The Effect of Team Games Tournament in Biology for Students in Second Semester Grade XI of SMAN 15 Medan Academic Year 2014/ 2015 on Their Learning Outcome, Motivation, and Retention

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ABSTRACT

The aims of this research were investigated the effect of Team Games Tournament on students' (1) Motivation, (2) Learning Outcome, (3) Memory Retention. Two classes of students from one school in Medan as control (conventional learning) and experimental class (TGT). Students' leaning outcome were measured with multiple choice and essay test (pretest and post- test). Data of students' motivation were derived from questionnaire filled by students, and students memory retention were measured by retention test after 21 days. The data were analyzed with ANCOVA by using SPSS v.19 software package for Windows, AnatesV4- New software, and SYSTAT. Results showed that Team Games Tournament did not have significantly affected students' model (F= 0.771; P= 0.383), corrected model (F=1.532; P= 0.214), sex (F= 0.930; P= 0.338) and the interaction between model and sex (F= 1.612 ; P= 0.208) but, it was significant in the students intercept (F=3523.514 , P= 0.000) for the motivation of students in pretest. The corrected model (F= 11.774; P= 0.000), intercept (F= 4923.363; P= 0.000), and model (F= 30.042; P= 0.000) were very significant, but sex (F= 0.489; P= 0.486) and the interaction between model and sex (F= 0.25; P= 0.874) were not significant for motivation of students in post- test. The corrected model (F= 1.667; P= 0.182), model (F= 0.277; P= 0.601), sex (F= 3.488; P= 0.66), and interaction between model and sex (F= 0.216; P= 0.274) were not significant, but it was significant in students intercept (F= 4505.125; P= 0.000) for learning outcome in pretest. The corrected model (F= 14.067; P= 0.000), intercept (F= 11908.631; P= 0.000), model (F= 14.433; P= 0.000), sex (F= 4.979; P= 0.000), and interaction between model and sex (F= 4.979; P= 0.29) were very significantly for learning outcome of students in post-test, and the corrected model (P= 90.968; F= 0.000), intercept (P= 53702.422; F= 0.000), model (P= 196.175, F= 0.000), and intercation between model and sex (P= 10.414; F= 0.002) were significant, but it was not significant for sex (F= 0.216, P= 0.643) to students' memory retention

Keyword   : Motivation. Learning Outcome, Retention, Team Games Tournament

INTRODUCTION

Biological knowledge plays as essential role in most aspects in the world (Burns and Butino. 1989) but, there is found many difficulties of biological learning, those are caused by models and methods of teaching that lead the students to learn the material only through memorization and prevent students to understand the meaningful of biological learning, the abstract concepts of biology, and difficulties to understand the textbooks (Lazarowitz and Penso. 1992; Chiapetta & Fillman. 1998; Osborne and Collins. 2001; Tekkaya Et al., 2001).

In this research are used three biology topics, regulatory system, reproductive system, and immune system where these topics are included in difficult biology topics based on (Çimer. 2012), which concluded five biology topics students had difficult to learn: matter cycles, aerobic respiration, genes and chromosomes, cell division and endocrine system and also in (Tekkaya, Et al., 2001) which found hormones, genes and chromosomes, mitosis and meiosis, mendelian genetic, and nervous system as difficult topic in biology. Regulatory, reproductive, and immune system have depth relation with endocrine system especially in human body, it means these topics are very urgent for

students to change their brain pattern that still regard the endocrine system is the difficult topic in biology. Motivation, interest, and goals always give effect for learning process, academic performance, and learning outcome (Bloom. 1980; Hidi & Harackiewicz. 2000; Mc Cleland. 1985; Weiner. 1986) and also decrease the level of students' boring in the class (Ebenezer & Zoller. 1993; Delpech. 2002).

The phenomenon of low students motivation, learning outcome, and memory retention in the subjects of biology were found in SMAN 15 Medan based on the result of observation and interviewed with Tinorma Siregar S.Pd as biology teacher. The result of observation showed, the students only sat and listened the teacher explanation and then, the students wrote the task that are given by teacher (teacher centered). So, the students often may lose their motivation, sleepy, noisy, and difficult to develop their critical thinking because they didn't have chance to share their ideas, fun in the class, understand the relationship between what was taught in the class with their daily lives and express their creativity. The student's learning outcome especially for cognitive aspects is still low, it can be proof by seeing their biology score in report where only less than fifty percent that has score above

eighty although their score has achieved above seventy two as the standardization of minimum score (KKM) in this school. The student's memory retention is also still low, it can be proof by the result of interviewed with the biology teacher in this school where the students difficult to remember the learning materials that have explained by teacher after one week and will be decreased significantly after three until four weeks.

