

IMPROVMENT THE OUTCOMES OF THE STUDENTS IN PHYSIC EDUCATION PROGRAM OF FACULTY EDUCATION OF RIAU UNIVERSITY BY IMPLEMENTATION STAD TYPE OF COOPERATIF LEARNING MODEL ON QUANTUM PHYSIC COURSE

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The research is intended to know the improvement the outcomes of the students in physic education program of Riau University by implementation of STAD type of cooperatif learning model. The subject of research is the students in the fifth semester of 2012/2013 academic year. Parameter of this research is the outcomes. Data of study result were collected by test, and data of activity were collected by observation paper. Data were processed by descriptif analysis. The result of research showed the improvement the outcomes by implementation of STAD type of cooperatif learning model. From the first cycle, average of absorption index 51,29 % which is categorized well as average changed to be 73,49 % which is good category in the second cycle. The improvement learning was supported by lecture condition that was indicated the increase of lecturer activity about 10,35 % and student activity about 12,34 %

Keyword : implementation STAD type of cooperatif learning model, the outcomes

Introduction

The high intitutional of education is an institute to produce professional teacher, so it needs the good candidates of teacher. All this time, the outcomes of students on quantum physic course have been low, such as in 2010/2011 academic year the average of the outcomes was 58,4. Quantum physic is a compulsory course discussing about quantity of sub atom (Gari Zukaf,2003). This course needs many Matematic analisa, so whoever doesn't have high motivation that they will difficult to follow it. Because in learning procces the students were more passive, the study results became low.

Lecturer who gives knowledge and skill to students have roles as facilitator, motivator, and adviser to get advancement in learning (Slameto, 2003). Learning is change of behaviour relative permanent, and occurs as result of reinforced practised potentially that is based to get particular purpose.

The following facts in physic quantum class:

1. Many students couldn't answer lecturer's question because in their opinion quantum physic is difficult subject.
2. Many students didn't seriously studied and worked exercises which had been given by lecturer.
3. The students are more passive



4. Absorption and the remember ability of students about prerequisite of lecture is low, it causing the outcomes in this course is low too.

If this condition is continuing without solution, so the concept share and the outcomes of students still low, and quantum physic learning has become boring. Quantum physic course is important because it is the continue subject linked up physics with sub atom quantity which has much relevance in development of technology. The low outcomes has been relevance with concentration activity of students and ability of lecturer to use variation of method and approach learning, now that quality of lecture hasn't been optimal yet and not match as expected. It can't be let and needs improving. Student competence that needs to develop is not only cognitive aspect, but also afective and psikomotor aspect. All of aspects will be excellent if it have optimal activities among lecturer and students in the lecture. These competence can attainable if students be active and lecturer can fasilitate by using variation model or variation approach. One of learning model that can be used to attain competence is cooperatif learning model of STAD (Student Teams Achievement Division) type.

Nur (1996) said that cooperative learning not only excellent helps student to understand of the difficult science concept but also useful to grow up cooperate, thinking critically, moral support to help their friend, etc. It can make student's motivation higher to study. Basically cooperative learning intends to develop behaviour of cooperative intern personal of student and to help students in their academic. Many variations in approach of cooperative learning. Every approach gives pressure at particular purpose which is made to influence pattern of student interaction.

Cooperative learning of STAD type is a model of learning which gives a chance for students to construct their knowledge actively and to cooperate with their friend in learning process, so it will be cooperation between wilier student and ordinary student. Thus the knowledge of ordinary student can increase through information from wilier student. In addition, dissimilarity about knowledge among students can be minimized, so it will make condition of calm and optimal. The optimal condition will make the students get more motivation and can get the understanding of concept far easier, so it hope to assume that it can increase motivation and the outcomes of student on physic quantum course. Based on above explanation, this research have purposed to improving the student's outcomes of physic quantum in physic education program FKIP UR by implementation STAD type of cooperative learning.

Literature Review

Cooperative learning is a metode that is used by educator to develop social skill of student. Basic element of cooperative learning in Ibrahim dkk (2000) are the following:

1. A student in their group must feel that they "be alive together".
2. The student have responsibility of everything in their group, as their own.
3. The student must look that all of group's member have the same goal.
4. The student must devide the task and responsible dispassionattely to the grup's member
5. The student will be evaluated or will be rewarded
6. The Students share leadership and they need skills to learn together during the learning process.



