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Impact of Using Website on Online Learning Behavior

Ahmad Muhaimin Bin Mohamad [a], Hafizan Binti Mat Som [b], Suhaila Binti Mukhtar [c], Jamaluddin Bin Harun [d]

[a] *Ph.D., Kolej Yayasan Pahang, Kuantan, Pahang (Corresponding Author).*

[b] *Ph.D., Kolej Yayasan Pahang, Kuantan, Pahang.*

[c] *Kolej Yayasan Pahang, Kuantan, Pahang.*

[d] *Assoc. Prof. Ph.D., Universiti Teknologi Malaysia, Skudai, Johor.*

Abstract

This research aims to develop a website which is based on constructivist learning environment. Cooperative learning method was selected to promote an active learning while group investigation method was conducted as the learning structure. -Six learning sessions were conducted to fifteen (15) students who were selected via purposive sampling. Quantitative analysis on instruments showed that there are three main patterns of behavior depicted by online cooperative learning that carry similar features like organization behavior; (i) structured and understandable task or instruction given to controlled organization or class, (ii) supporting environments for training and learning process, and (iii) training and learning process with current and related issues. in addition to that, learning theory and principles of organizational training can be considered for both since they are likely to show similar objectives such as changing individual behavior and thinking level. So, the findings of the research in education and organizational behavior can be used for both in organizational training as well learning process.

Keywords: Constructivist Learning Environment, Cooperative Learning, Group Investigation Method, Learning by Using Website, Learning Behavior, Pattern of Online Learning.

1. Introduction

According to 'change in technology affecting Teaching and Learning Approach'? (Brown *et al.*, 1959; Ololube, 2006; Glenn *et al.*, 2008; Warger and Dobbin, 2009), the studies carried out on active learning that was supported by technology has led to achieving various objectives (Karagiorgi and Tziambazi, 2005). Among the technologies that highlighted on active learning process, the online medium such as website, interaction tools, forum, and text chatting can provide a real time interaction, communication, collaboration and socialisation. In addition to that, this method is often used on online learning and learning management system (Despotović-Zrakić *et al.*, 2012; Pandey and Pandey, 2009; Graf and Kinshuk, 2002).

Studies that were carried by Plantamura *et al.*, (2004), Bermejo (2005), Dabbagh (2007), and Ramli (2010), had found that by using the online tools, such as the online forum and text chatting were proven to have positive impacts on learning. Nevertheless, , technology might not be the main factor that contributed to the results since it acted only as a tool to facilitate the learning (Clark, 1994). The main factor that lies behind a successful learning that could be considered are learning theory and learning structure.

The main theory that supports a learning process is Behaviorism theory. The theory suggests that stimulus response (Stimulus-Response) is the main component in learning process in which it was resulted from reward and punishment method (Dave Peel, 2005).

The second theory of learning suggests that learning occurs when there are changes in activity in mind (cognitive) and when there are information received or when there are interactions between mind and the received information through a complicated process (Peggy A. Ertmer and Timothy J. Newby, 2013). The information received is stored in a short-term memory (vice versa to ??). This learning process is referred as an understanding according to cognitive theory.

The behavior and cognitive theory, suggest that stimulus-response and receiving information are the main part of learning process. On the other side, constructivist theory claimed that students need to be actively engaged to the environment or surrounding for knowledge development to take place. (Keith S. Taber, 2011). Constructivists suggest that the active engagement of students in learning does not include one-way interaction such as an activity of teacher teaching or student reading, but it is rather a combination of learning experiences in classroom, social interaction in small groups, and accessing to several information (Jayeeta Bhattacharjee, 2015).

The active learning proposed by the constructivist theory can be applied to active learning structure supported by technology (Jo Coldwell, Annemieke Craig, and Annegret Goold, 2011). For example, e-learning is used as the main tool in a learning environment that can promote social interaction among students and teacher. Numbers of studies have showed that e-learning is effective in contributing to academic achievement, knowledge development, and skills (Talal Al-Mashaqba and Abeer Al-Khawaldeh, 2016; Signe Noesgaard and Rikke Orngreen Schack, 2015). In addition to that, the active engagement of students in e-learning environment has significantly promoted to the construction of knowledge as suggested by constructivist theory (Graham Attwell and Jenny Hughes, 2010).

