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Original Article

Evaluating Phase 2 MBBS Students' Perceptions of the Effectiveness of the Fish bowl Technique Combined with Lecture in Pathology

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Abstract

Background: Traditional classroom lecture has been the backbone of medical education for a long time. Though effective, it has inherent problems of active student engagement and facilitation of learning for better outcomes. In contrast, innovative small-group learning methods like the Fish bowl technique promote active participation and foster learning.

Objectives: The study aims to analyze the combined utility of the Fish bowl technique along with lecture and to compare students' perceptions of its effectiveness.

Methods: A quasi-experimental crossover study was conducted among second-phase medical undergraduate students in the Department of Pathology. The students were primed about the topic via a didactic lecture which was followed by a pre-test. The study consisted of 138 students, who were divided into six groups across 2 days/week (three batches/day), each group consisted of 23 students, and a Fish bowl discussion was conducted. At the end of the session, a post-test was done and feedback was taken from students.

Results: There was statistical improvement in post-test scores of the Fish bowl technique, a gain of 16.81% as compared to the pre-test score. Lecture followed by Fish bowl sessions stimulated more interest (75.36%), increased active participation (86.23%), and improved satisfaction of learning (73.91%) amongst students as compared to lecture only. The retention of the study subject, coverage of important concepts, and meaningful discussion was better with lecture along with Fish bowl discussion.

Conclusion: The combination of traditional and Fish bowl technique proved to be a positive learning experience for students. Fish bowl is an effective student-centric method that piques curiosity, promotes active participation, and fosters critical thinking.

Keywords: Medical Education; Fish bowl Technique; Lecture; Learning Experience

Background

Medical education has evolved significantly from conventional classroom instruction, focused on a chalkboard, to incorporate several Information and Communication Technology (ICT)-enabled tools and methodologies (1). A tremendous transformation in medical education has been observed, especially in recent years, which has caused medical educators to reassess standard teaching practices and develop innovative strategies to optimise student learning (2, 3). With the introduction of Competency-Based Medical Education, it is imperative for medical colleges to adopt a teaching-learning strategy to facilitate a two-way process of sharing ideas and concepts (4). In a study, Irby (5) emphasised the significance of both teaching and learning, highlighting the need to create an

environment that fosters effective and efficient learning—an expectation that has now become the norm. Consequently, teachers are required to be experts in their fields and possess a crucial understanding of the learning process (3-5). The educational approach ought to advance from familiar to unfamiliar and from simpler concepts to more complex ones, ensuring a comprehensive and structured learning process (5).

Traditional didactic learning, the most prevalent teaching method in the medical curriculum, has major limitations, being teacher-centric, and often results in reduced student attentiveness with no scope for active learning (4). Medical educationists from around the world have created various teaching-learning methods such as seminars, small-group teaching, tutorials, and brainstorming (6).

According to the Tennessee Student/Teacher Achievement Ratio project, numerous advantages exist for both teachers and students when class sizes are smaller (7). Coles (8) and Ratnakar et al. (9) propose that student satisfaction is higher with smaller class sizes, as they allow teachers to manage students effectively, provide more individualised attention, and foster increased interaction between teachers and students. One such small classroom teaching method is the "Fish bowl" strategy, which encourages students' participation (10). The Fish bowl technique, initially used by multinational companies to enhance employee participation, is now being utilised in medical education for students, wherein there are two groups: an inner group discussing an issue or topic while the outer group listens, looking for themes, patterns, or soundness of argument, or using a group behaviour checklist to give feedback to the group on its functioning, and the role can be reversed (4, 11, 12). This innovative teaching-learning method enhances learning through increased interaction and peer evaluation. Introverted students can develop group dynamics, enhance their social skills, improve focus, and transition from passive disinterest to active, experiential learning (4).