7. The students will responsible individually about the subject that they handled in cooperative groups

The following are procedures in cooperative learning which include 6 phase:

1. Tell the Student about the aim of learning and give them motivation for that, the teacher gives information about all of the aim of learning that will be gotten and motivates the student to study
2. Give information, the teacher gives information to the students by demonstration or by material for reading
3. Organize the students in group, the teacher explains how to form the group and helps each group to transition efficiently
4. Guide the student groups, the teacher guides the groups when they do their task
5. Evaluation, the teacher evaluates the outcomes about subject which has been learned, or each group shows their result task
6. Give reward, the teacher gives reward to the best individu or group (Ibrahim M, dkk, 2000).

STAD in Rai (2007) is one of cooperative learning strategy which helps to increase cooperate and to set their learning skill. Motive to choose STAD type is good interaction among students, increase positive attitude to the subject, and increase interpersonal skill. STAD can add source of learning in groups because wilier students act as teacher. Therefore it is hoped that it can increase the outcomes after learning procces (Balfakih, 2003). Balfaqih's result of research showed that in chemical lesson, STAD of learning methode is more effective than traditional methode.

STAD technic can more increase than traditional methode (Tuna Gencosman, 2012). Yamarik (2010) explained that student who works in group is more succes in test than student works individually.

Another side, STAD can be used in every course included mathematic. It is effective to effect students together, coleage teaching, and to increase other skill. In this methode, after teacher presents lesson, the student works in their group to understand that lesson, teacher must sure that each member in group understand. End step, student works quiz individually and must not to help other member (Slavin 1990).

Methodology

Subject of this research is students of physic education FKIP of Riau university who were taking quantum physic course in fifth semester academic year 2012/2013. Instruments of data collection are observation paper of activity lecturer and student, quetioner of student motivation study, and test of student's outcomes. Data of research was analized descriptively.

The following are steps in this research:

1. Planning phase
 - Arrange the equipment of learning:
 1. Prepare the lesson plan based on STAD type of cooperative learning
 2. Prepare work sheet of student

3. Prepare evaluation tools
 4. Prepare observation paper
 5. Prepare groups that measure up STAD type of cooperative learning
2. Realization phase
Activity in this phase is realize the scenario of learning that was planned. This research did in study program of physic education fifth semester in academic year 2012/2013. This research executed by two cycle
3. Observation and evaluation
Observation did together with action. Observation is done by 3 observer to observ student activity and one person to observe lecturer activity during learning process. Evaluation of task result's groups did every meeting and evaluation of one base competence did every end of cycle.
 4. Analysis and reflection
Data from observation, group assessment, and test every base competence (main matter) were analyzed their consummation, then it were discussed at reflection time to determine action for correction in the next cycle.

Research Finding

The following lists the outcomes of student for each cycle in quantum physic course. The outcomes was gotten after aplicates STAD type of cooperative learning.

Table 1. Absorption index of students in physic quantum course by implementation STAD type of cooperative learning

No	Category	Absorption index of students	
		Cycle I (%)	Cycle II (%)
1	Excellent	7,84	41,18
2	Good	21,56	25,49
3	Average	25,49	15,69
4	Below average	45,10	17,65
The average of absorption index		51,29	73,49
Category of absorption index		Average	Good

The following list The value of group development for every meeting

Table 2. The value of group development

NO	GROUP	The Cycle 1				The Cycle 2			
		NP 1	Category	NP 2	Category	NP3	Category	NP 4	Category
1	A	6.67	GOOD	23.33	GREAT	11.67	GOOD	28.33	SUPER
2	B	20	GREAT	20	GREAT	14	GOOD	20	SUPER
3	C	12	GOOD	18	GREAT	20	GREAT	26	SUPER
4	D	8	GOOD	22	GREAT	8	GOOD	28	SUPER
5	E	10	GOOD	18	GREAT	10	GOOD	24	SUPER
6	F	18	GREAT	26	SUPER	6	GOOD	26	SUPER
7	G	16	GREAT	8	GOOD	8	GOOD	30	SUPER
8	H	14	GOOD	10	GOOD	4		30	SUPER

9	I	14	GOOD	10	GOOD	8	GOOD	30	SUPER
10	J	8	GOOD	12	GOOD	4		30	SUPER
THE AVERAGE NP		13.33		16.00		9.11		27.11	
The average of score development		14.67				18.11			

Data of lecturer and student activity are obtained by the observation that was undertaken by the observers during process of learning using a type STAD of cooperative learning. In management classroom the lecturer should have skill about how to obtain a feedback that will stimulate the students to be active. Therefore, activity is important to be considered. The following lists lecturer activity in table 3 and students activity in table 4.

