ONLINE PROCEEDINGS

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Increasing students' activities and independent learning level through exploratory discussion method based on projects

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Sub Theme: Management and strategic development of ODL
Context of paper: Post-Secondary or University Education

Abstract
This study aimed to describe the implementation of explorative discussion method based on projects in tutorial to increase students' activity and self-reliance. The subjects were member of UT study groups at Sidoarjo in 2009. Results of study shown that this method has enabled: (1) to increase of students activities during the tutorial activities, (2) encouraged student's independent learning, (3) the use of projects in exploratory discussions have enabled students to understand the materials being studied, (4) the role of tutors in line with their primary function in tutorial activities and (5) the syntax of exploratory discussions have encouraged students to actively role in learning and develop mathematical communication.

Keywords: exploratory discussions, projects, tutorials, independent learning

Introduction

Basically, tutorial is assisting or guidance of academic learning, which is a person (tutor) to the student (tutee) to increase the process of independent learning of students as individuals or groups, associated with the learning materials being studied. Tutorials conducted in person or remotely based on the concept of independent learning (UT, 2005: 25-26), that is (a) the tutor should refrain from giving information (the transfer of knowledge/information) and to challenge students to dig up information/knowledge itself from various learning resources and everyday experiences, (b) the tutor must be able to foster discussion, comment and criticism among students, thereby enhancing the intellectual capacity, psychomotor, democratic attitude, cooperation, and interaction among students, (c) any decision in tutorial should be taken through a process of group dynamics where every student in the group to give false thoughts, and (d) the tutor should avoid the tutor-student interaction patterns and develop student-student interaction patterns.

Researcher's experiences indicate that there are still students who do not have independent attitude in learning yet. In the tutorial, they have not able to

understand the material that will be studied. As a result, when they asked for opinions about the matter, they are relatively silent or pretend to flip through the module to search for answers. Or, when discussing, they tend to be passive. Eventually the discussion turned into individual work, or only 1-2 people in group, the rest just keep quiet or take notes. Passive attitude during these lectures made the tutorial became boring.

This feeling will gradually make the students do not like these subjects. The result appears score of students' achievement is low. Therefore, it is important for tutors to foster positive attitudes to students in studying certain subjects. This positive attitude can be built in a learning culture where students are active and independent. Tutors act as a facilitator like a conductor guiding orchestra music.

Some of the subjects which students' achievement is low are Mathematics (PDGK4108) and Basic Science (PDGK4103). This low achievement can be an indicator level of students' activity in face-to-face tutorials. The lower score in achievement, the lower of the level of activeness we get. Here is the data of students' achievement for Mathematics final exam in 2008.1 and Basic Science (PDGK 4103), for region-UPBJJ UT Surabaya stated in Table 1.

Table 1
Student Achievement for Mathematics and Basic Science at UT's Surabaya Regional Center in 2008.1

No	Cities/ Districts	Students Passing Grades for Mathematics and Basic Science (%)									
		A		B		C		D		E	
		Math	BS	Math	BS	Math	BS	Math	BS	Math	BS
1	Surabaya	0	0	0	28	0	63	0	7	100	0
2	Sidoarjo	0,4	1	14,29	29	41,6	62	2,9	5	40,8	0.1
3	Gresik	2	1	16	27	8	67	0	1	73	4
4	Lamongan	2	0	8	32	10	63	0	0	80	5
5	Tuban	0	0	0			50	66,6	50	33,4	0
6	Jombang	5	0	55	19	9	46	6	0	20	33
7	Mojokerto	-	-	-	-	-	-	-	-	-	-
8	Mojokerto	20	14	19	55	5	26	0	0	56	3
9	Bojonegoro	0	2	1.14	50	42	40	3.44	2	51.68	6
10	Bangkalan	0	0	0	35	0	65	0	0	100	0
11	Pamekasan	3	0	17	2	5	9	0,1	66	71,9	21
12	Sampang	0	-	0	-	3	-	0	-	97	-
13	Sumenep	0	-	0	-	0	-	28	-	72	-
14	Madiun	10.5	-	21.05	-	36.8	-	2	-	28	-
15	Madiun	0	0	30.76	17	6	69	0	0	58.82	13
16	Magetan	16.1	-	33.3	-	50	-	0	-	0	-
17	Ponorogo	0	0	30.95	21	54.7	73	7.14	3	7.14	0,1
18	Ngawi	2.77	3	51.35	58	30.2	17	0	0	32.07	20
Averages		3.63	1.61	16.54	28.7	16.7	38.2	6.83	10.3	56.34	21.2

