

Original Article

Microteaching revisited! A tool for improving undergraduate student seminars

Kanavi Roopa Shekharappa¹, C. N. Tejaswi², Savita S. Patil³, B. M. Lakshmikanth⁴

Departments of ¹Physiology, ²General Medicine, Chandramma Dayananda Sagar Institute of Medical sciences and Research, Harohalli, and ³Community Medicine, BGS Global Institute of Medical Sciences, Bengaluru, ⁴Department of Anatomy, DM Wayanad Institute of Medical Sciences, Wayanad, Kerala, India.

***Corresponding author:**

C. N. Tejaswi,
Department of General
Medicine, Chandramma
Dayananda Sagar Institute of
Medical sciences and Research,
Harohalli, Bengaluru - 562 112,
Karnataka, India.

tejnat@gmail.com

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ABSTRACT

Objectives: A deluge of techniques are made available for students to encourage for self-directed learning. Microteaching is one of the old techniques which is traditionally used as a method to improve pedagogical skills. Incorporating microteaching techniques in student seminars enhance the effectiveness of the learning process. The objectives of the study were to assess the effectiveness and perceptions regarding microteaching methodology in improving the undergraduate student seminars.

Materials and Methods: The study was conducted among ten randomly selected 1st year MBBS students. They were assigned a seminar topic from pre-discussed lecture in Physiology. They were divided into two equal groups and one group underwent training in microteaching through a workshop. Each student from both the groups presented seminar which was evaluated on Likert's scale by standardised blinded observers consisting of 13 faculty and 12 students. Perceptions of students were assessed by self-evaluation. The data were analysed by Chi-square and Mann-Whitney U-test.

Results: Each student was evaluated by 25 members and got 125 responses from each group. The median score for all the components in the assessment was significantly higher in the intervention group as compared to the control group. The presentation skills, providing non-verbal clues and stating the objectives were significantly better among the microteaching trained group ($P \leq 0.05$). Common perception among the intervention group was that they found it interesting, innovative, improved presentation skills, interactive and needed preparation for application and analysis, whereas some students felt lack of time and motivation were the obstacles for implementation of microteaching methodology for student seminars.

Conclusion: The students found microteaching methodology to be very interesting and useful learning tool. Microteaching technique assists students to develop competence and confidence in seminar presentations.

Keywords: Microteaching, Seminar, Medical students, Undergraduates

INTRODUCTION

Self-directed learning is one of the important components proposed in the new Graduate Medical Regulations of 2019.^[1] Nowadays, a deluge of techniques is encouraged to increase the interest of students in learning.^[2] Student centred learning encourages active participation from the students and the results are better learning outcomes.^[3] As per the learning pyramid proposed by NTL, the highest retention rate for a student is by teaching others as compared to listening to lectures, reading and group discussions.^[4] There are multiple reasons why medical students must be trained in educational principles, some of them being effective communicator

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with patients, better learner and also an effective teacher in their future.^[5]

Student seminars are now a routine in medical institutes as a small group teaching method.^[6] Seminar is a small group teaching-learning (T-L) session, in which the participants discuss under the guidance of an expert. The instructor, the students, preparation, content, group dynamics, course coherence and facilities are key factors in seminar learning.^[7] Unfortunately, majority of the student-led seminars (SLS) remain to be passive with no interaction or incentive for active participation.^[7]

Microteaching was originally created in the early 1960s by Allen at Sanford University as a type of scaled-down simulation activity to help teacher candidates learn to teach. It was designed as a brief but structured practical experience in which prospective teachers would begin to bridge the theory-practice gap by planning and presenting a 5–10-min lesson in which they were to apply specific instructional skills or tasks previously studied in the class.^[8] Recently, microteaching was implemented in different curricula as a useful self-learning instrument for undergraduate and postgraduate students. As it is well known, self-learning involves the active participation of the students and encourages them to construct their own learning program.^[9] Microteaching-microlearning exercises are effective methods to enhance and develop communication, problem-solving and critical-thinking skills in students.^[10] Besides, the methodology of microteaching involves active participation of learners with interaction. There are studies on applying the methodology of microteaching for student seminars in non-medical field among the engineering students, whereas there are very few studies among the medical undergraduates. With this background a study was designed to assess the effectiveness of student seminar presentations following training them through microteaching methodology.

