Does Cooperative Learning may Enhance the Use of Students' Learning Strategies?

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Abstract

The present study investigates the effects of cooperative learning on learning strategies of 72 second-year Vietnamese higher education students toward the Research Methods in Education course over a nine-week course. These students were divided into two matched groups of 36 to be taught by the same lecturer. In the control group, cooperative learning was used, while in the experimental group, lecture-based teaching was employed. Results showed that students who were instructed using lecture-based teaching had lower scores on the post-tests of resource management and cognitive - metacognitive strategies than did the students who were instructed using cooperative learning. Implications for educators and further research are suggested for a less competitive and more effective learning outcome.

Keywords: cooperative learning, resource management, cognitive strategies, metacognitive strategies

1. Introduction

1.1 Cooperative Learning

Cooperative learning, one kind of "instructional methods in which teachers organize students into small groups, which then work together to help one another learn academic content" (Slavin, 2011, p.344), has been documented throughout the literature as an effective learning approach in helping students obtain the acquisition of practical learning skills, practical competences for effective communication. Chen (2018) has also proven that cooperative learning methods enhance students' better engagement in the classroom with the recognition of more productive problem-solving with contribution of the whole group. By that way, students can develop their proficiency in terms of comprehending knowledge, and promoting students' positive attitudes towards their own learning (Gillies, 2003; Johnson & Johnson, 2008; Johnson & Johnson, 2009). In the Asian education context, including Vietnam, the passive interaction of teacher–student through lecture-based teaching is still common due to cultures and big class room size (Maurice, Lai & Chan, 2018; Ministry of Education & Training of Vietnam, 2009; Moore, 2008; Thanh-Pham, 2011). This would lead to a passive learning and teaching attitude among students and teachers which threatens the unproductive learning outcomes (Harman & Nguyen, 2010; Thanh-Pham, 2010a, 2010b). This is against the 4.0 educational revolution trending which highlights the creativity, innovation, inclusivity, and sustainability of teaching and learning process (Hariharasudan, & Sebastian, 2018).

Recently, there has been much effort in implementing student-cantered/interactive approaches to create a more motivating learning environment (Harman & Nguyen, 2010). Cooperative learning method has been implemented to minimize the competitiveness in the learning environment by encouraging students to work together (Johnson & Johnson, 2009). In addition, it is claimed to promote more positive attitudes in students toward their own learning, enhance more collaborative relationships between participants, develop self-esteem, cohesiveness, and improve learning skills (Johnson & Johnson, 2005; Johnson, 2009; Tran & Lewis, 2012a, 2012b).

Johnson & Johnson (2008) emphasized those five elements: positive interdependence, face-to-face interaction, individual accountability, interpersonal and social skills, and group processing are important in the cooperative classroom for better students' engagement in learning.

Positive interdependence in cooperative learning contexts means that students are required to work together to achieve shared learning outcomes (Yager, 2000). Positive interdependence can be employed with students' joining in complementary roles (Thomas 1957), the group's contingencies provision (Skinner 1968), and separate division of teaching content (Aronson, Blaney, Stepan, Sikes, & Snapp, 1978) or labor/tasks (Knight & Bohlmeyer, 1990). Face to face interaction happens with individual's effort to support each other to achieve the group's shared objectives. In cooperative classroom, students are required to interact verbally with each other for learning tasks (Johnson & Johnson, 2008), explain things, teach others, and present their understanding (Ballantine & Larres, 2007). For promotive interaction, groups should be small when students can learn from each other to develop learning skills (Slavin, 2011). Individual responsibility refers to students' assistance seeking for their best work and learning, presenting their ideas, maintaining group's optimal operation, and caring for one another (Johnson, 2009). Individual accountability may be enhanced by keeping the size of the group small which would enhance the interaction among group members (Johnson & Johnson, 2005). Interpersonal and social skills could be enhanced in small groups when group members tend to communicate more frequently with each other. Frequent communication allows more information utilized in making a decision (Johnson & Johnson, 2009). In reality, the whole group cannot work effectively if students are socially unskilled (Slavin, 2011). To achieve shared objectives, students must: (a) know and trust each other; (b) communicate accurately with no ambiguity; (c) accept and support one another; and (d) resolve conflicts collaboratively (Johnson & Johnson 2005). The more socially skilled the participants are, the more productivity cooperative groups can achieve (Johnson & Johnson, 2008). Finally, group processing enhances members' effectiveness in contributing to the group's goals achievement with their learning reflection (Yamarik, 2007). Reflection helps students to differentiate practical or unpractical action, consider continuing or not the current problematic group processing (Gillies, 2006). Group processing can be established with interaction evaluation among group members, group's tasks evaluation, giving feedback, and organizing presentations for small groups and the entire class (Johnson & Johnson, 2009; Marlow & Page, 2005).