Table 3. Lecturer activity in quantum physic course through implementation STAD type of cooperative learning

The Activity of learning	Lecturer Activity	CYCLE I			CYCLE II		
		P 1	P 2	Average	P 3	P 4	Average
INTRODUCTION	1. Give prerequisite	3	3	3	4	4	4
	2. Give a motivation	3	3	3	3	3	3
	3. Explain the aim of learning	4	4	4	4	4	4
MAIN ACTIVITY	4. Give Information	3	3	3	4	4	4
	5. Organize the students in groups	3	4	3.5	4	4	4
	6. Guide the groups	3	3	3	4	4	4
	6. Give question	3	4	3.5	3	4	3.5
	7. Respond the questions	4	3	3.5	2	3	2.5
	8. Give reinforcement at presentation	3	3	3	4	4	4
CLOSING	9. Guide the students to conclude the lessons	4	3	3.5	3	4	3.5
	10. Evaluation	4	4	4	4	4	4
	11. Give a reward	3	4	3.5	4	4	4
	12. Do the follow up	2	4	3	3	4	3.5
Sum		43.5			48		
Average (%)		83.65			92.31		
Category		Very good			Very good		
The improvement activity (%)		10.35					

Table 4. Study activity of students in quantum physic course by implementation STAD type of cooperative learning.

Student activities	Cycle 1			Cycle 2		
	P1	P2	Average of activity (%)	P3	P4	Average of activity (%)
Listen lecturer's information	97.17	100	98.585	100	100	100
Read the resume of subject	91.67	91.49	91.58	95.56	98	96.78
Solve the task on work sheet	97.92	95.74	96.83	100	100	100
Discuss among them or ask the lecturer	97.3	89.36	93.33	91.11	100	95.555
Respond the presentation	13.95	12.77	13.36	22.22	100	61.11
Do the quiz	97.92	100	98.96	100	100	100
Average of activity I			82.11	Average of activity II		92.24
Category			Very good	Category		Very good
The increase of activity (%)		12.34				

Implication

The average absorption in the first cycle of 51.29% in the category quite well. The highest absorption in the unfavorable category. As it relates to many students who do not understand the concept of the wave function and the determination of the expectation value for the electron. In this concept the student should try to optimize an understanding of previously material and they should have used a mathematical analysis to solve the problems which was given. Many students have difficulty in understanding the concept. The absorption of students defined as the ability of students to absorb the material presented in the learning process. Mulyono (1997) said that the difficulty of learning is a condition that causes students can not learn properly.

After complete the first cycle, the reflection has done to minimized the distress level in the next cycle. The Revision carried out at the second cycle mainly on improving the work sheet at the third and fourth meeting. In the second cycle, application of mathematic analysis are used more than the first cycle to increase the understanding the concept. Therefore the revision is needed to increase the outcomes (the absorption index).

In the second cycle occurred significant improvement that the highest absorption index is 41.18% with very well category. The average of absorption index is 73.49% which good category. So, revision that was made for cycle II was successful. It means that many student can understand easier the concept of a particle trapped in one-dimensional box. The generally STAD type of cooperative learning can improve the study result of Quantum physics that requires a deep mathematical analysis. This is consistent with what Tuna Gencosman in Mustafa Dogru (2012) said that STAD type of cooperative learning can improve academic achievement of student that is greater than traditional teaching methods

(Ascher, 1986; Balfakih, 2003; Johnson & Johnson, 1989; Slavin, 1982). The cause of the high outcomes in quantum physics course is good cooperation within the group as what Yamarik (2010) said that the student working in groups will be more success in tests than the student working individually.