Source: Registration & examination Data

Based on the data, almost all districts in UT Surabaya, for Mathematics (PDGK4108) there is 37% of students who graduated, which grade A is 3.63%,

grade B is 16:54%, and grade C 16.66%, while 63% of students did not pass which grade D is 6.83% and grade E is 56.34%. For Basic Science is only 68.53% of students who graduated which grade A is 3%, grade B is 58%, and grade C is 17%. While who did not pass is 21.47%, which grade D is 10,3% and grade E is 21,17%.

If we see from mastery learning (which achievement score is at least 75), the result for 2008 final exam of Mathematics and Basic Science is still far from expectation. Moreover for Mathematics, the graduation rate is only 37%. For that, we need to think how to improve learning so students are able to master and understand the material module. Presumably, one of the answers to the problem is to increase the level of activity and independent learning of students in face-to face tutorials.

One method that can enhance learning and self study activities of students at tutorials are exploratory discussion based on projects. This method is students are discussing the material based on projects. Exploratory discussion itself is an activity where the main activity is discussion. The discussion was divided into two sessions, the first is a group discussion, second is a class discussion. In group discussion, students are encouraged to do student-student interaction. The purpose of this interaction is students are able to explain other lower students.

Meanwhile, the lower students are encouraged to improve their ability. It is suited to Hudojo (2005: 107-108) which states that the discussion allows the dialogue between teacher and students, and student with a student. This dialogue allows the explanation for lower students. In this tutorial activity, the role of tutor is (1) motivator for independent learning, thinking and discussion in tutorial, and (2) mentor, facilitator and mediator for students to build the knowledge, attitude and professional skills independently, or solving the problems faced by students in tutorial. Tutor is assistance and guidance for students to learn the material on their own understanding, giving feedback to students, improving students learning skills.

The aim of this project is to develop students' independence in learning and student-student interaction. In completing the project, students were asked to study the matter themselves at home. In the tutorial activities, students learn the meaning (sense) of the material. The goal is students to have thoughtful knowledge about the material. In addition, students have to work in team.

Based on the description, the researcher's interest is to conduct research with question about how the implementation of exploratory discussion based on projects increase the level of activities and independent learning of UT Study Club Sidoarjo in Mathematics tutorial? The subjects are members of UT Study Sidoarjo because researchers are tutor on this Study Club. Meanwhile, researchers chose this subject because researchers are Mathematics' tutor. After all, mathematics is a subject that "feared" by the students. This fear causes the students to be passive and depend on what we give as a tutor in face-to-face tutorials.

Research Method

This study used a qualitative approach and aimed to describe the implementation of exploratory discussion method based on project to increase

students' activity and independent learning level, the type of research is descriptive research (Borg & Gall, 1983). Subject of the study is class A and B, members of UT study group in Sidoarjo.

Before the implementation, researcher prepared research instruments such as: Tutorial Activity Plan (TAP), Tutorial Activity Unit (TAU), Tutorial worksheets (TWs) which is based on projects, Evaluation Plan (EP), observation sheets and questionnaires for students. Those instruments are closely related to how student's activity and independence can be increased. Instruments validated by five experts and they claim that instruments fitted to the purpose and it could be used for the research.