In reality, once these above basic elements of cooperative learning are included in cooperative learning, students are equipped with more positive self-esteem, and attitudes toward the subject. Therefore, they will achieve better, demonstrate superior learning skills, and experience more positive relationships among group members, and with their teachers (Johnson & Johnson, 2009; Slavin, 2011).

1.2 Learning Strategies

The learning strategies refer to students' management of different resources and cognitive and metacognitive strategies (Pintrich, Smith, Garcia, & McKeachie, 1991). The resource management strategies scale was employed to assess students' resource management. This scale includes four main components. The first component - time and study environment, relates to how the students schedule, plan, manage their study. The second component - effort regulation, refers to students' ability to maintain their effort, attention, commitment to overcome distraction and complete uninteresting tasks for their study goals. The third component, - peer learning, relates to how much students cooperate and help each other to comprehend new knowledge. The last component - help seeking, refers to seeking support from peers and instructors.

The cognitive and metacognitive strategies scale was employed to assess students' cognitive and metacognitive strategies before and after the experiment. This scale consists of five main elements. The first element - rehearsal strategies are reciting or naming items from a list to learn. The second element - elaboration strategies help students save information into long-term memory. Some elaboration strategies are paraphrasing, summarizing, creating analogies, and generative note-taking between learned knowledge. The third element - organization strategies help students choose appropriate information and relate the information to be learned. The fourth element - critical thinking strategies occur when students apply previous learned knowledge to new situations to solve problems, reach decisions, or make critical evaluations. The final element - metacognitive self-regulation refers to the awareness, knowledge, and control of cognition.

1.3 Cooperative Learning and Social, Affective and Psychological Outcomes

Recent studies (Bertucci, Conte, Johnson, & Johnson, 2010; Gillies, 2003; Johnson & Johnson, 2005; Johnson & Johnson 2008; Slavin, 2011; Tran & Lewis, 2012b) show that students in cooperative learning pedagogy achieved greater social, affective and psychological benefits at all levels of education. Specifically, cooperative learning develops confidence and mutual understanding among students (Johnson & Johnson, 2005); enhances positive

relationships between students (Johnson & Johnson, 2008); supports group interaction and motivation; increases individual responsibility (Gillies, 2003; Slavin, 2011); promotes mutual understanding and acceptance of students' differences (Tran & Lewis, 2012b); and enhances time management and communication skills (Bertucci et al., 2010).

With the high demand of 4.0 reformation in all areas, it is extremely crucial for the educators to train graduates to solve problems and face challenges in this 21st century (Azizan, Mellon, Ramli, & Yusup, 2018). It is why cooperative learning needs to be widely spread as it promotes students' creativity, interpersonal and learning skills such as reasoning and critical thinking (Johnson & Johnson, 2009). Bertucci et al. (2010) also emphasized that cooperative learning enhances social skills such as communication, presentation, problem-solving, leadership, delegation and organization in students; naturally motivates students' cognitive, linguistic, and social abilities (Killen, 2007); and offers students opportunities to exchange explanations with others (Johnson & Johnson, 2008).

Furthermore, cooperative learning creates a sociable environment for better interaction among members (Beck & Chizhik, 2008), and promotes positive attitudes towards teams and schools (Tran & Lewis, 2012a, 2012b). Besides these aforementioned positive effects, Johnson & Johnson (2008) reported that cooperative learning enhances better achievement, greater retention, and foster more positive attitudes to learning than competitive learning environments or individualistic learning.

Also, cooperative learning enhances more interest in learning with less anxiety for student (Slavin, 2011). Therefore, it is a valuable way to effectively enhance students' knowledge (Moore, 2008). The aforementioned findings validated the results of other studies (Gillies, 2006; Kose, Sahin, Ergun, & Gezer, 2010; Thanh-Pham, 2011; Zain, Subramaniam, Rashid, & Ghani, 2009;). Those studies report that cooperative learning promotes more use of advanced learning skills, more positive cohesion among students, higher responsibility, and more positive attitudes toward the learning tasks. These benefits of the cooperative learning may be explained by two factors: better learning outcomes, and improved social relations with other students (Johnson & Johnson, 2009). Therefore, cooperative learning could be considered as an effective way to engage students in positive learning.

