

Team based learning as a teaching strategy and pediatric nursing student's achievement, attitude and satisfaction

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Abstract: Background: Team based learning (TBL) as a structured type of cooperative learning (CL) promotes higher achievement than other structures across all age levels, subject areas and almost all task. **The aim of study:** This study aimed to evaluate the effect of team based learning as a teaching strategy on pediatric nursing student's achievement, attitude and satisfaction. **Research design:** A quasi experimental design was done where a systematic random sample was used to select 60 students (30 students were represented control group and 30 students were represented studying group) from third year pediatric course at academic year 2016-2017. Study was conducted at faculty of Nursing, Fayoum University. **Tools of the study:** Three tools were used in this study including: an achievement questionnaire sheet, student's satisfaction with learning methods sheet, and attitude Likert rating scale (assess attitude of study group towards team based learning. **Results:** Around three quartets (73.3%) of students undergoing team based learning achieved moderate level of achievement compared with (60%) of students undergoing lecture based learning (post - test). There were highly statistical significant differences between control group regarding satisfaction with lecture based method with mean score 10.40 ± 2.51 compared with mean score (12.87 ± 3.26) of studying group who had taught by team based learning. It was observed that all students (100%) who had taught by TBL strongly agree that cooperative learning is fun also, 70 % of them strongly agree that using cooperative learning promotes friendship among students. **Conclusion:** There were positive effects of team based learning as a teaching strategy on nursing student's achievement, attitude and satisfaction. **The study recommendations:** Team based learning or cooperative learning could be a new approach introduced in the nursing education in order to enhance the academic performance.

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Introduction:

Team based learning which considered as a structured type of cooperative learning is a specific instructional strategy and framework that uses intentionally formed teams of learners to deepen students learning and develop high performing teams (Michaelsen and McMahon, 2008). Collaboration is the philosophy of interaction and personal lifestyles where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers. Cooperative learning means a small dedicated group of students learning together, taking advantages of each other's experiences to achieve a common goal (Ruiz-Gallardo et al., 2012).

Traditional teaching approach (for example, a lecture) is a passive learning approach where students have not enough opportunities to work together and take little responsibility for their own learning outcomes. In cooperative learning, students participate actively in the process of learning through interaction and cooperation with each other compared with traditional education. Students have gained in cooperative learning better educational benefits such as critical thinking and group skills that are necessary

needed by today's society. Cooperative learning is a pedagogical approach that is identical with the reform of the current school curricula in nursing education incidence (Breen, 2015 & Scheckel, 2017).

There are many main principles for team based learning experience to be structured cooperatively including face to face promote interaction, in which the teacher work to maximize the opportunity for students to promote each other's success by helping assisting, supporting, encouraging and praising each other's efforts to learn. Another method include individual accountability & personal responsibility, teacher ensures that every member is responsible for learning the material and for the final outcome by assessing how much effort each member is contributing to the group's work. In interpersonal and small group skills method, student must be taught the social skills for high-quality collaboration and be motivated to use them. Some teachers follow positive interdependence and group discussion, "all for one and one for all" sink or swim together". These statements point that the students learn the assigned material and ensure that all members of their group learn the assigned material. The final one, refers to group processing, that's when group members discuss how

well they are achieving their goal and maintaining effective working relationship (**Farrelland Farrell, 2008**).

There are many quite different forms of cooperative learning that can be used by the teacher under umbrella of cooperative learning process; all of them involve students to work in small groups or teams to help one another learn the academic material. The principal students' team learning methods have been extensively developed and researched including; Student Teams Achievement Division (STAD), Jigsaw II and Teams Games Tournaments (TGT) (**Slavin, 2010**).

There were previous studies conducted on team based learning and concluded that TBL promote higher achievement than other methods. On the other hand, there are other studies clarified that TBL enhance students attitude, satisfaction and other social skill compared with other traditional methods (**Akinbobola, 2009 & Hashmi, 2014**). Therefore, this study had conducted to promote TBL as a trial to relieving internal stressors among students which hinder an academic achievement.

Significance of the study:

Team based learning is the most important method of the previous ways of structured learning situations, yet it is the least used. The research indicates that it should be used whenever teachers wants students to learn more, like school better, like each other better, have higher self-esteem, and learn more effective social skills. Additionally, it promote more positive attitudes towards the instructional experience and more continuing motivation to learn more about the subject area being studied, they like the teacher better and perceive the teacher as being more supportive (**Johnson and Johnson, 2008**).