Objectives

The objectives are as follows:

1. To assess the effectiveness of microteaching methodology in improving the undergraduate student seminar presentation.
2. To determine the perceptions of students regarding methodology of microteaching for undergraduate student seminar presentation.

MATERIALS AND METHODS

An interventional study was conducted among 1st year MBBS students of a medical college located in Bengaluru, Karnataka, between March and April 2017 after obtaining institutional ethics committee approval. Among 150 students, 50 students consented to participate. After obtaining the written informed consent, those 50 students were assessed

for their pedagogical skills and academic performance using a checklist following which 20 participants were similar in their ability scores. For the purpose of the study, ten students were selected by simple random sampling. They were assigned to conduct seminars with pre-discussed topics from the subject of physiology after taking into consideration the difficulty index. They were allotted facilitators to guide the students for preparation of seminars. The study subjects were randomly allocated into two groups, the intervention and the control group of five members each. One group was trained in the microteaching methodology by conducting 1 day workshop. The workshop consisted of an initial orientation of the students to concept of microteaching along with a microteaching demonstration session. Following this, the students made a 5 min microteaching session which was evaluated and feedback provided by the faculty of Medical Education Unit.

The participants from both the groups were allotted a time of 20 min each for seminar presentation. Each presentation was assessed by independent faculty members ($n = 13$) and students ($n = 12$) who were blinded for the study objectives. The assessment was done using a standardised checklist provided, which objectively assessed the various components of a good presentation.^[6] The components included were: Lesson planning, set induction, presentation – skill of describing, narrating and making the topic interesting, stimulus variation, proper use of audio-visual aids, reinforcement of student participation, fluency in questioning, body language, liveliness, closure – method of concluding a lesson summarising and highlighting the important points, take home message. Each presenter was scored on a scale of 0–10 by each of the assessor. The perception of the students who underwent training in microteaching methodology was noted by conducting a focused group discussion.

Statistical analysis

The collected data were entered into an Excel sheet. The data were expressed in median, interquartile range (IQR) and percentages. The median scores of skills under each component, namely planning, set induction, presentation, questioning, non-verbal Cues, use of AV aids and others, closure and over-all effectiveness between the intervention group (microteaching) and control (seminar group) were compared using Mann–Whitney U-test. (The distribution of the U-value approximates a normal distribution and the calculated U-value with the sample can be used to compare against the normal distribution to calculate the confidence level). The association of various sub-components of planning, set induction, presentation, questioning, non-verbal Clues, use of AV aids and others and closure with the responses between microteaching trained and untrained

groups were analysed using Chi-square test and Fisher's exact test. The analysis was performed using SPSS version 18.0. $P < 0.05$ was taken as statistically significant.

RESULTS

A total of ten students were included in the study, five in the intervention group who were trained using microteaching methodology and five of them in the control group who were untrained. Each student was assessed by 25 members with 13 faculty and 12 students. Thus, 25 assessment responses were obtained for each candidate resulting in 125 responses from each group. All the students belonged to the same class and Phase I of MBBS. The ratio of males to females was 2:3 in intervention group and 3:2 in control group. The median score for all the components in the assessment was significantly higher in the intervention group as compared to the control group [Table 1].

On exploring the various components of the presentation, more assessors felt that the students in intervention group made a better set induction in terms of arousal of interest, to bring out relevance and mentioning of specific objectives. There was also significant difference in presentation skills including involving the audience, questioning and providing clues. However, there was no significant difference in the nonverbal cues such as appropriate gestures and eye contact between the two groups. The intervention group also fared better in use of audio-visual aids and in closing the seminar appropriately [Table 2A and B].

