Title: From Student to Teacher: Medical Student Perceptions of Teaching Children and a Novel Application of the One Minute Preceptor

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Discussion Points:

1. Medical students as teachers of children and other non-peer learners
2. How do medical students feel about their training to be teachers?
3. Can the One Minute Preceptor be used to teach students how to teach?
4. How do medical students feel about the One Minute Preceptor?
5. Should medical students receive formal training regarding how to teach?

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ABSTRACT.

Background: As students progress through medical school, the student assumes teaching roles, but without formal training regarding how to teach.

Methods: We administered surveys to 1st, 2nd and 4th year medical students asking about perceptions of teaching. The surveys were completed in the Fall (2019) and again in late Spring (2020). In the interim, students were given the opportunity to teach 5th graders during an outreach program. We gave the medical student volunteers a brief interactive session about the One Minute Preceptor (OMP) as a tool to teach the children. In the Spring survey, medical students who used the OMP were also asked about its utility in the pediatric setting.

Results: Seventy-four students completed survey 1 and, of these, 51 completed the follow-up survey. Mean age was 24-27; 57% were female. Across both surveys, ≥70% were comfortable with and felt they understood their role as a teacher of trainees, peers and patients. However, <50% felt they knew any teaching method or had a plan for improving teaching skills. All felt that teaching was an important medical skill. Six students completed OMP training and the outreach program. All felt the OMP was useful to teach key points, provide feedback, and involve the learner. They also all felt the OMP should be taught in medical school.

Conclusion: Medical students believe it is important to learn teaching skills. The OMP may be a useful addition to the medical school curriculum to help medical students teach in doctor-patient settings across ages and group sizes.

Key Words: One Minute Preceptor, Teaching, Medical students, Curriculum (Source: MeSH-NLM).

INTRODUCTION.

The average medical student spends over twenty years acquiring as much knowledge and skills as humanly possible. During medical training, the student's role completely shifts as they enter the clinical years and progress to residency. The student *becomes* the teacher. Through both positive and negative educational experiences, the student begins to form an idea of what makes a good teacher, though the student never *formally* learned how to become a teacher. One might argue that learning this skill is not necessary until residency begins, hence the plethora of resident as teacher programs throughout the USA as mandated by the Accreditation Council for Graduate Medical Education. The counter argument, however, is that during medical school, students are *informally* learning important history, physical, documentation, social, and emotional skills to be effective residents, so why not formally train them as teachers during medical school as well? Opportunities for teaching peers, younger classmates, other healthcare professionals, and patients are ubiquitous throughout medical school. Thus, the training of physicians as teachers could begin in medical school. Currently, however, it is unclear how medical students feel about the importance of having formal teaching training added to their curriculum. More importantly, the ideal framework to deliver efficient, effective training in clinical teaching is unclear.

One well known teaching model utilized to guide faculty and resident teachers is the One Minute Preceptor (OMP). This is a five-step method originally developed in 1992 with the primarily goal of improving effectiveness and efficiency in clinical teaching. The OMP is quick to learn and easily remembered as the following five steps: 1) get a commitment from the learner, 2) probe for supporting evidence, 3) teach general rules, 4) reinforce what's done well, 5) correct mistakes. [1] While there are many other teaching models in the medical education realm, the OMP was chosen in this study because it can be utilized in under five minutes and due to its wide use throughout the USA. This model has been extensively studied in various countries in a variety of specialties from family medicine to pediatrics, emergency medicine, internal medicine, psychiatry, and gynecology.[2] Results from residents and attending surveys of perceptions and use of the OMP show that it is felt to be useful for a) teaching efficiently and in a student-focused manner, b) focusing on specific and limited take home points, c) improving the teacher's ability to rate students' competencies, and d) increasing the teacher's teaching skills and confidence. [1, 3-6] Furthermore, the OMP can be effectively applied to physician teachers at any level, given that the model is flexible to adaptation based on abilities of both teacher and student. [7] Once taught, the OMP is repeatedly used in teaching interactions and has been formally incorporated into several residency training curricula as part of the resident as teacher series. [1, 3-6] From the learner perspective, medical students being taught by physicians using the OMP method prefer it over traditional clinical interactions, citing it as more interactive, intellectually inspiring, and effective. [8] However, to date there is no literature on *medical students* utilizing the OMP to *teach others*. Furthermore, studies have not explored the effectiveness of using the OMP with groups of learners instead of one on one, as is commonly encountered during clinical settings, or with children as the learners.