Cooperative learning promotes the higher achievement than other structures across all age levels, subject areas and almost all tasks. Some theorists believe that it provides students with greater opportunities to a) interact with each other, b) negotiate meaning, c) work on a variety of subjects that are of interest to them, and d) participate in real world communicative activities more frequently than in traditional teacher- fronted classrooms (**Slavin, 2011**).

Aim of the study:

This study aimed to evaluate the effect of team based learning as a teaching strategy on pediatric nursing student's achievement, attitude and satisfaction.

Research Hypothesis:

The study results were testing the following hypothesis:

- Achievement of pediatric nursing students group with team based learning will be better than lecture based learning group.
- Satisfaction of pediatric nursing students group with team based learning will be more than lecture based learning group.
- Study group of pediatric nursing students will achieve positive attitude with team based learning.

Subjects and Methods:

Research design:

A quasi - experimental research design was used in this study.

Setting:

The study was conducted in faculty of nursing at Fayoum University.

Subjects:

Systematic random sample has been considered as simple form of random sampling technique. The total number of students were 130 students enrolled in third year during study of pediatric nursing course, 60 student were selected randomly to form (30) students in study group (team based learning) and (30) students in control group (lecture based learning).

To ensure the randomization the odd numbers were received the routine teaching strategy; while the double numbers were received the team based learning strategy during the paediatric nursing course.

Tools of data collection: Data were collected through the following tools;

1) Achievement questionnaire sheet: which included the following items:

- *Personal characteristics:* As age, gender, and place of residence.

- *Questionnaire sheet:* It was developed and utilized by the researcher based on an extensive literature review to assess students' level of knowledge regarding lecture at pediatric course about blood disorder pre & posttest. It included multiple choice, essay and matching questions.

Scoring system for this part: Each correct answer scored 1 mark, each wrong one scored zero and graded into: high level of achievement $\geq 80\%$, moderate level of achievement $75 < 80$, low level of achievement $60 < 75$.

2) Student's satisfaction with learning methods scale: The scale developed by **Mahmoud, 2015** to assess student's satisfaction towards instruction methodology. It contain 7 items; develop effective study skill, develop effective learning strategy, contribute to use time efficiently, develop independency of learning, develop ability of knowledge equation, contribute to achieve students intended learning outcomes, increased ability of understanding of the content. The scale graded into five categories including strongly disagree (1),

disagree (2), some extent (3), agree (4), and strongly agree (5).

Scoring system for this part: Students who achieve $\geq 65\%$ considered as satisfied with learning method meanwhile other students who achieve $< 65\%$ considered as unsatisfied with learning method.

3) Attitude Likert rating scale: It was adopted from **Mahmoud (2017)**, to assess student's attitude towards learning methods (team based learning).

Scoring system for this part: Total score of the scale was 150 and graded into strongly disagree (1), disagree (2), some extent (3), agree (4), and strongly agree (5). For unfavorable attitude on the scale weight were reversed.

4) Team based learning strategy:

The researcher used the Student's Teams Achievement Divisions (STAD) as one of the cooperative or team based learning methods. Such method incorporates the 5 main principles of cooperative team based learning.

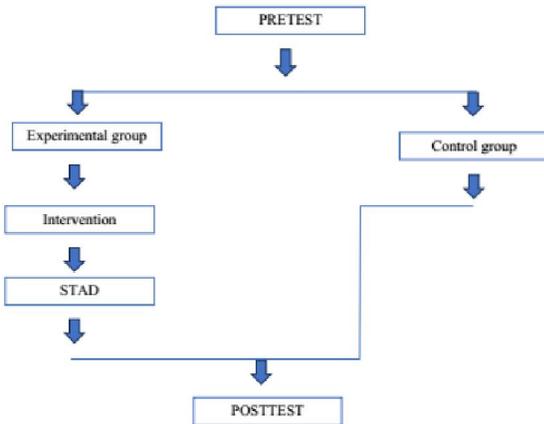


Fig 1: Control and Experimental groups design

1- The teacher explained what is cooperative or team based learning and its five main principles to the students (experimental group).

2- The teacher divided the 30 students in the experimental group into 5 groups, each group consisted of 6 students. Dividing the students depended on their academic level, the researcher made uses of the scores of questionnaire sheet of pretest as bases score (Fig 1).

