

An investigation of medical student reactions to feedback: a randomised controlled trial

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BACKGROUND Medical educators have indicated that feedback is one of the main catalysts required for performance improvement. However, medical students appear to be persistently dissatisfied with the feedback that they receive. The purpose of this study was to evaluate learning outcomes and perceptions in students who received feedback compared to those who received general compliments.

METHODS All subjects received identical instruction on two-handed surgical knot-tying. Group 1 received specific, constructive feedback on how to improve their knot-tying skill. Group 2 received only general compliments. Performance was videotaped before and after instruction and after feedback. Subjects completed the study by indicating their global level of satisfaction. Three faculty evaluators observed and scored blinded videotapes of each performance. Intra-observer agreement among expert ratings of performance was calculated using 2-way random effects intraclass correlation (ICC) methods. Satisfaction scores and performance scores were compared using paired samples *t*-tests and independent samples *t*-tests.

RESULTS Performance data from 33 subjects were analysed. Inter-rater reliability exceeded 0.8 for ratings of pre-test, pre-intervention and post-intervention performances. The average performance of students who received specific feedback improved (21.98 versus 15.87, $P < 0.001$), whereas there was no significant change in the performance score in the group who received only compliments (17.00 versus 15.39, $P = 0.181$) The average satisfaction rating in

the group that received compliments was significantly higher than the group that received feedback (6.00 versus 5.00, $P = 0.005$).

DISCUSSION Student satisfaction is not an accurate measure of the quality of feedback. It appears that satisfaction ratings respond to praise more than feedback, while learning is more a function of feedback.

KEYWORDS randomised controlled trial; humans; students, medical/*psychology; *feedback, psychological; *education, medical, undergraduate; personal satisfaction

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INTRODUCTION

Effective feedback has long been recognised as one of the main catalysts for effective learning.¹ Accordingly, its importance in medical education has been emphasised for more than 20 years.^{2–9} Feedback has been studied and classified in the literature by delineating specific characteristics or schemes that should be included in order to provide the best opportunity for performance enhancement.^{10–14} However, most studies of medical student perceptions show that they are dissatisfied with the feedback they receive.^{2,15–17}

One possible problem is that faculty simply do not provide feedback, so interventions have been designed that encourage faculty members to provide feedback to medical students. These interventions have included faculty development programmes designed to acquaint faculty members with effective feedback techniques^{6,14,18–21} and

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Overview

What is already known on this subject

Feedback is one of the main catalysts required for performance improvement.

Much time and many resources have been devoted to improving the ability of faculty to provide adequate feedback.

Medical students persistently report dissatisfaction with the feedback they receive.

What this study adds

The average satisfaction rating in the group that received compliments was significantly higher than the group that received feedback.

The most effective instructor response might be to combine both compliments and feedback.

Suggestions for further research

How best to educate students to recognise and seek out feedback.

Research into the development of tools that accurately measure the effects of feedback on student performance.

encounter cards or diaries that motivate faculty members to provide feedback.^{22–25} Most often the success of these attempts at improving feedback are measured by assessing student satisfaction.

Additionally, concern has been expressed that what medical students actually seek are general confirmations that reinforce their self-concept.² With all this in mind, and by providing a controlled, purposeful method of feedback, this investigation was undertaken to understand the impact of feedback on medical student performance and satisfaction. The study hypothesis was that medical students receiving compliments would be more satisfied than those receiving feedback. Further, medical students receiving feedback would demonstrate improved performance, whereas those receiving compliments would not.

METHODS

Subjects were recruited using e-mail solicitation of all 2nd- and 3rd-year medical students at Southern Illinois University School of Medicine (SIUSOM). The study was reviewed and approved by the local institutional review board for research involving human subjects and all volunteer participants were provided with informed consent.

A motor learning session was chosen as the study environment, as this allowed for the objective measurement of performance using previously validated assessment instruments.²⁶ Sachdeva's¹⁴ recommendations for delivering effective feedback, which include providing feedback that is specific, objective, consistent and timely, describe most effectively the type, timing and quality of feedback that was delivered during this project. An academic surgeon, who was seen by students as being an expert who was also supportive, credible and trustworthy, was the individual who provided the teaching and feedback.