Although several studies highlighted the advantages of innovative teaching approaches in medical education, further research is required to expand and validate these findings. Pavani et al. (10) reported that a combination of lectures and the Fish bowl technique enhanced student satisfaction. Rabbani et al. (6) emphasized that Fish bowl activities foster critical thinking, curiosity, and learner engagement. Similarly, Anand et al. (4) highlighted that the Fish bowl technique promotes the early identification of knowledge gaps, encourages self-directed learning, and facilitates holistic problem-solving. In contrast to these prior studies, the current study used a quasi-experimental crossover design, incorporated validated pre- and post-test assessments, and systematically analysed structured student feedback, specifically focusing on the application of the Fish bowl technique in pathology. The aim of this study was to evaluate the combined effectiveness of the Fish bowl technique and lectures and to compare students' perceptions of the effectiveness of the technique.

Objectives

The study aims to analyze the combined utility of the Fish bowl technique along with lecture and to compare students' perceptions of its effectiveness.

Methods

Type of study and its stages: This quasi-experimental crossover study was conducted among second-phase undergraduate medical students in the Department of Pathology. The study protocol was reviewed and approved by the institutional ethics committee (reference number: JGMMMCIEC/030/2023). The students were primed on the topic via a didactic lecture that lasted approximately 60 min before conducting the practical sessions. The Fish bowl technique, which involves structured discussions in the inner and outer circles, was used as an active learning strategy. A faculty member supervised each session, and plenary sessions were held after each discussion to consolidate the key learning points.

Study sample: A total of 138 Phase II undergraduate medical students participated in this study. Students who were present on the day of the activity and who provided informed consent were included in the study. Students who were on leave due to illness or personal reasons during the didactic lecture or Fish bowl discussion, or those who did not consent to participate, were excluded from the study. Using Minitab Statistical Software (version 16), the minimum sample size was calculated to be 64, based on an alpha of 0.05, a power of 0.8, a standard deviation of paired differences of 1.4, and a mean difference of 0.5. The purpose and protocol of the study were explained to the participants, and written informed consent was obtained from them. A total of 138 students were divided into six groups, with each group consisting of 23 students, meeting for

2 days per week (three batches per day). Within each group, students were further divided into inner and outer circles for the Fish bowl discussions, with those with odd roll numbers assigned to the inner circle and those with even roll numbers to the outer circle. In subsequent sessions, the groups were rotated to ensure that all students had the opportunity to participate in both roles (Figure 1).

Data Collection and Analysis: A pre-test comprising Multiple Choice Questions (MCQs) sourced from a validated departmental question bank was administered to all participants before the group assignments.

Fish bowl sessions

The Fish bowl technique has two circles:

- Inner circle: Students in the inner circle are called "fishes".
- Outer circle: The rest of the students in class form the outer circle, and they are called "fish watchers".

The chairs in the class were arranged in inner and outer circles for the Fish bowl method. Each group comprising 23 participants was divided into two circles based on their roll numbers. The first group of 12 students was asked to sit in an inner circle, which was further divided into three subgroups with participants in each subgroup (n = 4). Students were instructed to engage in discussions with representatives from their respective groups. Each subgroup spoke on the subtopic allotted to them. The other group, comprising the remaining 11 students, was asked to sit in the outer circle and observe the inner group (fishes). Fish watchers seated in the inner circle were given a tally/comment sheet and tasked with observing and grading their fish's contributions to the discussion. The grading criteria were as follows: i) relevance of the point of view expressed in the question/topic, ii) use of suitable evidence to substantiate their viewpoint, iii) the capability to stimulate and advance discussions among fellow students, and iv) adherence to the designated topic throughout the discussion. The positions of the inner and outer circles were swapped in the subsequent week to cover different pathological topics.

One faculty member per group supervised the group discussions, guided the enquiries into the topic being discussed, and helped to strengthen the group's overall understanding of the topic. Following the discussion, a plenary session was held, during which crucial points that had been missed were added and mistakes were corrected. The time allocated was as follows: 10 min for the Fish bowl discussion, 5 min each for the plenary sessions, and 15 min for the pre- and post-tests.

Finally, a post-Fish bowl assessment was conducted, and feedback was obtained from students regarding their views and experiences with the Fish bowl through a questionnaire using a Likert scale with ratings ranging from 1 to 5. Both the pre-test and post-test consisted of MCQs sourced from a validated question bank maintained by the department. These questions were used to determine the difficulty levels and discrimination indices. Changes in knowledge and learning outcomes were assessed by comparing scores between the pre-test and post-test MCQs.