Is there any possibilities of learning behavior to be aligned with active learning if students are given opportunity to apply e-learning? Will there be any significant behaviors occurred related to learning activity or learning structure or interaction tools? These are significant questions that require further

investigation with regard to the importance of learning behavior and its impact to meaningful teaching and knowledge development.

The aim of this study is to develop a website to assist learning. Constructivist theory is chosen as the main theory as to create an active learning environment. Six learning sessions were conducted to fifteen (15) students to test on the effectiveness of using website in learning. Quantitative instruments were used to get data from the learning behavior along with the six learning sessions.

The data and log from the usage of website were analyzed using a quantitative approach in order to identify the learning behavior; the number of learning activity and learning structure

2. Research Objectives

At the end of this study, the researchers aim to

1. Develop a website for online cooperative learning in order to promote active communication and social interaction among learners,
2. Identify the learning behaviors as a result to website using based on ;

a. Number of accessing into learning activity,
b. Learning structure.

3. Development of the Website

Constructive learning environment or CLE (Jonassen, 1998) was chosen as the main framework of learning to promote active learning activities among learners. There are seven main features of CLE implemented in web development that are

1. Related problem as trigger of learning,
2. Supporting information,
3. Gathering information via social interaction,
4. Supporting information: topic-based searching tools,
5. Supporting information: Accessible to source of information,
6. Social interaction tools,
7. Learning coaching.

CLE was implemented using the cooperative learning which requires active social interaction and collaboration. (as a teamwork ?). Five elements of cooperative learning (Johnson and Johnson, 1991; 1999) were taken as a guide to the implementation;

1. Positive interdependent,
2. Individual accountability,
3. Promotive interaction,
4. Social skills, and
5. Group processing

The implemented elements in the website were used as the supporting elements of cooperative learning activities in constructive learning environment.

Next, five elements of cooperative learning were structured as learning steps that can be followed by students as learning activities. Mitchell *et al.,* (2008) suggest group investigation methods (Sharan and Sharan, 1994) as steps of structured learning and also support the elements of cooperative learning. The six-step of group investigation method as follows;

1. Topic Selection
2. Cooperative Planning
3. Implementation
4. Analysis and Synthesis
5. Presentation of Final Project
6. Evaluation

The effectiveness of the designed learning structure enhanced by implementing guidelines of online learning was suggested by Salmon (2000 ; 2002). The stated guidelines were implemented across the entire learning process namely as;

1. Access and motivation
2. Online socialization (by using interaction tools)
3. Information exchange
4. Knowledge construction
5. Development of knowledge and cognitive skills
6. Dividing the information
7. Participation of learning activity
8. Final evaluation from lecturer
9. Accessing the learning activity.

Based on the chosen learning method, the structure of learning activities through the website is stated as follows;

1. Heterogeneous group of students to support cooperative learning,
2. Divided tasks and sub-topics based on group formation,
3. Introduction to the assignment,
4. Trigger of learning activities,
5. Identified triggered problem,
6. Planning the solution of problem,
7. Collaboration on information searching,
8. Share the information and ideas
9. Completing the article based on given task
10. Learning reflection.

The instructional design model called Recursive, Reflective, Design and Development (R2D2) (Willis, 1995) was chosen as a guide to system development and Modular Object-Oriented Dynamic Learning Environment (Moodle) as a learning management system (LMS). Three main phases of R2D2 Model named as define, design and development, and dissemination phase covering all processes of website

development. Whereas four principles of R2D2 Model such as repeating, reflection, random, and design involvement, were implemented in the process of development.

Figure 1, Figure 2, and Figure 3 show part of the website which used Moodle as LMS.