2. Research Hypothesis

In reality, very few research studies on cooperative learning were conducted in Asian education contexts [including Vietnam], despites this approach has been "a key pedagogic component of many education reform strategies" (Nguyen, Elliott, Terluw, & Pilot, 2009, p.114). The present study adds to the literature by reporting the results of an experimental study designed to determine if cooperative learning is more effective than lecture-based teaching in improving students' learning strategies. Results of the study may encourage teachers to design cooperative learning groups thereby providing students with more opportunities to learn together in groups. As stated above, the positive effects of cooperative learning on social, affective and psychological outcomes of students shown in the literature have led to the primary hypothesis that: Students who are taught by cooperative learning will have greater resource management and cognitive - metacognitive strategies than those taught through lecture-based teaching.

3. Research Method

3.1 Participants

This study used a convenient sample of 72 second-year Vietnamese higher education students from two intact classes in Faculty of Education at An Giang University. One class ($n_1 = 36$) acted as the experimental group, and the other class ($n_2 = 36$) acted as the control group. In the treatment group of 36 students, there were 29 females and 7 males with a mean age of 19.27, while in the control group of 36, there were 27 females and 9 males with a mean age of 19.36. The two groups were pre-tested on the test of resource management and cognitive - metacognitive strategies to validate the equivalence in learning strategies before the treatment. Results of an independent t-test analysis showed there were no statistically significant differences on pre-test scores on resource management and cognitive - metacognitive strategies between the treatment group and the control group (Table 1). These results indicate that students in both groups had similar pre-test scores before the experiment commenced.

Table 1. The results of independent t-tests between groups on pre-test scores

	Experimental group (n = 36)		**Control group** (n = 36)			
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**	**t value**	**p value**
Resource management strategies						
Time and study environment	3.04	.59	3.20	.51	1.23	.231*
Effort regulation	3.21	.45	3.02	.61	1.11	.356*
Peer learning	3.02	.51	3.35	.56	1.51	.116*
Help seeking	3.07	.47	3.11	.55	1.46	.106*
Cognitive & Metacognitive Strategies						
Rehearsal	3.19	.52	3.21	.51	1.31	.227*
Elaboration	3.14	.51	3.09	.60	1.21	.260*
Organization	3.13	.65	3.08	.51	1.34	.142*
Critical thinking	3.31	.44	3.13	.52	1.62	.120*
Metacognitive self-regulation	3.79	.63	3.17	.49	1.36	.133*

*No significant difference (p > .05)

3.2 Instruments

3.2.1 Resource Management Strategies

The resource management strategies scale (Pintrich et al., 1991) was utilized to assess students' resource management strategies before and after the experiment. This scale consists of four main components. The first component, called time and study environment, consisted of 8 items (e.g. I usually study in a place where I can concentrate on my course work; I make good use of my study time for this course; I find it hard to stick to a study schedule [reversed]). The second component, called effort regulation, contained 4 items (e.g. I work hard to do well in this class even if I don't like what we are doing; When course work is difficult, I give up or only study the easy parts [reversed]; and Even when course materials are dull and uninteresting, I manage to keep working until I finish). The third component, called peer learning, comprised 3 items (e.g. When studying for this course, I often try to explain the material to a classmate or a friend; I try to work with other students from this class to complete the course assignments). The last component, called help seeking, contained 4 items (e.g. I ask the instructor to clarify concepts I don't understand well; When I can't understand the material in this course, I ask another student in this class for help; and I try to identify students in this class whom I can ask for help if necessary).

For each item, respondents indicated on a five points scale. Items are scored 1, 2, 3, 4 and 5, respectively, for the responses Strongly Disagree, Disagree, Undecided/Neutral, Agree, and Strongly Agree. Table 2 reports the means, standard deviations and Cronbach Alpha coefficient of internal consistency for the four components.