Projects in TWs are developed by research consists of eight worksheets in accordance with the eight times face-to-face tutorials. They are (1) logic, (2) linear and inequalities equations, (3) sets, relations and functions, (4) introduction to statistics I, (5) introduction to statistics II, (6) transformation, (7) problem solution and (8) congruence and similarity.

The instruments then implemented in exploratory discussion based on projects. The stages of these methods are:

Introduction Stages
1. Tutor gives an example of the material in everyday life.
2. Tutor writes the purpose of tutorials on the board.
3. Tutor explains the mechanism of tutorial activity.
4. Tutor gives some time for students to sit in groups (1 group @ 5-6 people)

Core Stages
A. Group Discussion
1. Students in groups discuss their work on projects in the TWs which completed earlier independently, or completed on tutorial time depending on the characteristics of tutorial material.
2. Tutor gives guidance to help students to understand the meaning of the material learned through completing projects in TWs.

B. Class Discussion
1. Tutor asks students to report the results of their discussion by explain the meaning of the material to other groups.
2. Tutor facilitates the class discussion with emphasizing the significance of the material being studied based on the results of group discussions.
3. Tutor and student conclude the discussion.

Closing Stages
1. Tutor asks students to make conclusions with their own words about the activities of the tutorial.
2. Tutor explains tutorial plan and activities project for next week.

Results of implementation later described what it is to find out whether the implementation of exploratory discussions tutorials based on projects enabled to increase students' activity and independence. The data analysis technique used

is the flow model proposed by Miles & Huberman (1992) which includes (1) reduce the data, (2) present the data and (3) the withdrawal of conclusions and verification.

Results

Projects developed by the researchers resolved before the face-to-face tutorials by students independently or in groups are depending on the characteristics of the material. Projects that completed before the students in groups are the matter of logic, introduction to statistics I and II. Meanwhile, other projects can be ompleted independently by students. Tutorial activities carried out in groups. One group consisted of 5-6 students. This means there are 7 groups in class A and 8 groups in class B. Group formation based on gender and mathematics ability.

Implementation tutorials with exploratory discussions held for 8 times as scheduled in tutorial meetings from July-October 2009. During implementation, the researchers were accompanied by five observers to determine the level of students' activity. The instrument used by the observers is observing sheet of students' activities in tutorial. If a student asks a question or problems two times, then the observer will write 2 in the student column of the sheet. Sum of the scores counted by the observer when the student ask a question or a problem shared by total students multiplied by 100% is the percentage of questions or problems shared by students in the core activity, the average class A is 64%, while class B 75%. In other words, the percentage indicates the number of questions/problems rose in the students' core activities. The observation can be seen in Table 2.

Table 2
Summary of Observation Results of Student Activities in Class A and B

No	Students Activities	Average of Class A	Average of Class B
I.	INTRODUCTION STAGES		
1	Students response apperception from	94%	104%
2	Students make questions from the module that they did not understand yet	15%	3%
II. A.	CORE STAGES GROUP DISCUSSION		
1	Students search information from TWs or Book.	68%	118%
2	Students make question or problem	64%	75%
3	Students listen information, idea, answers, questions from tutor and friends	107%	140%
4	Students response idea, answers, questions from tutor and friends	77%	133%
5	Students write text which relevant to group discussion	54%	100%
B. CLASS DISCUSSIONS			
1.	Students present the result of group discussion	98%	101%

2	Students response the presentation	31%	56%
3	Students make answers or argumentation	41%	66%
4	Students make other answers	12%	2%
5	Students write discussion class information	0%	61%
III.	CLOSING STAGE		
1	Each groups present their summary	77%	70%
2	Other groups response the summary	61%	44%

Observations shown, that the level of students' activity in exploratory discussion is high. This is indicated by a greater percentage or equal to 100% in both classes is the time to listen of information, ideas, answers, questions from the tutor or friend. This means that almost all students do that activity. High activeness is also reflected in the students present their project work. In class A, percentage of the activity is 98%, in class B 101%.