Based on this problems, the teacher should design the learning environment to be fun in the class to increase the motivation, learning outcome, and retention of the students and the best choice is game, because play a game is the natural process that stimulate everyone to be more spirit and interactive to be a winner to encourage their creative behavior and divergent thought of students and also self confidence to answer the obstacles that are found in the game (Gee. 2003; Fuszard. 2001; Sadiman. 1990; Sulistyo. 2011).

The design of games should be fun and giving new experiences for students through practice, success/ failure, reflection, and the development of knowledge level as the reference to design first step of game which started from easier to be harder (Gee. 2005; Gredler. 2004; Kebritchi and Hirumi,

2008; Nielsen. 2005; Wilson et al., 2009) to promote the cooperation among the students (Duchenet & Moore. 2005) and to solve the problems and make decision together by using their critical thinking especially for biological learning that famous only as subject material to be memorized and uninteresting to be studied. It will suggest realizing student's learning centered where the teacher only be a facilitator to help students to make their reflection by using instructional design.

Team Games Tournament is the best model/method to solve these problems. In Rezeki (2001), Team Games Tournament success increased student's motivation significantly, it is similar with (Symons & Gill (2008) research where it could help teacher to increase engagement, long term motivation and achievement among students, and also in Micheal (2001) it success increased the student's learning outcome although the student's retention is not significantly different with control class, but contrasted in Silitonga (1999), Team Games Tournament exactly didn't give significant effect of student's learning outcome. Based on this explanation, we can find out the difference result for every research, it can be possible happened because the condition, location, sample, subject matter,

strategy, method, and techniques of learning that use in Team Games Tournament's Model are different between one for each other. So, in this research, it will be designed effectively in the class to find out the significant effect to motivation, learning outcome, and student's memory retention.

METHODS

Location and Time. This research have been conducted in SMA Negeri 15 Medan, Class XI- MIA (Science), even semester, academic years 2014/ 2015 at Jalan Sekolah Pembangunan in March- May 2015.

Population and Sample. Population in this research was all students in grade XI- Science SMAN 15 Medan. There were students that distributed into seven different classes. The sample of this research are XI- MIA (Science) 4 and XI- MIA (Science) 5 where, to determine the sample is used *Cluster Random Sampling* especially for XI grade because all the class are assumed homogeny based on biology score/value in their report. In this research, XI-MIA 4 as the experimental class (by using Team Games Tournament) and XI- MIA 5 as the control class (by using conventional/ traditional learning).

Research Variable. Independent variable (X) in this research is Team Games Tournament Model and conventional learning, and dependent variables (Y) in this research are motivation, learning outcome, and students' memory retention.

Research Design. Research design that used was Quasi Experiment by using control Group Pretest- Posttest Design. The instruments of this research are questionairre to test the students motivation, pretest and post test to test students learning outcome and retention test to test students' memory retention.

Research Procedure. This research used two classes that consist of control class (teaching by using conventional learning method) and experimental class (teaching by using Team Games Tournament's Model) after location and time of research was defined. The control and experimental class are selected by randomly where researcher acts as a biology teacher to teach both control and experimental class. The instrument and learning process was prepared by teacher researcher in the lesson plan based on the syllabus. The lesson plan consist of three topics in biological learning, those are: regulatory system, reproductive system, and immunity system.In first meeting, the students was given questionnaire and pretest and at the end of learning process, the students was given post

test to know the increasing of students learning outcome, in experimental class, students was given special treatment at the review stages, where the students played games tournament by using cleaver card after discussion in the learning process, and after 21 days, the students was given the retention test to measure the quality of students memory retention.

Data Analysis. In order to get the conclusion, the hypothesis must be tested. Hypothesis testing on this research normalized FCI Gain Formula was tested using ANCOVA test with α= 0.05. An SPSS v.19 software package for Windows for learning outcome, retention formula ata of students' memory retention was tested using ANCOVA test with α= 0.05. An SPSS v.19 software package for Windows for students memory retention and data of students' motivation was tested using ANCOVA test with α= 0.05. An SPSS v.19 software package for Windows.

