



THINK, PAIR AND SHARE METHOD AS AN EFFECTIVE COOPERATIVE LEARNING METHOD TO UNDERSTAND BIOCHEMISTRY CONCEPTS FOR FIRST YEAR PHYSIOTHERAPY STUDENTS

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ABSTRACT "Think-Pair-Share" (TPS) is an effective teaching strategy to enhance the thinking capabilities and improve cooperative learning in the students. TPS activity formulates ideas, improves analytical skills and logical thinking, eliminates the inhibitions and aids for better understanding of the concepts of Biochemistry. It also creates a positive environment where students are motivated to get involved in the discussion thus more effective for shy students. The main aim of the study is to develop cooperative learning by using of "Think-Pair-Share" technique among the 1st year Physiotherapy students for learning concepts of biochemistry. And also to determine the effectiveness of "Think-Pair-Share" technique by post assessment of their knowledge of biochemistry. The method was implemented in three successive sessions and the results were recorded. A total of 50 physiotherapy students were recruited and their pre-knowledge on the concepts of biochemistry was assessed. The students were trained by using "Think-Pair-Share" technique and their post knowledge was assessed. In our study most of the students got less than 40% marks and none of the students got 100% in pre-tests of all the three sessions, at the same time there was no single student with less than 40% marks and most of the students got 100% (5/5) marks in the post tests of all the three sessions. The difference in pre and post test results was statistically significant. And the students expressed that the method was more interesting, effective and has made learning biochemistry concepts easy.

KEYWORDS : Think-Pair-Share, Effective learning, Physiotherapy students

INTRODUCTION :

"Think-Pair-Share" is an effective teaching strategy to enhance the thinking capabilities and improve cooperative learning in the students. It was first suggested by Frank Lyman of the University of Maryland in 1981. (1) It assists students to outline their individual ideas, interact with pairs and share them with their peers in-group. It improves understanding of the topics before teaching a concept especially when used in smaller groups. Classroom engagement plays an important role in the learning process. It was observed in some studies that students with higher levels of engagement inside and outside the classroom will learn more than students with lower levels of engagement (2,3,4). In-class learning is very effective as it is more observable by the instructor so more helpful in assessing the learning of the students, more interactive, aids better monitoring. Some studies done with university and college students have shown that in-class participation accelerates learning motivation among the students (7,8) (Frisby & Myers, 2008; Frymier & Houser, 2016), added critical thinking (9) (Garside, 1996;), enhanced their language skills (10) (Dancer), and improved their course grades (11) (Handelsman et al., 2005).

AIMS & OBJECTIVES:

- To assess the existing level of knowledge related to biochemistry concepts.
- To implement think-pair-share technique as a cooperative learning technique among 1st year Physiotherapy students
- To determine the effectiveness of Jigsaw technique by post assessment of their knowledge of biochemistry concepts.

MATERIALS & METHODS:

The present study was done among 1st year Physiotherapy students of academic year 2020-21 at Department of Biochemistry, Apollo College of Physiotherapy, Hyderabad, India.

Research design:

The research design used was cross-sectional study. Out of 50 students joined in the 1st year Physiotherapy students, 30, 35 and 40 students were present on day 1, day 2 and day 3 of the study. Assessment of knowledge on biochemistry concepts was done by pre & post test using a questionnaire. The students were given liberty to participate in the study voluntarily.

INCLUSION CRITERIA:

First year Physiotherapy students, both male and female, between the age group of 18-21 years.

EXCLUSION CRITERIA:

- First year Physiotherapy Students who were not present on that day
- 2nd, 3rd, 4th year Physiotherapy students.

We have selected some concepts of Lipid metabolism to educate the

first year Physiotherapy students by using think-pair-share strategy. Pre and post test and an open-ended survey questionnaire designed by researcher were used for data collection (table 1.) The pre-test questionnaire was given to the students before introducing the method to assess the students' prior knowledge. And the post-test questionnaire was given to the students after application of the method to evaluate improvement in their knowledge. Both the pre-test and post-test contained short-answer questions. Two open-ended questions were included in the questionnaire survey to determine the students' views towards the think, pair and share strategy.



On the day of Think, pair & share session the students' pre-knowledge on Lipid metabolism concepts were evaluated by pre-test which includes 5 questions (Pre-test). And then the activity is done in 3 stages:

- 1. Think:** The students were given 5 minutes time to THINK about the question and find the answer.
- 2. Pair:** students were asked to PAIR up with the student sitting next to him and allowed to discuss about the answer he thought for 10 minutes. During this time they can discuss, compare their answers and thoughts and can come to a conclusion which is more convincing to both of them.
- 3. Share:** then individual pairs were asked to SHARE their thoughts with the entire class.