Student feedback collected through a Likert-scale questionnaire was analysed to assess the acceptability and perceived effectiveness of the Fish bowl technique in facilitating learning.

Statistical Analysis: Data was entered and analyzed using IBM SPSS Statistics for Windows (version 20). The mean and standard deviation (SD) were calculated for post-lecture and post-Fish bowl assessment scores and analysed using a paired t-test. $P \leq 0.05$ was considered statistically significant.

Results

A statistical improvement was observed in post-test scores of the Fish bowl technique, with a gain of 16.81% ($t = -11.6$, $p \leq 0.001$) (mean = 4.7 ± 0.51) compared to pre-fish bowl (mean = 3.86 ± 0.86), as shown in table 1.

Table 1. Comparison of the student's performance in the pre- and post-tests

Marks	Frequency (N)	Mean (SD)	t value	p-value
Pre-test	138	3.86 (0.86)	-11.6	<0.001
Post-test	138	4.70 (0.51)		

Analysis of student feedback revealed that lectures followed by Fish bowl sessions generated more interest (75.36%), increased active participation (86.23%), and improved satisfaction with learning (73.91%) among students as compared to lectures only (Table 2).

The retention of the study subject, coverage of important concepts, and meaningful discussions were better in the lectures with the Fish bowl discussion. Fish bowl sessions helped students better understand the topic, and most students did not encounter any difficulties or problems during the sessions (Figure 2, Table 3).

Table 2. Feedback from the students regarding the lecture and Fish bowl technique

Feed Back	Lecture alone [n (%)]	Lecture with Fish bowl [n (%)]
Which method stimulated interest in learning?	34 (24.64)	104 (75.36)
Which teaching method involved your active participation?	19 (13.77)	119 (86.23)
Which method led to greater learning satisfaction?	36 (26.09)	102 (73.91)
Which method is better?	39 (28.26)	99 (71.74)

Table 3. Students feedback regarding Fish bowl

Feed Back	Yes (%)	No (%)	Maybe (%)
Did the Fish bowl method advance understanding of the topic?	57.25	4.35	38.41
Did you face any problems during the discussion of the topic?	5.07	87.68	7.25

Overall, students found the Fish bowl sessions to be positive learning experiences. These sessions were highly interactive and enjoyable, contributing to improved retention of the topic discussed (Figure 3).

Discussion

One of the biggest challenges faced by teachers in medical colleges is the lack of student's attentiveness, participation, and engagement in class (13, 14). According to researchers, small-group instruction offers numerous benefits and is considered a crucial component in achieving student success (6, 7).

Group discussions are an important part of students' overall education, whether in problem-based learning, team projects, or in the more conventional academic settings of tutorials or seminars. When executed well, discussion can provide students with more opportunities to express themselves in the subject language and build stronger relationships with faculty members (10). Moreover, the demanding curriculum of medical colleges needs to be made engaging by implementing innovative teaching and learning techniques (6, 15); one such approach is combining a lecture with a Fish bowl discussion.

The current study was conducted to investigate how medical students perceive the effectiveness of the Fish bowl technique as an innovative teaching tool for pathology to Phase 2 MBBS students. In our study, the mean scores of students' post-tests after Fish bowl sessions were significantly higher, with a gain of 16.81% compared to the pre-test, which aligns with studies on undergraduates (1, 4, 6, 16). Our study showed that lectures with Fish bowl discussions instilled an interest in learning in 75.36% of students, which was similar to the findings of Rabbani et al. (6) (86.7%) and Kundoor et al. (17) (81.17%). Lectures followed by discussions have always developed an interest in students. In Fish bowl discussion, the teacher plays the role of a facilitator, creating a welcoming and conducive atmosphere that fosters internal motivation for learning and piques students' interest (1, 9, 18).

Moreover, 86.23% of students agreed that Fish bowl discussions involved their active participation and helped clear their doubts, which is concordant with studies done by Anand et al. (4) (92%), Cerqueira et al. (16) and Hertling et al. (19) (90%), as it allows them to assume centre stage, encouraging participation through give-and-take situations and providing them with the opportunity to solve problems and learn from their peers (4, 19).