RESULT

The students at experimental class in this research, showed that the motivation of students in pretest, ranged 35- 70 from on 0 to 80 scale, with the average 53.52 ± 8.422 $(\overline{X} \pm SD)$ for female, 49.69 ± 7.772 for male

and 52.21 ± 8.306 for total. Students at the control class showed that the motivation of students in pretest, ranged from 38-56 on 0- 80 scale, with the average 49.84 ± 5.699 for female, 50.36 ± 3.325 for male, and 50.00 ± 5.048 for total. Both of the data, from two classes, were normally distributed (Shapiro- Wilk Test Z=0.975; P= 0.531, Z= 0.959; P= 0.197). The Levene's Test for equality of variance otherwise revealed that the two chosen groups of sample were homogeneous among the population (F=4.036, P= 0.10). The ANCOVA, at the level of significance α= 0.05, showed that model (F= 0.771 ; P= 0.383), corrected model (F=1.532 ; P= 0.214), sex (F= 0.930, P= 0.338) and the unification between model and sex (F= 1.612 ; P= 0.208) were not significant, but, it was significant in the students intercept (F=3523.514 , P= 0.000), for the motivation of students in pretest (Figure 1 and Figure 2)
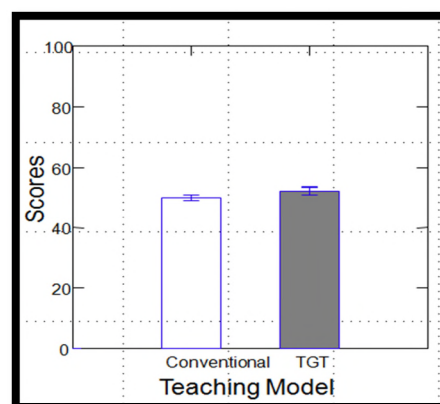

Figure 1. The Effect of Team Games Tournament on Students' Motivation in Pretest of Motivation in SMAN 15

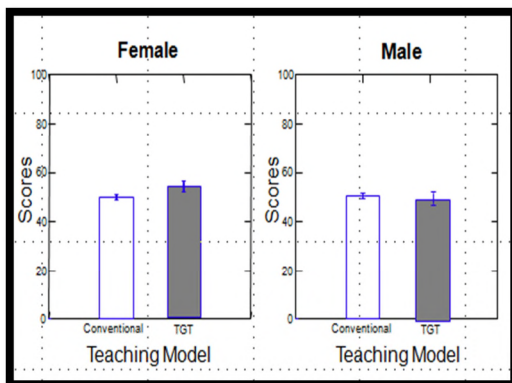Medan, Academic Year 2014/ 2015 (F= 0.771 ; P= 0.383)

Figure 2. The Effect of Team Games Tournament and Sex on Students' Motivation in Pretest of Motivation in SMAN 15 Medan, Academic Year 2014/ 2015 (F= 1.612 ; P= 0.208)

The students at experimental class in this research, showed that the motivation of students in post- test, ranged from 55- 72 on 0 to 80 scale, with the average 64.84 ± 6.421 ($\overline{X}$ ± SD) for female, 63.38 ± 6.131 for male and 64.34 ± 6.279 for total. Students at the control class showed that the motivation of students in post- test, ranged from 42- 71 on 0- 80 scale, with the average 55.28 ± 7.168 for female, 54.36 ± 7.567 for male, and 55.00 ± 7.195 for total. Both of the data, from two classes, were normally distributed (Shapiro- Wilk Test Z= 0.949 ; P= 0.80, Z= 0.958 ; P= 0.193). The Levene's Test for equality of variance otherwise revealed that the two chosen groups of sample were homogeneous among the population (F= 0.003 , P= 1.000). The ANCOVA, at the level of significance α=

0.05, showed the corrected model (F= 11.774; P= 0.000), intercept (F= 4923.363; P= 0.000), and model (F= 30.042; P= 0.000) were very significant, but sex (F= 0.489; P= 0.486) and the unification between model and sex (F= 0.25; P= 0.874) were not significant for motivation of students in post- test. (Figure 3 and Figure 4)
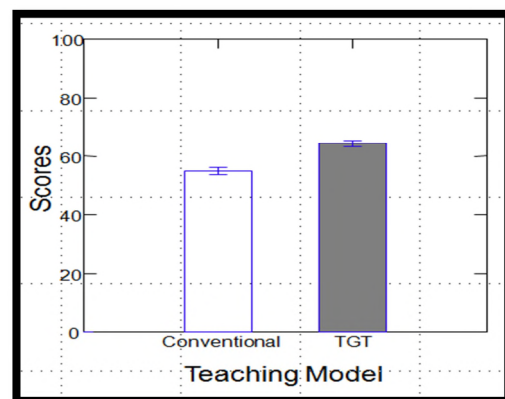