3- The groups were of mixed academic ability then, they were assigned roles, each group has:

a) A recorder: who writes down how the group members figured out the answer to a certain problem and then reports the answer.

b) Checker: checks to make sure all group members understand the problem or task.

c) Facilitator: organizes the groups' work, makes sure students understand the group's job and take the groups questions and concerns to teacher.

d) Leader: keeps the group on task and keeps time.

Students sit in rounded shapes facing each other thus achieving the first principle of team based learning (face to face promotive interaction).

4- Students were encouraged to help, assist, support, and praise each other to learn. These included oral explaining, discussing, teaching others and pushing thus achieving the second principle of team based learning (positive interdependence).

5- Teacher determined the third main principle of team based learning "individual accountability" by having individual students take a test which covers the material assigned to the group then the groups score is determined by adding individual scores together then taking the average of all scores.

6- The fourth main principle (interpersonal and small groups skills) was achieved by explaining certain social skills to the students that must be available during their work in groups: checking understanding, sharing ideas, helping and encouraging using names.

7- The fifth main principle (group processing) was applied at the end of every teaching session (half an hour) either orally or in a written form. The teacher discusses with the students how well they are achieving their effective working relationships.

Pre-testing validity:

A jury of three staff members related to pediatric nursing specialty from faculty of nursing examined the tools and approved their face validity and suitability to the level of subjects and to the set objectives.

Reliability:

A pilot testing was performed on 10% (6 students) of the sample at the beginning of the academic year 2016-2017, students included in pilot study were excluded from the main study sample. The test -retest method with two weeks interval was used to calculate reliability coefficient. The reliability coefficient of the tool (achievement questionnaire sheet) was (0.72).

Ethical considerations:

Each subject of the study was ensured that the study was not harmful either physical or psychological and treated all data collected secretly, and was used for research purposes only. The researcher took verbal approval from each student before participating in the study.

Field work:

-An official agreement was obtained from the Dean of the Faculty of Nursing, at Fayoum University to collect the necessary data at first academic term 2016-2017. The study lasted for three months from October 2016 till January 2017.

- An orientation guide was developed by the researcher and distributed to the students one week

before beginning the course to prepare the students for using cooperative learning approach.

- Pretest achievement questionnaire sheet about the blood disorder knowledge was distributed for study and control groups.

- The five constructed papers prepared by the researcher were distributed to the study group (critical thinking situation about blood disorders derived from real hospitals).

- The students confirmed that their participation was completely voluntary and informed their rights as research owners. Oral consent was obtained from all students.

- On completion of the course, a post-test were applied on achievement level, students satisfaction with learning methods for all students, but attitude Likert rating scale applied on study groups.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 19.0. Data summarized using mean and standard deviation for numerical variables. Also paired t test was used to test the difference between pre and post scores of both: achievement questionnaire sheet and students' satisfaction with learning methods. The level of significance selected for this study was $p < 0.05$ level while, highly Significant was $p < 0.001$.

Results:

Table (1), reveals that the mean age of students in both control and study group was 21 ± 0.64 & 21.77 ± 0.69 , respectively. Also, the results showed that 66.7% & 60 % of students in control and study group respectively were females while 66.7% of them lived in urban areas.

Table 1: Frequency distributions of students' characteristics were in the study and control group.

Personal Characteristics	Control group (n=30)		Study group (n=30)	
	No.	%	No.	%
Age: Mean +SD	21±0.64		21.77±0.69	
Gender: Male Female	10 20	33.3 66.7	12 18	40 60
Place of Residence: Urban Rural	20 10	66.7 33.3	20 10	66.7 33.3

In table (2) the data indicate that around three quartets (73.3%) of study group (student undergoing TBL) achieved a moderate level of achievement compared with more than half (60%) of control group (student undergoing lecture based learning) (post test).

Table (3) reveals that there was a statistically significant difference between study group undergoing

TBL and control group in pre and posttest achievement mean score.

Figure (1), clarified that 60% of study group had a satisfactory level towards team based learning compared with 20 % of control group who had a satisfactory level towards traditional methods (lecture based method).

Table 2: The difference between the pretest and post test student's (control and study group) achievement level.

