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Research Article

Jigsaw as a community learning strategy: Improving students' social attitudes

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ABSTRACT

Social attitudes are needed by students in improving communication and collaboration skills in the 4.0 industrial revolution era. This study aimed to identify the effect of the jigsaw learning model as a community learning strategy on students' social attitudes in digestive system material. This quasi-experimental research was using a non-equivalent pretest-posttest control group design. The population used was eighth-graders in Padang. The samples involved were two groups selected through a simple random sampling technique. The instrument used was observation sheets to measure four aspects of social attitudes, including social discipline, tolerance, self-confidence, and collaboration. Data were analyzed using one-way ANCOVA. The result showed that the jigsaw as a community learning strategy has a significant effect on students' social attitudes (p-value < 0.05). As a recommendation, the jigsaw learning model can be applied to promote students' social attitudes.

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INTRODUCTION

Humans are social beings (Hossain & Ali, 2014; Rumambi & Marentek, 2015) who need others to live in communities with various cultures. People need to be sociable. For this reason, learning to behave socially acceptable is the main thing. To live in society, an individual must not only know acceptable behavior, but they must also adjust their behavior. They must be able to play an acceptable social role. Then it will succeed in good social adjustment. Hence social attitudes become a concern for living life. According to Bialangi et al., (2016) social attitudes are patterns of behavior that conditioned responses to social stimuli. People with a positive social attitude can hope and look their best even in difficult situations (Chen, 2016; Yalçin & Hasan, 2018). In this industry 4.0 era, a person's social attitudes have an impact on their survival. This era demands

the ability to learn to live together (Binkley et al., 2014; Perrault et al., 2011), so a great social attitude is needed.

Social attitudes can develop through parenting styles in the family (Amedu & Gudi, 2017). Parents can play a big role in teaching their children how to get used to positive social attitudes. However, parents also begin to have difficulty controlling their children when they are already involved in the community. Thus, school is an environment for developing positive social attitudes of students (Bialangi et al., 2016; Juweto, 2015; Sánchez-Hernández et al., 2018; Yalçin & Hasan, 2018). Therefore, the development of students' social attitudes through learning activities is a crucial concern. As stated in education curriculum in Indonesia, social attitudes become one of the core competencies that must be develop in the learning process. This social attitude includes honesty, discipline, politeness, self-confidence, caring, and responsibility. These attitudes can be developed by students in schools that will later become good habits in society.

The preliminary research showed that some junior high schools in Padang have not maximally empowered students' social attitudes. The observation result showed that group learning to facilitate the empowerment of social attitudes does not go properly. Some students were passive in discussion and even were only one or two group members who complete the group task. Moreover, interest in sharing or discussion between groups is still low. The discussion class was dominated by certain students, while the others did not have the opportunity to express their opinion. On the other hand, according to Trilling and Fadel (2009), high school and university graduates in Indonesia are less competent in terms of (1) work ethics and professionalism; (2) teamwork and collaboration; and (3) working in different groups. This fact suggests that the collaborative skills required in the 21st century are not living up to expectations. Collaboration skills are essential to survive in facing global society challenges (Ball et al., 2016; Binkley et al., 2014; Haviz et al., 2018). As pointed out by Dede (2010), people with collaborative skills have a higher chance of getting a decent job. It is because every person cannot have all the knowledge and skill, they need to collaborate with others (Binkley et al., 2014; Le et al., 2018; Perrault et al., 2011; Sims, 2012; Q. Wang, 2010). Someone who can collaborate can interact well with other people. Therefore, education must be directed to improve students' social attitudes that provide by a collaborative environment.

Teachers, as agents of change, are expected to improve this condition. They can improve the learning process by determining appropriate learning strategies and models to develop students' social attitudes. As the research of Bustami et al. (2017) used the Jigsaw, Reading, Questioning, Answer (JiRQA) learning strategy in empowering the social attitudes of biology students from various ethnicities. Meanwhile, Bachtiar et al. (2018) used the integrated Problem Based Learning (PBL) and Numbered Heads Together (NHT) learning model to improve the social attitudes of students with high academic abilities. Also, Hanafi (2016) uses discovery learning to empower students' social attitudes. However, the three previous studies that have been carried out do not support students to collaborate with all school members to gain new knowledge. Students seeking information are limited to the classroom. In fact, the more they interact with other people, the more students' social attitudes will increase, especially tolerance and social self-confidence (Setiawan & Suardiman, 2018).