Figure 1: Main page of the website

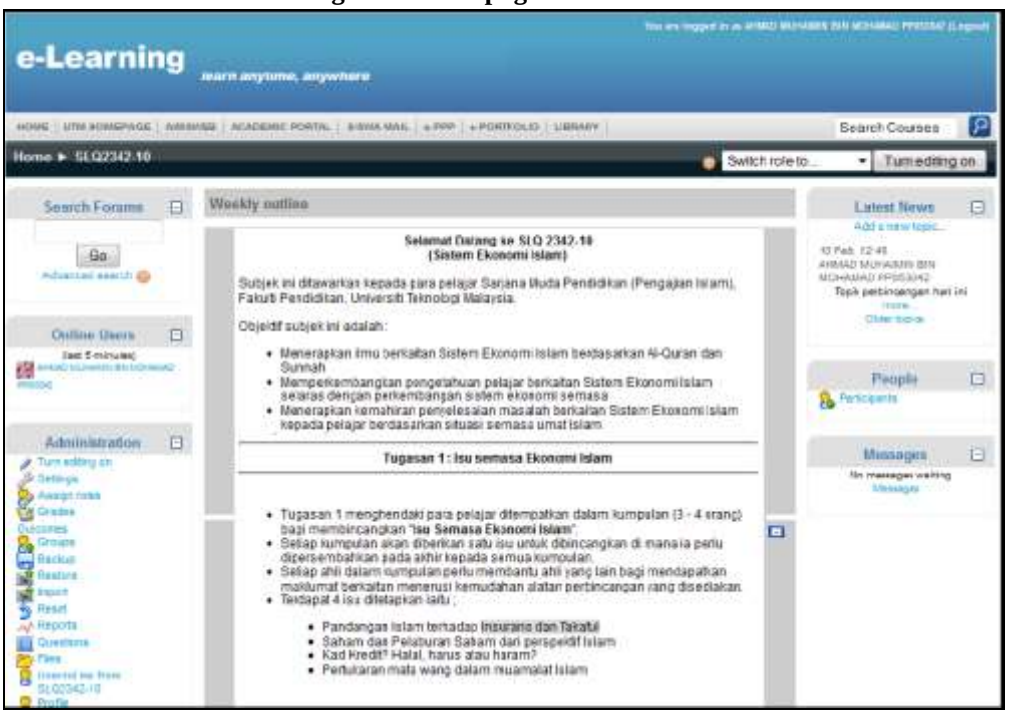


Figure 2: Page for learning guideline with interaction tool

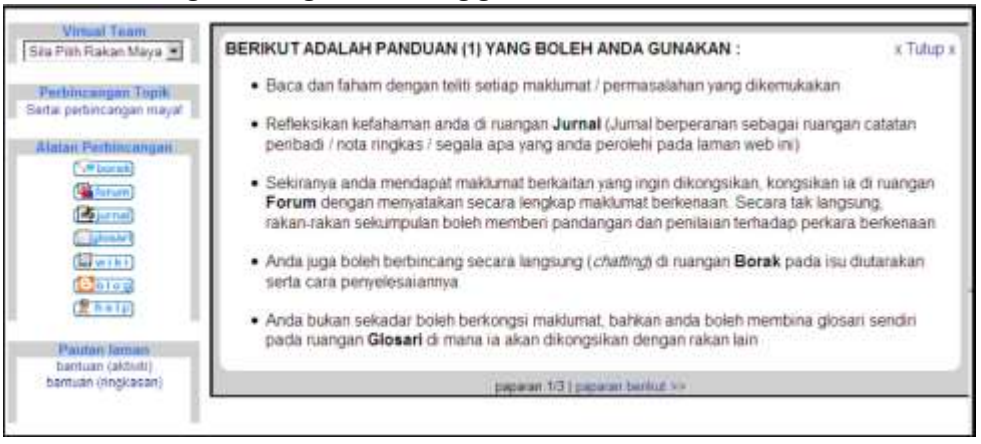
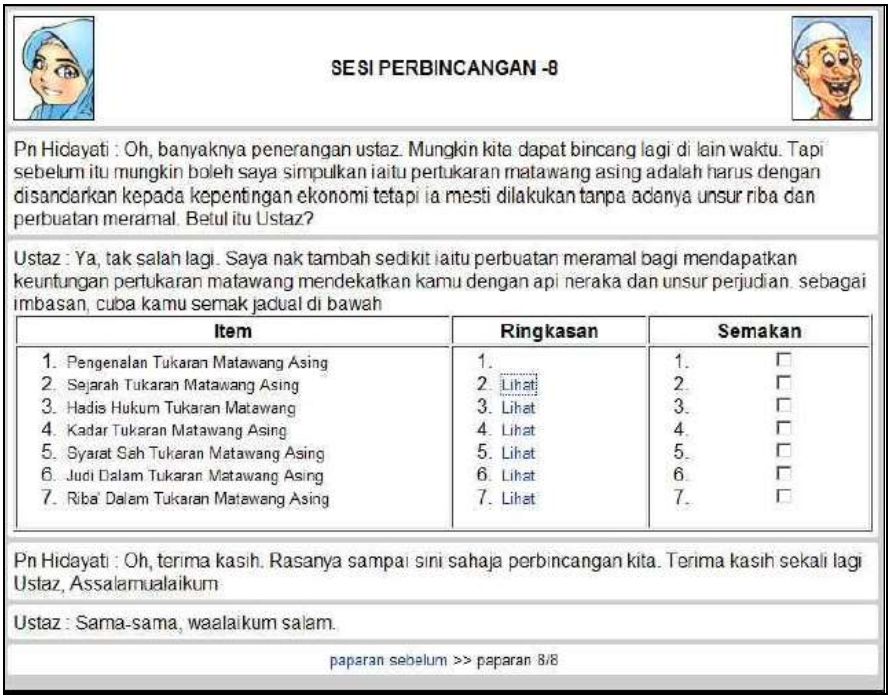


