

Success of a Faculty Development Program for Teachers at the Mayo Clinic

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Abstract

Background There has been limited research on the improvement of underperforming clinical teachers.

Objective To determine whether a faculty development program could improve the evaluations of clinical teachers in an internal medicine residency program.

Methods A total of 123 teachers completed faculty development at the Mayo Clinic from 2009 to 2012. The faculty enhancement and education development program (FEED) consists of 6 interactive, small group, 2-hour sessions taught by experienced Mayo Clinic faculty over 1 year. These sessions address the following competencies: asking questions, diagnosing learners, giving feedback, using teaching frameworks, recognizing learning styles, and providing clinical supervision. Resident-of-faculty Mayo teaching effectiveness (MTE) scores have previously demonstrated content, internal structure, and criterion validity. Teachers were grouped into the top

80% or the bottom 20%, according to baseline MTE scores. Mixed linear models were used to compare these groups regarding changes in MTE scores after completion of FEED. Results were adjusted for teacher age, sex, medical specialty, academic rank, and teaching awards.

Results For all participants combined, the adjusted MTE scores (mean; standard error) improved from baseline (3.80; 0.04) to completion of FEED (3.93; 0.04; $P < .001$). However, the bottom 20% had a significantly greater improvement in scores than the top 80% (score-change difference = 0.166, $P < .001$).

Conclusions We describe a low-intensity faculty development intervention that benefited all clinical teachers, but was particularly effective for underperforming teachers in internal medicine. The approach may be suitable for adoption or adaptation in other graduate medical education programs.

Introduction

Numerous faculty development programs for clinical teachers exist at national, regional, and local levels.¹ Examples of longstanding national programs include the Harvard Macy Program for Physician Educators^{2,3} and the

Stanford Faculty Development Program.^{4,5} To train community- and hospital-based teachers, the Health Resources and Services Administration funded a faculty development program that disseminated teaching skills education at a modest cost.⁶ However, only a minority of academic medical centers offer ongoing faculty development in teaching skills.⁷ Recognized barriers to faculty development for clinical teachers include work pressures, time limitations, and logistical issues.⁸

Research on the effectiveness of faculty development related to teaching has yielded mixed results. A systematic review of online faculty development noted limitations of electronic courses for clinical teachers, including inadequate time for the completion of voluntary modules and difficulty in establishing interpersonal relationships.⁹ One study found that students of trained teachers may perform worse on structured clinical examinations.¹⁰ In contrast, a systematic review on traditional faculty development of teaching demonstrated overall participant satisfaction, changes in attitudes, increased knowledge

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of educational principles, and improved teaching behaviors.¹¹

Optimizing the quality of clinical teaching is important because clinical teaching, which is intricately involved with patient care, lies at the heart of every medical education training program.¹² The goals of remediation should model recognized qualities of excellent teachers, which would include the abilities to create a positive learning environment, engage in dialogue, provide effective feedback, diagnose learners' needs, use known teaching methods, and develop personal philosophies of teaching.¹³

There is mixed evidence on the interaction between faculty's preintervention skills and the effectiveness of a faculty development program. Litzelman et al¹⁴ found that teachers with low learner baseline ratings showed poor improvement in teaching performance after receiving feedback, compared to teachers with high baseline ratings. In contrast, Baroffio et al¹⁵ found that a faculty development workshop for instructors teaching practice-based learning and improvement had a greater effect on teachers with low baseline scores.

We created a faculty development program that was structured on recognized components of clinical teaching,¹³ such as creating a positive learning climate,¹⁶ asking questions effectively,^{17–19} diagnosing the learner's needs,^{20–25} and giving feedback.^{26,27} The goals of this study were to describe a Mayo Clinic faculty development program on clinical teaching, and to determine whether poor clinical teachers would experience different levels of improvement in teaching effectiveness scores than the best teachers, after exposure to faculty development.

Methods

Study Intervention: Faculty Development Program for Clinical Teachers

In 2009, we developed the faculty enhancement and education development (FEED) program for the purpose of educating internal medicine faculty on the art and science of clinical teaching. The curriculum was implemented in the internal medicine residency as part of the Education Innovations Project of the Accreditation Council for Graduate Medical Education. The curriculum covers 6 basic topics: asking questions effectively,^{17–19} diagnosing learners' needs,^{20–24} giving feedback,^{26,27} using teaching frameworks,^{28,29} recognizing learning styles, and providing clinical supervision. A basic summary of the curricular content of FEED was previously published.¹³ These topics are taught by experienced, award-winning teachers in 2-hour sessions involving small groups of fewer than 20 participants, and using interactive and discussion-based learning methods that are intended to role model effective

What was known

There is interest in improving underperforming teachers, but research on the effectiveness of faculty development has yielded mixed results.

What is new

A faculty development intervention in an internal medicine program benefited all participants, but particularly underperforming teachers.

Limitations

Single institution study and selection bias due to voluntary participation may limit generalizability.

