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The Combination of the Jigsaw and Teams Game Tournament Model in Increasing the Adversity Quotient (AQ) and Academic Performance

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***Abstract*—This study was conducted to investigate the influence of outdoor education through the cooperative learning model by combining jigsaw and the teams game tournament (TGT) learning models to measure the Adversity Quotient (AQ) and at Sports Science Department of UNM students' volleyball learning. This research is a Quasi-Experiment study with the nonequivalent control group design. In this study, the subject was tested in the classroom then divided into two unequal groups in which only one group received treatment. Based on the results of the data analysis, it was found that the implementation of outdoor education affects or can increase students' adversity quotient (AQ) and the volleyball learning outcomes.**

Keywords—jigsaw, Teams Game Tournament (TGT), learning model, sports science

I. INTRODUCTION

Education is one of the indicators of a country's Human Index Factors. As the economic development indicator, education aims to improve intellectual and quality human resources. A country is classified as developed when it possesses quality education and adequate human resources. Moreover, education in Indonesia is marked by the distinction between academic standards and student performance standards. Many students focus more on the ability to memorize materials they have received despite having a poor understanding. Most of the students are not able to connect what they learn with how the knowledge will be used in the future [1], [2]. This affects the quality of human resources. On the other hand, that is not the case if learning is done through more practice than theories; learning how to do sports is an example.

To achieve a good learning process, the theory should be taught aligned with how it is applied practically in the field by not focusing on just one thing. Taking up a sport usually takes more time for practice than for theory so that the students learn more about practice doing sports than about the theory of how to do them. However, learning sports through theory is not a problem if the students have a thorough understanding of the learning materials. The learning material delivery usually takes place in the classroom. A learning process that takes place more in the classroom tends to make students who accordingly become less able to understand the materials explained by the educators. Therefore, teachers need to conduct the learning process outside the classroom to change the learning atmosphere in order for the students to achieve a better understanding of the given materials. The outdoor education takes advantage of the surrounding environment as an object in learning [3]–[8]. Such learning can be in the form of theory or practically applied theory.

Aside from the learning atmosphere at the school, teachers also play an essential role in improving the student learning outcomes. However, not only teachers but students also need to be actively involved in every learning process. During the teaching and learning process, students often face several internal problems that affect their activity. The ability students need is not only about how to come up with great ideas but also about how to solve their internal problems. Adversity Quotient is a person's ability to overcome these things. Adversity Quotient (AQ) is an individual's ability to survive the trials and to cope with them [9]–[11]. This ability affects students' activity in the learning process. Students who possess a high AQ will not easily give up on generating new ideas when facing challenges.

It is the teachers' role to implement effective and efficient ways of learning to help students improve their abilities to overcome difficulties (AQ) and their learning outcomes. These methods are known as learning models. There are many learning models that the teachers can choose from. One of them is the cooperative learning model which can be divided into several types. The cooperative learning model requires each student to play an active role in a small group to work together in creating optimum learning conditions.

In addition to being effective and efficient, teachers need to innovate in the selection of learning models. An innovation that can be used is to combine several types of learning models. In this study, the researcher combined the *jigsaw* technique [12] and the *teams game tournament* technique [13]. The jigsaw cooperative learning model trains students to have more courage to express opinions, to cooperate, to develop themselves, to be individually responsible, to have positive interdependence, and to be involved in personal interaction and group processes.

Meanwhile, the teams game tournament allows students to learn how to be more relaxed beside fostering responsibility, honesty, cooperation, healthy competition, and learning involvement. Volleyball is one of the sports that require a good foundation in practice. This aims to maximize the implementation of practice in the field. For this reason, a

learning model is needed in terms of making it easier for students to understand it. Based on the explanation above, the researcher is interested in discovering the influence of outdoor education through the cooperative learning model combination of the jigsaw and the team's game tournament (TGT) learning models on the Adversity Quotient (AQ) and the results of Sports Science of UNM students' volleyball learning.

