BIOEDUSCIENCE
ISSN: 2614-1558
http://journal.uhamka.ac.id/index.php/bioeduscience

Knowing the Role of the Teams Games Tournament Cooperative Learning Model on Student Learning Activeness

Mohammad Ghaemi [1*], Esmail Ebrahimi [2], Pariyaporn Ocak [3]

[1] Bahar Institute of Higher Education, Razavi Khorasan Province, Mashhad, District 9, Kosar 2, No. 32, Iran;
[2] Bozok University, Faculty of Education, Atatürk Yolu 7. Km Eğitim Fakültesi Binası, 66000 Yozgat, Türkiye, Turkey
[3] Sultan Qaboos University, Al Seeb Al Khoudh SQU SEPS Muscat OM, 123, Oman
* Correspondence: ghaemi@baharihe.ac.ir

Abstract

Background: This study aimed to investigate the impact of the Teams Games Tournament (TGT) cooperative learning model on student learning engagement in the subject of Ecosystem. **Method:** The research was conducted at a Middle School in Muscat, Oman, utilizing cluster random sampling. The study involved two groups: a control group and an experimental group. The research design employed was a quasi-experiment with a posttest-only control design. Data analysis was conducted using the t-test with a significance level of 1%. Data collection techniques included observation and questionnaires. **Results:** The hypothesis test results revealed a t-test value of 8.1, whereas the critical t-table value was 2.66. The calculations indicated that t-test > t-table, leading to the rejection of H_0. This finding indicates that students responded positively to the learning experience using the TGT cooperative learning model. **Conclusion:** In conclusion, implementing the TGT cooperative learning model enhanced student learning activity in Ecosystem education.

Keywords: Learning model; Student activity; Teams Games Tournament

Article history
Received: 24 Jul 2023
Accepted: 12 Aug 2023
Published: 31 Aug 2023

Publisher's Note:
BIOEDUSCIENCE stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Citation:
Ghaemi et al. 2023. Knowing the Role of the Teams Games Tournament Cooperative Learning Model on Student Learning Activeness. BIOEDUSCIENCE, 7(2), 209-214. doi: 10.22236/jbes/12400

Introduction

The primary aim of science education is to foster scientific literacy among individuals (Olson & Labov, 2014). An essential aspect of scientific literacy is understanding the nature of science. Science education goes beyond merely grasping scientific concepts or acquiring scientific knowledge; it involves incorporating the understanding of the nature of science into an educational framework (Connelly, 2013). Natural Sciences, which originates from the Latin word scientia denoting knowledge (Bhola et al., 2022), encompass the study of natural phenomena, factors influencing changes, and natural laws (Ibáñez & Delgado-Kloos, 2018). Additionally, science is associated with values concerning moral responsibility, social significance, the benefits of science for human life, and attitudes and actions (Lissa, 2017).

The concept of active learning can be traced back to Locke, who asserted that knowledge is derived from experience. According to Krathwohl & Anderson (2010), learning occurs through experiences, active participation, and interaction with educational materials and peers (Ferreira et al., 2015). In learning activities, students are expected to process and internalize the knowledge they acquire consistently and actively (Freeman et al., 2014). For effective management of their learning progress, students must be active physically, intellectually, and emotionally (Pheeraphan, 2013).

The observation of student engagement during the learning process reveals various dimensions of student activity within the context of active student learning. These dimensions shed light on the behaviors exhibited during learning activities, and they are as follows (Selvianiresa & Prabawanto, 2017); Student involvement in preparing learning activities; The courage of students to express their interests, desires, opinions, and motivations in learning; Active participation of students in learning activities, particularly in interactions among peers; The cohesiveness and unity within student groups.

A cooperative learning model is an instructional approach where students collaborate in small groups, each comprising individuals with different ability levels (Ahangari & Samadian, 2014). In this model, students work together on group assignments, supporting one another to grasp the learning material. The TGT cooperative learning model is a particular type of collaborative learning that is easy to implement and ensures equal participation of all students regardless of their status (Susanti et al., 2021). This approach involves students acting as peer tutors and incorporates playful elements and reinforcement (Shahali et al., 2015). When learning activities are designed using the cooperative learning model of the Teams Games Tournament, students will develop a sense of responsibility, cooperation, healthy competition, and increased involvement in the learning process (Thibaut et al., 2018). This study aimed to investigate the impact of the Teams Games Tournament (TGT) cooperative learning model on student learning engagement in the subject of Ecosystem.

