



## Effectiveness of microteaching as a method of developing teaching competence among in-service medical teachers

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### Abstract

**Introduction:** In spite of the fact that microteaching has been practiced extensively in most universities, its actual efficacy has not been studied systematically. In this study, there was an attempt to quantify the efficacy of microteaching in inducing behavioral change in teachers. We also aimed to determine the perceived utility and ease of this process in teacher training, using the feedback received from the participants. This feedback along with efficacy can collectively predict the effectiveness of microteaching.

**Methods:** A prospective experimental study was designed using a convenient sample of 30 faculty volunteers. After the institutional ethics committee approval, the videos of pre-microteaching and post-microteaching sessions from the 30 participants undergoing 5 sessions of microteaching were graded with a seven point teaching competency scale and the participant's perceived usefulness and perceived ease of use was studied using a validated questionnaire. Paired sample t-test was used to determine the efficacy of the study.

**Results:** Microteaching showed a statistically significant improvement among the behavior of the participants after five sessions of microteaching. All the parameters in the scale showed a statistically significant improvement. Though the participants felt that this method was useful, the majority of them felt it is a very time consuming process requiring resources.

**Conclusion:** Hence, the overall effectiveness in in-service teaching process was limited for microteaching in this current scenario; though microteaching induced positive behaviour change, it was time consuming and also it was difficult to arrange a peer group to enrol.

**Keywords:** Microteaching, Efficacy, Usefulness, Effectiveness, Teacher training

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### Introduction

Teaching in medical schools in our country is done without any formal training similar to many other important aspects of our life like marriage or parenting, not recognizing the complexities involved in these processes. Most teachers are directly pushed into teaching and over a period of time gain experience (1, 2). Although western countries have recognized

this long before (3), we have only in recent times recognized this flaw. A newer process of in-service training of the faculty has been initiated by the medical council of India.

Microteaching was introduced by Allen and Ryan in 1960 at Stanford University as a technique for learning teaching skill in a scaled down teaching encounter where teachers could practice already known skills and also learn newer skills (3, 4).

The Stanford process involved steps to plan, teach, observe, re-plan, re-teach and re-observe (5, 6). It required the teachers to demonstrate their teaching skill among the peers or supervisors who would evaluate the teacher's performance and suggest corrective measures. This would be followed by a re-teaching session in which the teacher would attempt to incorporate the suggestions (3-6). This technique came up with a set of promising advantages over normal classroom teaching and other learning tool. Few important advantages of microteaching are as follows:

- It was more practically oriented as it required the teacher to perform the tasks.
- It was a scaled down process with few students and 4-6 peers which could be used to build confidence in young teachers.
- Teachers could safely experiment new techniques without any risk for students.
- Effective feedback and self-reflective learning from viewing one's own videos of teaching was encouraged.
- Positive criticism taken in the right spirit could improve the teaching skills of the teacher.

Though microteaching had been effectively conducted in many pre-service teaching programmes by various universities across the world, its acceptance in in-service situations was limited (7). Allan and Ryan have also commented that microteaching had promises and dangers similar to any newly devised research and training technique. It could open new avenues and prospects or expose everyone to the risk of accepting something which was created purely out of chance and convenience (8).

Over time, it became evident that this Stanford process of microteaching was not very successful with in-service scenarios. Teachers felt that the checklists created to scale the teacher's performance were turning to be very extensive and threatening. The process was described to be more mechanical and concentrated more on training teachers than educating them. It was strongly felt that microteaching trained the teachers to perform in a way which the trainers felt was good for the teachers (1).

Thus, microteaching technique was later modified for in-service teachers as 21<sup>st</sup> century microteaching (MT2) by making the feedback process more acceptable and non-threatening (1). Instead of a checklist for the supervisors, a more objective 2+2 feedback by peers was introduced. The peers and the teachers each had to suggest two strengths to fortify and two suggestions to improve teaching. There was also an implicit shift from a behavioral to a cognitive philosophy, in that MT2 took away the pre-decided response

from teachers and allowed them to reflect on their teaching behavior. It was also not necessary to have the re-teach session in the same session. The whole process of microteaching was designed to harbor reflective learning among the teachers. Even with this welcome change, microteaching has not been effectively implemented.