Focused group discussion was conducted for the intervention group regarding their perceptions on microteaching as a method to improve seminar presentations. The discussion was routed through their perceptions about the effort involved, usefulness and the difficulties in the programme. All the students in the intervention group felt that the training was very useful and were willing to undergo such trainings further. Three students opined that lack of time and motivation in undergoing training was a hindering factor.

Some of the common perceptions of the students who underwent microteaching were, they mentioned microteaching as interesting, innovative, interactive method and it improved their presentation skills. However, it needed lot of preparation for its application such as the set induction and exploring for example. The students also perceived that the training helped in increasing the retention of the knowledge, confidence and thorough preparation of the topic given in [Table 3].

DISCUSSION

Active learning as defined in ERIC digest is 'instructional activities involving students in doing things and thinking

about what they are doing.' Active learning helps students in better retention of knowledge and also improves their learning skills. SLS is one of such methods which are used widely across the universities. They not only enhance the cognitive domain but also serve as an opportunity to enhance their communication skills. There have been various attempts to make seminars more effective and interactive. In one such attempts, Kadayam Guruswami Gomathietal incorporated quiz and provided specific learning objectives for a seminar presentation and observed that the new format was significantly more interesting, interactive, fun and made them feel more like a team and also reported 'improvement in communication skills,' 'learnt to make a formal scientific presentation' and 'gained self-confidence after presenting the seminar.'^[11]

Table 1: Comparison of median scores between the intervention and control group.

Skills	n=250 responses	Median scores (IQR)**	U	P value
Planning				
Trained in microteaching	125	8.0 (2)	5020.50	<0.001*
Not trained	125	7.0 (2)		
Set induction				
Trained in microteaching	125	8.0 (2)	4414.00	<0.001*
Not trained	125	7.0 (3)		
Presentation				
Trained in microteaching	125	8.0 (2)	6467.00	0.016*
Not trained	125	7.0 (2)		
Questioning				
Trained in microteaching	125	7.0 (1)	5048.00	<0.001*
Not trained	125	6.0 (3)		
Non-verbal cues				
Trained in microteaching	125	8.0 (2)	5177.00	<0.001*
Seminar	125	7.0 (3)		
Use of AV aids and others				
Trained in microteaching	125	8.0 (3)	4336.00	<0.001*
Not trained	125	5.0 (4)		
Closure				
Trained in microteaching	125	8.0 (1)	5110.50	<0.001*
Not trained	125	6.0 (3)		
Over-all effectiveness				
Trained in microteaching	125	8.0 (1)	4752.50	<0.001*
Not trained	125	7.0 (2)		

*Indicates a significant statistical difference between the groups with $P < 0.05$. **IQR: Interquartile range

Table 2A: Association of different responses (Yes/No) with the two comparative groups.

Skill	Groups	Responses		χ^2 value	P value
		Yes n (%)	No n (%)		
Set induction - Aroused Interest [‡]	Trained in microteaching	124 (99.2)	01 (0.8)	-	<0.001*
	Not trained	103 (82.4)	22 (17.6)		
Set induction - Brought out relevance [‡]	Trained in microteaching	123 (98.4)	02 (1.6)	-	<0.001*
	Not trained	108 (86.4)	17 (13.6)		
Set induction - Specified objectives [‡]	Trained in microteaching	123 (98.4)	02 (1.6)	-	<0.001*
	Not trained	103 (82.4)	22 (17.6)		
Presentation - involved students	Trained in microteaching	120 (96.0)	05 (4.0)	35.87	<0.001*
	Not trained	83 (66.4)	42 (33.6)		
Questioning - Paused after asking the question	Trained in microteaching	118 (94.4)	07 (5.6)	11.61	<0.001*
	Not trained	100 (80.0)	25 (20.0)		
Questioning - Changed target	Trained in microteaching	96 (76.8)	29 (23.2)	5.50	0.01*
	Not trained	79 (63.2)	46 (36.8)		
Questioning - Rewarded pupil effort	Trained in microteaching	113 (90.4)	12 (9.6)	19.04	<0.001*
	Not trained	85 (68.0)	40 (32.0)		
Questioning - Gave clues appropriately	Trained in microteaching	117 (93.6)	08 (6.4)	23.98	<0.001*
	Not trained	87 (69.6)	38 (30.4)		
Questioning - Probed	Trained in microteaching	111 (88.8)	14 (11.2)	12.1	<0.001*
	Not trained	89 (71.2)	36 (28.8)		