Therefore, this research will be applying to a community learning strategy integrated with cooperative learning models. The community learning strategy was first introduced by Sato (2019), a Japanese scholar, who integrates western theory and local practice as an approach to improve the education quality. The community learning strategy encourages the students to work together and utilize existing learning resources in the environment to create multi-directional communication resulting in new knowledge and experiences (Weiss et al., 2015). The community learning strategy can be realized by proposing contextual questions to the relevant parties (Sato, 2019). In a previous study, Shinta and Muchlis (2013) integrates the community learning strategy with Student Team Achievement Divisions (STAD) learning model for chemistry subjects. Hence. this study integrates the community learning strategy through a jigsaw learning model for digestive system materials.

Jigsaw is one of the cooperative learning models (Arends, 2012; Jacobs & Renandya, 2019). The jigsaw learning model can increase students' sense of responsibility towards their learning and others' (Halley et al., 2013; Şengül & Katranci, 2014). Students not only learn the material but also required to present their assigned material to the group members (Halley et al., 2013). Consequently, they will depend on each other and need to cooperatively collaborate to achieve the learning objectives (Chang & Benson, 2020; Karacop & Diken, 2017; Şahin, 2010; Tekbiyik, 2015). Community learning strategy through a jigsaw can improve learning achievement and students' understanding (Tran & Lewis, 2012). Furthermore, the jigsaw has the potentials of helping to foster cooperative skills, mutual trust, and understanding among students irrespective of female and male (Olukayode & Salako, 2014). The students who learn with the Jigsaw admit that more cooperation and

information are sharing between students (Halley et al., 2013; Tran & Lewis, 2012). Thus, it is thought that Jigsaw can increase the students' social attitude.

Hence, this study aimed to examine the effect of community learning strategy through a jigsaw on students' social attitudes in digestive system materials. The research findings of this study can be used to optimize the learning process. Also, the implementation of a community learning strategy through a jigsaw will provide new information on whether this strategy has a significant effect on students' social attitudes.

METHOD

This quasi-experimental research applied a non-equivalent pretest-posttest control group design (Cook & Campbell, 1979). The design of the study used was a non-equivalent pretest-posttest control group design (Table 1). The population of the study was eighth-graders at SMPN 12 Padang (State Junior High School) in the 2016/2017 academic year. The samples involved two classes selected through a simple random sampling technique. The researcher selected 31 students as the experimental group with a community learning strategy through a jigsaw. Then, the other 31 students were selected as the control group with conventional learning.

Table 1. Design of study

Group	Pre-test	Treatment	Post-test
Experimental	O_1	X_1	O_2
Control	O_1	X_2	O_2

Description: X_1: Community learning strategy through a jigsaw; X_2:: Discovery learning model.

The data were collected through observation of the social attitude of each student. The observation was done for 5 meetings (one meeting for 120 minutes). The observation sheets were adopted from the Directorate General of Primary and Secondary Education 2015 about Assessment Guidelines. The social attitudes measured are consists of four indicators, i.e., discipline, tolerance, self-confidence, and collaboration (Table 2).

Table 2. The indicators of social attitude

Social Attitude Indicators	Description Item
1. Discipline	- Arrive on time - Obey the rules - Follow the rules of good and correct written language - Collect tasks according to the specified time
2. Tolerance	- Don't bother friends with different opinions - Accepted the agreement despite differences of opinion - Open to or willingness to accept something new - Able and willing to cooperate with anyone who has a variety of backgrounds, views, and beliefs - Don't impose the opinions or beliefs and ideas of others in order to better understand others
3. Self-confidence	- Argue or do activities without hesitation - Able to make decisions quickly - Not easily discouraged - Not awkward in acting - Bold presentation in front of the class - Dare to argue, ask, or answer questions
4. Collaboration	- Willingness to perform tasks according to agreement - Willing to help others for nothing - Active in group work - Focus on group goals - Looking for ways to overcome differences of opinion or thoughts between oneself and others - Encourage others to work together to achieve common goals

The stages of the community learning strategy through a jigsaw are presented in Table 3. The data analysis was using the ANCOVA test. The prerequisite test was using Levene's test as homogeneity and Shapiro-Wilk as normality test. After conducting the prerequisite test (normality and homogeneity), the data was normal and homogenous. Thus, the hypothesis test is carried out using the one-way ANCOVA with a significance of 0.05.