3.2.2 Cognitive and Metacognitive Strategies

The cognitive and metacognitive strategies scale (Pintrich et al., 1991) was utilized to assess students' cognitive and metacognitive strategies before and after the experiment. This scale consists of five main components. The first component, called rehearsal strategies, consists of 4 items (e.g. When I study for this class, I practice saying the material to myself over and over; I memorize key words to remind me of important concepts in this class; I make lists of important terms for this course and memorize the lists). The second component, called elaboration strategies, comprised 6 items (e.g. When reading for this class, I try to relate the material to what I already know; When I study for this course, I write brief summaries of the main ideas from the readings and the concepts from the lectures; I try to understand the material in this class by making connections between the readings and the concepts from the lectures). The third component, called organization strategies, contained 4 items (e.g. When I study the readings for this course, I outline the material to help me organize my thoughts; I make simple charts, diagrams, or tables to help me organize course material; and When I study for this course, I go over my class notes and make an outline of important concepts). The fourth component, called critical thinking strategies, consists of 5 items (e.g. I often find

myself questioning things I hear or read in this course to decide if I find them convincing; I treat the course material as a starting point and try to develop my own ideas about it; I try to play around with ideas of my own related to what I am learning in this course). The final component, called metacognitive self-regulation, comprised 12 items (e.g. During class time I often miss important points because I'm thinking of other things [reversed]; Before I study new course material thoroughly, I often skim it to see how it is organized; When I study for this class, I set goals for myself in order to direct my activities in each study period).

For each item, respondents indicated on a five-point scale. Items are scored 1, 2, 3, 4 and 5, respectively, for the responses Strongly Disagree, Disagree, Undecided/Neutral, Agree, and Strongly Agree. Table 2 reports the means, standard deviations and Cronbach Alpha coefficient of internal consistency for the nine components.

Table 2. Number of Items and Cronbach Alpha coefficient for the resource management and cognitive - metacognitive strategies

Resource management strategies		**Number of Items**	**Cronbach Alpha**
	Time and study environment	8	.67
	Effort regulation	4	.74
	Peer learning	3	.69
	Help seeking	4	.75
Cognitive & Metacognitive Strategies			
	Rehearsal	4	.73
	Elaboration	6	.67
	Organization	4	.69
	Critical thinking	5	.72
	Metacognitive self-regulation	12	.71

3.3 Design and Procedure

An experimental study was undertaken, using the Pre-test-Post-test Non-equivalent Comparison-Group Design, to test the cause and effect relationship between a treatment variable (cooperative learning) and the outcome variables (resource management and cognitive – metacognitive strategies).

Before the start of academic year, two intact higher education classes were selected for the study before these classes were scheduled. One class was randomly chosen for lecture-based teaching technique and acted as the control group, and the other for cooperative learning technique and acted as the treatment group in a Research Methods in Education course for 9 weeks. The same pre-test and post-test were administered to both groups before and after the treatment. A pre-test on resource management and cognitive - metacognitive strategies was administered to both groups before the treatment. The course comprised 9 units and each unit taught within 500 minutes in one week. The same lecturer taught both groups. In the control group, the lecturer covered the teaching content with lecture-based technique in logical steps for whole class. In the experimental group, the lecturer guided students to learn the knowledge content using the cooperative learning technique. In this group, the lecturer followed 9 steps: (i) the lecturer organized the learning materials and identified the objectives of the subject matter, (ii) the lecturer introduced the structure of the lesson, and expected outcomes, (iii) the lecturer formed groups, (iv) the lecturer moved students to assigned groups, (v) the lecturer delivered the learning materials to students, (vi) students studied their learning materials, (vii) students exchanged knowledge and helped each other to learn, (viii) students presented their understanding of the entire unit, and (ix) the lecturer assessed students' understanding through their presentation in front of the whole class. This whole process was repeated 9 times, once for each unit of work. Throughout the experiment, both groups were taught separately with different schedule. Both groups covered the same curriculum, and received the different pedagogy styles for the same amount of time in the afternoons, and in the same room. After the treatment, both groups took a post-test measuring resource management and cognitive - metacognitive strategies.

3.4 Data Analyses

Independent-samples t-tests were used to compare the groups' pre-test and post-test scores. All analyses were tested

for significance at the .05 level.

4. Results and Discussion

4.1 Results

Results of the t-test analyses show no statistically significant differences in pre-test scores of resource management and cognitive - metacognitive strategies between the experimental group and the control group. However, the findings obtained from t-test analyses on the post-test scores showed significant differences between the experimental group and the control group on resource management strategies and cognitive - metacognitive strategies (Table 3). Inspections of mean scores showed that the experimental group achieved significantly higher overall scores on four resource management strategies and five cognitive and metacognitive strategies than the control group.