[‡]Fisher's exact test *indicates a significant statistical difference between the groups with $P < 0.05$. Only significant components are included in the table

Table 2B: Association of different responses (Yes/No) with the two comparative groups.

Skill	Groups	Responses		χ^2 value	P value
		Yes n (%)	No n (%)		
Non-verbal cues - Gestures appropriate	Trained in Microteaching	117 (93.6)	08 (6.4)	3.6	0.05
	Not trained	108 (86.4)	17 (13.6)		
Non-verbal cues - Eye contact done well	Trained in Microteaching	118 (94.4)	07 (5.6)	3.87	0.04*
	Not trained	109 (87.2)	16 (12.8)		
Use of AV aids and Others - Use of colour-appropriate [‡]	Trained in Microteaching	122 (97.6)	03 (2.4)	-	<0.001*
	Not trained	103 (82.4)	22 (17.6)		
Use of AV aids and others - Font type and size appropriate [‡]	Trained in Microteaching	122 (97.6)	03 (2.4)	-	<0.001*
	Not trained	104 (83.2)	21 (16.8)		
Use of AV aids and Others - Layout appropriate [‡]	Trained in Microteaching	122 (97.6)	03 (2.4)	-	<0.001*
	Not trained	100 (80.0)	25 (20.0)		
Use of AV aids and Others - Illustrations/Pictures appropriate [‡]	Trained in Microteaching	122 (97.6)	03 (2.4)	-	<0.001*
	Not trained	104 (83.2)	21 (16.8)		
Use of AV aids and Others - PPT animations appropriate	Trained in Microteaching	119 (95.2)	06 (4.8)	11.27	<0.001*
	Not trained	102 (81.6)	23 (18.4)		
Use of AV aids and Others - Emphasised key points	Trained in Microteaching	120 (96.0)	05 (4.0)	15.15	<0.001*
	Not trained	100 (80.0)	25 (20.0)		
Closure - Mentioned relevance of the key points	Trained in Microteaching	119 (95.2)	06 (4.8)	5.79	0.01*
	Not trained	108 (86.4)	17 (13.6)		
Closure - Suggested Follow up activity	Trained in Microteaching	96 (76.8)	29 (23.2)	8.16	0.004*
	Not trained	75 (60.0)	50 (40.0)		

[‡]Fisher's exact test *indicates a significant statistical difference between the groups with $P < 0.05$

The current study was a similar attempt in improving the effectiveness of the seminars by improving the preparation and presentation skills by applying microteaching methodology. The study reported significant difference in

presentation skills and interaction following intervention. The response from the intervention group also reiterated the effect of microteaching in their learning skills and improving their confidence in presentations.

Table 3: Perceptions of the students trained in microteaching methodology for seminars.

S. No.	Particulars	Responses/perceptions
1	Learning from preparing and presenting this lesson	Needed lot of preparation for application and analysis for the topic to give the set induction and the examples.
2	Overall feeling about this lesson	Interesting, innovative, improved presentation skills and interactive.
3	The most difficult components of the presenting this lesson	Making it interesting by giving examples, time consuming and searching for content from different sources and compiling.
4	The most positive aspect of this experience was:	Retention of the knowledge, confidence and thorough preparation of the topic given.