Figure 3: Page for subject content and learning checklist



4. Research Methodology

4.1 Sampling

Respondents for this research were chosen by using purposive sampling technique in order to meet the objectives of the research and describing the situation (Kumar, 2005 ; Schutt, 1996). 15 students of second year in social science field, from local university participated as respondents of the research. No control group was used due to threats of research validity.

4.2 Learning Implementation

The Quasi-experimental method (counterbalanced design) of one group (Cambpell and Stanley, 1963) was used repeatedly over six learning sessions (using website) and at the same time, students produced learning portfolio and data logging which could be evaluated in terms of learning behavior. The repetition of learning session over six times allowed for a continuous comparison of learning behavior (refer to Table 1).

Table 1 : Design of Learning Implementation

Session (s)	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Design	X_1O	X_2O	X_3O	X_4O	X_5O	X_6O

4.3 Research Instrument – Log of Website Usage

Not just for learning activities, the website was also functioned as instruments for data gathering which automatically recorded log of website usage by students. According to Johnson and Johnson (1999), recorded log of learning shows all the activities during the learning process. The use of weblogs as an instrument as proposed by Burton and Walther (2001) can be used as the measurement to design effectiveness, navigation, interaction, patterns of behavior and website content.

4.4 Research Instrument – Screen Capture

Screen capture was used as an instrument to capture all computer activities such as cursors, interface interaction, and screen display during the learning sessions (Goodwin, 2005). This approach is a value added to support the log of website usage as efforts to get the data of students' learning behavior (structure and number of accessing).

4.5 Analysis of Learning Behavior - Number of Learning Activities Accessing.

Number of accessing into learning activities were analyzed to get learning behavior among the students. Each click to web pages was classified into six learning activities according to group investigation methods. Tables 2 and 3 show the classification of learning structure and activities.

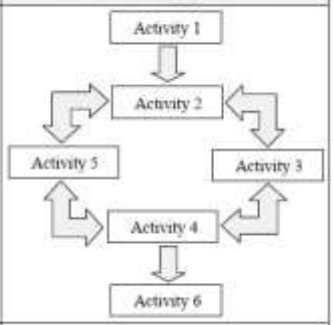
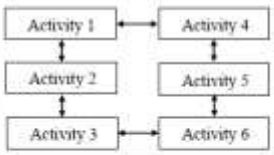
4.6 Analysis of Learning Behavior - Learning Structure

Classification of six learning activities guided the analysis of learning behavior of accessing learning activities. Three identified patterns; Pattern 1 (structured), Pattern 2 (non-structure), and Pattern 3 (minimum structure). The learning structure for Pattern 1 was based on methods of group investigation. While Pattern 2 is non-structure assessing method and Pattern 3 refers to minimum access by student.