Therefore, given the need for expanding medical student education to include how to be an effective teacher, the strong support for the OMP's use in clinical teaching, and the notion that the model can be adapted to any level based on teacher and student abilities, we aim to teach medical students about the OMP and assess their

perceptions on its use in teaching children and teaching in group settings. We will also determine medical students' background perspectives on teaching, including comfort level with teaching, motivating factors for participating in an outreach program to teach children, and their perceived importance of formal training to teach in their curriculum.

MATERIALS AND METHODS.

Overview

We performed a descriptive pre and post-intervention survey study of medical students to understand perspectives on teaching, drivers of motivation to teach and opinions regarding the effectiveness of the OMP as a teaching tool for them (Figure 1). This study was conducted over the 2019-2020 academic year at the University of Florida Medical School. The University of Florida Institutional Review Board approved this study under number 201902111 and participants provided written performed consent before enrolling in this study.

Study Population

All members of the University of Florida College of Medicine Classes of 2020, 2022, and 2023 were given the option to participate in this before and after survey study. The class of 2021 was excluded due to their busy schedule and clinical obligations during their third-year clerkship experiences. There were 74 total participants, aging from 21-32, with students in all years of medical school (1,2,3 and 4).

Recruitment and Enrollment

We gave a short, in-person description of the project to medical students in the class of 2022 and 2023 at the beginning of one of their lectures in the Fall of 2019 (Figure 1). The purpose, duration, risks, benefits, alternatives and security of data was discussed with the students and any questions were answered. We then told them to expect an email later in the day with a link to the electronic informed consent form. The same process was repeated, but completely in electronic form, for the class of 2020 due to their 4th year schedules being very spatially spread out. The students then were able to read about the study again as well as the consent form and, if they chose, electronically consent using Research Electronic Data Capture (Redcap). Following the consent process, students were immediately directed to Survey 1.

Intervention

The experimental group consisted of subjects who self-selected to participate in an annual outreach program. In this program, University of Florida medical students spend 3-4 hours teaching local 5th grade students at one school about the cardiovascular system during the Spring semester. The intervention was as follows: students were given the option to attend a brief (5-10 minute) pre-program presentation in which they could learn about and practice the OMP. The format of this presentation was designed based on literature that suggests a combination of video examples, didactic lecturing, active role playing, and discussion is helpful in teaching the OMP method to others. [3,11] The presentation began by emailing out two optional clinical teaching videos from YouTube—one reflecting a traditional approach and one reflecting the OMP approach.[12,13] Using the OMP method, the authors gave email prompts for the group of students to identify the differences between the two videos. For in-person instruction, on the morning of the teaching event, the medical students received a 5-minute didactic PowerPoint presentation on the OMP followed by brief review of an example of using the OMP in a clinical setting. [11, 14] Then, students participated in four active role-playing scenarios and scripts, of increasing difficulty, using relevant 5th grade cardiovascular examples to practice using the OMP. The medical students were then encouraged to use the OMP when teaching the cardiovascular lesson to the 5th grade students that day.

Measurements

Survey 1

Using REDCap's online survey platform, we asked medical students to rate their perceptions and comfort levels in teaching on a 5-point Likert scale (Survey1) as in similar prior studies. [9,10] Survey 1 also gathered demographic information to help understand subject baseline characteristics that could influence their perceptions of teaching and desires to teach children. This survey was given immediately following recruitment and enrollment, at the beginning of the academic year (See Figure 1).