In Patel *et al.* study where they focused only on seminars, they found that students actively research a topic and prepare the PowerPoint presentation to teach the class. Apart from learning, the students acquire other skills such as searching the internet-based materials and preparing presentations which can help them learn in an easier and better way.^[2,12] Indian studies which sought feedback on T-L methodologies in pharmacology state that seminars are largely unpopular and uninteresting T-L methods.^[7] Palappallil stated that only 8% participants showed interest in seminars, 44% participants did external referencing for preparation and 17% considered post seminar tests as an effective method of assessment.^[13] Retention of knowledge through active participation was the most frequently cited reason for preferring small group tutorials, while a dislike of compulsory course components was mentioned more frequently by students preferring interactive seminars.^[14]

A study done at the University of Calgary to evaluate the effect of participation in teaching on the learning of medical students, the author observed that the students who were assigned the role of peer educators performed significantly better as compared to their peers in terms of preparation time and performance in clinical exams.^[15] A study involving medical students in Spain showed that microteaching was effective in developing participant's self-learning and self-regulation processes.^[6,10] In the field of medicine, a study by Sana reported that microteaching was instrumental in helping medical students enhance their medical teaching abilities^[16] and the same has been noted in a 5 Years study by Ralph on 'The Effectiveness of Microteaching: In Related Disciplines such as pharmacy, nursing, medical, pre-service undergraduates and in-service graduates.'^[8]

Suryawanshi *et al.* conducted a study on postgraduate students in improving their presentation skills by

incorporating microteaching methodology. They observed that by providing systematic feedback there was significant improvement in the presentation skills of the PGs. They also reported the usefulness of the feedback in improving their skills. This is similar to the present study where the intervention group performed better than the control group and gave a similar feedback in group discussion.^[17]

With regard to perceptions of students on microteaching, Roush RE observed that his participants felt they could improve their presentation skills^[18] and subjects of Handfield-Jones *et al.* said they were able to use innovative techniques in planning and teaching which was enjoyable and productive.^[19] This is similar to the perceptions of the subjects in the present study.

Similar results were obtained by Omar and Mehdi in Katihar where they mention that there is basically a change in behaviour which can be brought about at any age. When the learner is experienced, learning becomes more effective.^[20] The most important quality of the participants of microteaching sessions is the ability to give and receive constructive feedback with an open mind and achieve appropriate teaching-learning goals.^[21] In this study, the participants of the microteaching group have strongly acknowledged the usefulness of microteaching method and they have perceived that microteaching imparts creativity among students. This is in concordance with study conducted by Shilpashree, where they mentioned that all the students acknowledged the usefulness of feedback and 44.4% felt it as the most useful part of the workshop.^[22]

Limitations

Limitations of this study were relatively smaller size of subject, disproportionate sample size and bias of intelligence level of the students could not be categorised, possibility that even a brief previous information might affect the results, it could reflect light on our comprehension of the students' preferences involved in microteaching.

CONCLUSION

Active learning is a critical tool for facilitating learning in the classroom. Development of critical thinking and interpersonal skills along with communication is the key to efficient learning. The performance and participation of the students were very much encouraging. In the present study, the association of various sub-components of planning, set induction, presentation, questioning, non-verbal clues, use of AV aids and others were significantly associated with the intervention group than the control group which shows the effectiveness of methodology of microteaching in routine seminars which will help in improving the all the domains of learning and delivering the contents. Microteaching

methodology facilitated learning as it ensured active participation from the students, was interesting, interactive and innovative. It provoked interest in topic, helped them to come prepared and also improved their presentation and communication skills.

Recommendations

The student seminars can be made more effective by improving the presentation skills of the students by training them through principles of microteaching.