Methods

This research occurred at a Middle School in Muscat, Oman, from May to October 2015. The study used a quasi-experimental design, specifically a posttest-only control design, due to limitations in randomization. The sample consisted of 101 students studying math, biology, physics, and chemistry at the secondary education level.

To collect data, the researchers utilized observation sheets and questionnaires as instruments. The central hypothesis was tested using the t-test, with a significance level set at 1%. However, before conducting the hypothesis test, prerequisite tests, namely the normality test and homogeneity test, were performed to ensure the appropriateness of the data for the statistical analysis. These tests help assess whether the data meets the assumptions necessary for valid t-test results.

Result

Student Engagement in Active Learning

The outcomes concerning student engagement in active learning for both the experimental and control groups are displayed in Figure 1.

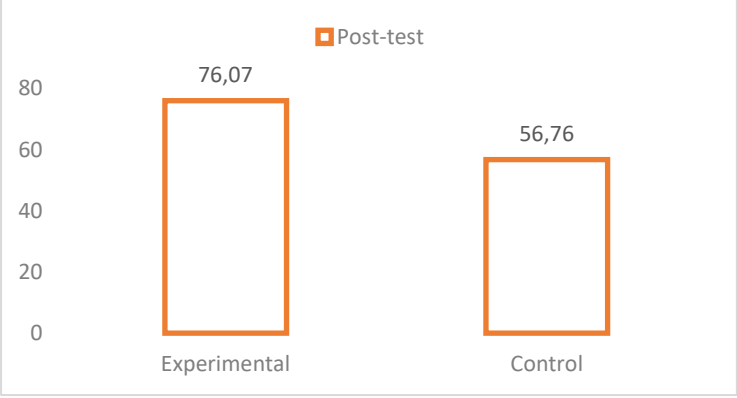

Figure 1. Comparison of Posttest Student Engagement between Experimental and Control Classes

As depicted in Figure 1, the experimental class achieved a posttest score of 76.07, whereas the control class obtained a posttest score of 56.76. The experimental class

demonstrated significantly higher student engagement in post-test learning than the control class. This indicates that students in the experimental group exhibited better active learning compared to those in the control group.

Development of Student Activity During Learning

The progression of student engagement in the experimental class throughout the learning process on the topic of Ecosystem is illustrated in Figure 2.

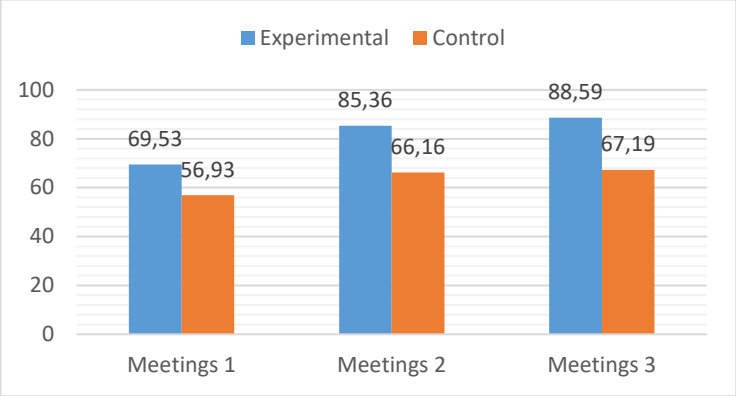

Figure 2. Evolution of Student Engagement in Experimental and Control Classes Throughout the Learning Process

The average learning activity scores were 69.53, 85.86, and 88.59 at the first, second, and third meetings. There was a notable increase in student engagement within the experimental class throughout the learning process.

Student Feedback on the TGT Type Cooperative Learning Model in Ecosystem Material

Table 1 presents an analysis of student feedback on implementing the TGT-type cooperative learning model during the study of Ecosystem material. Table 1 summarizes the results of analyzing student responses to the (TGT) type of cooperative learning activities. The table showcases the percentage of positive responses received for each indicator, with all indicators exceeding 70% satisfaction rate.