Survey 2

A few days after the intervention, a follow up survey (survey 2) was administered to all of the subjects, both those who participated in the intervention (experimental group) and those who did not but completed survey 1 (controls) (Figure 1). This survey repeated the same questions on the self-assessment of teaching comfort and views to see if those naturally changed over time or improved with the OMP intervention. Further, for the experimental group, we asked about the effectiveness of the OMP preprogram PowerPoint, the use of teaching the OMP to all medical students, their ability to use OMP in group teaching, and the overall effectiveness for teaching students with the OMP using a Likert scale and questions from previous studies of OMP effectiveness.[4]

Analytic approach

Because only 6 students participated in the intervention, we proceeded with a descriptive approach. First, we summarized Survey 1 responses from overall respondents, regardless of completion of survey 2 using counts and proportions for categories of demographics. We collapsed categories of Likert Scale responses into proportion responding agree/strongly agree vs neutral/disagree/strongly disagree due to skewed distribution of responses and for ease of presentation. We then created a table of similar data for those who only completed survey 1 and those who completed both surveys to visually inspect for any large differences. Finally, we display changes in Survey 1 and Survey 2 responses between those who completed both surveys but did not participate in the intervention (controls) and those who did participate in the intervention (experimental).

RESULTS.

Demographics

Seventy-four medical students consented and participated in the Survey 1, of which 69% (n=51) completed the follow up, Survey 2 (Table 1). Six of those 51 who completed both surveys self-selected to participate in the teaching outreach day where they learned about and used the OMP (experimental group). The remaining 45 participants are noted as the control group. The demographics, shown in Table 1, illustrate the participants' amount of potential baseline exposure to teaching and working with children in past or future. Additionally, Table 1 illustrates some demographic differences between the experimental and control group, most notably in the distributions of age, gender, and prior history professionally working with pediatric patients, which may influence the results presented later.

Perspectives on Teaching

Table 2 displays responses to Survey 1 questions about perspectives on teaching among all participants, and Survey 1 and 2 responses by experimental versus comparator group. Overall, there were no substantial differences in baseline (Survey 1) perspectives on teaching between the group that took only survey 1 compared to those that completed both surveys (less than 15% in all categories). At baseline, >80% of participants felt comfortable with and understood their role in teaching future medical students, patients and peers though fewer felt confident about their role relative to teaching peers (72%). Less than half of participants felt they could apply at least 2 different teaching methods (46%, n=34) or help others become better teachers (38%, n=28), and even fewer (24%, n=18) felt they could describe and evaluate the methods they use or plan for improving their skills. Only 57% (n=42) of students felt that their teaching skills would be described as good. All students highly valued and believed that teaching is an important skill and is important for professional development.

When comparing experimental and control groups, at baseline more students in the experimental group felt they understood their role in teaching younger students(100% vs 82%) and peers (83% vs 67%). The experimental group also more frequently felt they could help others improve their teaching skills (67% vs 29%), were comfortable teaching younger students (100% vs 78%), patients (100% vs 78%) and children (100% vs 76%), and perceived their teaching skills as being good (83% vs 55%).

We found that, in general, over the course of an academic year medical student confidence in teaching increased (Table 2). More students in both the experimental and comparator groups had knowledge of and were able to apply multiple different teaching methods (increased 34% and 22% respectively), had plans for improving their own teaching strategies (increases 33% and 11% respectively), and were comfortable teaching peers (increased 16% and 14% respectively). More students in the comparator group increased their understanding of their role in teaching peers by the end of the year (67% -> 84%), achieving a similar percent as the experimental group's baseline (83%). More students who learned about the OMP (the experimental group) felt comfortable helping others become better teachers by the end of the year (increased by 33%) compared to the control group whose perception on the same topic did not change. After the course of a year, fewer students in both the control and experimental group rated their self-perceived teaching skills as good (decreased by 6% and 16% respectively). Additionally, compared to their own perceptions at the beginning of the year, the students who learned the OMP (experimental group) had an increase in their ability and desire to

help others become better teachers (67% -> 100%). When the control group was asked this same question, their confidence in and desire to become better teachers were lower at baseline and did not change over the course of this year (29% ->31%).