On conducting a thorough literature search on Google Scholar, Pub Med & Google search, using key words like microteaching, efficacy, effectiveness etc, we have come to a conclusion that the effectiveness of microteaching in its current form has not been studied. Most of the literature hypothesizes its benefits, while few studies published on its efficacy comment only on its perceived usefulness. Studies have been primarily conducted among pre-service teachers or among in-service teachers in primary or secondary education (1, 5, 7). The effectiveness of this method in training medical teachers has not been studied (5).

Success of a method not only depends on its efficacy to achieve its goal or target, but also depends on its perceived ease of use and its perceived utility (1). This can collectively determine the effectiveness of a process or system in achieving its goals. In the case of microteaching, although it has been practiced extensively in most universities, its actual efficacy has not been studied systematically. This is probably further complicated by the fact that grading teaching competencies in a very objective way has not been possible.

Here the aim of our study was to attempt to quantify the efficacy of microteaching in inducing behavioral change in teachers by comparing their teaching skills before and after the microteaching exercise, using a seven point scale similar to the one used by Stanford teaching competency scale (9). We also attempted to determine the perceived utility and ease of this process in teacher training using a feedback received from the participants. This feedback along with efficacy can collectively predict the effectiveness of microteaching.

## Methods

A prospective experimental study using a convenient sample of 30 faculties was conducted in Shri Sathya Sai Medical and research institute over a period of six months. After obtaining the ethical committee approval from the institutional ethics committee, we advertised to recruit 30 faculty of the college who volunteered to participate in this study. Informed consent from the entire faculty was obtained. The data collected from the volunteers were kept confidential all along the process. All the participants had the

right to withdraw during any phase of the study.

#### Materials required

- Sound proof room with seating arrangements to set up the microteaching lab
- Audio visual aids for the microteaching facility
- Video recording facility for the teaching sessions
- Computer for analysis and tabulation of the data
- Television set for viewing the recorded videos

#### Procedure of data collection

Thirty faculty volunteers were divided randomly into five groups of six participants each. All faculty volunteers were individually asked to engage a class for 25 second year medical students on a topic of their choice for 15 minutes using a power point as the audio visual aid. This process was videotaped as the Pre-MT2 recording. The recording was further graded by three supervisors, who were experts experienced and trained in medical education technology, using a seven point scale similar to the one used by Stanford teaching competency scale (9) (Figure 1). Stanford teaching competency scale grades different teaching competencies with a seven point score similar to Likert scale. This

has been standardized and used to access and provide feedback on microteaching in Stanford microteaching sessions. It grades the interns participating in the microteaching sessions under thirteen different observable behaviours during a presentation (9).

After this process the five groups separately took part in five sessions of Microteaching (MT2) with a one week interval. Each microteaching session required all the participants to present a topic of their own choice for 10 minutes, using power point presentation as the A-V aid. The presentation was recorded followed by peer group discussion where the participants used a 2+2 approach for feedback on self and each other. The peer group consisted of randomly selected faculties from different specialities including assistant professors, associate professors, and professors. Each participant then got to see his/her own presentation video for self assessment. Each participant was encouraged to identify at least two skills that he would like to improve in his teaching by the next session for re-teach after one week. The presentations made by the participants were again discussed in the peer group who provided two positive comments to reinforce the teaching and two suggestions to improve. All the participants underwent five such sessions.

After the fifth session, the participants again individually engaged a class of 25 second year medical students for a 15 minute session which was recorded as the post- MT2 teaching recording. This was subjected to grading by three supervisors using a seven point scale similar to the one used by Stanford teaching competency scale. The average of the scores obtained by the participants in the Pre-MT2 and Post-MT2 Recording were tabulated and analyzed for improvement. Statistical significance of the results was reported using Paired sample T-test with SPSS version 23 statistical analysis software. This determined the efficacy of microteaching in developing teaching competencies. Feedback from the participants about the perceived usefulness and perceived ease of microteaching was also collected using a validated questionnaire and analyzed using SPSS, version 23 Face validity of the questionnaire was measured for clarity of the questions, relevance to the objectives, repetition, and use of technical terms. The feedback was reported in the form of frequency and percentage. This feedback, along with efficacy, collectively provides a measure of the effectiveness of microteaching.