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Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Medical Council of India. Curriculum Implementation Support Program of the Competency Based Undergraduate Medical Education Curriculum. New Delhi: Medical Council of India; 2019.
2. Patel JR, Patel DS, Desai R, Parmar J, Thaker R, Patel ND. Evaluation of student seminar in medical education: Students' perspective. *Int J Cur Res Rev* 2015;7:6-9.
3. University of Arizona Teaching Teams Program. How to Create Learner-centered Courses with Teaching Teams: A Faculty Resource Manual for Participants in the Teaching Teams Program and the Einstein's Protégés Program; 2004. Arizona: University of Arizona. Available from: <http://www.teachingteams.arizona.edu/manual.htm>. [Last accessed on 2017 Apr 10].
4. Masters K. Edgar Dale's Pyramid of Learning in medical education: A literature review. *Med Teach* 2013;35:e1584-93.
5. Dandavino M, Snell L, Wiseman J. Why medical students should learn how to teach. *Med Teach* 2007;29:558-65.
6. Faizan M, Tidke P, Khan MS, Barick D. Microteaching of MBBS students presenting seminars: An observational study. *Int J Sci Stud* 2014;2:15-9.
7. Palappallil DS, Sushama J, Ramnath SN. Effectiveness of modified seminars as a teaching-learning method in pharmacology. *Int J Appl Basic Med Res* 2016;6:195-200.
8. Ralph EG. The effectiveness of microteaching: Five years' findings. *Int J Hum Soc Sci Educ* 2014;1:17-28.
9. Campos-Sánchez A, Martn-Piedra MA, Carriel V, González-Andrades M, Garzón I, Sánchez-Quevedo MC, *et al.* Reception learning and self-discovery learning in histology: Students' perceptions and their implications for assessing the effectiveness of different learning modalities. *Anat Sci Educ* 2012;5:273-80.
10. Campos-Sánchez A, Sánchez-Quevedo M, Crespo-Ferrer P, García-López J, Alaminos M. Microteaching as a self-learning tool. Students' perceptions in the preparation and exposition of a micro-lesson in a tissue engineering course. *J Technol Sci Educ* 2013;3:3926.
11. Gomathi KG, Ishtiyag AS, Venkatramana M. Student-led seminars as a teaching-learning method: Evidence of effectiveness of a modified format. *Gulf Med J* 2012;8:82-4.
12. Srivastava TK, Waghmare LS. Interactive intra-group tutorials: A modification to suit the challenges of physiology tutorial in rural medical schools. *Natl J Physiol Pharm Pharmacol* 2014; 4:128-31.
13. Palappallil DS. Attitude of interns and students on teaching and learning methodologies in pharmacology. *Int J Pharmacol Ther* 2015;5:1-7.
14. De Jong Z, van Nies JA, Peters SW, Vink S, Dekker FW, Scherpbier A. Interactive seminars or small group tutorials in preclinical medical education: Results of a randomized controlled trial. *BMC Med Educ* 2010;10:79.
15. Adam DP, Sylvain C, Bruce W, Deirdre J, Kelly B, Shannon L, Kevin M. Involvement in teaching improves learning in medical students: A randomized cross-over study. *BMC Med Educ* 2009;9:55.
16. Sana E. Improving teaching through microteaching. *Ann Acad Med Singapore* 2007;36:452-3.
17. Suryawanshi SP, Sahsrabudhe RA, Pandit VA, Dawane JS, Mate V. Application of microteaching principles to improve teaching skills of postgraduate students in department of pharmacology. *Int J Health Sci Res* 2016;6:195-200.
18. Roush RE. Being "on stage": Improving platform presentation skills with microteaching exercises and feedback. *Gerontol Geriatr Educ* 2008;29:248-56.
19. Handfield-Jones R, Nasmith L, Steinert Y, Lawn N. Creativity in medical education: The use of innovative techniques in clinical teaching. *J Med Teacher* 1993;15:3-10.
20. Omar S, Mehdi MD. Departmental exercise based on microteaching and its utility in personal teaching skill improvement of trainee teachers. *J Evid Based Med Healthc* 2014;1:65-8.
21. Banga CL. Microteaching, an efficient technique for learning effective teaching. 2014;2:2206-11.
22. Dhananjaya SY, Nusrath A. Effectiveness of a microteaching workshop designed to improve the teaching performance of post graduate medical students. *Int J Res Med Sci* 2018;6:1982-5.

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