Table 3. The results of independent t-tests between groups on post-test scores

	Experimental group (n = 36)		**Control group** (n = 36)			
Resource management strategies	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	**t value**	**p value**
Time and study environment	3.99	.64	3.77	.58	3.77	.021*
Effort regulation	3.98	.46	3.76	.59	3.19	.042*
Peer learning	4.62	.54	3.61	.62	4.30	.017*
Help seeking	4.79	.57	3.57	.56	4.76	.012*
Cognitive and metacognitive strategies						
Rehearsal	4.67	.56	4.01	.48	3.98	.013*
Elaboration	3.91	.46	3.30	.61	2.46	.043*
Organization	3.76	.52	3.23	.57	3.45	.036*
Critical thinking	4.18	.47	3.76	.48	3.69	.022*
Metacognitive self-regulation	3.92	.51	3.61	.62	3.64	.027*

*Significant difference ($p < .05$)

4.2 Discussion

This finding supports the hypothesis which states that students who are taught by cooperative learning will have greater resource management and cognitive - metacognitive strategies in learning the Research methods in Education course than those taught through lecture-based teaching. According to the results, the students in the treatment group that had engaged in learning together method produced higher overall scores on the post-test. Specifically, students were more effective in managing their time and study environment, regulating their effort and attention, cooperating and supporting others, teaching others, reciting or naming items and building internal connections between items to be learned, constructing connections among the information to be learned, applying previous knowledge to new situations and elaborating ideas on the concept taught in the learning process.

Despite the fact that cooperative learning successfully enhances students' more positive academic, social, affective, and psychological outcomes compared with students taught by the traditional teaching method (Johnson, Johnson, & Smith, 1998), it is still a controversial topic in teaching and learning. Researchers who investigate this question have suggested a range of theoretical models to explain the effectiveness of cooperative learning. These theoretical perspectives include the social interdependence theory (Deutsch, 1949), the cognitive perspective of Vygotsky (1978) and Piaget (1926), and the social learning theory of Bandura (1977), all of which contribute to the theory of learning known as constructivism. Each of these perspectives contributes to an understanding of cooperative learning in terms of improving academic, social, and psychological aspects. The important role of reciprocal interaction among participants in constructing knowledge is highly emphasized by these theoretical perspectives. This corresponds to the nature of cooperative learning, in which students are required exchange knowledge and interact on learning tasks to obtain a shared goal or comprehend the new learned knowledge (Johnson & Johnson, 2009).

Obviously, frequent reciprocal interaction among students in interactive learning tasks contributes the effectiveness of learning and teaching. Reciprocal interaction is a result of social interdependence (Deutsch, 1949; Schreiber & Valle, 2013). Through such interaction each student's goals are determined under the influence of the actions of other students (Johnson & Johnson, 2009). Cooperative contexts provide students with more opportunities for mutual help, needed resources exchange, effective communication, and mutual influence (Johnson & Johnson, 2008). In addition, cognitive processes are the outcomes of cultural and social interactions in an active learning environment (Piaget, 1926; Vygotsky, 1978). For these reasons, students were able to fully develop their learning strategies, and their new knowledge based on their current knowledge which derived from frequent reciprocal interaction with their partners, while undertaking interactive learning tasks.

The constructivist learning theorists have shared that learners are in control of constructing their own meaningful knowledge through interaction with their environment (Almala, 2005; Brooks & Brooks, 1999; Bruner, 1966; Dewey, 1991; Yager, 2000). Constructivist shared point of view that students in the treatment group were more active in constructing their own knowledge (Driscoll, 2000; Marlow & Page, 2005) through working with others, exchange knowledge, and getting help. In addition, Sousa (2006) reported that the retention rate for learned material increases when students explain and exchange knowledge in groups. Explanation to others is considered one of the most effective means of elaboration (Cohen, 1994; Kagan & Kagan, 2009; Slavin, 2011). From the perspective of cognitive elaboration, the effectiveness of learning and long-term memory was claimed to depend on the level of cognitive elaboration between group members (Webb, 2008). The positive learning outcomes was achieved in the cooperative group because students were given opportunities to develop social and learning skills (Bertucci et al., 2010), and experience achievement in learning (Kilic, 2008). In summary, students in the treatment group achieved positive attitudes toward their learning strategies since they were socially, academically and psychologically successful (Johnson & Johnson, 2008). The results of this study indicate that cooperative learning results in higher resource management and cognition - metacognition which are consistent with the findings of previous research (Doymus, Karacop, & Simsek, 2010; Kilic, 2008; Yamarik, 2007). These consistent findings have strongly supported the effective learning outcomes of cooperative learning.