II. METHOD

A. Research Design

This research is a Quasi-Experiment study with *the nonequivalent control group design* type. In this study, the subject was tested in the classroom then divided into two unequal groups in which only one group received treatment [14]–[16]. The two groups were called the control group which was not given any treatment and the experimental group which received treatment. Both groups were compared through the test scores to see the significance of the treatment effect. Moreover, this study consists of three types of variables, namely one independent variable, one moderator variable, and two dependent variables. The independent variable consists of outdoor education and conventional learning methods (MPK). Moderator variables are the collaborative treatment of cooperative learning models of jigsaw and teams game tournament (TGT).

B. Population and Sample

The population of this study was the students of the Sports Science Study Program of the Faculty of Sports Science, Universitas Negeri Makassar. The sample of this study was taken by using a simple random sampling technique to select one of the classes in Sports Science. There were 33 students involved as the participants of the study that were divided into two groups: the control group and the experimental group. The control group consisted of 16 students while the experimental group consisted of 17 students.

C. Research Variable

Meanwhile, the dependent variable consists of adversity quotient (AQ) and volleyball learning outcomes. Adversity Quotient (AQ) is the students' ability to respond to the materials provided by the teachers. AQ can also be interpreted as an individual's ability or intelligence to change obstacles and difficulties into an opportunity AQ is the condition of a person about the extent to which he or she survives to face the challenging problems and even turn them into opportunities [10]. AQ can measure students' attitudes towards a condition, such as giving up easily in the face of math problems (low category), giving up when they have partially completed their assignments and then giving up (medium category), or having an unyielding attitude and completing their tasks (high category). Meanwhile, Stoltz [9] suggested that Adversity Quotient is the intelligence to overcome difficulties. Stoltz classified AQ into three categories:

- Quitter (Low), which is a group of people who lack the will to accept challenges in their lives.
- Camper (Medium), which is a group of people who have the will to try to deal with the problems and challenges that exist, but they stop because they feel they are not strong anymore.
- Climber (High), which is a group of people who choose to continue to survive to fight various problems that keep coming up.

Adversity Quotient has four dimensions or indicators regarding a person's response in dealing with a problem. These dimensions include control (C), origin and ownership (O2), reach (R), and endurance (E). The greater the person's AQ, the greater the intelligence in facing difficulties. To calculate the level of AQ one uses the Adversity Quotient measurement formula: $C+O_2+E=AQ$ [10]. Here are the indicators of Adversity Quotient:

TABLE I. INDICATORS OF ADVERSITY QUOTIENT (AQ)

No.	Indicators (Dimensions of Adversity Quotient: CO_2RE)	Measurement
1	Control: the control level over the experienced events that cause difficulties.	Self-control when dealing with difficulties
2	Origin and Ownership	Alternatively, recognition of the origin of the difficulties Ow: recognition of the occurring difficulties
3	Reach: the extent to which difficulties are perceived to reach other parts of life	Individual recognition of the extent to which difficulties are considered to reach other parts of life.
4	Endurance	Individual's assumptions about how long the difficulty and its causes will last.

D. Procedure

Here are the procedures of the research:

1) Planning Phase

- Preparation of the Adversity Response Profile (ARP) scale questionnaire to obtain AQ level data based on control, origin, ownership, reach, and endurance indicators.
- Preparation of learning outcomes tests based on the basic competence of volleyball material.