Tables 2: Classification of Learning Activity

Learning activity	Type of Access	Tools
Beginning of learning (Activity 1)	• Introduction • Understanding learning process • Distribution/receiving work • Introducing and understanding assignment	Allocation of assignment using grouping application in Moodle learning system
Finding and reading information (Activity 2)	• Finding and reading information • Reading forum • Reading glossary • Reviewing work	• Provided notes • Integrated search engine • Forums and glossary • *Wiki*
Direct interaction (Activity 3) Sharing information (Activity 4)	• Interaction using text conversation tools • Starting topic of discussion • Adding to glossary • Writing in forums	• Chat box • Forum • Private message •
Learning reflection (Activity 5)	• Answering self-reflection question • Editing / addition to journal • Journal revision	• Journal • Self-reflection column • Learning feedback / input
Group Assignment (Activity 6)	• Completing assignment	*Wiki*

Table 3: Types of Learning Structure

Pattern	Details	Pattern of Learning Behavior
Pattern 1 - Structured	In line with suggested group investigation method	
Pattern 2 – Unstructured	Did not follow suggested group investigation method	
Pattern 3 – Minimum access	No access or minimum access / one click	

5. Data Analysis and Result

5.1 Result of Analysis – Learning Behavior (Number of Accessing Learning Activity)

Log of accessing by 15 students in each session were analyzed and classified into six types of learning activities (refer to Table 2). Next, Table 4 shows the number of accessing learning activities.

Table 4: Number of Accessing Learning Activity

Learning Activity	Learning session						Number of access
	S1	S2	S3	S4	S5	S6	
Finding and Reading Information	138	143	89	89	66	88	613
Beginning of learning	64	44	37	47	28	62	282
Learning Reflections	53	47	36	47	21	42	246
Direct Interaction	39	59	20	24	17	14	156
Information Sharing	27	54	20	24	17	14	56
Group Assignment	20	25	25	27	14	27	138
Total	**341**	**372**	**238**	**268**	**175**	**252**	**1646**

The highest number of learning activity was 'finding and reading information' that can be related to the concept of learning. That is, the process of getting the information for the purpose of translating into knowledge.

The second highest number of learning activity is the activity of beginning of learning; it is showed that the students repeatedly accessing the website in order to understand the process of learning including

identifying the assignment. This finding showed that students required a constantly guidance in the learning process, especially in the case of learning using websites where the students were not able to interact directly with the lecturer. In addition to that, the students also provided individual feedback and learning reflections via personal questions and personal journals. It can be understood that some of the information obtained by the students were reflected from their private journals. Synchronous interaction allows discussion, motivation, response and provocation to support collaboration among team members and group process. Synchronous interaction is also important to act as continuous support for learning even though it is considered as meaningless interaction.

In the first and second session, majority of the students explored the learning activities accordingly to group investigative method (Pattern 1) with the assumption that at an early stage, students need to understand the structure of learning. This finding is in-line with the concept of cooperative learning and online learning where students are free but remain accountable for their personal learning.

This situation explains why synchronous interaction received numbers of access as compared to information sharing, although the analysis has shown that information sharing activities led to more interaction which are meaningful for learning. Learning assignment activities received the lowest access as students would have had to complete the assignment after following other learning activities. As a whole, from the analysis, it was found that the learning activities showed by the students' behavior emphasizes more on synchronous interaction and information sharing at the beginning of the learning session as compared to at the end of the session, where students focusing more on completing their learning tasks.

5.2 Result of Analysis – Learning Behavior (Learning Structure)

Data or log of accessing activity for each session was analyzed according to type of learning structure (refer to Table 3) and learning activities (refer to Table 2). The result of analysis showed that numbers of patterns of learning behavior for each learning session as shown in Table 5.

Table 5: Number of Students by Learning Behavior Pattern in Each Session

Pattern	S1	S2	S3	S4	S5	S6	Total
Pattern 1	P2, P3, P4, P7, P9, P11, P12, P14, P15 ($\sum = 9$)	P1, P3, P5, P8, P10, P11, P12, P14, P15 ($\sum = 9$)	P5, P8, P10, ($\sum = 3$)	P1, P2, P5, P6, P7, P8, P9, P10, P11, P14 ($\sum = 10$)	P4, P8, P15 ($\sum = 3$)	P3, P6, P7, P9, P10, P11, P12, P15 ($\sum = 8$)	42
Pattern 2	P1, P5, P6, P8, ($\sum = 4$)	P2, P4, P6, P7, P9, P13 ($\sum = 6$)	P1, P2, P3, P4, P6, P7, P9, P11, P12, P13, P14, P15 ($\sum = 12$)	P3, P4, P12, P13, P15 ($\sum = 5$)	P1, P2, P3, P5, P6 ($\sum = 5$)	P1, P2, P4, P5, P8, P13, P14 ($\sum = 7$)	39
Pattern 3	P10, P13 ($\sum = 2$)				P7, P9, P10, P11, P12, P13, P14 ($\sum = 7$)		9
Total	15	15	15	15	15	15	90