Perspectives on OMP

To understand if the experimental group liked or disliked the OMP, the group rated their level of agreement with a series of statements, resulting in Table 3. 100% (n=6) found it was a useful method for teaching elementary school students, an effective and efficient teaching tool, and were overall satisfied with the teaching tool. When asked why it was effective, 100% (n=6) noted it was quick to use, 67% (n=4) noted its structure was helpful, and 50% (n=3) noted it being learner focused. Due to the nature of teaching 5th graders, the medical students had the opportunity to use the OMP in both individual and group settings. 67% (n=4) of the students said it was an effective tool in groups but when asked if it was easier to be used in groups or with individual students, 67% (n=6) said it is easier with individuals while the others said it worked equally well. Also, 83% (n=5) felt that initiating "ascertainment of commitment" from the learner was challenging to do in this setting. Nevertheless, 100% of the students said they will use the OMP when working with future children patients, future adult patients, and future students.

All students in the experimental group stated that the OMP should be taught to medical students, saying it "is an easy, helpful way to explore a learner's thought patterns and guide them to a more beneficial pattern"; "provides a method for engaging a small audience"; and "if nothing else, it helps to orient towards a mindset that facilitates insight into teaching methods." Figure 2 shows the results of when in the medical school curriculum students think they should learn the OMP.

DISCUSSION.

We found that medical students place high value on their role as teachers in medicine, and subsequently desire to develop their teaching skills throughout their professional careers. However, they lack an armamentarium of teaching tools and do not have a plan for or understanding of how they will learn to teach. When we introduced a small group of medical students to the OMP, they found it to be a useful teaching strategy. They felt it was an effective method for teaching the pediatric population, suggesting a potential application of the OMP beyond traditional settings (older physician to younger physician/student). Finally, they thought the OMP should be taught to all medical students.

While medical students might not directly state their love of teaching as their motivation for pursuing medicine, teaching is intimately tied to the most cited rationale- the desire to help people.[16] These students have been in school long enough and likely understand the value of a good teacher and therefore aim to emulate those positive characteristics they have seen. Because of the busy nature of medicine, some knowledge is gathered from on-the-go teaching from residents or faculty; in fact, surveys have shown that the majority of medical students attribute about one third of what they have learned to resident teachers.[17] This cycle of acquiring knowledge from more senior trainees and faculty inspires students to value their own role as teachers; indeed, studies show over 80% of medical students desire to teach students in their career.[17] Students in our study had similar values, with all students surveyed placing high value on the role of teaching in medicine and developing teaching skills throughout their professional careers. However, though there is a desire to learn how to teach as well as ample opportunity to practice teaching, instruction in formal teaching methods is not required as part of the medical school curriculum. Since the 1990s, there has been an increasing number of medical teaching electives offered, but none are mandatory.[17] While many may want to participate in such electives they may not do so due to pressure to take advanced electives in their specialty in order to compete for USA residency positions.

Despite the novel application of the OMP in our study, the medical students' impression of OMP was similar to that from existing literature on physician perspective on OMP utility in clinical teaching. Students found the OMP to be an effective, efficient, learner-centered teaching strategy for teaching children and teaching in groups. The OMP increased their ability to determine the student's fund of knowledge, provide feedback, and teach focused learning points. Not only did all of them think the method was applicable to teaching elementary aged students, they all planned to use it in future encounters teaching children. The alignment of our findings on with that of the literature, albeit a different application of the OMP, strengthens the validity of our results.