Table 3. The stages of community learning strategy through a jigsaw learning model

Stages	Teacher Behavior
Phase-1 Divide students into groups with 5/6 students in each group.	The teacher divides the students into several groups with five students in each group. The group members consisted of different gender, ethnicity, and academic achievement.
Phase-2 Divide the day's lesson into 5-6 segments.	The teacher divides a topic in the core competence into five segments. For example, in nutrient material, the teacher divides it into some segments: (1) carbohydrate, (2) protein, (3) fat, (4) vitamin, and (5) mineral.
Phase-3 Assign each student to learn one segment.	The teacher assigns each student to learn a segment. The teacher ensures that each student focuses on learning their assigned segment.
Phase-4 Form temporary "expert groups" by having one student from each jigsaw group join other students assigned to the same segment.	The teacher forms expert groups by having one student from each jigsaw group join other students assigned to the same segment.
Phase-5 Bring the students back into their jigsaw groups.	After completing the discussion in the expert groups, the teacher asks the student to go back to their jigsaw group.
Phase-6 Ask each student to present her or his segment to the group.	The teacher asks the student to present his or her segment to the group. After completing this phase, the teacher distributes a worksheet containing questions related to all segments to each group.
Phase-7 Move from one group to another and observing the discussion process.	The teacher monitors the discussion process in each jigsaw group. If the students get difficulty in answering the questions in LKPD, they are allowed to ask the other groups, teachers, or even any people outside the classroom. However, the teacher doesn't allow them to find the answer through their Smartphone. After completing the LKPD, the lesson is continued with class discussion.
Phase-8 At the end of the session, give a quiz about the material.	The teacher randomly proposes questions related to all segments to the students.

RESULTS AND DISCUSSION

The summary result of the data analysis of the students' social attitude was presented in Table 4. To find out the difference in means of the test result between the experimental group and the control group, the one-way ANCOVA test was conducted. Based on the data presented in Table 4, the significant value was smaller than 0.05. It can be concluded that there was a significant difference in the students' social attitudes in the experimental and control group. In conclusion, it can be said that the community learning strategy through a jigsaw affected students' social attitudes of the experimental group.

Table 4. Summary of data analysis comparison of the students' social attitude in the experimental and control group

Class	N	Mean	*SD*	***α***	Sig.	Description
Experimental group	31	85,69	9,786	0,05	0,000	There is a significant difference
Control group	31	70,61	9,022			

Table 5 shows the mean value of students' social attitudes based on each indicator. It is known that the students' social attitude in the experimental group was higher than that in the control group on each indicator (discipline, tolerance, self-confidence, collaboration). Social attitude is one of the core competencies that have to be possessed by students through learning. It means that the expected outputs of the learning process aren't only students who have knowledge competencies and skills, but also have good social attitudes. If they have good social attitudes, they can interact well with the teachers and others in the classroom resulting in a harmonious relationship in the school environment (Amedu & Gudi, 2017; Bustami et al., 2017; Ryzin et al., 2020; Sánchez-Hernández et al., 2018; Setiawan & Suardiman, 2018). Also, social attitudes affect students' learning results (Callaghan & Bower, 2012; Juweto, 2015; Olukayode & Salako, 2014; Yalçin & Hasan, 2018). Teachers can develop students' social attitudes by applying the cooperative learning model (Koc et al., 2010; Olukayode & Salako, 2014; Yalçin & Hasan, 2018). The cooperative learning strategies are proven to affect the social attitudes of students (Borich, 2017; Tran & Lewis, 2012; Yalçin & Hasan, 2018). Furthermore, G. Wang (2020) added the application of cooperative learning strategies can reduce the character of individualism and form harmony between students.