2) Implementation Phase

- The pre-test, the ARP questionnaire and the results of the volleyball learning test given to the control and experimental groups.
- The implementation of outdoor education by implementing the collaboration between jigsaw and TGT cooperative learning model types for the experimental group and the conventional learning methods (MPK) for the control group.
- The post-test, the ARP questionnaire and the results of the volleyball learning test given to both groups

3) Drawing Conclusion Phase

- Processing data and analyzing the results of the pre-test and post-test
- Drawing a comparison between the results of analysis before and after the treatment to see if there was an effect of the jigsaw and TGT combination on the AQ and the students' volleyball learning outcomes
- Comparing the results of data analysis between the experimental group and the control group

- Interpreting and drawing conclusions based on the results of the analysis
- Giving suggestions on several aspects of the research that were considered to need improvements

E. Data Collection

The techniques of collecting data in this study were:

1) Questionnaire: Questionnaire was used to obtain the data about the AQ levels of sport science students before and after the learning took place by using the ARP scale.

2) Test: Test was conducted to obtain the data about the sport science students' at volleyball subject before and after the learning took place by using the instrument of the volleyball learning test results.

F. Data Analysis

Prerequisite data analysis was the fulfillment of the assumption test of homogeneity and normality of the data distribution. As a result, this research was conducted in one class that was considered to have homogeneous members. Also, the normality test of the data distribution was carried out by employing the *Kolmogorov-Smirnov* test and the *Shapiro-Wilk test.* The data were then analyzed using *parametric inferential tests* and *paired sample t-test.* All tests were performed on the significance level of 95% ($\alpha = 0,05$).

III. Results and Discussion

In this study, the adversity quotient (AQ) data and the students' learning outcomes were obtained after the learning process of the outdoor education system was performed by implementing the TGT-Jigsaw learning model collaboration and conventional learning (without giving special treatment). The adversity quotient (AQ) data were obtained by distributing questionnaires to students after learning. Meanwhile, the learning outcomes were obtained from the pretest and the posttest. The test results of the influence of outdoor education on the adversity quotient (AQ) and the student learning outcomes are described as follows.

A. The Influence of Outdoor Education on the Adversity Quotient (AQ)

1) Data Description: Based on the descriptive statistical analysis using SPSS 22, the results were explained as follows:

TABLE II. The Results of Descriptive Statistics Test on the Adversity Quotient (AQ) Data

Group	Total	Min	Max	Average	SD
Control	16	144	187	164.19	13.172
Experimental	17	170	207	191.35	10.173

Based on Table 2 above, it can be seen that the AQ average score of the experimental group is 191.35 which is higher than that of the control group with the score 164.19. The difference between the standard deviation between both groups shows that the AQ scores of the control group vary.

2) Assumption Test: Before the data was tested with hypothesis testing, the assumption test was necessary to be initially conducted to know if the data could be analyzed with the hypothesis testing. The assumption tests in this research were the normality test and the homogeneity test. The normality test is carried out to find out if the data obtained from the result of the research distribute normally. Data are considered to distribute normally if the significance level is higher than the probability value. On the other hand, data do not have a normal distribution if the significance level is lower than the probability value. If distributing normally, data are analyzed with parametric statistics test. Meanwhile, data are analyzed with a non-parametric statistics test if data do not distribute normally.

TABLE III. Normality Test on Adversity Quotient Data

Group	*Shapiro-Wilk*		
	Statistics	Degree of Freedom	Significance
Control	0.956	16	0.584
Experimental	0.963	17	0.684

Table 3 illustrates that based on the *Shapiro-Wilk* normality test, the significance level of the control group and the experimental group is higher than the probability value used in this research that is 0.05. It can be concluded that the *adversity quotient* (AQ) data of both groups distribute normally.

Homogeneity test is performed to find out if the data of the research result of the control group and the experimental group have the same variance (homogeneous). If the significance level is higher than the probability value, data have the same variance (homogeneous). On the other hand, data have different variance (inhomogeneous) if the significance level is lower than the probability value.

TABLE IV. Homogeneity Test on Adversity Quotient (AQ) Data

Levene Statistics	The degree of Freedom 1	The degree of Freedom 2	Significance
2.104	1	31	0.157

It can be seen from the Table 4 above that based on the homogeneity test, the significance level of *adversity quotient* (AQ) data of the control group and the experimental group is more than 0.05 meaning that the data are homogeneous.