Concordance with the literature also suggests that OMP may be practically used by medical students on alternative groups of learners during their medical school training.[7] Despite the non-clinical setting of this study, we believe we simulated the doctor-patient conversation by having medical students teach 5th graders about the cardiovascular system. While it is not an exact simulation of all teaching-based conversations during a patient encounter, it does mimic a common conversation when a physician explains physiology and mechanism of disease to a patient who does not understand complicated science. As such, the OMP has the potential to be utilized in settings beyond the traditional inter-professional "physician to student-learner" model. Indeed, it can be utilized in physician-patient teaching conversations to help patients, both pediatric and adult, better

understand relevant complex health topics. More studies need to be done in order to further investigate this expanded use of the OMP.

The medical students who used the OMP unanimously stated it would be beneficial for all students to learn about the OMP at some point in the curriculum. Though the best time to teach the OMP is unclear, our study suggests a clear area of and desire for an addition to graduate medical education. Additionally, while we cannot make conclusions given the small sample size in the experimental groups, this study suggests that teaching medical students about the OMP may be correlated with an increased desire of the students to help *others* become better teachers. Generating a culture of medical students who are empowered to boost others' teaching skills may be a powerful added benefit to instructing medical students on teaching methods.

While our study provides fertile ground for future research, it has several important limitations. First, our experimental group sample size was small, limiting our findings to a descriptive nature. Similarly, the students in the experimental group were 100% comfortable teaching those younger than them at baseline, generating selection bias in this group. Also, this is a single center study, limiting external validity to other medical schools. In addition, the complexity of the intervention design as a blend of many new OMP contexts (medical students as teachers, children as students, group setting, simulating doctor-patient conversation) precludes commenting specifically on any one of these contexts. Ultimately, further studies are needed to boost the power and generalizability of these trends as well as gather more focused information on each use of the OMP. In addition, future studies should examine perspectives of the *learners* in these novel OMP application settings. In a study like ours, one could survey the 5th graders at the elementary school to see if they like the method and see if they retain more when learning from students who used the OMP model versus the traditional model. Nevertheless, our work paves the way for limitless opportunities to study an expanded role for the OMP as a teaching tool in medicine. For reference, the University of Florida College of Medicine is 48.7% male/ 51.3% female for the classes that participated in this study, showing an initially representative gender population self-selected to participate.

CONCLUSION.

To sum, the OMP is a method that is well-known and well-studied for aiding busy physicians in their "on-the-go" medical education efforts, but it has the potential to be much more than that for both faculty and medical students. Medical students value their role as a teacher in medicine and desire to learn teaching skills in their curriculum. The OMP or something similar, could be added into medical curricula to arm students as teacher, and to ignite a culture of more empowered physician teachers.

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FIGURES AND TABLES.