Table 5. Summary of each indicator of the students' social attitude in the experimental and control group

Group	Mean value of social attitude							
	Discipline		Tolerance		Self-confidence		Collaboration	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Experimental group	86,67	9,816	94,30	9,002	78,76	9,874	83,03	10,451
Control group	65,87	8,969	83,10	9,393	67,61	8,759	65,87	8,969

The jigsaw learning model is one of the cooperative learning models to develop students' social attitudes (Şengül & Katranci, 2014). Bialangi et al. (2016) argue that the jigsaw learning model can increase honesty, discipline, responsibility, tolerance, cooperation, and confidence attitudes of high school students, particularly in the biology subject. It is also supported by Amedu and Gudi (2017), in which Jigsaw can develop a positive attitude of high school students, particularly in the biology subject. The characteristic of the jigsaw learning model is using the expert and jigsaw groups. The task of becoming an expert makes each student active and responsible for their learning. Therefore, the success of the jigsaw group is determined by the ability of an expert in presenting the material to their group (Tran, 2016). The role of an expert in explaining material to his/her friends can be nurturing the self-confidence of students so that it will improve their cognitive abilities (Al-salkhi, 2015; Halley et al., 2013; Juweto, 2015).

The knowledge gained in the jigsaw group can be used to answer questions in the students' worksheet. The questions in students' worksheets are contextual in which the answer can't be found in the printed book. Therefore, they have to utilize the school community as a source of learning. This activity is a form of implementation of the community learning strategy through a jigsaw learning model. Community learning strategies support students to gain new knowledge through proposing questions to knowledgeable persons such as peers, senior students, teachers of other subjects, even juniors (Mindich & Lieberman, 2012). One of the indicators to be understood by the students about the digestive system material can mention the types and sources of nutrients. Therefore, the students can ask the canteen owners about the types and sources of nutrients. Through this activity, they will learn contextually, linking theories obtained in the classroom with daily life. It means they can learn from the canteen owners about the ingredients of their products such as rice cake, satay, meatballs, and others. Then, the information will be processed by each student to classify food according to its nutritional content.

Another sample of questions that encourages students to propose questions to non-science teachers is about diabetes. They have to ask about the causes of diabetes and the benefits of brown rice for diabetics. The collected answers are discussed with the jigsaw group before being presented to the class. This activity is beneficial for students, especially those who have a kinaesthetic learning style. Because, someone with a kinaesthetic learning style more quickly receives and processes information, if done through activities that involve body movements (Leasa et al., 2017).

The stages of learning using a jigsaw learning model can develop students' social attitudes of discipline, tolerance, self-confidence, and collaboration. The students' self-confidence can be shown from the students' courage to propose questions to the school community and to present their knowledge to their peers. A tolerance attitude is demonstrated by accepting different opinions proposed by various sources and establishing an agreement. Besides, it can be seen from the willingness to work with others from different cultural backgrounds and religions. Discipline attitudes are demonstrated by following the applicable rules during the learning process, such as coming on time to class after collecting information outside the classroom. Collaboration attitude can be seen from the willingness to be an expert and more active in the jigsaw group to achieve shared learning goals.

The social attitude of tolerance is well developed through the community learning strategy through a jigsaw learning model. Meanwhile, disciplinary social attitudes, self-confidence, and collaboration can't be developed properly through conventional learning models. This is approved by the results of Bustami et al. (2017) research, conventional learning doesn't encourage students to develop collaboration, honesty, discipline, responsibility, tolerance. Some research showed that the Jigsaw learning model is considerably more effective than conventional learning (Azmin, 2016; Karacop & Diken, 2017; Keramati, 2010; Tran & Lewis, 2012). In conventional learning, there is no task of students as an expert, so that each student has the same understanding from the teacher. Also, the questions in the students' worksheet aren't challenging. So, students can easily answer these questions from book sources or the internet. Therefore, conventional learning doesn't build cooperation, confidence, and tolerance in groups to help each other solve questions in students' worksheet.

The results of this study are supported by Shinta and Muchlis (2013) which uses a community learning strategy through a STAD learning model, which can improve students' social responsibility attitudes. The other research was conducted by Novidsa and Darussyamsu (2017) which uses a community learning strategy through an inquiry learning model, which can improve students' social discipline, tolerance, self-confidence, and collaboration attitudes. Meanwhile, the Jigsaw learning model positively improves students' social attitudes, such as collaboration, self-confidence, discipline, and tolerance. Thus, the community learning strategy through a jigsaw learning model is appropriate in improving the social attitudes of students.