Think, pair & share activity eliminates the inhibitions and formulates ideas in the students as the students are discussing the answers with their pairs before sharing with all the students so more useful to involve the shy students. The teacher acts as a facilitator and will ensure contribution of all the students creating a positive atmosphere. After completion of the discussion the students' knowledge was again assessed by a post-test.

Statistical analysis : The mean and standard deviation of the pre and post test scores were calculated. The statistical significance between the pre and post-test means was calculated by Paired t-tests. P value less than or equal to 0.05 was considered statistically significant.

Results:

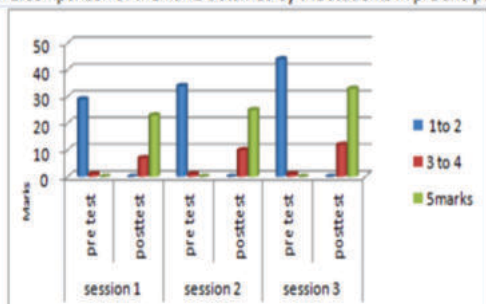
Out of 50 students, 30 were present session-1 (response rate 60%), 35

were present for session-2 (response rate 70%) and 40 were present for session-3 (response rate 80%). The marks obtained by number of students were shown in table 1 and Graph 1. In session-1 pre-test, 96.7% (29/30) students obtained 1 to 2 marks, 3.3% (1/30) students obtained 3 to 4 marks, none of the students obtained 5 marks. Where as in post test 23.3% (7/30) students scored 3 to 4 marks and 76.7% (23/30) students scored 5 /5. Similarly In session-2 pre-test, 97.1% (34/35) students scored 1 to 2 marks, 2.9% (1/35) students obtained 3 to 4 marks, none of the students scored 5 marks. While in post test 28.6% (10/35) students scored 3 to 4 marks and 71.4% (25/35) students scored 5 /5 marks . In the same way in session-3 pre-test, 97.8% (4/45) students obtained 1 to 2 marks, 2.2% (1/45) student obtained 3 to 4 marks, none of the students obtained 5 marks. while in post test 26.7% (12/45) students scored 3 to 4 marks and 73.3% (33/45) students scored 5 /5 marks . Surprisingly none of the students got 1 to 2 marks in the post test.Marks obtained by number of the students in pre and post testwas represented in Table1. Marks obtained by number of the students in pre and post testwas represented in Table 1 and Graph 1.

Table 1. The marks obtained by number of students were shown in

session	test	1to 2 marks and %	3 to 4 marks	5marks
1	pre test	29 (96.7)	1 (3.3)	0
	posttest	0	7 (23.3)	23 (76.7)
2	pre test	34 (97.1)	1 (2.9)	0
	posttest	0	10 (28.6)	25 (71.4)
3	pre test	44 (97.8)	1 (2.2)	0
	posttest	0	12 (26.7)	33 (73.3)

Graph 1. Comparison of the marks obtained by the students in pre and post test

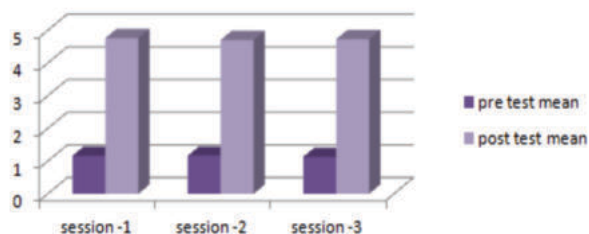


The session -1 ,Pre test mean and SD were 1.167± 0.747 and the post test mean and SD were 4.767± 0.43. In session -2 ,Pre test mean and SD were 1.171± 0.747 and the post test mean and SD were 4.714± 0.458. and in session -3 ,Pre test mean and SD were 1.133± 0.726 and the post test mean and SD were 4.733± 0.447. There was a significant increase in the mean values of post – test compared to the mean values of pre – test (P ≤ 0.0001) in all the three sessions (Table 2, Grph 2). Comparison of means and SD and P values of pre and post test scores was represented in Table 2 and Graph 2.