Students need to retain information from classes for interpretation and application of information (1). In our study, students could retain information better (81.88%) when a lecture was followed by a Fish bowl as it evoked interest, promoted active participation, and students were constantly involved in discussion. These findings are in concurrence with studies by Priyam et al. (1) (95%), Anand et al. (4) (72%), and Rabbani et al. (6) (70%). Most students felt that the Fish bowl discussions were meaningful and covered all important topics.

In our study, a lecture followed by a Fish bowl helped students better understand the topic. This strategy enhances knowledge by promoting interactive learning, stimulating curiosity, and fostering critical reasoning. Students preferred a combination of teaching methods (lectures with Fish bowls) over a single method in our study (71.74%). Studies conducted by Chaudhary et al. (20) (67.1%) and Rabbani et al. (6) (66.7%) concluded that students favoured a combination of teaching methods. The combination teaching approach is the most effective because it compensates for the inherent shortcomings of a single method with another (21). Overall, the students had a positive learning experience

with the lecture, followed by the Fish bowl, with improved learning satisfaction. Few students face the barrier of shyness or fear of stage fright, which can be overcome by applying this technique more often, allowing them to gradually feel more comfortable with it and subsequently participate in discussions.

Limitations: This study was conducted at a single medical college and involved a limited number of students over a specified duration. To enhance the robustness of this method, future studies should be conducted on a larger scale encompassing diverse medical colleges and other educational institutions. In addition, the number of Fish bowl sessions was limited. Further studies with longer duration and increased exposure to the Fish bowl technique could help alleviate student shyness, gradually increase their comfort levels, and facilitate more participation with increased confidence.

Conclusion

This study has demonstrated the effectiveness of the Fish bowl method and concluded that integrating both traditional and innovative teaching approaches has a positive impact on learning outcomes in pathology. The Fish bowl method is one of the effective student-centric learning methods that promotes critical thinking, curiosity, interest in the topic, improves memory retention, and gives students the confidence to articulate their perspectives. The Fish bowl technique is rarely used for short group discussions in medical education. The Fish bowl method can be implemented in the medical curriculum to enhance teaching efficiency.

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Conflict of interests: There is no conflict of interest.

Ethical approval: This study was approved by the Institutional Ethics Committee, JGMMMCIEC. (Reference number: JGMMMCIEC/030/2023).

