowledge can be used as a guide to solving problems and encouraging students to think critically about the learner's activities [5]. In addition, learning together, in line with the skills associated with

collaborating with others means that the students are able to work effectively within a team and respect the diversity of the team members. It also makes team members flexible and willing to compromise, responsible, able to work as part of a team, and involve team members. To achieve the team goal. Jointly, these are the skills required of students in the 21<sup>st</sup> Century [6, 26].

A Virtual Team consists of teams with members in different locations who work together through communication channels. This is possible through the use of information and communications technology. Team members from diverse cultures, time zones and with a range of organizational expertise, work together. Working as a team in this way helps reduce the time and cost of travel, which utilize in many agencies. In addition, it can be used in educational institutions [7].

Multiuser interactive learning is a learning process. The interaction with people that they can work as a team is a different place, a different culture or a different time zone. It can work together by collaborative learning. Team to achieve common goals together [6-7].

## **II. LITERATURE REVIEWS**

### ***A. Collaborative Learning***

It is important to learn how to use collaborative learning in the classroom. Collaborative learning is child-centered learning and team learning. Constructivist Theory and Social Learning Theory can be used as the cornerstone with regard to building knowledge [8]. Collaborative learning is a task that requires a joint effort between learners, and between the student and the instructor [9]. Such a process is beneficial for both students and instructors as a means of developing effective learning [13, 15, 28]. Collaborative learning involves the setting up of small groups of 4-6 students with different abilities. Collaborative learning involves a blend of new knowledge and prior knowledge. Group members share ideas and find solutions together. Such learning is based on information and communications technology

in collaboration through the use of various communication channels [3, 12, 29].

Working together effectively, group members have a common goal. This involves the practice of sharing resources and workload, with communication being open and to the point. It creates a bond of trust, and establishes trust in the effective functioning of the group working together [11, 30].

The results of the work undertaken are presented, and the knowledge and experience gained are shared in the classroom. The instructor serves as a consultant or facilitator. The theory of collaborative learning processes consists of four elements as follows: the situation, the interaction, the process, and the feedback [14]. Collaborative learning is a learning process that has the aim of ensuring that the students obtain the following skills: interpersonal skills, group building and management skills, inquiry skills, conflict resolution skills, synthesis and presentation skills, motivation skills, and speaking style skills [10].

From the foregoing conclusion, collaborative learning means that students learn how to participate in group situations. Group members can engage in a range of joint research and project work together by sharing experiences and knowledge. They then present the knowledge gained as a result of the collaborative learning.

### ***B. Virtual Team***

The composition of the leadership team that can bind virtual team members together is important. It ensures that conflict arising within the team will improve quickly and will eliminate the inconsistent performance of the group. The leader must adopt several roles such as a diplomat, a psychologist, an administrator and a role model for the other team members [6, 16].

Communication is the most challenging aspect because members of the virtual team are in different places and departments, and communications can be difficult. This variety

can cause communication problems and understanding, and mistakes can happen. This can hinder the performance of the virtual team members which might result in delays or even the halting of the project. The team members do not have to meet or face each other directly, so there should be an agreement in terms of communications. There needs to be agreement on the part of members on the subject of communication channels and frequencies to allow them to communicate with each other [16].

The benefits of working as a team enhances the learning process within the group. This includes learning activity conditions for starting and ending the learning process. This is associated with the resources required to support the various types of learning involved [23, 30].

### III. DATA ANALYSIS

The study involved research on analysis process of collaborative learning and virtual team as show on Table I:

**TABLE I  
ANALYSIS OF MULTIUSER INTERACTIVE  
LEARNING PROCESES**

Collaborative Learning Process (Reid, Forrestal and Cook, 1989) [17]	Kordaki and Grigoriadou [18]	Soon and Sarrafzadeh [19]	Alanis-Funes, Neri and Noguez [20]	Zemliansky [16]	Paviva, Machado and Valenca [21]	Ficapal-Cusi and Boada-Grau [22]	Sun and Shen [23]
1. Engagement phase	/	/	/	/	/	/	/
2. Exploration phase	/	/	/	/	/	/	/
3. Transformation phase	/	/	/	/	/	/	/
4. Presentation phase	/	/	/	/	/	/	/
5. Reflection phase	/	/	/	/	/	/	/

The study by Kordaki and Grigoriadou [18] looked at the design of adaptive online learning (STAD). This contains the following steps: 1) imported into learning activities, 2)

evaluation of individual, 3) set up the group, 4) work together as a team, 5) the preparation, 6) the presentation, 7) evaluation of the group, 8) evaluation of the individual, and 9) the group that made the best award. The implementation of these steps uses an adaptive design pattern by which learners can learn together in both a synchronous and an asynchronous environment.

Soon and Sarrafzadeh [19] indicated that an online learning environment is created using a learning management system called “Interactive”. The campus was used as a form of support for the project which aimed to help distant students to work together. Group members included foreigner students and Australian students. The interactive tools that were used for communication and collaboration in support of the team including Wikipedia, synchronization discussion, group mail, announcements and multimedia library resources. The procedure was as follows: 1) engagement, 2) brainstorming, 3) implementation, and 4) presentation.

Alanis-Funes, Neri, and Noguez [20] have used the tools to learn together involving the following steps: 1) teachers assigned to a group, 2) students brainstorm and work through the communication channel, 3) students who are assigned by operating activities, learn together, using collaborative tools such as blogs, forums, reports and wiki, 4) presentation interoperability allowed through the use of collaboration tools, and 5) teacher monitors and evaluates the collaboration of the students and the work of the group.