In the present study, students in the cooperative learning group, with higher participation in the process of learning, had greater resource management and cognitive and metacognitive strategies than students in the comparison group. Evidently, the cooperative group were equipped with positive skills such as managing their time, and study environment; regulating their effort and attention; cooperating and supporting others; teaching others; reciting or naming items, and building internal connections between items to be learned; constructing connections among the information to be learned; applying previous knowledge to new situations and elaborating ideas on the concept taught in the learning process. The results of this study are consistent with the findings of previous studies (Johnson & Johnson, 2008; Slavin, 2011). The study revealed evidence that supports the positive impact of cooperative learning on resource management and cognition - metacognition of a group of Vietnamese tertiary students. These results were compatible with the nature of cooperative learning in which students work together to maximize their own learning and others' learning (Slavin, 2011; Tran & Lewis, 2012a, 2012b).

5. Conclusion

The findings show that in nine weeks with cooperative learning methods, a group of Vietnamese students achieved better resource management and cognitive - metacognitive strategies on a post-test than did a similar group who were taught by lecture-based methods. Results show that cooperative learning should be applied to enhance students' effective management of study time and environments; maintain students' effort when dealing with uninteresting tasks; cooperate and seek for support from each other for better learning outcomes. In addition, this learning technique also supports students to restore information into long-term memory by reciting and relating the learned knowledge; and apply the learned knowledge to new situations for solving problems, decisions making, or making critical evaluations. Cooperative learning also promotes students' awareness, knowledge, and control of cognition for optimal learning outcomes.

The findings provide Vietnamese lecturers with more evidence to enhance productive changes for effective teaching methods and better learning outcome. Therefore, cooperative learning is highly recommended as an effective teaching technique in the pedagogical reform in Vietnamese higher education; especially for transforming a more motivating learning environment for students. Although it is argued that the learning approaches of students are significantly influenced by their cultures (Neuman & Bekerman, 2000), this study suggest that students' learning approaches can be influenced by learning context with the benefits obtained via cooperative learning technique (Nguyen et al., 2009).

Although the present findings demonstrate the effectiveness of cooperative learning for students' resource management and cognitive - metacognitive strategies, the sample of this study is limited to only 72 participants. Therefore, future studies are suggested to generate more evidence-based benefits of cooperative learning with bigger participants to enhance the reliability of the research findings. Together with a few research studies investigating the effectiveness of cooperative learning in higher education level, more studies on cooperative learning at different levels of Vietnamese education (primary and secondary) should be conducted to maximize the evidence-based implementation for the technique. It is important to popularize cooperative learning in all levels of education due to its aforementioned benefits for students' learning outcomes, more researches with bigger participants in different education levels will be more persuasive for more educators to implement the technique.

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References

Almala, A. H. (2005). A Constructivist Conceptual Framework for a Quality e-Learning Environment. *Distance Learning, 2*(5), 9-12.

Aronson, E., Blaney, N., Stepan, C., Sikes, J., & Snapp, N. (1978). *The jigsaw classroom.* (2rd ed.). Beverley Hills, CA: Sage.

Azizan, M.T., Mellon, N., Ramli, R.M., & Yusup, S. (2018). Improving teamwork skills and enhancing deep learning via development of board game using cooperative learning method in Reaction Engineering course. *Education for Chemical Engineers, 22,* 1-13. ISSN 1749-7728. https://doi.org/10.1016/j.ece.2017.10.002

Ballantine, J., & Larres, P. M. (2007). Cooperative learning: A pedagogy to improve students' generic skills? *Education and Training, 49*(2), 127-137. https://doi.org/10.1108/00400910710739487

Bandura, A. (1977). *Social Learning Theory*, Englewood Cliffs, NJ: Prentice Hall Regents.

Beck, L., L. & Chizhik, A. W. (2008). An experimental study of cooperative learning in CS1. In *Proceedings of the 39th SIGCSE technical symposium on Computer science education* (pp. 205-209). New York: ACM. https://doi.org/10.1145/1352135.1352208

Bertucci, A., Conte, S., Johnson, D. W., & Johnson, R. T. (2010). The impact of size of cooperative group on achievement, social support, and self-esteem. *The Journal of General Psychology, 137*(3), 256-272. https://doi.org/10.1080/00221309.2010.484448

Brooks, M. G., & Brooks, J. G. (1999). The Courage to be constructivist. *Educational Leadership, 57*(3), 18-24.