CONCLUSION

The jigsaw as a community learning strategy has a significant effect on students' social attitudes (p-value < 0.05). The students' social attitudes such as discipline, collaboration, tolerance, and self-confidence in the experimental group are higher than the control group. As a recommendation, the jigsaw learning model can be applied to promote students' social attitudes.

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REFERENCES

Al-salkhi, M. J. (2015). The effectiveness of jigsaw strategy on the achievement and learning motivation of the 7th primary grade students in the islamic education. *International Journal of Humanities and Social Science*, *5*(4), 111–118. Retrieved from http://www.ijhssnet.com/journals/Vol_5_No_4_April_2015/12.pdf.

Amedu, O. I., & Gudi, K. C. (2017). Attitude of students towards cooperative learning in some selected secondary schools in Nasarawa State. *Journal of Education and Practice*, *8*(10), 29–34. Retrieved from https://files.eric .ed.gov/fulltext/EJ1139726.pdf

Arends, R. I. (2012). *Learning to teach* (9th ed.). Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/cbdv.200490137/abstract

Azmin, N. H. (2016). Effect of the jigsaw-based cooperative learning method on student performance in the general certificate of education advanced-level psychology: An exploratory Brunei case study. *International Education Studies*, *9*(1). doi: https://doi.org/10.5539/ies.v9n1p91

Bachtiar, S., Zubaidah, S., Corebima, A. D., & Indriwati, S. E. (2018). The spiritual and social attitudes of students towards integrated problem based learning models. *Issues in Educational Research*, *28*(2), 254–270. Retrieved from https://www.researchgate.net/publication/324532148_The_spiritual_and_social_attitudes_of_students_towards_integrated_problem_based_learning_models

Ball, A., Joyce, H. D., & Anderson-Butcher, D. (2016). Exploring 21st century skills and learning environments for middle school youth. *International Journal of School Social Work*, *1*(1), 1–15. doi: https://doi.org/10.4148/2161-4148.1012

Bialangi, M. S., Zubaidah, S., Amin, M., & Gofur, A. (2016). Development of students' social attitudes in biology classroom through jigsaw and guided inquiry. *Development*, *1*(10), 1–7. Retrieved from http://www.academicjournal.in/download/165/1-9-32-530.pdf

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2014). Defining twenty-first century skills. In *Assessment and teaching of 21st century skills*. doi: https://doi.org/10.1007/978-94-007-2324-5_2

Borich, G. D. (2017). *Effective teaching methods: Research-based practice* (9th ed.). Pearson. Retrieved from https://www.pearson.com/us/higher-education/program/Borich-Effective-Teaching-Methods-Research-Based-Practice-Enhanced-Pearson-e-Text-with-Loose-Leaf-Version-Access-Card-Package-9th-Edition/PGM14957.html

Bustami, Y., Corebima, A. D., Suarsini, E., & Ibrohim. (2017). The social attitude empowerment of biology students: implementation JiRQA learning strategy in different ethnics. *International Journal of Instruction*, *10*(3), 15–30. Retrieved from https://doaj.org/article/4c2c55fa852d4f3caf8393c6795dcf88

Callaghan, N., & Bower, M. (2012). Learning through social networking sites - the critical role of the teacher. *Educational Media International*, *49*(1), 1–17. doi: https://doi.org/10.1080/09523987.2012.662621

Chang, W. L., & Benson, V. (2020). Jigsaw teaching method for collaboration on cloud platforms. *Innovations in Education and Teaching International*, 1–13. doi: https://doi.org/10.1080/14703297.2020.1792332

Chen, Y. shan. (2016). The effect of learner-learner interactions on a multiple-choice discourse completion task. *Learning, Culture and Social Interaction*, *9*, 55–67. doi: https://doi.org/10.1016/j.lcsi.2016.02.001

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Houghton Mifflin. Retrieved from https://www.scholars.northwestern.edu/en/publications/quasi-experimentation-design-and-analysis-issues-for-field-settin

Dede, C. (2010). Comparing frameworks for 21st century skills. In J. Bellanca & R. Brandt (Eds.), *21st Century skills: Rethinking how students learn* (pp. 51–75). Solution Tree Press. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.475.3846