The development value of group for each cycle can be seen in the table 2. The development value is obtained by giving quizzes at each meeting. Ibrahim (2000) said that the reward in cooperative learning can improve the student's assessment about the academic achievement and norm of change which related to the outcomes. In fact, the development value of group increased in the cycle I which the average is 13,33 to be 16, 00. In the cycle II at the third and fourth meeting, the increase was significant. Although value of development in the third meeting decreased, it can be resolved with quiz on The fourth meeting. At the third meeting, the development value of group was low because the students can't answer the problem about procedure of determine to obtain the exact energy level and wave function in the case of a particle trapped in one-dimensional box. Generally the increase of development value occurred in the second cycle. The development value of group that have increased provides an opportunity of interdependence and individual responsibility in the group.

The Second cycle occurred the improvement of activity about 10.35% from the first cycle which is categorized very well to both of cycles. The lecturer as educator is demanded to have the flexibility and ability to deliver subject of lesson, thus the student activities can be optimized so that achieves the expected results.

By the tables 3 and 4, the average of lecturer activity and students have increased. The student activity in the first cycle is 82.11% with very good category. The lowest activity is to respond presentation aspect. After reflection this activity increased to 61.11% on the second cycle. In general, there is the improvement activity from the first cycle to the second cycle about 12.34% during the learning process. The improvement of student activity is appropriate with statement by Zakaria, Chin & David (2010) that there is a positive change if a educator transforms learning method toward student-centered. So, the implementation STAD cooperative learning can improve the lecturer and students activity. The participation which is done in cooperative groups can make harmonious cooperation, create the discipline of class, and create an atmosphere of learning to be democratic.

Conclusion

Based on the results of research, it can be concluded that through the implementation STAD type of cooperative learning can increase the outcomes of students Physics education program of Facultyr Education of Riau university on quantum physics course. The average of absorption index increases from 51.29% with average category to be 73.49% with good category. The improvment of the outcomes are supported by the lecture atmosphere that is reflected through the activities of lecturer and students that increase too, with 10.35% by lecturer and 12.34% by student. STAD type of cooperative learning can be expected an alternative of learning model for other lectures, and needs further research about affective aspect and skill of scientific process.

References

- Ascher,C. (1986) Cooperative Learning in the Urban Classroom (ERIC document no: ED 273717)
- Balfakih, N.M.A. (2003). The Effectiveness of Student Team; Achievement Division (STAD) for Teaching High School Chemistry in the United Arab Emirates. *International Journal of Science Education*, 25 (5), 605-624.
- Garry Zukaf, (2003) *Makna Fisika Baru dalam kehidupan*, LKPM, Yogyakarta
- Ibrahim, M., Rachmadiarti, F., Nur, M., dan Ismono, 2000, *Pembelajaran Kooperati*, University Press UNESA, Surabaya.
- Johnson,D.W., & Johnson, R.T (1989) Cooperative Learning What Special Education Teachers Need to Know the Pointer, 33 (2), 5-11.
- Mulyono,(2007) *Pendidikan Bagi Anak Berkesulitan Belajar*, Jakarta : DepDikBud dan Rineka Cipta,.
- Nur, M., 1996, *Konsep Tentang Arah Pengembangan Pendidikan IPA SMP dan SMU Lima Tahun yang Akan Datang*, Depdikbud Direktorat Jenderal Pendidikan Dasar dan Menengah Umum, Jakarta.
- Rai, N, & S. (2007) STAD Vs Traditional Teaching Redignng Pedagogy_crrp Conference.
- Slameto, 2003, *Belajar dan Faktor-Faktor yang Mempengaruhinya*, Rineka Cipta, Jakarta.
- Slavin,R.E (1982) *Cooperative Learning: An Overview and Practical Guide*. Second Edition.
- Slavin, R.E., 1995, *Cooperating Learning Theory Research and Practice, Second Edition*, Boston Allyn and Bacon Publisher, Massachusetts.
- Tuna Gencosman, Mustafa Dogru (2012), Effect of Student Teams_Achievement Division Technique used in Science and Technology Education on Self_Efficacy, Test Anxiety and Academic Achievement, *Journal of Baltic Science Education*, Vol.11. No.1, 2012 ISSN 1648-3839
- Zakaria,E,Chin.C.L,&Daud.Y. (2010). The Effect of Cooperative Learning on Students Mathematics Achievements and Attitude to Ward Mathematics. *Journal of School Science*, 6 (2):272-275.
- Yamarik,S.(2010). Does Cooperative Learning Improve Student Learning Outcomes? *The Journal of Economic Education*, 38 (3), 259-277.