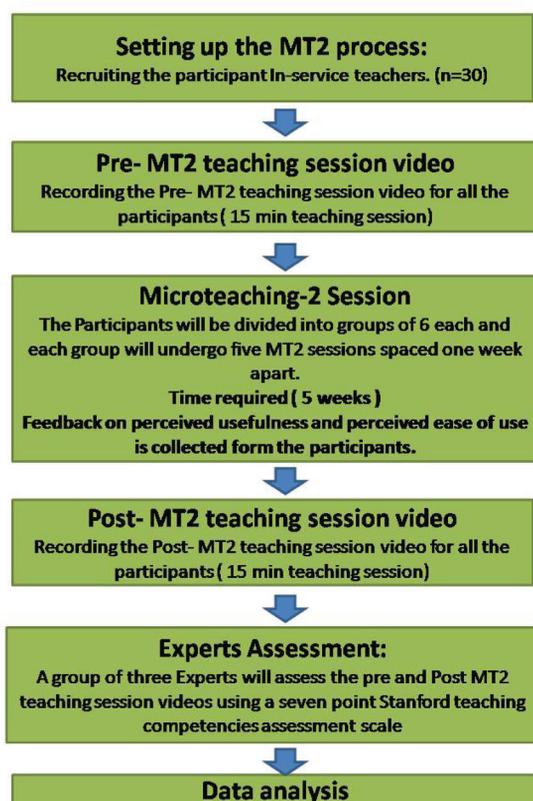


Figure 1: Flowchart showing the data collection process

#### Results

In this study, thirty in-service faculty volunteers (convenient sample) of the institute

consisting of 3 professors, 8 associate professors, 14 assistant professors and 5 tutors participated in this study. The study group consisted of 20 male faculties and 10 females. The participants' age ranged from 30 years to 55 years with a mean of 38.4 years. All the participants underwent five sessions of microteaching with one week intervals. Pre- microteaching and post-microteaching videos of 15 minutes were each graded by three senior professors using a Seven Point Stanford Teaching Competency Grading Scale.

### Efficacy of microteaching

Tables 1 and 2 present the analysis of the efficacy of microteaching in improving the skills of the teacher. As shown in the Table, six components of an ideal teaching session were graded under nineteen sub-tasks based on a seven point scale by three independent supervisors. The difference in the scores for the pre-microteaching and post-microteaching was used to determine the change in the participants' teaching behavior. From the data presented in this Table, it can be noted that there was a statistically significant improvement among the behavior of the participants after five sessions of microteaching. The mean scores of all the participants showed improvement.

### Perceived usefulness of microteaching

Table 3 presents the finding of the feedback collected regarding the perceived usefulness of

the microteaching sessions using a validated questionnaire. It can be noted that all the participants felt that microteaching can help improve the teaching skills and teacher quality. Contrary to this, only 40% of the participants felt microteaching could improve their performance as a teacher. Only 40% of the participants felt that the peer criticism was effective.

### Perceived ease of use

Table 4 displays the data of the feedback collected from the participants regarding the ease of use of microteaching as a learning tool for teachers using a validated questionnaire. From the Table it can be noted that though 80% of the participants felt that it was easy to put together a peer group only 40% felt that it was easy to put together the resources. Similarly, the participants felt that it was difficult to find sufficient time and effort to run the sessions.

## Discussion

Thirty in-service medical teachers underwent five sessions of microteaching with an interval of one week, during which they were allowed to watch their own presentation and also received peer feedback on what can be improved in their teaching. The pre-microteaching and post-microteaching videos of all the participants were graded by three independent experts using a seven point scale on six components. As shown

