Utilizing ICT to Improve Influential Cooperative Learning toward Student's Achievement in Satya Wacana Christian University Salatiga 2012

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Abstract—The organization of lectures that rely on the contents characteristics of the lecture can improve students' achievement. One model of the organization of lectures is elaboration model. The problem in this research is First, how the organization of the content with elaboration model can create a cooperative learning culture by using Information and Communication Technology (ICT) to improve student's achievement? Second, what is the effect of cooperative learning with ICT toward students' achievement?

Developmental step of the model starts from preliminary study, planning, development, and validation of the model through measurement of the cooperative learning culture with ICT based and students' achievement. Step development of models ranging from preliminary studies; Planning and development models and model validation through measurement of ICT-based cooperative learning culture and student's achievement. The results showed that this model has proven to be effective. It can improve students achievement and the cooperative learning that are moderated by the usage of ICT give effect on student's achievement.

Index Terms—Elaboration model, cooperative learning, ICT, student's achievement.

I. INTRODUCTION

Elementary Curriculum Development courses for students of Elementary School Teacher Education are a compulsory subject that needs to be taken. This course serves to drive them to logical thinking, rational, critical, careful, honest, effective and efficient. This competencies are necessary for students to have the ability to obtain, process and use the information to survive even to anticipate the ever-changing circumstances, and certainly not competitive. In this course students are expected to develop skills in problem solving and communicating ideas using symbols, tables, diagrams and other media either in writing or orally. Thus the role of information and communication technologies (ICT) in the lecture necessary. However, there are some constraints underlying cultural issues both related to reading, studying, and researching [1]

In general, student's success depends on the key variables classified by Reigeluth and Merrill [2] to three things: 1) the condition of the lecture (instructional conditions), 2) strategy lecture (instructional strategy), and 3) student's achievement (instructional outcomes). According to the research [3] the organization of the content based on the characteristics of the lecture can improve student's achievement and better

retention. One model of content organization of the lecture is elaboration model. This model provides a framework begins with the content of lectures, then choosing this field of study into parts, specify each part, sorting parts into sub-sections, and then each section into sub sections, and so on until the level of detail specified by goal. In this way, the student will always associate between each sub-section to section, and each section into a broader context, this would result in better retention of student's achievement so that the acquisition will also increase. The problem is whether or not the achievement occurred because it established reading culture, a culture of learning and research culture, as pointed by Darmawan, Deni [1]; Related to the renewal of learning culture is the cooperative learning.

The problem in this research is how the development of elaboration model of course content can improve students' achievement in Elementary School Curriculum Development class. This problem is translated into research problem as follow: Is the elaborative model of course content organization give effect on students' achievement? Was the usage ICT serves as a moderator? If so is the usage of ICT increases the effect of content organization through cooperative learning on student's achievement?

II. THEORY

Besides the role of conservative curriculum that preserve cultural values as a legacy of the past to counteract the various influences that can undermine the noble values of the community, it also has a creative role that helps students expand things - new things to support its potential in order to play an active role in the life society that is dynamic; With the development of ICT in learning, it demanded the creation of a new culture of learning that is ICT culture in the lecture. Through organization of contents with the elaboration model will improve the quality and student's achievement, because through the sequence, prerequisite, summary, synthesizer, analogy, activation of cognitive strategies, and control of learning, students are expected to make a better retention of what has been learned. According Downstream [4] in the development of teaching materials need to consider the 12 principles; strategy of organizing the contents of lectures called by Reigeluth, Bunderson, and Merrill [2] as one of them is structural strategy, which refers to a way to make the order (sequencing) and synthesizing facts, concepts, procedures, and principles related. One solution to organize lectures contents is to use the elaboration model (using 7 components of the strategy), as disclosed by Degeng [3] that

teaching using the content organization with elaboration models is superior compared to the teaching without prior content organization.

Cooperative learning is a teaching strategy that expands cooperative relationships among students in academic tasks in the classroom. In these cooperative strategies there are three strategies of learning management aspects that must be considered that is structured tasks that learners should be done in collaboration with others, the structure of goals and reward structures that depend on the performance of both products and other student's achievement displayed by each learner in the learning process.

Revolutionary combination of internet-computer-World Wide Web (www) has established a new generation with new values, new interaction styles, new culture, new economy even so-called digital economy. Communication and information access become almost instantaneous, quick and easy, so that activities such as trade and education can be done in conjunction with a personal computer.

Student's achievement are also often called achievement is a specific statement of what will be known and can be done by the students, as a result of learning, which is usually in the form of knowledge, skills, or attitudes [5]. According Stainberg [6] refers to skills learning achievement and student performance is multi-dimensional, with respect to human development: cognitive, emotional, social, and physical wholeness that reflects students. Wagenaar [7] identifies the results of research on the factors that affect student achievement, one of which is a method of group study/discussion correlated with academic achievement.

III. DEVELOPMENT MODEL

The designs of the models are developed by this course consists of: objectives, materials and resources, procedures, and evaluation of learning [8]. When compared to an effective learning model, then the learning model that developed is a process of inquiry in addressing college students as prospective elementary school teachers; not only develop the ability to think/cognitive, but also foster a culture of student learning such as open-mindedness, responsibility, wholeheartedness.