Zemliansky [16] researched the field of cross-cultural training using a virtual project team. The researcher identified the following activities: 1) there is talking and coming together of the small groups via the communication channel adopted, 2) debate ensues and ideas are shared in the project work, 3) reports are prepared and edited jointly, 4) the work of the group is reported, and 5) the workings, communication and collaboration is evaluated.

Paviva, Machado, and Valenca [21] developed a virtual environment for the training and evaluation of a surgical team. In summary, the steps are as follows: 1) set assignment, 2) ensure the compatibility of the system through interactive networking and virtual environments that support both working through local networks and the internet, 3) engage in practice using virtualization, and 4) evaluate individual and group using a multi-stage evaluation system. Assessment reports were prepared for both individuals and groups.

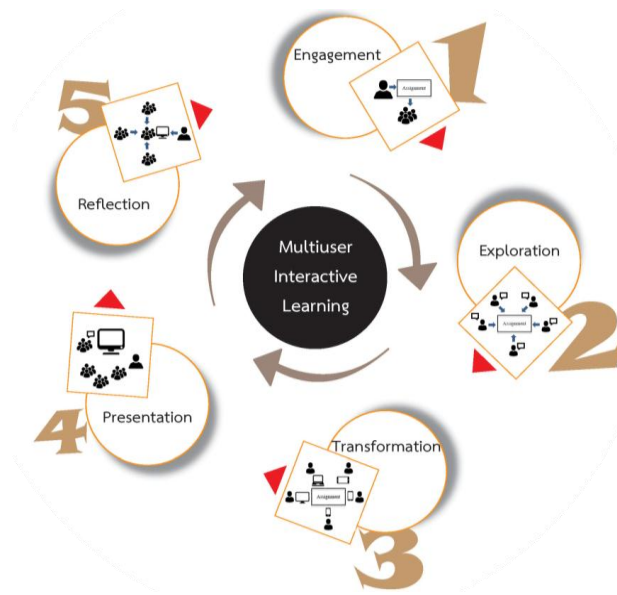
Ficapal-Cusi and Boada-Grau [22] conducted research on e-learning and learning as a team, using a virtual team. The design of the learning process consisted of the following steps: 1) define the objective, the expected learning results and the associated indicators, 2) design an appropriate task for the environment, 3) explore the needs, abilities and knowledge of aboriginal learners. In terms of planned improvements, 4) determine and improve learning resources with regard to communication, synchronization and time synchronization, 5) create a report with determine time, group size, procedures in operation, rules and performance indicators, 6) design how to evaluate the results. The students were involved in learning and in individual assessment. This considered their

part in the learning and the collaboration of each member of the group, and 7) establishing the feedback guidelines.

Sun and Shen [23] introduced the concept of considering the network processor (Social Computing) used and teamwork (Teamwork as a Service or TaaS), which means that students and teachers used a Learning Management System. The researcher was cloud hosting in order to align the learning activities. The process of teamwork for learning through the mobile cloud was as follows: 1) the team was assigned the task, 2) to guide the collaboration, the objectives and collaborative teamwork was explained, 3) the context of teamwork was explained, including the difficulty of the task at each stage. This also included identifying the right person to run the team. The role and work of the team was defined. Following the process of working together as a team, it was planned to 4) present the results of the learning, and 5) evaluate the learning.

#### IV. RESULT

The process of virtual work teams that used the shared knowledge of relevant research is analyzed. The analysis of each procedure to be used in the process of learning as part of a multiple-user interaction is as shown in Fig. 1.



**Fig. 1** Multiuser Interactive Learning Processes

The details of each step are as follows:

### 1. **The Engagement Phase**

The instructors guide the learning in conjunction with virtualization with regard to the mission. The provision of information, knowledge and materials is facilitated. In order to guide the direction of the project or piece of work the students are provided with preliminary information on the project or piece of work by talking through the experience. [16, 18-23].

### 2. **The Exploration Phase**

Students are introduced to the project or task of work. The objectives of the project or working together are explored. Group members come together to discuss plans to work together and to create a work plan. Sharing the idea to the assigned task finished. The process will involve the analysis of the difficulty of the task and a consideration of the aptitude or the group members. These members can choose which topics they have an aptitude for by getting the approval of the members of the group. The instructor is responsible for the provision of learning resources such as books, journals, web resources, while other instructors play the role of director with regard to the learning of the students, and respond to requests for assistance. They also reflect on the ideas of the learners. [16, 18-23].

### 3. **The Transformation Phase**

Students customize the accessories and enhance the data integrity. Planning and working together evolves as expected by the learners operating in a collaborative learning environment. The team members assess collaborative work. Teachers are expected to check compatibility and provide facilities in the event that the learners need help. They also provide the necessary information in the event that the students request assistance. [16, 18-23].

### 4. **The Presentation Phase**

The study is presented in terms of a consideration of concepts such as leading the planning process or the operation of the group.

Also considered are performance and compatibility. Each team reported the occurred problem and how to eliminate the issue. Feedback from the instructor facilitates the presentation and monitoring of the process in terms of meeting the target. [16, 18-23].

### 5. **The Reflection Phase**

Students reflect on what they have learned and present to the instructors. This phase involves an evaluation of the knowledge the participants have gained. It also considers the response of the students, and this is used to plan future classes. Students evaluate their own work and the work of fellow group members. The teachers assesses the compatibility of each group and informs the students. [16, 18-23].

## **V. DISCUSSION**

The process of learning is a Multiuser interaction that synthesizes the work of virtual teams using collaborative learning consists of five main steps. The brainstorming stage is used to present practical knowledge and allow for reflection. The students can collaborate through a variety of devices and network connections. They can work together effectively without limit of time and space. The research aims to lead the process of learning to synthesize multiuser interaction in order to further develop a learning management system appropriate to multiuser interaction.

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