A pre-test was performed that consisted of videotaping each subject's ability to tie a two-handed surgical square knot prior to receiving instruction (pre-test). All students then received identical instruction on two-handed square surgical knot-tying by the same expert instructor. A second performance was recorded on videotape (pre-intervention). Subjects were then assigned randomly to 1 of 2 groups. Subjects in the first group (compliment) were observed performing the skill by the expert instructor and were then given pre-arranged 'scripted' compliments (e.g. great job, you're making progress, outstanding). Subjects in the second group (feedback) were observed performing the skill and were then given immediate feedback that was based on deficiencies in the performance. After the intervention, a final performance was videotaped (post-intervention) and subjects were asked to rate their satisfaction with the instruction using a 7-point Likert scale with 1 = 'very poor' and 7 = 'truly exceptional'.

Subject performances were coded and ordered randomly into a single videotape of performances. Three faculty evaluators reviewed all performances in a blinded fashion using a previously validated assessment instrument.²⁶ This assessment instrument uses a rating scale that allowed for a range in total scores from 0 to 32.

Intra-observer agreement among expert ratings of performance was calculated using 2-way random

effects intraclass correlation (ICC) methods. Paired-sample *t*-tests were used to determine if there were any within-group differences for the pre- and post-intervention knot-tying and independent-sample *t*-tests were used to compare average performance ratings between groups. Average satisfaction scores of the 2 groups were also compared using independent sample *t*-tests.

RESULTS

Performance data from 33 subjects were analysed. Subject's demographics such as average age (25.6), gender (male 51.5%, female 48.5%) and level of training were representative of the 2nd- and 3rd-year class at SIUSOM as a whole. As well, there were no significant differences between the 2 intervention groups with respect to demographics or experience level. Inter-rater reliability exceeded 0.8 for ratings of pre-test (0.80), pre-intervention (0.82) and post-intervention (0.83).

The average pre-test performance rating was equivalent in the compliment and feedback groups (5.82 versus 6.45, $t = 0.430$ $P = 0.670$), as was the average performance rating after the brief instruction (15.39 versus 15.87, $t = 0.228$, $P = 0.822$). The compliment group had a significantly lower average performance rating after the intervention than did the feedback group (21.98 versus 17.00, $t = 2.85$, $P = 0.008$). In contrast, the global satisfaction in the compliment group was significantly higher than the same rating in the feedback group (6.0 versus 5.0, $t = 3.02$, $P = 0.005$).

DISCUSSION

The results of this study demonstrated improvement in the performance of medical students who received feedback. This is consistent with the results of previous medical education research and provides support for continuing efforts to enhance the feedback that medical students receive. These include efforts designed to facilitate faculty provision of feedback. The finding that compliments produce greater satisfaction than did the feedback suggests that studies of interventions designed to improve feedback should include outcome measures other than measures of student satisfaction. Studies that include only medical student satisfaction as an outcome may cause faculty to adopt feedback behaviour that would improve student satisfaction but would not improve actual student learning.

Medical students should be satisfied with their learning experience and this study shows that they find pure behavioural feedback to be less satisfying than general compliments. It is likely that the best response that the instructor could provide would include elements of both feedback and compliments, as this combination would produce a medical student who is both educated and satisfied.

A limitation of this study is that it involves a small group of medical students at a single institution. Thus, there may be cultural factors that affect medical student expectations of the instructor that may not have been detected in this study. Another limitation is that the students in the feedback group were given only 1 or 2 suggestions for improvement. This was carried out so that the amount of time spent providing either a compliment or feedback was equivalent between groups. However, this artificially abbreviated feedback may have had a negative impact on the satisfaction ratings on this intervention.

In conclusion, the results of this study suggest an answer to the persistent question of why student satisfaction with feedback seems to be such an intractable problem. The results suggest that student satisfaction ratings are not an accurate indicator of the quality of feedback. In fact, the study results imply that satisfaction ratings are more reflective of praise than feedback, while improved performance is more a function of feedback. If this is true, then student satisfaction reports regarding feedback may be of little use when making decisions on how to improve the overall feedback process or on judging the amount of feedback given. It seems obvious that we measure a coach's ability to provide feedback and the student athlete's ability to use the feedback by measuring an athlete's performance, not by how satisfied the athlete was with the feedback provided. Correspondingly, caution would be prudent in using medical student satisfaction as the only measure of feedback effectiveness.

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