Achievement level	Control group (n=30) Lecture based learning				Study group (n=30) Team based learning			
	pre		Post		Pre		Post	
	No.	%	No.	%	No.	%	No.	%
High	0	0	2	6.6	0	0	6	20
Moderate	11	36.6	18	60	11	36.7	22	73.3
Low	22	63.4	10	33.4	19	63.3	2	6.7
Test	$\chi^2 = 0.067$ $p = .795$				$\chi^2 = 26.400$ $P = .000^*$			

* Highly Significant <0.001

Table 3: Comparison of mean score of students' achievement pre and post test score.

Variables	Pre test score		Post test score		Significance test	
	Mean	SD	Mean	SD	F value	P value
Study group	15	3.3	17.8	5.5	6.45	0.002*
Control group	13	2.7	15.5	3.3		

*Significant < 0.05

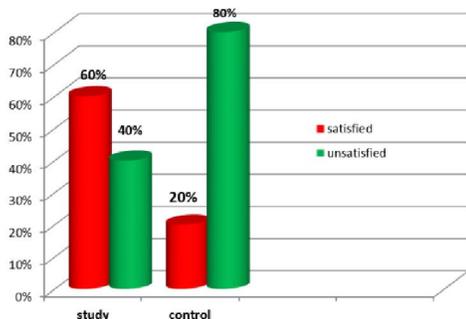


Figure 1: Distribution of student's satisfaction regarding learning methods (posttest) for both groups.

Data showed in table (4) that there was a highly statistical significant difference between control group who had taught by lecture based method with mean score 10.40 ± 2.51 compared with mean score

(12.87 ± 3.26) in study group who had taught by team based learning.

Table 4: Difference in students' satisfaction regarding learning methods (post test)

Students' satisfaction	Mean \pm SD	T test	P-value
Control group	10.40 \pm 2.51	65.32	0.000*
Study group	12.87 \pm 3.26		

*Highly significant <0.001

Table (5) shows study group's agreements towards team based learning (cooperative learning). It was observed that all of them (100%) strongly agree that cooperative learning are fun while, 70 % of them strongly agree that using cooperative learning promotes friendship among students.

Table 5: Study group attitude (agreement responses) towards team based learning (cooperative learning) n=30.

Variables	Response			
	Strongly agree		Agree	
	No	%	No	%
I enjoy cooperative learning activities	15	50	15	50
I learn better in a team	17	56.7	13	43.3
I think cooperative learning activities are an effective approach to learning.	18	60	12	40
Cooperative learning are fun	30	100	0	0
I think cooperative learning helped me improve my grade	19	63.3	11	36.7
I think cooperative learning I have a positive attitude towards team based activities.	17	56.7	13	43.3
I have a good experience with cooperative learning.	16	53.3	14	46.7
This type of learning increased understanding of the course content	15	50	15	50
We communicated effectively while completing our group work.	17	56.7	13	43.3
Using cooperative learning promotes friendship among students.	21	70	9	30
Cooperative learning enhances the learning of low ability students.	14	46.7	16	53.3
I felt responsible to my group	21	70	9	30
The groups were structured so that multiple points of view were represented	15	30	15	30
Engaging in cooperative learning enhances student's social skills.	16	53.3	14	46.7
I felt responsible to my group	16	53.3	14	46.7

Discussion:

Team Based Learning (TBL) or Cooperative Learning (CL) is a form of an active learning in which small groups of students work together on the issue. Also, TBL is an active learning and small group of an educational strategy that provides students with opportunities to apply theoretical knowledge through a series of activities that include individual work, teamwork, and immediate feedback. On the other hand, traditional teaching methodologies lecture the basis of the transfer of information negatively from teacher to student, does not require the active participation of students to think about the concepts being "delivered", thus reducing teachers in the

development of students critical thinking skill (Pamele et al., 2012 & Marttyn et al., 2014).

The current study was conducted to evaluate the effect of team based learning as a teaching strategy on pediatric nursing students' achievement, satisfaction and attitude. As regards characteristics of studied sample, this study clarified that the mean age of students in both control and study group were homogenous it may be due to similar stage of age in the university studying.

The heightened level of the quality and academic achievement is one of the main goals of education. Teachers can play an important and effective role in the academic achievement of students by selecting the

proper methods (**Hoseini, 2008**). On the other hand, (**Slavin, 2004**) mentioned that cooperative learning only improves the students' achievement when their teacher places them in small groups and states a clear goal for them, and this improvement is achieved when all group members master the educational content. In other words, if there is a possibility that one or more members of a group finds an answer and shares it with others, or performs the intellectual part of the group assignment while others only observe, then in this case, collaborative learning is not achieved.