**Table 1:** Efficacy of microteaching in learning and improving teaching competencies

Components tested	Tasked graded by the supervisors	Improved (%)	No change (%)	Deteriorated (%)
Set induction	1.1 Aroused interest in the beginning by relation to previous learning, throwing a new idea, questioning etc.	40% (12)	60% (18)	0
	1.2 Specified the objectives of presentation	100% (30)	0	0
Planning	2.1 Organized material in a logical sequence	80% (24)	20% (6)	0
	2.2 Used relevant content matter	40% (12)	60% (18)	0
	2.3 Spacing of the content was appropriate with the time	80% (24)	20% (6)	0
Presentation	3.1 Changed the pace of presentation by shifting emphasis, jokes etc.	60% (18)	40% (12)	0
	3.2 Used specific example to illustrate main ideas	40% (12)	60% (18)	0
	3.3 Used non-verbal cues, eye contact etc.	60% (18)	40% (12)	0
	3.4 Clarity of content present	80% (24)	20% (6)	0
	3.5 Presentation justified all learning objectives	80% (24)	20% (6)	0
Use of AV aids (Power point)	4.1 Stimulus variation	80% (24)	20% (6)	0
	4.2 Used the aid (s) effectively	80% (24)	20% (6)	0
	4.3 Was comfortable/ well acquainted with the A-V aid	60% (18)	40% (12)	0
Pupil participation	5.1 Allowed questions from students	80% (24)	20% (6)	0
	5.2 Asked questions	80% (24)	20% (6)	0
	5.3 Solicited/ raised questions	40% (12)	40% (12)	20% (6)
	5.4 Rewarded pupil effort	40% (12)	60% (18)	0
Closure	6.1 Summarized most important points at the end of the session	80% (24)	20% (6)	0
	6.2 Provided a consolidated concept	80% (24)	20% (6)	0
Collective effectiveness of the presentation		60% (18)	40% (12)	0
Average score		100% (30)	0	0

**Table 2:** Mean score of the participants in pre- and post-MT video assessment

			Statistical significance ( Paired sample t test)			
			Mean score Pre MT	Mean score Post MT	Difference of means	Sig.
Set induction	1.1	Aroused interest in the beginning by relation to previous learning, throwing a new idea, questioning	4.1724	4.7931	0.6207	T (29)=4.06 P<0.000
	1.2	Specified the objectives of presentation	2.8000	4.0000	1.2000	T (29)=16.1 P<0.000
Planning	2.1	Organized material in a logical sequence	3.8000	5.0000	1.2000	T (29)=8.6 P<0.000
	2.2	Used relevant content matter	4.0000	4.6000	0.6000	T (29)=4.3 P<0.000
	2.3	Spacing of the content was appropriate with the time	3.4000	4.6000	1.2000	T (29)=8.6 P<0.000
Presentation	3.1	Changed the pace of presentation by shifting emphasis, jokes etc.	3.4000	4.6000	1.2000	T (29)=5.51 P<0.000
	3.2	Used specific example to illustrate main ideas	4.0000	4.8000	0.8000	T (29)=5.7 P<0.000
	3.3	Used non-verbal cues, eye contact etc.	4.0000	5.0000	1.0000	T (29)=6.01 P<0.000
	3.4	Clarity of content present	4.2000	5.4000	1.2000	T (29)=8.6 P<0.000
	3.5	Presentation justified all learning objectives	3.6000	4.8000	1.2000	T (29)=4.8 P<0.000
Use of AV aids (Power point)	4.1	Stimulus variation	3.2000	4.6000	1.4000	T (29)=15.4 P<0.000
	4.2	Used the aid (s) effectively	3.6000	4.8000	1.2000	T (29)=8.6 P<0.000
	4.3	Was comfortable/ well acquainted with the A-V aid	3.6000	4.6000	1.0000	T (29)=6.02 P<0.000
Pupil participation	5.1	Allowed questions from students	3.2000	4.4000	1.2000	T (29)=8.6 P<0.000
	5.2	Asked questions	4.0000	4.6000	0.6000	T (29)=3.1 P<0.004
	5.3	Solicited/ raised questions	3.6000	4.0000	0.4000	T (29)=2.1 P<0.043
	5.4	Rewarded pupil effort	3.6000	4.2000	0.6000	T (29)=4.03 P<0.000
Closure	6.1	Summarized most important points at the end of the session	3.4000	4.4000	1.0000	T (29)=8.5 P<0.000
	6.2	Provided a consolidated concept	3.4000	4.6000	1.2000	T (29)= 8.6 P<0.000
Collective effectiveness of the presentation			4.2000	4.8000	0.6000	T (29)= 6.8 P<0.000
Average score			3.6800	4.4600	0.7800	T (29)= 11.2 P<0.000