Table 1. Student Responses to the Process of (TGT) Type Cooperative Learning Activities

Indicator	%	Criteria
Active Participation	79,14	Very good
Interest to learn	80,16	Very good
Express opinions	73,07	Very good
Interactions and Hubs. Social	82,13	Very good
Motivation to learn	89,52	Very good

Students responded very positively to the learning experience facilitated by the TGT-type cooperative learning model. The percentage of positive responses for all indicators surpassed 70% (Table 1).

Discussion

Active Student Learning

Figure 1 presents the posttest results, indicating that the experimental class outperformed the control class regarding student learning activity. The active engagement of students in the experimental class is evident from their enthusiastic participation during the lessons. They demonstrate a keen interest in acquiring knowledge about Ecosystems, fearlessly ask questions, express their opinions, respond to queries, and collaborate effectively in group problem-solving activities related to Ecosystem material. These activities have enhanced camaraderie among the students while collectively tackling

challenges. Table 1 reflects the positive responses of students to the learning activities. It shows that students were highly engaged in expressing their opinions and actively participating in social interactions and relationships during learning. Approximately 73.07% of students expressed their opinions, while 82.13% engaged in social interactions and relations. This finding aligns with Luo et al. (2020) study, which suggests that the Teams Games Tournament (TGT) learning model promotes a sense of togetherness and mutual respect among group members.

Their high enthusiasm marks the students' participation in the game's tournament. The academic nature of the questions and the prospect of earning awards motivate each group to energetically answer questions in pursuit of achieving the highest scores and receiving rewards. The direct involvement of students in the learning process through these games contributes to their increased level of activeness. This observation aligns with Chen & Chen's (2017) findings, which indicate that the Teams Games Tournament (TGT) type of cooperative learning model ensures the involvement of all students, disregarding any status differences, and encourages students to take on the role of peer tutors. Additionally, incorporating elements of games and rewards further enhances student engagement. This notion is also supported by the research of (Bećirović et al., 2022), who assert that when students are directly engaged in the learning process, they exhibit a higher intensity of activity and participation. The combination of academic challenges, rewards, and active involvement in games within the cooperative learning setting fosters a dynamic learning environment, stimulating students to be more proactive and invested in their learning journey (Hoorani, 2015).

The control class students exhibit lower activity levels during learning activities that utilize the picture-and-picture cooperative learning model for Ecosystem material (Coelho et al., 2017). The limited use of pictures as the primary learning tool in the control class may lead to student boredom and a subsequent lack of interest in the learning process (Bernard & Chotimah, 2018). As a result, students are less motivated to participate in their studies actively. The absence of active cooperation among group members when solving ecosystem-related problems also contributes to their passiveness in learning activities.

These findings are consistent with the research conducted by Yeganeh (2018), which points out several weaknesses of the picture-and-picture cooperative learning model, one of which is the tendency of many students to become passive participants (Pillay et al., 2020). This situation contradicts the objectives of Biology Science learning, which aim to foster active engagement and participation among students throughout the learning process. Implementing teaching strategies that encourage more dynamic and collaborative learning experiences may be necessary.

Development of Student Learning Activeness

Figure 2. shows that the development of experimental class student activity from the first meeting to the third meeting has increased. The learning model applied to the experimental class emphasizes students' activeness in learning activities. In this case, students are directly involved in learning activities and participate in learning activities.

At the first meeting, students were not very active in learning. This can be seen that some students focus on finding information about Ecosystem material. Students and their group members have not fully cooperated in solving problems regarding ecosystems. And some students do not understand the application of the TGT cooperative learning model. This is because it is the first time students are introduced to the TGT cooperative learning model, so students need to get used to it.