Bruner, J. (1966). *Toward a theory of instruction*. Cambridge, MA: Harvard University Press.

Chen, Y. (2018). Perceptions of EFL College Students toward Collaborative Learning. *Canadian Center of Science and Education, 11*(2), 1 – 4. https://doi.org/10.5539/elt.v11n2p1

Cohen, E. G. (1994). Restructuring the classroom: Conditions for productive small groups. *Review of Educational Research, 64*, 1–35. https://doi.org/10.3102/00346543064001001

Deutsch, M. (1949). A theory of cooperation and competition. *Human Relations, 2*, 129-152. https://doi.org/10.1177/001872674900200204

Dewey, J. (1991). Exeprience and education. In A. Boydston (Ed.), *Johnson Dewey: The later works, 1938-1939* (pp. 1-62). Carbondale, II: Siu Press.

Doymus, K., Karacop, A. & Simsek, U. (2010). Effects of jigsaw and animation techniques on students' understanding of concepts and subjects in electrochemistry. *Education Tech Research Dev, 58*, 671-691. https://doi.org/10.1007/s11423-010-9157-2

Driscoll, M. P. (2000). *Psychology of learning for instruction.* (2nd ed.). Boston: Allyan & Bacon.

Gillies, R. M. (2003). Structuring cooperative group work in classrooms. *International Journal of Educational Research, 39*, 35–49. https://doi.org/10.1016/S0883-0355(03)00072-7

Gillies, R. M. (2006). Teachers' and students' verbal behaviors during cooperative and small-group learning. *British Journal of Educational Psychology, 76*(2), 271-287. https://doi.org/10.1348/000709905X52337

Hariharasudan, A. & Sebastian, K. (2018). A Scoping Review on Digital English and Education 4.0 for Industry 4.0. *Industry 4.0 Implication for Economy and Society, 7*(11), 227. https://doi.org/10.3390/socsci7110227

Harman, G., & Nguyen, T. N. (2010). Reforming teaching and learning in Vietnam's higher education system. In G. Haaland, M. Hayden & T. Nghi (Eds.), *Reforming Higher Education in Vietnam: Challenges and Priorities* (pp. 65-86). London: Springer. https://doi.org/10.1007/978-90-481-3694-0_5

Johnson, D. W, & Johnson, R. (2005). New Developments in Social Interdependence Theory. *Genetic, Social, & General Psychology Monographs, 131*(4), 285-358. https://doi.org/10.3200/MONO.131.4.285-358

Johnson, D. W. (2009). *Reaching out: Interpersonal effectiveness and self-actualization,* Boston: Allyn & Bacon.

Johnson, D. W., & Johnson, R. T. (2008). Social Interdependence Theory and Cooperative Learning: The Teacher's Role. In R. M. Gillies, A. Ashman & J. Terwel (Eds.), *Teacher's Role in Implementing Cooperative Learning in the Classroom* (pp. 9-37). New York, U.S.A: Springer. https://doi.org/10.1007/978-0-387-70892-8_1

Johnson, D. W., & Johnson, R. T. (2009). An Educational Psychology Success Story: Social Interdependence Theory and Cooperative Learning. *Educational Researcher, 38*(5), 365-379. https://doi.org/10.3102/0013189X09339057

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1998). Cooperative learning returns to college: What evidence is there that it works? *Change: The Magazine of Higher Learning, 30*, 26–35. https://doi.org/10.1080/00091383.1994.9940643

Kagan, S., & Kagan, M. (2009). *Kagan Cooperative Learning* (1st ed.). San Clemente, CA: Kagan Publishing.

Kilic, D. (2008). The Effects of the Jigsaw Technique on Learning the Concepts of the Principles and Methods of Teaching. *World Applied Sciences Journal, 4*(1), 109-114.

Killen, R. (2007). *Effective Teaching Strategies: Lessons from Research and Practice* (4th ed.). Melbourne: Thompson Social Sciences Press.

Knight, P. G., & Bohlmeyer, M. E. (1990). Cooperative Learning and Achievemnt: Methods for Assessing Causal Mechanisms. In S. Sharan (Ed.), *Cooperative Learning: Theory and Practice* (pp. 1-22). New York: Greenwood Press, Inc.

Kose, S., Sahin, A., Ergun, A., & Gezer, K. (2010). The effects of cooperative learning experience on eighth grade students' achievement and attitude toward science. *Education, 131*(1), 169-180.