**Table 3:** Feedback regarding the microteaching sessions: Perceived usefulness (N=30)

Feedback	Likely %	To some extent %	Unlikely %
Using the system in my job would enable me to improve my skills more efficiently.	100% (30)	0	0
Using the system would improve my performance as a teacher.	40% (12)	60% (18)	0
Using the system in my job would improve my quality.	100% (30)	0	0
Using the system would enhance my effectiveness as a teacher.	100% (30)	0	0
Using the system would make it easier to learn new skills.	80% (24)	20% (6)	0
I would find the a system useful learning tool.	60% (18)	40% (12)	0
Criticism received from the peers will guide me in improving my standards.	40% (12)	60% (18)	0

**Table 4:** Feedback regarding the microteaching sessions: Perceived Ease of use (N=30)

Feedback	Likely	To some extent	Unlikely
Easy to put together all the resources	40% (12)	40% (12)	20% (6)
Can find likeminded people to give feed back	80% (24)	20% (6)	0%
Does require much of your personal time	20% (6)	80% (24)	0%
Does justice to the invested time and effort	40% (12)	60% (18)	0%
Overall process is very easy	40% (12)	60% (18)	0%
Would you attend frequent sessions of microteaching (one a week)	40% (12)	60% (18)	0%

in Table 2 which presents the analysis of these scores, the efficacy of microteaching in inducing behavioural change among the participants is revealed. It can be clearly observed that there

has been improvement in the performance of all the participants as rated by our experts as the mean scores of all the participants improved. Most of the components showed a statistically

significant improvement in the performance of the teachers after five consecutive sessions. 60% of the participants were rated to have a better post-microteaching presentation, thus proving its efficacy in inducing change in behavior. This was similar to the findings of other researches like Chen et al. (10) and Mergler et al. (7).

From the feedback report presented in Table 3 on the usefulness of microteaching, it can be observed that the participants felt that microteaching was definitely useful in improving their skills and can be used as a learning tool for teachers. However, what is interesting in this scenario is that the teachers did not value the peer feedback they received. This seems strange as microteaching is designed primarily to be able to receive feedback on one's performance. On further enquiring, it was unanimously felt by all participants that watching their own presentation videos was primarily useful in self-introspection and reflection on one's performance. All participants felt it was very important to provide recordings of their presentation for microteaching to be effective.

This was a finding similar to many previous studies on microteaching and video feedback (4, 10, 11). Studies reported by Perlberg et al. (4), Chen et al. (10) and Burnard et al. (11) clearly suggest that the faculty exposed to video feedback showed far better progress than those exposed to only peer feedback. Video helps the teacher to view and self-reflect on his/her own performance. They can also serve as a measure of progress and hence serve as a very strong trigger for behavioral change.

Table 4 presents the results of feedback collected on the ease of use of microteaching. It can be noted from the Table that although 80% of the participants felt that it was likely to find a peers group that is interested in Microteaching, majority were not sure if the resources for microteaching can be easily installed. 20% of them also felt that it was unlikely that the resources could be put together. The participants felt that it would take too much of their personal time; hence, it would be difficult to put up with frequent microteaching sessions in an in-service scenario. Only 40% were likely to attend microteaching sessions even once a week. Given previous studies by various researchers like Fortune et al. (3), Perlberg et al. (4), Amanda et al. (7), Chen et al. (10) and Burnard et al. (11), the findings of our study reflect a similar note that the resources and time required for microteaching session are not easy to generate. Therefore, although it is found to be a very efficient method of learning teaching skill, it has not been adopted properly.

For microteaching to be a successful learning

tool, it is very essential to adopt a format where there is a flexibility of time even if the resources are always in place. Currently, the microteaching has not been effective in the in-service format primarily because of the lack of time. This probably can be addressed if the personal peer feedback can be replaced with peer feedback through recorded videos. The microteaching sessions can be recorded and the videos given to peers participating in microteaching to be viewed at their convenience. This would solve the necessity of finding a common session time where all the participants get together. This would complete the feedback process. By doing this, the acceptability of microteaching would increase and with that the overall effectiveness of this efficient method of learning teaching skills would increase.

### Conclusion

Microteaching is a very efficient learning tool for improving one's teaching skills. However, this tool has not been very popular because it is difficult to find the resources required and coordinate the time for all the participants, especially in an in-service scenario. However, the participants appreciate its usefulness.

For microteaching to be a successful format, we need to address these primary issues. This can probably be achieved by eliminating the need for the participants to sit together at one single time. Video recording of the teaching sessions to be viewed by the peers and self is very efficient means to generate feedback. This has been well appreciated as the most effective element of microteaching.

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