At the second meeting, students' active learning began to be seen. This is because students have made habituation with the TGT type of cooperative learning model repeatedly. This is the opinion (Gillies, 2016) that learning that is done repeatedly will form a habit. Repeating an action becomes a habit and habituation. At the games tournament stage, students enthusiastically participated in learning. Student enthusiasm is marked by

an increased focus on finding information about Ecosystems and good cooperation in solving problems about Ecosystems. This is because students who have understood certain concepts provide explanations and exchange ideas with other group members. Learning activities are carried out in group activities so that students can learn from each other through the exchange of thoughts, experiences, and ideas.

At the third meeting, students actively sought information about Ecosystem material. Students and group mates work together to solve problems regarding Ecosystem material. Students dare to express opinions, and students dare to answer questions from the teacher. Students are motivated to get the highest scores and awards in tournament games. Student enthusiasm in games tournaments increases student learning interest in Ecosystem material. This can be seen from students' positive responses to the learning activities in Table 1. that the interest in learning and student motivation in learning is very good. It can be seen from the students' response to learning interest of 80.16% and learning motivation of 89.52%. This is the opinion of (Slavin et al., 2014) that students who are motivated to learn will appear through sincerity to be involved in the learning process, among others, seen through the activeness of asking questions, expressing opinions, and doing assignments by learning demands.

The TGT type of cooperative learning model adds a dimension of joy to the game, so students look happy in learning activities. This is supported by (Slavin, 2008), that TGT activities are fun, so students are more motivated to do better in learning. This is also supported by (Barata et al., 2013) that using learning models can encourage the growth of students' enjoyment of lessons, foster and increase motivation in doing assignments, and make it easy for students to understand lessons to enable them to achieve better learning outcomes.

Conclusions

We extend our heartfelt thanks to all individuals and entities who contributed to the successful completion of this research. In particular, we would like to thank the guiding lecturers who provided invaluable assistance and unwavering support throughout the research process. Their guidance and encouragement were instrumental in shaping the direction of this study and enriching our understanding of the subject matter. We deeply appreciate their dedication and expertise, without which this research would not have been possible.

Declaration statement

The authors reported no potential conflict of interest.

References

Ahangari, S., & Samadian, Z. (2014). The Effect of Cooperative Learning Activities on Writing Skills of Iranian EFL Learners. *Linguistics and Literature Studies*, *2*(4), 121–130. https://doi.org/10.13189/lls.2014.020403

Barata, G., Gama, S., Jorge, J., & Gonçalves, D. (2013). Improving participation and learning with gamification. *ACM International Conference Proceeding Series*, 10–17. https://doi.org/10.1145/2583008.2583010

Bećirović, S., Dubravac, V., & Brdarević-Čeljo, A. (2022). Cooperative Learning as a Pathway to Strengthening Motivation and Improving Achievement in an EFL Classroom. *SAGE Open*, *12*(1). https://doi.org/10.1177/21582440221078016

Bernard, M., & Chotimah, S. (2018). Improve Student Mathematical Reasoning Ability with an Open-Ended Approach Using VBA for Powerpoint. *AIP Conference Proceedings*, *2014*. https://doi.org/10.1063/1.5054417

Bhola, M., Ram, D. karan, Panda, A., & ... (2022). Ecological behavior in children is linked to environmental knowledge and "a sense of connection to nature." *Journal of Positive School Psychology*, *6*(3), 3202–3213. https://www.journalppw.com/index.php/jpsp/article/view/2100

Chen, K. D., & Chen, P. K. (2017). Research on the relation between the characteristics of the faculty and the commitment to continuous improvement of motivations and student study processes. *Asia Pacific Education Review*, *18*(4), 439–449. https://doi.org/10.1007/s12564-017-9500-y

Coelho, F., Pereira, M. C., Cruz, L., Simões, P., & Barata, E. (2017). Affect and the adoption of pro-environmental behavior: A structural model. *Journal of Environmental Psychology*, *54*, 127–138. https://doi.org/10.1016/J.JENVP.2017.10.008

Ferreira, M. E., Porteiro, A. C., & Pitarma, R. (2015). *Journal of Education and Practice www.iiste.org ISSN*. *6*(8). www.iiste.org

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America*. https://doi.org/10.1073/pnas.1319030111

Gillies, R. M. (2016). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education*, *41*(3), 39–54. https://doi.org/10.14221/ajte.2016v41n3.3