Marlow, B. A., & Page, M. L. (2005). *Creating and sustaining the constructivist classroom.* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Maurice, G., Lai, K. C., & Chan, K. W. (2018). Implementing small class teaching in East Asia: Problems and possibilities. *International Journal of Educational Research*, ISSN 0883-0355. doi.org/10.1016/j.ijer.2018.10.004

Ministry of Education and Training of Vietnam [MOET] (2009). *Development Strategy from 2009 to year 2020 for the Cause of Industrialization and Modernization of Vietnam*. Hanoi: Vietnamese Government.

Moore, K. D. (2008). *Effective instructional strategies: From theory to practice*. Thousand Oaks, CA: Sage Publications.

Nguyen, P. M., Terlouw, C., Pilot, A., & Elliott, J. G. (2009). Cooperative learning that features a culturally appropriate pedagogy. *British Educational Research Journal, 35*(1), 857-875. https://doi.org/10.1080/01411920802688762

Piaget, J. (1926). *The language and thought of the child,* New York: Harcourt Brace.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie. (1991). A manual for the use of the motivated strategies for learning questionnaire. National Center for Research to improve Postsecondary Teaching and Learning, Ann Arbor, MI. https://doi.org/10.1037/t09161-000

Schreiber, L. M., & Valle, B. E. (2013). Social constructivist teaching strategies in the small group classroom. *Small Group Research, 44*, 395–411. https://doi.org/10.1177/1046496413488422

Skinner, B. (1968). *The technology of teaching*. New York: Appleton-Century-Crofts.

Slavin, R. E. (2011). Instruction Based on Cooperative Learning. In R. E. Mayer & P. A. Alexander (Eds.), *Handbook of Research on Learning and Instruction* (pp. 344-360). New York: Taylor & Francis.

Slavin, R. E. (2011). Instruction Based on Cooperative Learning. In R. E. Mayer & P. A. Alexander (Eds.), *Handbook of Research on Learning and Instruction* (pp. 344-360). New York: Taylor & Francis.

Sousa, D. A. (2006). *How the brain learns* (3rd ed.). Heatherton, Vic: Hawker Brownlow Education.

Thanh-Pham, T. (2010a). Group Composition of Cooperative Learning: Does Heterogeneous Grouping Work in Asian Classrooms? *International Education Studies, 3*(3), 12-19. https://doi.org/10.5539/ies.v3n3p12

Thanh-Pham, T. (2010b). Implementing a Student-Centered Learning Approach at Vietnamese Higher Education Institutions: Barriers under Layers of Casual Layered Analysis (CLA). *Journal of Futures Studies, 15*(1), 21-38

Thanh-Pham, T. (2011). An Investigation of Perceptions of Vietnamese Teachers and Students toward Cooperative Learning. *International Education Studies, 4*(1), 3-12. https://doi.org/10.5539/ies.v4n1p3

Thomas, E. J. (1957). Effects of facilitate role interdependence on group functioning. *Human Relations, 10*, 347-366. https://doi.org/10.1177/001872675701000404

Tran, V. D., & Lewis, R. (2012a). Effects of Cooperative Learning on Students at An Giang University in Vietnam. *International Education Studies, 5*(1), 86-99. https://doi.org/10.5539/ies.v5n1p86

Tran, V. D., & Lewis, R. (2012b). The effects of Jigsaw Learning on Students' Attitudes in a Vietnamese Higher Education Classroom. *International Journal of Higher Education, 1*(2), 1-13. https://doi.org/10.5430/ijhe.v1n2p9

Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes*. Cambrigde: Harward University Press.

Webb, N. M. (2008). Learning in small groups. In T. L. Good (Ed.), *21st Century education: A reference handbook* (pp. 203-211). Los Angeles: Sage. https://doi.org/10.4135/9781412964012.n22

Yager, R. E. (2000). The Constructivist Learning Model. *The Science Teacher, 67*(1), 44-45.

Yamarik, S. (2007). Does cooperative learning improve student learning outcomes? (Research in Economic Education)(Report). *The Journal of Economic Education, 38*(3), 259-277. https://doi.org/10.3200/JECE.38.3.259-277

Zain, Z. M., Subramaniam, G., Rashid, A. A., & Ghani, E. K. (2009). Teaching Students' Performance and Attitude. *Canadian Social Science, 5*(6), 92-102.