

## Learning Activities and Third-Year Medical Student Ratings of High Quality Teaching Across Different Clerkships

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### Abstract

**Objective:** To identify and compare learning activities that students associate with high quality teaching across clerkships.

**Methods:** For six months, 110 third year medical students recorded data on learning activities and teaching quality using personal digital assistants (PDAs) during five different required clinical clerkships. Univariate and multivariate analyses were performed to assess the association between learning activities and student ratings of high teaching quality.

**Results:** 11,450 teaching interactions were recorded. Univariate analysis revealed that feedback was associated with perceptions of high quality teaching in all clerkships. Proposing a plan, formulating an assessment and giving an oral case presentation were associated with high quality teaching in 80% of the clerkships ( $p < 0.01$ ). Multivariate analysis demonstrated that receiving high quality feedback was an independent predictor of student ratings of high quality teaching for all clerkships.

**Conclusion:** Receiving high quality feedback is the learning activity most strongly associated with students' ratings of high quality teaching across four different clerkships.

Academic physicians face significant challenges in fulfilling their educational missions in today's clinical environment. Increased demands on clinical productivity,<sup>1</sup> decreases in length of stay for hospitalized patients and increasing administrative responsibilities<sup>1-5</sup> have made teaching of medical students and residents a demanding and challenging endeavor. Therefore, it is imperative to identify the specific learning activities that students associate with effective teaching. It is also important for clerkship directors to gather formative data about the quality of teaching and the learning activities that occur in their clerkships in order to assess achievement of curricular objectives and meet the LCME requirements.

Our previous research using students' real-time personal digital assistant (PDA)-based data collection showed that receiving high quality feedback and proposing a plan of care were learning activities most strongly associated with student ratings of high quality teaching during a third year (M3) medicine clerkship.<sup>6</sup> However,

because the study only examined students' ratings of high quality teaching during a medicine clerkship, we could not determine if these effective learning activities, identified in one specialty,<sup>6</sup> remain constant across other specialties. Therefore we sought to determine students' ratings of high quality teaching using PDA based data across four different other clerkship such as pediatrics, family medicine, surgery and obstetrics and gynecology.

### Methods

**Study population** - From July to December 2001, we collected data on patient encounters, learning activities, and teaching quality ratings from 110 M3 medical students rotating through four required third-year clerkships: pediatrics (PED), surgery (SURG), obstetrics and gynecology (OB/GYN) and family medicine (FM). The PED and SURG clerkships had a required length of eight weeks, and both had an inpatient and outpatient component. The remaining two clerkships, FM and OB/GYN,

had durations of four weeks, with the latter characterized by an inpatient and outpatient component.

**Data collection** - All third year students at the Medical College of Wisconsin (MCW) are provided with a PDA and attend a mandatory one-hour tutorial on how to use the PDA and enter the patient encounter questionnaire. The patient encounter questionnaire was developed based on a framework of core clinical competencies for third year medical students developed by Clerkship Directors in Internal Medicine (CDIM).<sup>7</sup> The form, which is the same form used in our previous study,<sup>6</sup> was approved by a consensus of all clerkship directors at MCW and downloaded onto each of the students' PDAs.

Students were told at orientation to enter clinical teaching encounters for patients with whom they had a significant interaction. Such interaction was defined as an encounter in which students performed at least two of the following: a patient history, a physical examination, an assessment and a plan of care. The students were told that they were expected to record three to four eligible teaching encounters per week. Written directions about what constituted a significant, eligible encounter were also included in the orientation packets given to students at each clerkship orientation. Thus, for each patient with whom they had a significant interaction, students were to record answers to the following questions regarding the patient encounter: Did you make a case presentation? Did you give an assessment? What was the quality of oral feedback you received (rated as high, medium, low, none)? Students were also asked to record information as to whether they proposed a therapeutic plan of care or wrote a progress note. At the end of the form, students then rated the overall teaching quality of each patient encounter (rated as outstanding, very good, good, marginal, unsatisfactory).

The PDA-based form was presented and explained to the students by the clerkship director during orientation and subsequently downloaded onto the students' PDAs at the beginning of each clerkship period. Each day, student observations were entered into personal digital assistant (PDAs) loaded with the patient encounter questionnaire. The content was downloaded by the clerkship coordinator into a centralized database once a week.