3) Hypothesis Testing: Because the two assumptions were met in the prerequisite test, the analysis was continued to perform hypothesis testing with Independent Sample T-Test. The result shows that the significance level (2-tailed) is 0.0001 which means that it is smaller than 0.05. It can be concluded that there is a significant difference between the Adversity Quotient (AQ) data of the control group and the experimental group. This shows that the application of outdoor education can affect and increase students' Adversity Quotient (AQ).

B. The Influence of Outdoor Education on the Learning Outcomes

1) Data Description: Based on descriptive statistical analysis using SPSS 22. The results are shown in Table 5 below.

TABLE V. DESCRIPTIVE STATISTICS TEST ON THE DATA OF STUDENTS' LEARNING OUTCOMES

Group	Test Type	Total	Min	Max	Average	SD
Control	*Pretest*	16	58	83	74.66	8.93
	Posttest		65.2	83	78.19	6.17
Experimental	*Pretest*	17	60	83	70.58	7.56
	Posttest		70	83	80.12	3.76

It can be seen from Table 5 that the average value of pretest in the control group is greater than that of the experimental group. The average value of the posttest of the experimental group, however, is greater than that of the control group. The difference in standard deviation from each test of both groups also shows that the value of the learning outcomes of the control group quite varies.

To determine the N-Gain Score, Ms. Excel 2013 was used based on the following formula:

$$NGain = \frac{posttest - pretest}{maksimum - pretest} \quad (1)$$

The results are presented in Table 6 below:

TABLE VI. N-GAIN OF THE STUDENTS' LEARNING OUTCOMES

No	Learning Outcomes							
	Control Group				Experimental Group			
	Pretest	Posttest	N-Gain	Level	Pretest	Posttest	N-Gain	Level
1	77.3	79.3	0.1	Very low	78.2	83	0.2	Very low
2	58	65.2	0.2	Very low	76.2	81	0.2	Very low
3	77.3	78.3	0.0	Very low	64.2	81	0.5	High
4	61.2	67.2	0.2	Very low	64.2	81	0.5	High
5	83	83	0.0	Very low	70.3	81	0.4	Low
6	83	83	0.0	Very low	65	81	0.5	High
7	62.2	70	0.2	Very low	69.2	81	0.4	Low
8	83	83	0.0	Very low	67	81	0.4	Low
9	77.2	81	0.2	Very low	83	83	0.0	Very low
10	73	80	0.3	Low	65	81	0.5	High
11	63	71	0.2	Low	83	83	0.0	Very low
12	72.2	80	0.3	Low	61.2	71	0.3	Low
13	83	83	0.0	Very low	70	81	0.4	Low
14	75.2	81	0.2	Very low	60	70	0.3	Low
15	83	83	0.0	Very low	83	83	0.0	Very low
16	83	83	0.0	Very low	71.2	80	0.3	Low
17					69.2	80	0.4	Low

2) Assumption Tests

TABLE VII. NORMALITY TEST ON THE N-GAIN OF THE STUDENTS' LEARNING OUTCOMES

Group	*Kolmogorov-Smirnov*		
	Statistics	Degree of Freedom	Significance
Control	0.283	16	0.001
Experimental	0.221	17	0.027

Table 7 above describes that based on the Liliefors normality test, the significance level of the control group and the experimental group is lower than 0.05, which means that the data do not distribute normally. This suggests that the assumption of normality is not met. The next test for examining the normality test is the homogeneity test. In this study, the test was carried out using *Levene's* test which can be used to test the homogeneity of variance in data that are not normally distributed.

TABLE VIII. HOMOGENEITY TEST ON THE N-GAIN OF THE STUDENTS' LEARNING OUTCOMES

Levene Statistic	The degree of Freedom 1	The degree of Freedom 2	Significance
1.611	1	31	0.214

It is depicted in Table 8 that based on the data homogeneity test, the significance level of *N-gain* on students' learning outcomes between the control group and the experimental group is higher than 0.05 meaning that the data are homogeneous.