In the third session, majority of the students' behavior changed to Pattern 2 with only three students remaining in Pattern 1 as compared to the previous sessions. This situation suggests that students did not prefer to choose learning structured based on their experiences from the two previous sessions. In the fourth session, majority of the students revisited the website by using Pattern 1. It is suggested that majority of the students who have experienced in the third session which was based on Pattern 2 did not give as much positive impact on learning process, and therefore a majority of the students changed to Pattern 1 at the fourth session.

After the four sessions of learning, the behavior of the majority students shifted to Pattern 3. This does not mean that the majority of students was less interested in learning, but instead, at the fifth session, some students were involved in extracurricular activities which led to them having less time to participate the learning. However, the number of students following Pattern 1 and Pattern 2 remained higher as compared to the number of students in Pattern 3 which allowed for data collection.

At the end of the learning session, it was found that the number of students in Pattern 1 and 2 were remained the same, with a ratio of 8:7. This situation suggests that the experience of previous learning resulted in students being more focused towards completing their tasks without performing learning activities such as interacting , sharing information and doing self-reflection.

6. Discussion

6.1 Learning Behavior - Number of Learning Activity Accessing

A ***high number of accessing the activity of 'searching and sharing information'*** was seen as appropriate to the concept of active learning. Almost similar pattern of learning behavior identified by Shi *et al.*, (2013), which is students are more focused towards reading and social interaction. They said that reading is the main objective of learning with social interaction being method of online learning environment.

This finding shows that a substantial part of learning activities is concentrated on searching and reading information within a social activity and environment. As the implication, ***online learning must be designed and structured to encourage students to find and read the information by social interaction***.

Group investigation method in the form of structured learning is considered to influence the students to make repeated revisions of the study guide especially at the beginning of learning. At the same time, it shows that at the early stage of online learning, students asked for guidance on learning.

The information gained from the activity of searching and reading encouraged students to create personal journal as a reflection of information and learning process. We can say that why certain activities on learning reflection achieved lower access as compared to that of searching for information. The findings may have been different if a different learning approach was used. For example, online learning based on project showed the different result where writing and analysis activities received the highest access as compared to searching for project based data (Hou, 2010).

The higher frequency of real time interaction as compared to sharing information shows that students require social interaction support throughout the process of learning to allow sharing of information and discussion. As an example, analysis of text interaction found that students will ask for help if they need information and this will be followed by sharing in the forum. It can be understood here that synchronous interaction was used to support learning while forums act as the main content of learning. This finding showed that there are various forms of interaction with different objectives within same online learning process (Lee and Kim, 2012).

All these activities needed to be translated by the collaboration of students in completing their tasks, such as compiling information into an article. Each student is required to submit a sub-topic (in article) as group task.

6.2 Learning Behavior - Learning Structure

Number of students with Pattern 1 at the early session of learning showed that they follow the suggested learning structure. We can say that this situation is in-line with the concept of familiarizing the students with learning (Salmon, 2002).

At the middle of learning session, majority of the students accessing the learning process without following the suggested learning structure with the assumption that their experiences with previous sessions had enabled them to go through learning without the guidelines, but focusing on personal activities.

Next in the fourth learning session, majority of the students changed their learning in-line with the suggested guidelines and structure. As stated, the students felt that going through the learning process without following the proposed guidance will give fewer results or will not reach the objective of learning.

Majority of the students with Pattern 3 at the fifth learning session showed that adequate time is required to implement online learning. Therefore, majority of the students access with minimum activity. To support this finding, Knight (2013) states that main effectiveness element of cooperative learning is adequate time for each learning activity.

Numbers of students were equally at the end of the session, thus showing that repeating the same type of learning will allow a better understanding by the students of the learning structure and allow better focus on completing the assignment. This findings can be related to the high frequency of activities in completing tasks at sixth learning session which can be summed up to be that the preference of students' for social interaction changed from team working into completing the group assignment.

As a conclusion, ***majority of the students acquired learning based on suggested learning structure especially at the early session of learning.*** This may be because the structure provided can help the students in the learning process and increase social interaction (Budenkova, 2012 ; Kupczynski et al., 2012).