**Data analysis** - Univariate (chi-square) and multivariate (stepwise multiple logistic regression) analyses were performed to assess the association between students' learning activities and overall teaching quality for each clerkship. Overall teaching quality was the outcome variable of interest, dichotomized into high (outstand-

ing/very good) and low (good, marginal, unsatisfactory) quality teaching. Our goal was to focus on encounters of the highest teaching quality, so we dichotomized the variable to define as "high quality" only those encounters that were outstanding or very good.

We employed multiple logistic regression with overall teaching quality as the dependent variable and independent variables that included learning activities such as giving a case presentation, formulating an assessment, proposing a plan, receiving high quality feedback, writing a progress note, having a faculty as teacher, and being on an inpatient rotation. Results of the multivariate analysis are reported as odds ratios with 95 % confidence intervals.<sup>8</sup> All analysis were performed using Intercooled Stata, version 7 (Stata Corporation College Station).

As the use of PDA-based tools is a part of our clerkship curricular elements and part of a formative evaluation process to improve the quality of students' education, this project was exempted from IRB review.

## Results

A total of 11,450 clinical encounters were recorded by 110 students during a six-month period. Overall, 3,000 were collected in FM, 2,700 in OB/GYN, 3,000 in PED, and 2,750 in SURG. Each student recorded approximately 100 encounters for the total period of six months, with an average of 3.5 encounters per week in each of the aforementioned clerkships. Ninety percent of FM encounters and 67% of PED encounters occurred in the outpatient setting. The majority of all other specialty interactions occurred in the inpatient setting: 72 % for SURG and 58% for OB/GYN.

Giving a patient assessment, developing a plan and writing a progress note were reported as learning activities by more than 65% of students in all four clerkship rotations. Feedback from the attending physician about the performance of the student was reported as occurring in 64% or more of all interactions independent of rotation. The frequency of individual learning activities by clerkship is shown in Table 1.

The univariate analysis revealed that receiving high quality feedback was associated with students' ratings of high quality teaching for all clerkships. Furthermore, students' perception of high teaching quality was associated with giving a patient assessment, developing a plan, giving an oral case presentation, being on an inpatient rotation, having a faculty as teacher (as opposed to a resident teacher), and writing daily progress notes in two or more clerkships ( $p < .001$ ).

**Table 1**  
**Frequency (%) of specific learning activities of 110 third-year medical students rotating through different clerkships during 11,450 teaching encounters Medical College of Wisconsin, Milwaukee, 2001**

Required Third Year Clerkships→	Family Medicine	Pediatrics	Surgery	OB/GYN
Learning Activities ↓				
Give an Oral Presentation	87	81	50	85
Develop a Plan of care	73	72	68	88
Write a daily Progress Note	65	70	87	95
Give a Patient Assessment	87	80	71	90
Receiving High Quality Feedback	72	74	75	68
Have a Faculty as Teacher	70	60	52	52
Being on Inpatient Rotation	3	67	72	58

Results from the stepwise multiple logistic regressions revealed that receiving high quality feedback remained the only item that was significantly associated with high quality teaching across all four clerkships. Other items showed significance by specialties: developing a plan was the only additional item associated with high quality teaching in PED whereas writing a daily progress note and formulating an assessment were learning activities associated with high teaching quality in FM only. In contrast, students' perception of high quality teaching in SURG and OB/GYN was associated primarily with two variables: giving an oral presentation and having a faculty as teacher. Teaching activities independently related to high teaching quality across clerkships are presented in Table 2.

**Table 2 about here**

**Conclusions**

Receiving high quality feedback was the learning activity most strongly associated with student ratings of high teaching quality across all clerkships. Other learning activities, such as developing a plan, having a faculty as teacher or writing a daily progress note differed among clerkships. In comparison with our previous study<sup>6</sup> in which receiving high quality feedback and proposing a plan were the learning activities most strongly associated with students ratings of high teaching quality, pediatrics was the most similar to medicine with the same two learning activities associated with high teaching quality.

Interestingly for family medicine, a primary care

clerkship, students' ratings of high quality teaching were associated with learning activities such as writing a note or presenting a case, which were different from those that emerged from our previous report during the medicine clerkship.<sup>6</sup> Whether the heavily outpatient-based structure of this clerkship had a significant effect on such outcome is to be determined. Surprisingly in agreement with our previous findings,<sup>6</sup> making an assessment was not associated with students' perception of high quality teaching for any other clerkships except family medicine. This is somewhat unexpected, as making an assessment is a key clinical competency for third year medical students to master. However, this may reflect the realities of learning in today's hospital settings, particularly in heavily hospital-based specialties such as obstetrician/gynecology, surgery, and medicine, where many diagnoses are already established at the time patients are admitted to the hospital. Students are often left with few opportunities to practice and appreciate such an important clinical skill.