The results of the current study revealed that students undergoing TBL achieved a moderate level of achievement on a lesson of blood disorders in the pediatric course compared to students undergoing lecture-based learning (post-test). This result was in accordance with (**Hashmi, 2014**), who reported in his study about team based learning in undergraduate medical education that students who had taught by TBL had achieved higher score of knowledge regarding diabetes mellitus compared with student who taught by traditional lecture. Similarly, (**Peresky et al., 2011**) who found in their study about modified team based learning physiology course that students who had taught by modified TBL achieved higher score in physiology examination rather than those who had taught by traditional lecture.

The result of current study attempted to find and supported the research hypothesis. As regards first hypothesis, the research finding indicated that there was a statistically significant difference between pre and post test regarding the mean score of achievement. The result was consistent with (**Gull and Shehzad, 2015**) who stated in their study about cooperative learning that there was a statistically significant difference in achievement score pre and posttest. This result was agreed with (**Jafari, 2014**) who reported in his study about a comparison of conventional lecture and team based learning methods in term of students learning and teaching satisfaction that there was a significant difference between team based learning and lecture based learning towards achievement score.

Our findings clarified that students undergoing TBL had satisfactory feeling more than students undergoing lecture based learning. This result was in the line with (**Fowler et al, 2016**) and (**Branney et al., 2018**) who reported in their studies that students who had taught by team based learning had achieved high level of satisfaction rather than who had taught by traditional lecture. It may be due to that cooperation encourage students to think critically and promote abilities to make a decision, these skills enhance the satisfaction among those students.

The results of the current study provide an additional support that there was a statistical significance difference between pretest and post test

mean score of students' satisfaction (favoring study group). This result was in accordance with (**Clark et al., 2008 & Mennenga, 2010**) who found in their study that there was a statistical significant difference between study group who taught by team based learning and control group who had taught by lecture as regards satisfaction mean score.

Cooperative learning is not only to promote student achievement but also to instill self-development as a comprehensive person. Each student contributes his / her effort in small groups to enhance the performance of all students. In this process, students produced an interaction to engage many activities, such as communication, monitoring, and supporting. In addition, students have changed their learning behaviors, stimulated their cognitive activity, and improved relationships between students (**Othman et al., 2012**).

As regards students'(study group) attitude (agreements response) towards TBL, the result of current study stated that all of student who had taught by TBL reported that they feel that cooperative learning are fun, this result was similar to (**Mahmoud, 2017**) who reported that the majority of student undergoing cooperative learning stated that atmosphere of learning environment should be fun. On the other hand, findings of the present study revealed that the majority of students undergoing TBL strongly agree that using cooperative learning promotes friendship among students. This result was in accordance with (**Laguado, 2014**) who reported that cooperative learning offers a pleasant learning situation for all students, all students have an equal opportunity, competition is amended as friendship, the spirit of cooperation and participation is reinforced, and all students are entitled to be thoughtful and creative.

According to (**Gillies, 2004**), who had examined the effects of cooperative learning on students' social skills and their behavior, found that there were improvements in students' behavior and their interpersonal relationships. Additionally, (**Akinbobola, 2009**), mentioned that students showed more positive attitude toward learning using cooperative learning compared to competitive and individualistic learning strategies.

Conclusions and recommendations:

There was a positive effect of using team based learning as a teaching strategy on nursing students enrolled in pediatric nursing course especially in area of academic achievement and non academic gain as satisfaction and attitude. In the light of previous findings the following recommendations are suggested:

1. Cooperative learning should be introduced as a new and interactive approach to nursing education in order to enhance professional skills.

2. Further research is needed to examine the effectiveness of collaborative learning with different levels of achievement.