However, it was also found that those who followed learning without the suggested guidance can be connected to the students' freedom to access any learning activities. Besides, each of the students has his or her own style of learning.

7. Research Finding and Organizational Behavior

In the early stage of learning session, most of students perform the learning process in the line with group investigation method as suggested. In brief, , teacher can control students' behavior if they (teacher) have deep knowledge and implementable skill on certain learning structure.

From the perspective of organizational behavior (OB), having a knowledge of OB among top management will help to predict certain behavior of staff to given action (Talya Bauer, 2012). So from the feedback of behavior among staff, it can lead to better decision in future. This simple discussion leads

us to a conclusion that a senior or top manager or teacher can control a group of people by using structured and understandable task or instruction.

8. Learning Process and Organizational Behavior

Learning or training has become necessary for an organization that involves the process of acquiring, retaining, and using competencies to change the thinking and behaviors of staff. The important aspect in an organization is human resource development by Human Resource department (HRD) that is accountable for positive changes in an organization. In most cases, HRD choose to appoint external trainers to train staff. . As trainers, they need to design activity that focus on learning how to learn (Gordon L. Lippitt, 1998). In other word, trainers are responsible to teach, facilitate or provide coaching to staff on how to learn for example, how to find information by themselves. . This situation suggests the fact that to encourage learning, trainers are to equip the learning with proper structure. This scenario reflects similarity to constructivist learning theory where a teacher is to create an environment for learning that can support the learning. Students are taught indirectly as they indulged learning independently through active process. Thus, the issue on training and teaching share similar process in which both require supportive environment to encourage learning.

Gordon L. Lippitt (1998) suggested that HRD should move away from training that is unrelated to the organization's needs or in other word, current organizational issues should be one of the raining focus. Not only that, training should include from basic skills to advanced skills. (Stephen P. Robbins and Timothy A. Judge, 2013). In a nutshell, training can be considered as learning process in an organization.

From the perspective of constructivist learning environment (Jonassen, 1998), learning process should start with a related problem as a trigger to ??. This process enables the the learners to relate the issues to their situations and the learning becomes more meaningful. In this context, the learners immerse into the learning structure due to the needs to do so. All in all, the discussion from this study emphasizes the fact that there are similarities between a training in an organization and a learning process. Therefore, the principle of organizational training and learning theory can be applied to both in training and learning process.

9. Implication of Study

Designing and learning structure which are based on cooperative learning, implemented accordingly to the group investigation method showed positive impact on communication, collaboration, and interaction among learners. More than that, provided interaction tools play a vital role to support the process of online cooperative learning. Skills of communication and team working gained from the learning process can be used to trigger development of generic skills for future career. In simple word, learning structure from this research can be a consideration as a guideline to promote communication and team working skills among students by using website.

As a result of research, there are guidelines on how to integrate pedagogical elements such as learning theory into website and online interaction tool. The result showed that there are positive impacts on learners from the integration of pedagogy and technology elements. Not just for learning performance, but also to develop skills such as virtual collaboration by using the online interaction tools.

There are few data, information and guidelines which can be extracted from this research that can be used for further study, for example the data on using website or online interaction tool to enhance generic skills among the students. From the technical perspective, the website and interaction tool can be customized for other purpose , for example to teach students on language or technical based subjects.

10. Conclusion

As a conclusion, it can be said that online cooperative learning must be conducted in a structured learning process. Several methods of cooperative learning can be used without neglecting five elements of cooperative learning. Learning guidelines must be given throughout the online learning process along with the lecturer's presence as a source of information and monitor the learning process. Online cooperative learning with several synchronous and asynchronous interaction tools can lead to better collaboration for example, in aspects like sharing information, information support, text editing, learning reflection and feedback.

As a support, learning guidance must be given as well as suggestion on how to perform the learning activities, but students can perform the learning process based on their own style and level. Implementing the repeated learning session has been identified to help students to understand the process of online cooperative learning, however enough time must be provided.

In summary, it can be said that learning activities, structure, and implementing method are more important than the technology or tool. It is hoped that the findings of this study can stimulate and trigger other researches especially in relation to specific learning methods with the latest technology support and thus to aid learning and teaching at higher education levels.

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