At the introduction stage, the level of students' activeness for class A is 94% and class B is 104%. At this stage of group discussion, level of the activeness for class A is 107% and class B is 140%. In class discussion stage, level of activeness for the class A and class B, respectively 98% and 101%. In the closing stages, level of activeness in class A and class B, respectively 77% and 70%. This means that almost all students involved in exploratory discussions based on projects. One of students' activeness levels is caused by the positive response of students to tutorial activities based on exploratory discussion. The response can be seen in Table 3.

Table 3
Results Questionnaire response of Students in Class A and Class B

No	Questions	Number of Students (%)				
		1	2	3	4	5
1	You are happy to follow mathematics tutorial with exploratory discussion?.	1	1	4	46	47
2	You understand the mathematics module which discuss in tutorial?	1	4	16	53	25
3	You feel motivated to learn mathematics modules independently after this tutorial based on exploratory discussion	1	1	10	62	25
4	You are motivated to solve tasks or project from modules that have you learned in this tutorial based on exploratory discussion	0	3	9	59	29
5	You have new understanding/knowledge after this tutorial based on exploratory discussion	0	1	7	40	51
6	You wish other tutorial use this method e.q. exploratory discussion	1	1	12	38	47
7	You are listened in mathematics tutorial	0	3	4	29	63

8	Your tutor always response all students questions	0	1	6	28	65
9	You are helped or schaffolded by your tutor to solve tasks or projects	0	0	7	29	63
10	Your are motivated to solve tasks or projects in TWs (Lembar Kerja Tutorial) through exploratory discussion	0	1	9	40	50
AVERAGE		1	2	9	42	47

Description: 1 = strongly disagree, 2 = disagree, 3 = quite agree, 4 = agree, 5 = strongly agree

Response in Table 3 shows that 93% of students in both classes are agreed or strongly agreed that the tutorial with an exploratory discussion based on projects is pleasing. Moreover, 88% of students is agree or strongly that they are encouraged to complete the tasks/projects is in TW independently. About 85% of students also expect another tutorial using this method in the activities of face-toface tutorials.

In addition, the tutorial with an exploratory discussion based on projects can help students understand the material being studied. This is apparent from the responses of students who claim that this method can help them in understanding the material in the module. This response is expressed by 78% of the students. In addition, 91% of students stated that they acquire new knowledge at the time of learning with this method. In other words, students believe that they acquire new knowledge to complete the project within the framework of exploratory discussion. An understanding of the material indicated by the average value of tutorials over 80 (scale 0-100). Average can be seen in Table 4.

Table. 4
Average of Tutorial Scores for Class A and B

	Class A	Class B	Combined
Average of tutorial scores	85,14	86,72	85,92
Maximum score	89,2	90,3	90,3
Minimum score	81	82,2	81

Discussions

The results shown, that the method of exploratory discussion based on project responded well by the students. It is shown from the results of the questionnaire which stated 93% of students combined class A and B agree or strongly agree with the statement that they were happy to follow the tutorial activities with this method. This conclusion can also be seen from the level of students' activities during the tutorial that almost all students active at every stage of the tutorial. This is indicated by a percentage greater than or equal to 100% in both classes. These stages are a) introduction, b) core (groups and classes discussion), and (c) closing.

These results were obtained for exploratory discussion activities to help tutors focus on helping all students' learning activities and create the exchange of knowledge about student thinking and learning comprehension. So the focus is what is experienced by students is not what the tutors wanted. In addition, the project used to make exploratory discussions have become more active. This is because the projects made closer to daily life and focuses on student understanding. For example, the introduction of statistical I material, the project was the students asked to measure the heights of all students in each class. Then, students create a line chart, bar, circle or pictogram on carton. One group only made one diagram. Charting has been done in groups before face-to face tutorials. Then, the project is presented to the class. Based on that, tutors facilitate class discussion to determine which of these diagrams are best suited to describe the heights of the students and why. Another example, in introductory statistics II, before tutorial, students asked to calculate the average, median and mode from data given in TWs. This can be done because these materials have been studied by students at the secondary school. At tutorial, students give an argument about which of measure of central tendency that best describe the data in the TWs and why. In other materials, students were asked to complete existing projects before tutorials. At the time of the tutorial, tutor facilitates the discussion to explore students' understanding at the level of understanding of the concept.