Hoorani, B. H. (2015). Impact of Cooperative Learning in Developing Students' Cognitive Abilities for Academic Achievement. *Journal of Education and Educational Development*, *1*(2), 145. https://doi.org/10.22555/joeed.v1i2.41

Ibáñez, M. B., & Delgado-Kloos, C. (2018). Augmented reality for STEM learning: A systematic review. *Computers and Education*. https://doi.org/10.1016/j.compedu.2018.05.002

Krathwohl, D. R., & Anderson, L. W. (2010). Merlin C. Wittrock and the revision of Bloom's taxonomy. *Educational Psychologist*. https://doi.org/10.1080/00461520903433562

Lissa, L. (2017). Penggunaan Metode Giving Questions and Getting Answer Terhadap Keaktifan Belajar Siswa SMA. *Bioeduscience*, *1*(1), 11. https://doi.org/10.29405/bioeduscience/11-18111107

Luo, Y. J., Lin, M. L., Hsu, C. H., Liao, C. C., & Kao, C. C. (2020). The effects of team game tournaments on learning motivation and motor skills in college physical education. *Sustainability (Switzerland)*, *12*(15), 1–12. https://doi.org/10.3390/su12156147

Michael Connelly, F. (2013). Joseph Schwab, curriculum, curriculum studies, and educational reform. *Journal of Curriculum Studies*, *45*(5), 622–639. https://doi.org/10.1080/00220272.2013.798838

Olson, S., & Labov, J. (2014). STEM learning is everywhere: Summary of convocation on building learning systems. In *STEM Learning Is Everywhere: Summary of a Convocation on Building Learning Systems*. https://doi.org/10.17226/18818

Pheeraphan, N. (2013). Enhancement of the 21st Century Skills for Thai Higher Education by Integration of ICT in Classroom. *Procedia - Social and Behavioral Sciences*, *103*, 365–373. https://doi.org/10.1016/j.sbspro.2013.10.346

Pillay, Y., Lu, H. T., & Funk, L. (2020). Introducing Mind Mapping as a Creative Counseling Modality. *Journal of Creativity in Mental Health*, *15*(4), 474–481. https://doi.org/10.1080/15401383.2020.1746721

Selvianiresa, D., & Prabawanto, S. (2017). Contextual Teaching and Learning Approach of Mathematics in Primary Schools. *Journal of Physics: Conference Series*, *895*(1). https://doi.org/10.1088/1742-6596/895/1/012171

Shahali, E. H. M., Halim, L., Treagust, D. F., Won, M., & Chandrasegaran, A. L. (2015). Primary School Teachers' Understanding of Science Process Skills to Their Teaching Qualifications and Teaching Experience. *Research in Science Education*, *47*(2), 257–281. https://doi.org/10.1007/s11165-015-9500-z

Slavin, R. E. (2008). *Cooperative Learning Teori Riset dan Praktik*. Nusa Media.

Slavin, R. E., Lake, C., Hanley, P., & Thurston, A. (2014). Experimental evaluations of elementary science programs: A best-evidence synthesis. *Journal of Research in Science Teaching*, *51*(7), 870–901. https://doi.org/10.1002/TEA.21139

Susanti, D., Widiana, R., Sumarmin, R., Susanti, S. (2021) Student Motivation Against Using Guided Inquiry-Based Animal Physiology Practicum Guide. BIOEDUSCIENCE, 5(1), 69-73. https://doi.org/10.22236/j.bes/514994

Thibaut, L., Ceuppens, S., De Loof, H., De Meester, J., Goovaerts, L., Struyf, A., Boeve-de Pauw, J., Dehaene, W., Deprez, J., De Cock, M., Hellinckx, L., Knipprath, H., Langie, G., Struyven, K., Van de Velde, D., Van Petegem, P., & Depaepe, F. (2018). Integrated STEM Education: A Systematic Review of Instructional Practices in Secondary Education. *European Journal of STEM Education*. https://doi.org/10.20897/ejsteme/85525

Yeganeh, C. (2018). Knowledge sharing mechanisms in education. *Kybernetes*, *47*(7), 1456–1490. https://doi.org/10.1108/K-06-2017-0227