Halley, J., Heiserman, C., Felix, V., & Eshleman, A. (2013). Students teaching students: A method for collaborative learning. *Learning Communities Research and Practice*, *1*(3), 20. Retrieved from https://files.eric.ed.gov/fulltext/EJ1112670.pdf

Hanafi, H. (2016). The effect of discovery learning method application on increasing students' listening outcome and social attitude. *Dinamika Ilmu*, *16*(2), 291. doi: https://doi.org/10.21093/di.v16i2.552

Haviz, M., Karomah, H., Delfita, R., Umar, M. I. A., & Maris, I. M. (2018). Revisiting generic science skills as 21st century skills on biology learning. *Jurnal Pendidikan IPA Indonesia*, *7*(3), 355–363. doi: https://doi.org/10.15294/jpii.v7i3.12438

Hossain, F. M. A., & Ali, M. K. (2014). Relation between individual and society. *Open Journal of Social Sciences*, *02*(08), 130–137. doi: https://doi.org/10.4236/jss.2014.28019

Jacobs, G. M., & Renandya, W. A. (2019). *Student centered cooperative learning*. Springer Singapore. doi: https://doi.org/10.1007/978-981-13-7213-1

Juweto, G. A. (2015). School location on students achievement and attitude towards biology in secondary school in Delta State. *International Journal of Education and Research*, *3*(8), 31–40. Retrieved from https://www.ijern.com/journal/2015/August-2015/04.pdf

Karacop, A., & Diken, E. H. (2017). The effects of jigsaw technique based on cooperative learning on prospective science teachers' science process skill. *Journal of Education and Practice*, *8*(6), 86–97. Retrieved from https://eric.ed.gov/?id=EJ1133003

Keramati, M. (2010). Effect of cooperative learning on academic achievement of physics course. *Journal of Computers in Mathematics and Science Teaching*, *29*(2), 155–173. Retrieved from https://eric.ed.gov/?id=EJ885726

Koc, Y., Doymuş, K., Karacop, A., & Şimsek, Ü. (2010). The effects of two cooperative learning strategies on the teaching and learning of the topics of chemical kinetics. *Journal of Turkish Science Education*, *7*(2), 52–65. Retrieved from http://tused.org/index.php/tused/article/view/511

Le, H., Janssen, J., & Wubbels, T. (2018). Collaborative learning practices: Teacher and student perceived obstacles to effective student collaboration. *Cambridge Journal of Education*, *48*(1), 103–122. doi: https://doi.org/10.1080/0305764X.2016.1259389

Leasa, M., Corebima, A. D., Ibrohim, & Suwono, H. (2017). Emotional intelligence among auditory, reading, and kinesthetic learning styles of elementary school students in Ambon-Indonesia. *International Electronic Journal of Elementary Education*, *10*(1), 83–91. doi: https://doi.org/10.26822/iejee.2017131889

Mindich, D., & Lieberman, A. (2012). Building a learning community: A tale of two schools. *Stanford Center for Opportunity Policy in Education*. Retrieved from https://eric.ed.gov/?id=ED532976

Novidsa, I., & Darussyamsu, R. (2017). Peningkatan kompetensi sikap peserta didik dengan penerapan strategi learning community melalui model pembelajaran inkuiri pada materi struktur dan fungsi jaringan tumbuhan Kelas VIII di SMPN 12 Padang. *Bioeducation Journal*, *1*(2), 87–96. doi: https://doi.org/10.24036/bioedu.v1i2.46

Olukayode, A. S., & Salako, E. T. (2014). Effect of jigsaw technique and gender on students' attitude to ethnic integration and sustainable development in Nigeria. *World Journal of Education*, *4*(3), 46–52. doi: https://doi.org/10.5430/wje.v4n3p46

Perrault, E., McClelland, R., Austin, C., & Sieppert, J. (2011). Working together in collaborations: Successful process factors for community collaboration. *Administration in Social Work*, *35*(3), 282–298. doi: https://doi.org/10.1080/03643107.2011.575343