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References

1. Priyam S, Sankeshwari RM, Vyavahare S, Ankola AV. Comparison of routine teaching with Fish bowl and 1-min preceptor for dental undergraduate students: an interventional study. Indian J Dent Res. 2020 Jan-Feb;31(1):48-52. doi: 10.4103/ijdr.IJDR_231_18. [PMID: 32246681]
2. Torre DM, Daley BJ, Sebastian JL, Elnicki DM. Overview of current learning theories for medical educators. Am J Med. 2006 Oct;119(10):903-7. doi: 10.1016/j.amjmed.2006.06.037. [PMID: 17000227]
3. Devi DV, Deedi MK. Teaching and learning methodology in medical education: an analysis-in GSL Medical College, Rajahmundry, AP. J Evol Med Dent Sci. 2015 Sep 7;4: 12557-65. doi:10.14260/jemds/2015/1808.
4. Anand N, Pujar S, Rao S. A heutagogical interactive tutorial involving Fish bowl with Fish Battle and Round Robin Brainstorming: A novel syndicate metacognitive learning strategy. Med J Armed Forces India. 2021 Feb 2;77(Suppl 1): S73–S78. doi: 10.1016/j.mjafi.2020.12.003. [PMID: 33612935] [PMCID: PMC7873678]
5. Irby DM. What clinical teachers in medicine need to know? Academic Medicine. 1994; 69(5): 333-42. doi:10.1097/00001888-199405000-00003.
6. Rabbani H, Tarannum F, Chavan VM, Ali SI. Fish-Bowl Teaching Technique in Phase III Mbbs Students: An Observational Study. J Cardiovasc Dis Res. 2023; 14(3): 396-401.
7. Pate-Bain H, Boyd-Zaharias J, Cain Van A, Word E, Binkley E. The State of Tennessee's Student/Teacher Achievement Ratio (STAR) Project. Lebanon, TN: HEROS, Inc; 1997.
8. Coles C. Variability of student ratings of accounting teaching: evidence from a Scottish business school. International Journal of Management Education. 2002;2(2):30-40.
9. Rathnakar UP, Gopalakrishna HN, Pai PG, Ullal SD, Pemminati S, MRSM P, et al. Didactic lectures and interactive sessions in small groups: a comparative study among undergraduate students of pharmacology in India. Journal of Clinical and Diagnostic Research. 2010;4(2):2260-4.
10. Pavani G. Fish bowl teaching technique for IIND year MBBS students in AIMSR. J Evolution Med Dent Sci. 2016 Apr 21;5(32):1713-5. doi:10.14260/jemds/2016/404.
11. Jaques D. ABC of learning and teaching in medicine-Teaching small groups. British Medical Journal. 2003 Mar 1;326 :492-4. doi:10.1136/bmj.326.7387.492.
12. Tint SS, Nyunt EE. Collaborative learning with think-pair-share technique. Computer Applications: An International Journal. 2015 Feb;2(1):1-11. doi:10.5121/caij.2015.2101.
13. Hegde AM, Shetty S, Mehrotra D. Comparison of Class Room Lectures with Fish bowl-Snowball Activity for Dental Undergraduate Students: An Observational Study. Journal of Health and Allied Sciences NU. 2023; 13(03): 395-9. doi:10.1055/s-0042-1757731.
14. Grabosky F. The dynamic commitment design. Small group behavior. 1985 Feb; 16(1): 111-9. doi: 10.1177/104649648501600107.
15. Singh V, Kharb P. A paradigm shift from teaching to learning gross anatomy: meta-analysis of implications for instructional methods. Journal of the Anatomical Society of India. 2013 Jun 1;62(1):84-9. doi:10.1016/S0003-2778(13)80019-6.
16. Santos Cerqueira G, Silva RS, da Santos Silva JM, Naconecy de Souza HS, Pimenta Bindá HS, da Silva ID, et al. Fish bowl as Pedagogical Innovation in Anatomy Teaching. The FASEB Journal. 2022 May;36(S1). doi:10.1096/fasebj.2022.36.S1.0R412.
17. Kundoor N, Sannidhi S, Bashetty B. Effectiveness of Fish bowl method in teaching clinical biochemistry for 1st year medical students. International Journal of Medical Science and Education. 2019;6(1):27-31.
18. Brophy J. Synthesis of research on strategies for motivating students to learn. Educational leadership. 1987;45(2):40-8.
19. Hertling S, Hertling D, Matziolis G, Schleußner E, Loos F, Graul I. Digital teaching tools in sports medicine: A randomized control trial comparing the effectiveness of virtual seminar

and virtual Fish bowl teaching method in medical students. PloS One. 2022 Jun 16; 17(6): e0267144. doi: 10.1371/journal.pone.0267144.
20. Choudhary R, Dullo P, Gupta U. Attitude of 1st MBBS medical students about two different visual aids in physiology lectures. Pakistan Journal of Physiology. 2009 Dec 31;5(2):16-9.
21. Priyadarshini KS, Shetty HV, Reena R. Assessment of different teaching aids and teaching methods for the better perception of biochemistry by 1st MBBS students. Journal of Evolution of Medical and Dental Sciences. 2012; 1(6): 1159-65. doi: 10.14260/jemds/189.