3. Encourage other different models of group-based learning strategies.

4. Repeat this study on a larger sample with different groups of students should be tried.

References

- Akinbobola, A. (2009): Enhancing students' attitude towards Nigerian senior secondary school physics through the use of cooperative, competitive and individualistic learning strategies. *Australian Journal of Teacher Education*, 34(1):1-9.
- Branney, J. and Priego- Hernandez, J. (2018): A mixed methods evaluation of team based learning for applied pathophysiology in undergraduate nursing education. *Nurse education today*, Vol. 161, PP.127-133.
- Breen, H. (2015): Virtual collaboration in the online educational setting: A concept analysis. *Nursing Forum*, 48(4), 262-270.
- Clark, M., Nouyen, H., Bray, C. and Levine, R. (2008): Team based learning in an undergraduate nursing course. *Journal of Nursing Education*, 47(3): 111-7.
- Farrell, B. and Farrell, H. (2008): Student satisfaction with cooperative learning in an- accounting curriculum. *Journal of University Teaching & Learning Practice*, Vol. 5, Issue.2.
- Fowler, D., Bass, L. and Branson, S. (2016): Team based learning: Application in integrated baccalaureate, *Journal of nursing education*, 6(4):50-46.
- Gillies, R. (2004): The effect of cooperative learning on junior high school students during small group learning. *Learning and Instruction*, Vol. 114, PP. 197-213.
- Gul, F. and Shehzad S. (2015): Effects of cooperative learning on students' academic achievement. *Journal of Education and Learning*, 9(3):246-255.
- Hashmi, N. (2014): Team based learning in undergraduate medical education. *Journal of the College of Physician and Surgeons*, 24(8): 553-556.
- Hoseini, A. (2008): Evaluating the effect of teachers' creativity educational program on academic achievement and self-esteem of students. *Educational Innovations*, 6(23):147-168.
- Jafari, Z. (2014): A comparison of conventional lecture and team based learning methods in terms of student learning and teaching satisfaction. *Medical Journal of the Islamic Republic of Iran*, 28(5):28-33.
- Johnson, D. and Johnson, R. (2008): Social interdependence theory and cooperative learning: The teacher's role. In Gillies, R., Ashman, A. and Terwel, j. (2008): *Teacher's role in implementing cooperative learning in the classroom*. New York, U.S.A: Springer.PP. 9-37.
- Laguado, J. (2014): Cooperative learning approach in an outcomes based environment. *International journal of Social Sciences, Arts and Humanities*, 2(2):46-55.
- Mahmoud, N. (2015): The effect of self learning package versus lecture method on students' intended learning outcomes. *World Journal of Nursing Science*, 1(3):88-99.
- Mahmoud, H. (2017): The effect of cooperative learning strategy on undergraduate nursing students enrolled in nursing administration course. *International Journal of Learning and Development*, 7(1):23-40.
- Marttyn, J., Terwijn, R. and Huijser, H. (2014): Exploring the relationships between teaching, approaches to learning and critical thinking in a problem- based learning foundation nursing course, *Nurse Education Today*, 43(5):829-835.
- Mennga, H. (2010): Team based learning engagement and accountability with psychometric analysis of a new instrument, *Doctorate Degree*, University of Nevada, Division of Health Science, P.70.
- Michaelsen, L. and McMahon, L. (2008): *Team Based learning for health professions education. A guide to using small groups for improving learning*. Syllus Publishing LLC, Sterling, VA, PP. 151-160.
- Othman, H., Asshaari, I., Bahaludin, H. Tawil, N. and Ismail, N. (2012): Students' perceptions on benefits gained from cooperative learning experiences in engineering mathematics courses. *Social and Behavioral Sciences*, 60: 500 – 506.
- Parmelee, D. Michaelsen, L., Cook, S. and Hudes, P. (2012): Team - based learning: a practical guide: AMEE guide no. 65. *Med. Teach.*, 34: e275-e287.
- Peresky, A. and Pollack, G. (2014): Modified team based learning physiology course. *American journal of pharmaceutical education*, volume 7, Issu.10, Article 204.
- Ruiz-Gallardo, J. López-Cirugeda, I. and Moreno-Rubio, C. (2012): Influence of cooperative learning on students self-perception on leadership skills: A case study in science education. *Higher Education Studies*, 2 (4): 40-48.
- Scheckel, M. (2017): Nursing education: Past, present, future. *Journal of health specialties*, Volume: 2 Issue: 4 PP: 136-141.
- Slavin, R. (2004): Translating research into widespread practice: The case of success for all-ERIC. https://ies.ed.gov/ncee/wwc/Docs/.../wwc_sfa_081109.pdf
- Slavin, R. (2010): Co-operative learning: what makes group- work? In Dumont, H. Instance, D. and Benavides, F. (2010): *The nature of learning: using research to inspire practice*. OECD publishing.
- Slavin, R. (2011): Instruction based on cooperative learning. In Mayer, R. and Alexander, P. *Handbook of research on learning and instruction*. New York, Taylor & Francis. PP. 344-360.

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