Rumambi, H. D., & Marentek, S. A. (2015). A human dignity perspective: Exploring the implementation of corporate social responsibility. *Procedia - Social and Behavioral Sciences*, *211*, 127–134. doi: https://

doi.org/10.1016/j.sbspro.2015.11.019

Ryzin, M. J. Van, Roseth, C. J., & McClure, H. (2020). The effects of cooperative learning on peer relations, academic support, and engagement in learning among students of color. *Journal of Educational Research*, *113*(4), 283–291. doi: https://doi.org/10.1080/00220671.2020.1806016

Şahin, A. (2010). Effects of jigsaw II technique on academic achievement and attitudes to written expression course. *Educational Research and Reviews*, *5*(December), 777–787. Retrieved from https://academicjournals.org/journal/ERR/article-full-text-pdf/33E2E094215.

Sánchez-Hernández, N., Martos-García, D., Soler, S., & Flintoff, A. (2018). Challenging gender relations in PE through cooperative learning and critical reflection. *Sport, Education and Society*, *23*(8), 812–823. doi: https://doi.org/10.1080/13573322.2018.1487836

Sato, M. (2019). Spread and progress of school as learning community in Asia. In *Lesson Study and Schools as Learning Communities* (pp. 3–13). Routledge. doi: https://doi.org/10.4324/9781315690322-1

Şengül, S., & Katranci, Y. (2014). Effects of jigsaw technique on seventh grade primary school students' attitude towards mathematics. *Procedia-Social and Behavioral Sciences*, *116*, 339–344. doi: https://doi.org/10.1016/j.sbspro.2014.01.218

Setiawan, A., & Suardiman, S. P. (2018). Assessment of the social attitude of primary school students. *Research and Evaluation in Education*, *4*(1), 12–21. doi: https://doi.org/10.21831/reid.v4i1.19284

Shinta, C. N., & Muchlis. (2013). The implementation of learning community strategy through STAD type of cooperative learning in hydrolysis matter to train student responsibility in class of XI IPA 3 SMA Negeri 1 Manyar Gresik. *Unesa Journal of Chemical Education*, *2*(2), 127–131. Retrieved from https://jurnalmahasiswa.unesa.ac.id/index.php/journal-of-chemical-education/article/view/2754

Sims, L. (2012). Taking a learning approach to community-based strategic environmental assessment: Results from a Costa Rican case study. *Impact Assessment and Project Appraisal*, *30*(4), 242–252. doi: https://doi.org/10.1080/14615517.2012.736761

Tekbiyik, A. (2015). The use of jigsaw collaborative learning method in teaching socio-scientific issues: The case of nuclear energy. *Journal of Baltic Science Education*, *14*(2), 237–253. Retrieved from http://www.scientiasocialis.lt/jbse/files/pdf/vol14/237-253.Tekbiyik_JBSE_Vol.14_No.2.pdf

Tran, V. D. (2016). The effects of jigsaw learning on students' knowledge retention in Vietnamese higher education. *International Journal of Higher Education*, *5*(2), 236–253. doi: https://doi.org/10.5430/ijhe.v5n2p236

Tran, V. D., & Lewis, R. (2012). The effects of jigsaw learning on students' attitudes in a Vietnamese higher education classroom. *International Journal of Higher Education*, *1*(2). doi: https://doi.org/10.5430/ijhe.v1n2p9

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. Jossey-Bass. Retrieved from https://psycnet.apa.org/record/2009-18745-000

Wang, G. (2020). On the application of cooperative learning in college english teaching. *International Education Studies*, *13*(6), 62. doi: https://doi.org/10.5539/ies.v13n6p62

Wang, Q. (2010). Using online shared workspaces to support group collaborative learning. *Computers and Education*, *55*(3), 1270–1276. doi: https://doi.org/10.1016/j.compedu.2010.05.023

Weiss, M. J., Mayer, A. K., Cullinan, D., Ratledge, A., Sommo, C., & Diamond, J. (2015). A random assignment evaluation of learning communities at kingsborough community college—seven years later. *Journal of Research on Educational Effectiveness*, *8*(2), 189–217. doi: https://doi.org/10.1080/19345747.2014.946634

Yalçin, K., & Hasan, A. (2018). The effect of cooperative learning on the academic achievement and attitude of students in Mathematics class. *Educational Research and Reviews*, *13*(21), 712–722. doi: https://doi.org/10.5897/err2018.3636