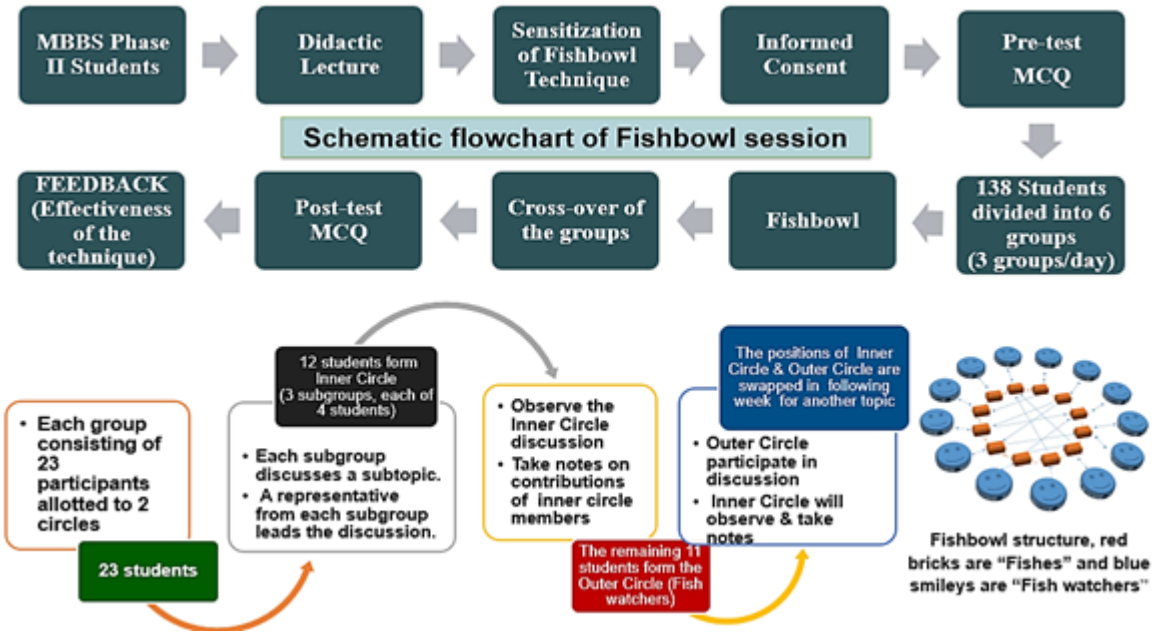

Figure 1. Schematic flowchart of Fish bowl session

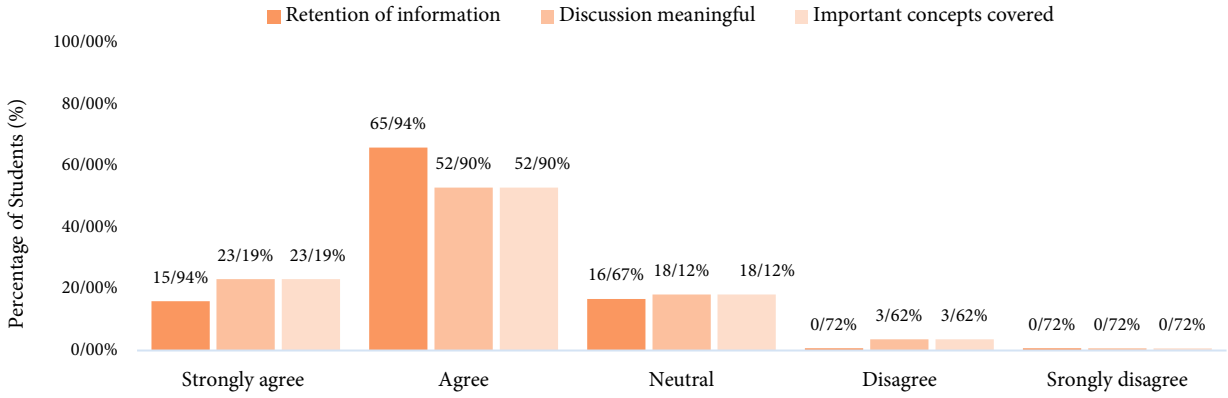

Figure 2. Students' perception regarding Fish bowl

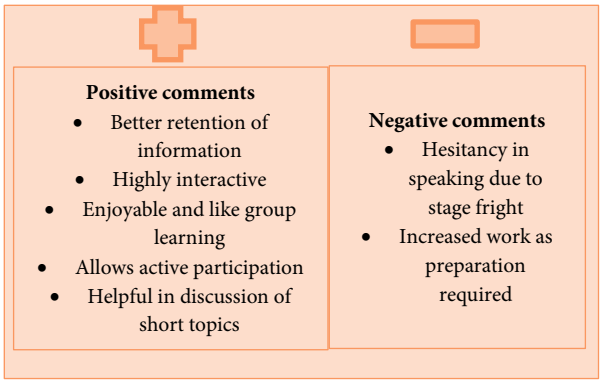

Figure 3. Positive and negative opinions of students regarding Fish bowl