During this time, students only know how to count, but do not understand why this is so and what it means. Thus, exploratory discussions encourage students to actively participate to gain in-depth knowledge. Questionnaire results indicate that (a) 87% of students agree or strongly agree with the statement that they feel motivated to learn mathematics modules independently after tutorial activities with exploratory discussion method based on projects, and (b) 88% of students agreed or strongly agreed with the statement that they are motivated to complete the project from the module has been learned in the tutorials by themselves after following the tutorial activities with exploratory discussion. It means that the implementation of exploratory discussions based on project can encourage students to study independently mathematics modules. Thus, this method is in accordance with the basic principles of a tutorial, "independent learning of students". It can also be seen from the average tasks score of the two classes is 85.92 (scale 0-100). This indicates that the student is motivated not only to complete the project, but also try to understand the mathematics modules so they obtain a high score in the task.

The role of tutors in the exploratory discussions are in accordance with the primary function of tutors in tutorial activities as mentors, facilitators and mediators of students in building the knowledge, values, attitudes and academic and professional skills independently, or to solve the problems. It is shown from the results of a questionnaire in which 92% of both classes of students agreed or strongly agreed with the statement that they heard and paid attention during mathematics tutorial, 93% agreed or strongly agreed with the statement that their tutors are always responded to student questions, and 92% of both classes is agreed or strongly agreed with the statement that they always assisted/guided by tutors during the discussion activities.

Syntax of explorative discussion can encourage students to take an active role in learning and develop mathematical communication. It is because of the stage group discussions and class discussions. At stage of group discussion, students are actively involved with each other to understand the material from the work of the project. This means that at this stage, students make interaction. At stage of the class discussion, students are encouraged by the tutor to explain and respond to the results of group discussion. Thus, during this stage, students can develop mathematical communication. These results are in line with Hudojo (2005: 108) which states that learning is done by discussion in small groups to facilitate effective communication in both mathematics to understand the concept or principle.

Conclusions and Suggestions

Conclusions

The results show that the implementation of project-based exploratory discussion provides several advantages. First, this method can increase the activity of tudents during the tutorial activities. It is indicated from the observation of five observer states that at the introduction stage, the level of student activity is 94% of class A and 104% in class B. At stage of group discussion, level of the activity of class A is 107% and 140% in class B. In class discussion stage, level of activity for t class A and B, respectively 98% and 101%. In the closing stages, level of activity class A and B, respectively 77% and 70%. This means that almost all students involved in exploratory discussions based on projects. Second, face-to-face tutorial activities with exploratory discussions based on projects can encourage independent learning of students. These results are shown from students via a questionnaire response states that 87% of students agreed or strongly agreed with the statement that they feel motivated to learn mathematics modules independently after tutorial activities using this method. Third, the uses of projects in exploratory discussions help students to understand the material being studied. It is

because the project is in TW closely related to daily life and help students to gain in depth to understand the meaning of the concept. This understanding can be seen from the average task score of student in both classes. It is 85.92. Fourth, the role of tutors in exploratory discussions based on projects also in accordance with the primary function of tutors in tutorial activities as mentors, facilitators and mediators of students in building the knowledge, values, attitudes and academic and professional skills independently, or in dealing with solve problems in learning mathematics. Fifth, the syntax exploratory discussions can encourage students to take an active role in learning and develop mathematical communication.

Suggestions

Exploratory discussion of project-based method can be used for tutorial courses beside the field of mathematics. This is because the method is not reserved only for mathematics. Of course in the application outside of mathematics, it needs to be adjusted to the characteristics of learning materials of the subject.

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