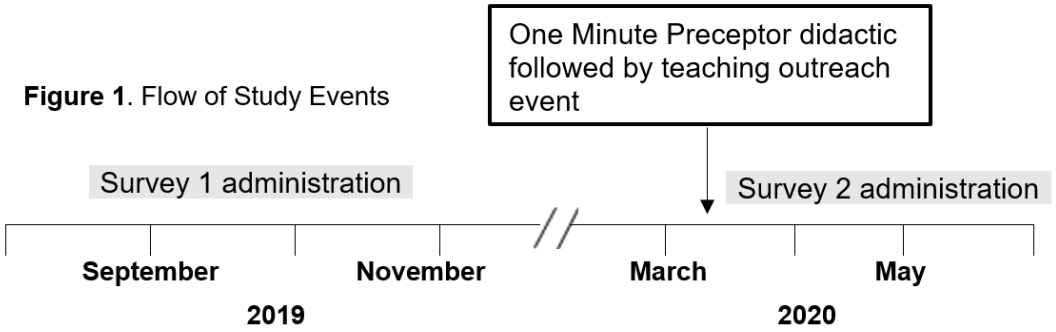
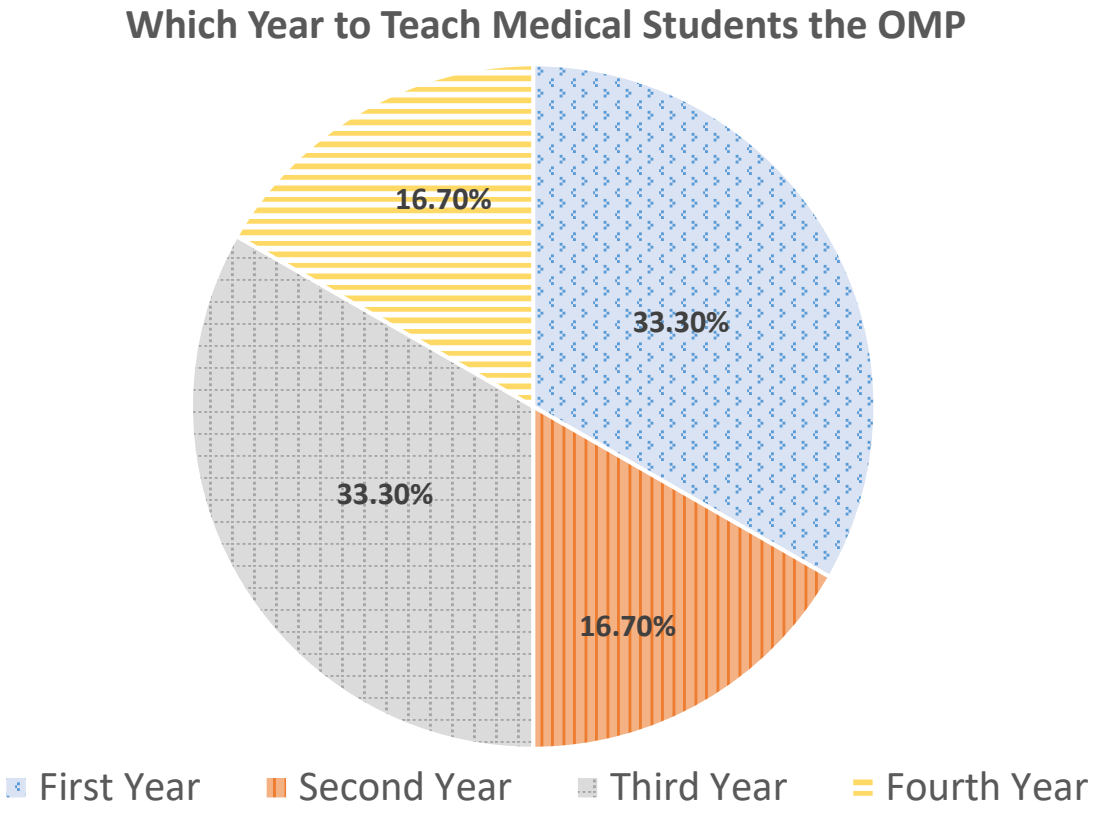


Figure 1. Flow of Study Events

Figure 2: Timing of OMP



1 **Table 1**. Survey 1 Demographic Data

	All participants completing Survey 1 (n=74)	**Comparison Group: Completed Survey 1 and 2, did not participate in OMP and Outreach** (n=45)	**Experimental Group: Completed Survey 1 and 2, participated in OMP and Outreach** (n=6)
Age (years)			
18-23	21 (28%)	13 (29%)	0 (0%)
24-27	40 (54%)	28 (62%)	3 (50%)
28-31	11 (15%)	3 (7%)	2 (33%)
32+	2 (3%)	1 (2%)	1 (17%)
Gender, n (%)			
Male	32 (43%)	16 (36%)	4 (67%)
Female	42 (57%)	29 (64%)	2 (33%)
Year in Medical School, n (%)			
MS 1	12 (16%)	8 (18%)	1 (17%)
MS 2	33 (45%)	18 (40%)	2 (33%)
MS 3	2 (3%)	0 (0%)	0 (0%)
MS 4	27 (36%)	19 (42%)	3 (50%)
Degree* (n)			
STEM	50	30	5
Arts/Humanities	6	3	1
Health Sciences	9	6	1
Social Sciences	18	12	1
Business	0	1	0
Has Children, n (%)	3 (4%)	0 (0%)	1 (17%)
Worked as Teacher, n (%)	10 (13%)	8 (18%)	0 (0%)