Bottom line

The low-intensity faculty development approach described may be applicable to other residency programs.

clinical teaching. Each of the 2-hour sessions addresses 1 of the basic topics listed above and is offered multiple times during 1 year to allow faculty members to attend at times that are convenient for their schedules. To facilitate participation, the residency program provides support for these sessions over lunch time with food and a small reduction in the afternoon patient visit targets. Although participation is not strictly required, the Department of Medicine encourages teaching faculty to participate in the program with the goal of having all teaching faculty complete the program within several years.

This study was deemed exempt by the Mayo Clinic Institutional Review Board.

Independent and Dependent Variables

Mayo Clinic teaching effectiveness (MTE) scores, which were obtained from resident-of-faculty assessments, comprised the independent variables (top 80% versus lower 20% of faculty as determined by baseline scores) and the dependent variables (change in scores pre-FEED and post-FEED intervention) for this study. Preintervention scores were obtained in the 12 months before beginning FEED, and postintervention scores were determined in the 12 months after completing FEED. The MTE is a 17-item instrument with questions regarding learner comfort, explaining decisions, feedback, emphasizing learning goals, improving examination skills, excellent teaching, asking for differentials, encouraging reading, organization, handling interruptions, and starting on time. These questions have previously demonstrated validity evidence including content based on the literature and input from experts, multiple dimensions as determined by factor analysis, good internal consistency and interrater reliability, and score associations with other variables related to clinical teaching.^{30–32}

Covariates

Covariates in our study included teacher age, tenure, sex, medical specialty (procedural specialties: cardiology, gastroenterology, emergency medicine, and pulmonology/critical care versus nonprocedural specialties: general internal medicine, allergy, endocrinology, hematology, infectious diseases, nephrology, neurology, preventive medicine, and rheumatology), academic rank (none, instructor, assistant professor, associate professor, professor), and teaching awards (yes or no). For this study, the teaching award was the “Mayo Fellow Association Teacher of the Year Award,” which was established in 1972 and is the longest-standing award for teaching excellence at the Mayo Clinic. Faculty members are selected by residents and fellows to receive this award.

Data Analysis

Scores from all MTE items were combined to form an overall score ranging from 1 to 5. Mixed linear models using a variance components covariance structure to account for repeated assessments by residents of teachers were used to evaluate associations between teacher rank (top 80% and lower 20%) and change in MTE scores pre- and postparticipation in FEED. Bivariate associations between change in MTE scores and the covariates listed above were examined. To account for multiple comparisons, the threshold for statistical significance was set at $P < .010$. Statistical analyses were conducted using SAS version 9.3 (SAS Institute Inc).

Results

A total of 123 faculty members completed the Mayo Clinic FEED program from 2009 to 2012. Regarding the faculty members' demographic characteristics, most were men (82 of 123, 67%) in nonprocedural specialties (88 of 123, 72%), with an average tenure of 9 years ($SD = 7.3$) as faculty and an average age of 45.4 years ($SD = 8.9$). A small proportion of faculty members had received Mayo Fellows Association teaching awards (12 of 123, 10%), and only a minority held advanced ranks of associate professor or professor (29 of 123, 24%).

For all faculty participants combined, the adjusted MTE scores (mean; standard error) improved from baseline (3.80; 0.04) to completion of the FEED intervention (3.93; 0.04; $P < .001$). However, the bottom 20% of teachers had significantly greater improvement in scores than the top 80% (score-change difference = 0.166; $P < .001$; TABLE).

In multivariate models, there were significant associations (β ; standard error; P value) between changes in scores after exposure to FEED and the following variables: bottom 20% versus top 80% of teachers (0.166; 0.014;

$P < .001$); age (-0.007 ; 0.001; $P < .001$); procedural versus nonprocedural specialty (-0.119 ; 0.012; $P < .001$); academic rank (β range, -0.166 to 0.263 ; SE range, 0.021 – 0.048 ; $P < .001$); and receiving a teaching award (0.074; 0.015; $P < .001$). There were no significant associations for years on faculty (tenure) or sex (TABLE).

Placing these findings into context, the prescore to postscore change for the lower 20% of faculty is 0.18 and the SD for the sample is 0.24, which means this score change equals approximately three-fourths of a SD. Therefore, if a faculty member in this sample was -1 SD below the mean, a 0.18 score change would advance him or her to near the sample mean and improve his or her rank by 29 faculty positions, which would be a very meaningful improvement within our institution's evaluation system.

Discussion

To our knowledge, this is the first study that examined the impact of a faculty development program on low- versus high-performing clinical teachers. We found the FEED curriculum associated with increased teaching effectiveness scores for all faculty participants. However, low-performing teachers had significantly greater improvements in teaching effectiveness scores than high-performing teachers. These findings indicate that curricula such as FEED, which emphasize basic principles of teaching, might be useful at advancing the performance of struggling graduate medical education faculty.