Table 2.comparison of means and SD and P values of pre and post test scores

session	test	mean	SD	P
session 1	Pre-test	1.167	0.747	P < 0.0001
	Post est	4.767	0.43	
session 2	Pre-test	1.171	0.747	P < 0.0001
	Post est	4.714	0.458	
session 3	Pre-test	1.133	0.726	P < 0.0001
	Post est	4.733	0.447	

Table 2.comparison of means of pre and post test scores



DISCUSSION:

Active involvement of the students is the key factor in the effective learning and enhances creative thinking, interpretation, judgment, and problem-solving skills(12). In think-pair-share classroom activity the

teacher acts as a facilitator, and poses a question or a problem to the students. The students are given sufficient time to think this helps to initiate their thinking process. Subsequent to this the teacher instructs them to pair up among themselves and share their thoughts with each other, as every student participates and thinks independently in different perspective, sharing their views develops communication skills and helps to overcome their inhibitions. At the end when they share their knowledge with the entire group it aids in the complete understanding of the concept and builds up their confidence. In our study most of the students got less than 40% (2/5) marks and nobody got 100% (5/5) in pre-tests of all the three sessions, to my surprise there is no single student with less than 40% and most of the students got 100% (5/5) marks in the post tests of all the three sessions . It gives an idea that there was an improvement in the students performance and the progress is constant in all the sessions. In our study there was a significant increase in the means of post test scores compared to pre test scores(P<0.0001). similarly , in another study done by Sutopo,a progressive improvement was observed in students involvement and cooperation in the successive classes with implementation of TPS (13). Further, in a study conducted among nursing students reported that the students who were educated by TPS developed more CT skills than those who were not educated by TPS method (14). TPS strategy creates a healthy atmosphere where students work together with cooperation , share their ideas with each other and construct new thoughts enhances academic integration of concepts(14).All most all the students expressed that the method is more interesting and effective .They also felt that this type of activity has made leaning biochemistry concepts easy.

CONCLUSION:

Think, pair & share activity eliminates the inhibitions, formulates ideas , improves analytical skills and logical thinking and can contribute better understanding of the concepts in the students. TPS also creates a positive environment which motivates the shy students to get involved in the discussion.

REFERENCES:

1. Lyman, Frank. "Think-Pair-Share". MAA-CIE Cooperative News.
2. Howard, J. R., & Henney, A. L. (1998). Student participation and instructor gender in the mixed-age college classroom. *The Journal of Higher Education*, 69, 384–405. <https://doi.org/10.2307/2649271>.
3. Howard, J. R., James, G. H. I., & Taylor, D. R. (2002). The consolidation of responsibility in the mixed-age college classroom. *Teaching Sociology*, 30, 214–234. <https://doi.org/10.2307/3211384>.
4. Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *The Journal of Higher Education*, 68, 599–623. <https://doi.org/10.2307/2959965>.
5. Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, 85, 571–581. <https://doi.org/10.1037/0022-0663.85.4.571>.
6. Mello, J. A. (2010). The good, the bad and the controversial: The practicalities and pitfalls of the grading of class participation. *Academy of Educational Leadership Journal*, 14, 77–97.
7. Frisby, B. N., & Myers, S. A. (2008). The relationships among perceived instructor rapport, student participation, and student learning outcomes. *Texas Speech Communication Journal*, 33, 27–34
8. Frymier, A. B., & Houser, M. L. (2016). The role of oral participation in student engagement. *Communication Education*, 65, 83–104. <https://doi.org/10.1080/03634523.2015.1066019>. Garside, C. (1996). Look who's talking: A comparison of lecture and group discussion teaching strategies in developing critical thinking skills. *Communication Education*, 45, 212–227. <https://doi.org/10.1080/03634529609379050>. Ginsburg, H. P., & Oppen, S. (1988). Piaget's theory of intellectual development. Prentice-Hall, Inc
9. Garside, C. (1996). Look who's talking: A comparison of lecture and group discussion teaching strategies in developing critical thinking skills. *Communication Education*, 45, 212–227. <https://doi.org/10.1080/03634529609379050>.
10. Dancer, D., & Kamvounias, P. (2005). Student involvement in assessment: A project designed to assess class participation fairly and reliably. *Assessment & Evaluation in Higher Education*, 30, 445–454. <https://doi.org/10.1080/02602930500099235>
11. Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). A measure of college student course engagement. *The Journal of Educational Research*, 98, 184–192. <https://doi.org/10.3200/joer.98.3.184-192>.
12. S P Rao , S E DiCarlo (2001). Active Learning of Respiratory Physiology Improves Performance on Respiratory Physiology Examinations. *Adv Physiol Educ*. 25(2):55-61. doi: 10.1152/advances.2001.25.2.55.
13. Sutopo1, Bayu Rahmat Setiadi1, Muhammad Nurtanto2, Sigit Purnomo3, Nurcholish Arifin Handoyo4 and Arif Bintoro Johan (2020). Enhancing of Student Collaboration in Thinking, Pairing, and Sharing on Energy Conversion Learning. *International Journal of Higher Education*9(4): 199. June. DOI: 10.5430/ijhe.v9n4p199
14. Kaddoura, Mahmoud (2013). Think Pair Share: A Teaching Learning Strategy to Enhance Students' Critical Thinking. *Educational Research Quarterly*, v36 n4 p3-24.