3) Hypothesis Test: Based on the pre-requisite test, one of the assumption tests was not met in which the data were not distributed normally. Therefore, the hypothesis test was analyzed using Mann Whitney's non-parametric statistics test.

TABLE IX. THE AVERAGE RATING OF EACH GROUP USING MANN WHITNEY'S TEST

Group	Total	Average Rating	Total Rating
Control	16	11.66	186.50
Experimental	17	22.03	374.50

In Table 9, it can be seen that the average rating of the control group is lower than the average rating of the experimental group. To ascertain whether the difference in the average of the two groups is statistically significant, it can be seen in Table 10 below.

TABLE X. HYPOTHESIS TEST ON THE INFLUENCE OF OUTDOOR EDUCATION TOWARDS STUDENTS' LEARNING OUTCOMES

Statistics Test[a]	
	Gain Value
Mann-Whitney U	50.500
Wilcoxon W	186.500
Z	-3.160
Asymp. Sig. (2-tailed)	.002
Exact Sig. [2*(1-tailed Sig.)]	.001[b]
a. Grouping Variable: Group b. Not corrected for ties.	

Table 10 depicts that the significance value (2-tailed) 0.002 is lower than the probability value 0.05 which means that there is a significant difference between the control group and the experimental group. This shows that the implementation of outdoor education affects or can improve students' learning outcomes.

The intelligence of a student should be measured by the results achieved in the learning process and by how they turn the difficulties in learning into an opportunity to attain good grades and abilities. Consequently, educators play an important role in the students' learning process. Not only should the individual abilities of an educator be implemented in the learning process, but also an educator's creativity. One method to demonstrate it is by applying the learning model. Adversity Quotient (AQ) is the students' ability in responding to learning materials provided by the teacher, including the ability to overcome difficulties encountered during the learning process. The greater a person's intelligence, the higher his ability to face difficulties. Based on the results of the research previously described related to AQ, it shows that the average value of the experimental group is higher with the score 191.35 than the average value of the control group with the score 164.19. The experimental group was given treatment regarding the implementation of outdoor education through the jigsaw and team games tournament (TGT) cooperative learning models. This suggests that the students in the experimental group can face greater difficulties than the students in the control group.

The dimensions measured in AQ are related to self-control when recognizing a difficulty, its origin and occurrence, the extent to which difficulties can reach other parts of life, and assumptions about how long the difficulty its cause will take place [11]. Based on the hypothesis testing, the significance level of 0.0001 is lower than the significance level which is 0.05. This shows that there is an influence of the implementation of outdoor education through the jigsaw and team games tournament (TGT) cooperative learning models on the students' adversity quotient (AQ). These results explain that the implementation of the learning model affects students in regards to solving the problems during the learning process.

In addition to intelligence in problem-solving, the main factor that becomes an indicator of a successful learning process is the learning outcomes achieved by students. The collaborative learning models are designed to help students more easily understand the material provided by educators. Therefore, there should be an influence related to the application of outdoor education through the jigsaw and teams game tournament (TGT) cooperative learning models on the volleyball learning outcomes. The indicators that measure students' achievement in volleyball learning are:

- The cognitive aspect, which is the ability to solve the problems regarding volleyball sports satisfactorily.
- The effective aspect, which is when individuals remain passive towards the learning process, the interaction making with their friends, and the confidence improvement of the movement of basic techniques of volleyball sports.
- The psychomotor aspect, which is the mastery of basic techniques, such as passing starting from the initial attitude, implementation, and final attitude [1].