Elaboration model context in the learning design can be explained by the design learning steps proposed by Degeng [9]. These steps are:
1) Objectives and characteristics analysis of field studies
2) Analysis of learning resources (constraint)
3) Analysis of student characteristics
4) Establish learning objectives and learning content
5) Establish a strategy of organizing the learning content
6) Establish learning content delivery strategy
7) Establish learning management strategies
8) Development of student's achievement measurement procedures.

These eight steps can be grouped into three as follow:
1) Preliminary study that includes analysis of conditions learning that includes steps 1), 2), 3) and 4).
2) Planning and development models includes step 5), 6)

and 7).
3) Validation of the model including the step 8) the measurement of student's achievement. Conditional analysis performed on the initial steps, which then used as the basis to develop models and learning strategies.

IV. MEASUREMENT AND RESULTS

Step to validate the model is by measuring the result which includes the measurement of the efficiency and effectiveness of teaching and learning. This activity is carried out by conducting observational learning and achievement test. The result of this activity is in the form of evidence of the efficiency and effectiveness of lectures. There are two kinds of instruments, they are test and performance assessment.

The next model validity is the observation of lecturer's capability as evidence of the level efficiency of lecturing. This validation model development is understandable if, after implemented by teachers/developers proved efficient based by student assessment that measured on their perceptions, both of learning group variable (X_1) which includes: in this lecture we (students) in group doing the division of tasks such as: task of recording, search for information through the internet as well as providing creative responses in dialogue/ debate and presentations, as well as access to ICT (X_2 as moderator): computer and internet networks we have developed as a very effective medium to support the implementation and success of the college.

The results of student assessment when analyzed with regression to determine whether the group learning effect on the success of student learning is described as follow.

TABLE I: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.416[a]	.173	.146	.79559

a. Predictors: (Constant), X_1

TABLE II: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.980	1	3.980	6.288	.018[a]
	Residual	18.989	30	.633		
	Total	22.969	31			

a. Predictors: (Constant), X_1

b. Dependent Variable: *Y*

Tests conducted on the parameters of the model in an attempt to check the goodness of the model. According to Hosmer and Lemeshow (1989), to determine the role of all the explanatory variables in the model can be used simultaneously likelihood ratio test, the omnibus test. Having analyzed the Chow test is a further development of the regression to determine whether the influential group learning (X_1) the success of student learning (*Y*), moderated by Internet Access/ICT (X_2), was obtained the following results.

TABLE III: OMNIBUS TEST[A]

Likelihood Ratio Chi-Square	df	Sig.
16.211	3	.001

Dependent Variable: *Y*
Model: (Intercept), X_1, $X_2 * X_1$
a. Compares the fitted model against the intercept-only model.

TABLE IV: TESTS OF MODEL EFFECTS

Source	Type III		
	Wald Chi-Square	df	Sig.
(Intercept)	11.927	1	.001
X_1	10.461	1	.001
$X_2 * X_1$	9.246	2	.010

Dependent Variable: Y
Model: (Intercept), X_1, $X_2 * X_1$

Based on the analysis of the Chow Test on omnibus tests obtained Likelihood Ratio Chi-Square 16.211, *df* = 3 and a significance level of 0.001; 0.001 level of significance is less than 0.05 which means that the model is accurate/worth as significant. With Model Effects Type III tests with Wald Chi-Square *df* obtained X_1 or moderator (X_2) has a significance level of 0.001 and 0.010 are all less than 0.05, this means that the role of the moderator is significant X_2.

It is proven that cooperative learning in the development of the content organization models affects the improvement of student's achievement and access/use ICT that serves as the moderator. In other words, the usage of ICT give effect on cooperative learning on student's achievement in content organizing applied through the elaboration model. Finally, elaboration model can improve students' achievement in elementary school Curriculum Development class.

V. DISCUSSION

This course development model after implemented by the lecturer executing/developers proved efficient base on student assessment measured by their perceptions, both toward learning group variable (X_1) and access to ICT (X_2 as moderator). The analysis result showed in general (mode) is at the high level for the study group and very high in internet access. Thus the development of lecture material organizational models with the elaboration model proved to be efficient.

Furthermore, after further analysis, it turns out that the learning group influence on student success is 14.6%. The degree of this effect is moderated by Internet access: this means that the higher intensity group learning coupled with high internet access, will have 22.6%, much higher the student's achievement also, and vice versa. The results are in line with the findings of Wagenaar [7] which states that group study/discussion method correlated with academic achievement. The role of Internet access/ICT in learning as a moderator is also in line with the conclusions [11] that the use of ICT in more sophisticated way can support new strategy and technique in teaching and learning.

VI. CONCLUSION

The development of course contents organization with elaboration model in Elementary School Curriculum Development class were proven effective as an alternative solution to foster a culture of study group that can improve student's achievement. Access/use ICT serves as a moderator and influence group learning to enhance student's achievement, in optimal conditions can affect 22.60%.

The results of this study can be used by lecturers and teachers especially elementary teachers, as input, to improve their performance and professionalism, as well as for the consideration in selecting the ongoing professional development (teacher/lecturer). Education of Primary School Teachers can use the results of this study in order to improve the quality of student's achievement, increasing both the lecture courses in Elementary Curriculum Development course and other courses. Students as prospective teachers need to develop a culture of cooperative learning through ICT access which has been shown to affect the effectiveness and student's achievement as identified above.

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