The FEED curriculum was accompanied by overall improvement in teaching effectiveness scores. Several studies¹¹ have shown that faculty development programs are associated with overall improvement in teaching performance, but the outcomes for most entailed self-assessments as opposed to learner evaluations. In contrast, the outcomes in our study consisted of learner evaluations that were supported by validity evidence,³³ including content, internal structure, and relationships to other variables, such as faculty characteristics and resident well-being.^{30,31,34}

We demonstrated that low-performing teachers benefited from faculty development more than their top-performing colleagues. Our findings extend the results of a retrospective study of surgeons by Cohen et al,³⁵ which revealed that good and average teachers had temporally stable scores, but that poor teachers tended to progress. Contrarily, Litzelman et al¹⁴ found that teachers with low baseline ratings from learners experienced less improvement in teaching performance after receiving feedback than teachers with high baseline ratings. Learners in that study were medical students and the intervention was focused, involving faculty reading feedback from medical students

TABLE ADJUSTED ASSOCIATIONS BETWEEN FACULTY CHARACTERISTICS AND CHANGES IN TEACHING SCORES AFTER EXPOSURE TO FACULTY DEVELOPMENT^a

Variable	Category	No. (%)	Prescore	Postscore	Change in Score		Within-Group Score Change Difference	
					Mean (SE)	P Value	β (SE)	P Value
Sex	Male	82 (67)	3.83	3.95	0.1188 (0.0124)	< .001	0.0154 (0.0113)	.17
	Female	41 (33)	3.78	3.91	0.1342 (0.0156)	< .001		
Specialty	Procedure	88 (72)	3.77	3.96	0.1588 (0.0119)	< .001	-0.1193 (0.0115)	< .001
	Nonprocedure	35 (28)	3.84	3.90	0.0479 (0.0132)	.001		
Rating before FEED	Top 80%	98 (80)	3.99	4.04	0.0324 (0.0119)	.007	0.1664 (0.0138)	< .001
	Bottom 20%	25 (20)	3.61	3.82	0.1744 (0.0141)	< .001		
Rank	Professor	14 (11)	3.74	3.92	0.1552 (0.0206)	< .001	-0.1682 (0.0238)	< .001
	Associate	15 (12)	3.93	3.94	-0.0284 (0.0158)	.07		
	Assistant	62 (50)	3.86	3.88	-0.0157 (0.0093)	.09		
	Instructor	28 (23)	3.84	3.82	-0.0145 (0.0122)	.24		
	None	4 (3)	3.66	4.10	0.4203 (0.0428)	< .001		
Teaching award	No	111 (90)	3.78	3.87	0.0897 (0.0112)	< .001	0.0736 (0.0145)	< .001
	Yes	12 (10)	3.83	3.99	0.1633 (0.0177)	< .001		

Abbreviation: FEED, faculty enhancement and education development program.

^a The categories of age and tenure were included in the multivariate analysis, but were excluded from this table because they represented continuous data, whereas the other variables in this table represented categorical data.

provided on previous rotations. In contrast, our intervention occurred in the context of resident education and involved a comprehensive faculty development program. This may explain why our low-performing teachers improved.

That low-performing teachers in our study improved with faculty development implies plasticity in their abilities, and indicates that teaching skills may be learnable. Other studies have demonstrated improvement in teaching performance following faculty development,^{2,5,11} suggesting the determinants of teaching ability are multifactorial. Both unadjusted and adjusted models revealed no associations between the number of years on faculty and improvement with FEED; this discounts the argument that low-performing teachers in our study were simply inexperienced. Furthermore, we discovered that MTE scores actually declined with age, which supports prior research findings that teaching effectiveness scores wane over time.³⁶

Improvement with faculty development was also correlated with being an award-winning teacher or a full professor. We suspect award-winning teachers are more likely to mature with faculty development, because they are inherently curious and passionate about teaching, which would optimize their engagement in teaching curricula.

Similarly, full professors, by virtue of advancing through the ranks, have demonstrated a commitment to self-study and improvement, which may enhance their participation in faculty development.

This study has limitations. It was a single institution study and the faculty members at the Mayo Clinic may differ from faculty at other institutions, which may restrict generalization of the study findings to other settings. The faculty members were not strictly required to participate, which may introduce selection bias. However, as faculty were not required to participate, it may be difficult to argue that low-performing faculty underwent a formal process of remediation. Finally, one could question whether the high-performing physicians in our study experienced a restriction in preintervention to postintervention score changes based on a ceiling effect. However, the high-performing physicians in our study (top 80%) actually demonstrated a statistically significant improvement in scores, suggesting a ceiling effect was not present.

Conclusion

We describe a faculty development curriculum that was associated with overall improvement in learner-based teaching evaluations, and that appears to have been particularly effective for low-performing clinical teachers.

These findings indicate that other graduate medical education programs may help struggling clinical teachers by incorporating voluntary faculty development that emphasizes basic educational principles, such as asking questions effectively, diagnosing learners' needs, giving feedback, using teaching frameworks, recognizing learning styles, and providing clinical supervision.

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