Figure 3. The Effect of Team Games Tournament on Students' Motivation in Post- Test of Motivation in SMAN 15 Medan, Academic Year 2014/ 2015 (F= 11.774; P= 0.000)
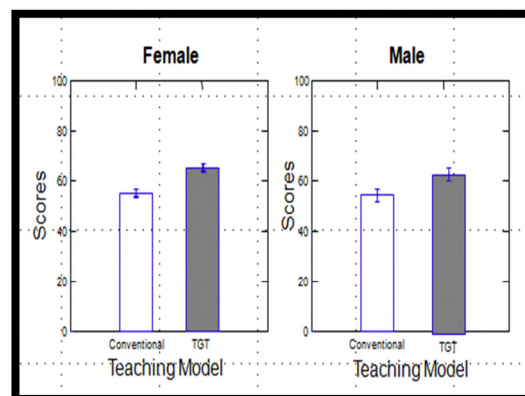

Figure 4. The Effect of Team Games Tournament and Sex on Students' Motivation in Post- Test of Motivation in SMAN 15 Medan, Academic Year 2014/ 2015 (F= 0.25; P= 0.874)

The students at experimental class in this research, showed that the learning outcome of students in pretest, ranged from 108- 160 on 0 to 300 scale, with the average 127.84 ± 15.874 ($\overline{X}$ ± SD) for female, 116.92 ± 12.744 for male and 124.11 ± 15.610 for total. Students at the control class showed that the learning outcome of students in pretest, ranged from 106- 156 on 0- 300 scale, with the average 125.72 ± 12.368 for female, 122.91 ± 18.960 for male, and 124.86 ± 14.468 for total. Both of the data, from two classes, were normally distributed (Shapiro- Wilk Test Z= 0.980; P= 0.755 , Z= 0.984; P= 0.844). The Levene's Test for equality of variance otherwise revealed that the two chosen groups of sample were homogeneous among the population (F= 1.353, P= 0.264). The ANCOVA, at the level of significance α= 0.05, showed the corrected model (F= 1.667; P= 0.182), model (F= 0.277; P= 0.601), sex (F= 3.488; P= 0.66), and unification between model and sex (F= 0.216; P= 0.274) were not significant, but it was significant in students intercept (F= 4505.125; P= 0.000) for learning outcome for students in pretest. (Figure 5 and Figure 6)

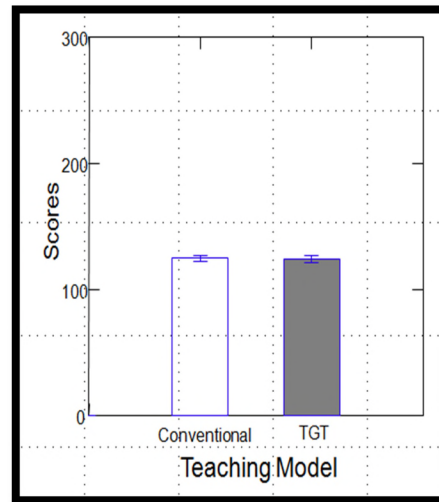**Figure 5.** The Effect of Team Games Tournament on Students' Learning Outcome in Pretest in SMAN 15 Medan, Academic Year 2014/ 2015 (F= 0.277; P= 0.601)
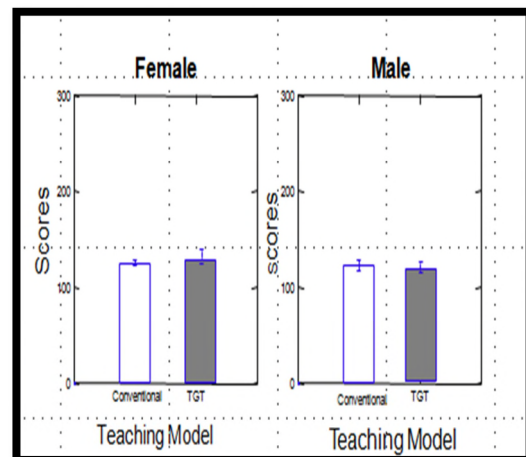

Figure 6. The Effect of Team Games Tournament and Sex on Students' Learning Outcome in Pretest in SMAN 15 Medan, Academic Year 2014/ 2015 (F= 0.216; P= 0.274)

The students at experimental class in this research, showed that the learning outcome of students in post-test, ranged from 214- 296 on 0 to 300 scale, with the average 273.52 ± 17.553 ($\overline{X}$ ± SD) for female, 246.31 ± 17.428 for male and 264.21 ± 21.668 for total. Students at the control class