Worked in clinical setting with pediatric patients, n (%)	32 (43%)	20 (44%)	5 (83%)
Knows about OMP, n (%)	3 (4%)	2 (4%)	0 (0%)
Predicted Specialty, n (%)			
Pediatrics	11 (15%)	9 (20%)	1 (17%)
Family Medicine	4 (5%)	3 (7%)	1 (17%)
Other	59 (80%)	33 (73%)	4 (66%)

MS=medical student; STEM=Science Technology Engineering and Math; OMP=One Minute Preceptor; *May add up to more than 74 due to option to choose multiple degree per participant

1
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Table 2. Perspectives on Teaching at Baseline and Follow-Up

Statement, n (%)	All participants completing Survey 1 (n=74)	Comparison Group: Completed Survey 1 and 2, did not participate in OMP and Outreach (n=45)		Experimental Group: Completed Survey 1 and 2, participated in OMP and Outreach (n=6)	
		Survey 1	Survey 2	Survey 1	Survey 2
I understand my role in teaching younger/future medical students	62 (84%)	37 (82%)	39 (87%)	6 (100%)	6 (100%)
I understand my role in teaching my peers	53 (72%)	30 (67%)	38 (84%)	5 (83%)	5 (83%)
I understand my role in teaching patients	73 (99%)	44 (98%)	44 (98%)	6 (100%)	6 (100%)
I can apply at least 2 different teaching methods	34 (46%)	19 (42%)	39 (64%)	2 (33%)	4 (67%)
I can describe and evaluate the teaching methods I use	18 (24%)	9 (20%)	18 (40%)	2 (33%)	3 (50%)
I have a plan for improving my teaching skills	16 (22%)	9 (20%)	14 (31%)	1 (17%)	3 (50%)
I can help others become better teachers	28 (38%)	13 (29%)	14 (31%)	4 (67%)	6 (100%)
I am comfortable teaching younger/future medical students	58 (78%)	35 (78%)	36 (80%)	6 (100%)	6 (100%)
I am comfortable teaching my peers	51 (69%)	29 (64%)	35 (78%)	4 (67%)	5 (83%)
I am comfortable teaching patients	59 (80%)	35 (78%)	39 (87%)	6 (100%)	6 (100%)
I am comfortable teaching children	58 (78%)	34 (76%)	36 (80%)	6 (100%)	6 (100%)
People I teach would describe my skills as good	42 (57%)	25 (55%)	22 (49%)	5 (83%)	4 (67%)
Teaching is an important medical skill	74 (100%)	45 (100%)	45 (100%)	6 (100%)	6 (100%)
Developing teaching skills is important to professional development.	74 (100%)	45 (100%)	44 (98%)	6 (100%)	6 (100%)

1 **Table 3.** Usefulness of the OMP among those who completed the program (n=6)

Statement, n (%)	**Very good /excellent n (%)**
Ability to ascertain commitment to learning from your student	1 (17%)
Ability to assess underlying reasoning of your learner	4 (67%)
Ability to assess fund of knowledge of your learner	4 (67%)
Ability to teach a few key points for students' future use	6 (100%)
Ability to provide positive feedback to the student to reinforce what was done well	6 (100%)
Ability to provide constructive feedback to the student	4 (67%)
Ability to involve student (s)	6 (100%)
Overall efficiency as a teaching tool	6 (100%)
Overall effectiveness as a teaching tool	6 (100%)
Overall satisfaction with OMP as a teaching tool	6 (100%)

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