The results of this study show that the pretest average value in the control group is higher than the pretest average value in the experimental group, but the average score of the posttest of the experimental group is higher than that in the control class. This suggests that the knowledge possessed by the students in the control group is greater than the students in the experimental group. A different result occurred when the materials were given using the collaboration of the jigsaw cooperative learning model and the team games tournament (TGT). The results of the posttest illustrate that students in the experimental group have broader knowledge than the students in the control group. However, this cannot yet illustrate whether there is an influence of the implementation of the learning model before the hypothesis is tested.

Based on the results of hypothesis testing, the significance value (2-tailed) 0.002 is lower than the probability value 0.05, which means that there is a significant difference between the control group and the experimental group. This study found that there is an influence of the outdoor education implementation through the jigsaw cooperative learning model and team games tournament (TGT) on students' volleyball learning outcomes. The implementation of the learning model collaboration helps students understand the material better than the conventional learning methods conducted in the control group.

IV. Conclusion

This study found that the average adversity quotient (AQ) value of the experimental group is 191.35 higher than the average adversity quotient (AQ) of the control group, which is 164.19 with a standard deviation of 10.17 for the experimental group and 13.17 for the control group. The significance level is 0.001, which is smaller than 0.05. This study also suggests that the implementation of outdoor education affects or can increase students' adversity quotient (AQ). The average pretest score of the control group is higher than that of the experimental group, but the average posttest score of the experimental group is higher than the control group. This study found that the significance value (2-tailed) 0.002 is lower than the probability value 0.05, which means that there is a significant difference between the control group and the experimental group. This suggests that the implementation of outdoor education affects or can improve the students' volleyball learning outcomes.

References

[1] A. Lie, "Cooperative learning." Jakarta: Grasindo, 2002.

[2] R. E. Slavin, "Cooperative Learning," *Rev. Educ. Res.*, vol. 50, no. 2, pp. 315–342, Jun. 1980.

[3] C. L. Shepard and L. R. Speelman, "Affecting environmental attitudes through outdoor education," *J. Environ. Educ.*, vol. 17, no. 2, pp. 20–23, 1986.

[4] G. W. Donaldson and L. E. Donaldson, "Outdoor education a definition," *J. Heal. Phys. Educ. Recreat.*, vol. 29, no. 5, pp. 17–63, 1958.

[5] P. Ford, *Outdoor Education: Definition and Philosophy*. ERIC, 1986.

[6] K. Gilbertson, T. Bates, A. Ewert, and T. McLaughlin, *Outdoor education: Methods and strategies*. Human Kinetics, 2006.

[7] J. W. Smith, *Outdoor Education*. ERIC, 1963.

[8] S. Priest, "Redefining outdoor education: A matter of many relationships," *J. Environ. Educ.*, vol. 17, no. 3, pp. 13–15, 1986.

[9] P. G. Stoltz, *Adversity quotient: Turning obstacles into opportunities*. John Wiley & Sons, 1997.

[10] P. G. Stoltz and P. Stoltz, *Adversity Quotient@ Work: Make Everyday*

Challenges the Key to Your Success--Putting the Principles of AQ Into Action. William Morrow, 2000.

[11] E. S. Phoolka and N. Kaur, "Adversity Quotient: A new paradigm to explore," *Contemp. Bus. Stud.*, vol. 3, no. 4, pp. 67–78, 2012.

[12] E. Aronson, *The jigsaw classroom*. Sage, 1978.

[13] A. Veloo, R. Md-Ali, and S. Chairany, "Using Cooperative Teams-Game-Tournament in 11 Religious School to Improve Mathematics Understanding and Communication.," *Malaysian J. Learn. Instr.*, vol. 13, no. 2, pp. 97–123, 2016.

[14] L. Cohen, L. Manion, and K. Morrison, *Research Methods in Education*, 6th ed. London and New York: RoutledgeFalmer, 2007.

[15] J. W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Resarch*. Pearson, 2012.

[16] J. R. Fraenkel and N. E. Wallen, *How to Design and Evaluate Research in Education*. McGraw-Hill Higher Education, 2009.