The importance of feedback for learners at all levels of medical education and across specialties is well recognized, in particular, as a key step in the acquisition of clinical skills.<sup>9-12</sup> While Irby<sup>12</sup> and others have reported that learners have difficulty in recognizing feedback when given, in our study students recorded that they had received high quality feedback in 64% or more of their teaching interactions across all clerkships. This important and positive finding seems to support the use of the PDA as useful tool for real time recording of feedback interactions that may be missed in an end of course evaluation. Furthermore, because the most effective feedback is that which occurs on a day-to-day basis during patient care,<sup>9</sup> the use of PDAs may have allowed learners to immedi-

**Table 2**  
**Learning Activities associated with the perception of high quality teaching of 110 Third-year Medical Students rotating through different clerkships during 11,450 teaching encounters, Medical College of Wisconsin, Milwaukee, 2001**

Learning activities ↓	Pediatrics OR* (95% CI)	Family Medicine OR (95% CI)	Surgery OR (95% CI)	Ob-Gyn OR (95% CI)
Receiving high quality feedback	5.2† (3.8- 7.1)	3.7† (3.1-4.6)	3.7† (2.7-5.2)	2.6† (2.1-3.1)
Propose plan	2.1† (1.2-3.6)	1.1 (0.90-1.5)	0.92 (0.56-1.6)	1.1 (0.65-1.8)
Writing a progress note	1.2 (0.81-1.8)	2.0† (1.6-2.5)	1.4 (0.91-2.4)	0.71 (0.43-1.1)
Give an oral presentation	1.6 (1.0-2.7)	1.6† (1.2-2.4)	2.0† (1.5-2.9)	1.5† (1.2-1.9)
Having faculty as teacher	0.83 (0.52-1.2)	0.83 (0.71-1.0)	1.7† (1.2-2.3)	1.9† (1.5-2.3)
Being on inpatient rotation	0.83 (0.55-1.3)	0.55 (0.27-1.0)	1.5† (1.1-2.1)	0.83 (0.71-1.0)
Give an assessment	1.6 (0.66-2.3)	1.6† (1.1-2.4)	1.4 (0.76-2.3)	1.4 (0.83-2.5)

\*OR (Odds ratio)>1 = teaching activity positively related to high quality teaching. OR< 1= teaching activity negatively related to high quality teaching.

† Statistically significant (95% confidence interval (CI) does not include 1).

ately document feedback activities any time it occurred, whether the feedback occurred once or multiple times in a day or throughout different learning settings. Kogan and colleagues<sup>13</sup> found daily e-mail questionnaires sent to students immediately after a feedback interaction to be a useful and efficient method to gather information about feedback. Our findings confirmed such reports as PDAs, used as tools close to the teaching encounter, are an additional and efficient tool to measure the occurrence of feedback, saving time and effort for both faculty and clerkship staff. Ende<sup>9</sup> states that feedback can be used as an indicator of how well a program is fulfilling its educational mission. Its accurate measurement, therefore, becomes important for educators and particularly for clerkship directors. The use of PDAs to collect information about feedback regardless of clerkship type seems to be a valuable tool for clerkship directors to assess the achievement of specific clerkship goals.

Several limitations of this study should be considered. First, the study was carried out in a single institution and focused on third year medical students. This may limit the generalizability of our findings to other institutions. Our results may not apply to senior medical students or postgraduate trainees. Second, these students were rotating on their required clerkships during the first half of the academic year; it is possible that late academic year M3 clinical clerks might have different perceptions of what constitutes important learning activities and high quality teaching compared to students rotating through the early part of the academic year. Third, whether highly rated learning activities, such as receiving high quality feedback, are associated with improved student clinical performance represents an opportunity for further investigation. Nonetheless, there is evidence that high clinical teaching ratings have a positive and significant association with medical students' learning and performance.<sup>14-17</sup> Finally, in our report students were not asked to evaluate

the specific learning activities. Students' evaluations and ratings of each learning activity may be the focus of future research in this area.

We conclude that whether in the operating room, on inpatient medical wards or in the outpatient clinic, regardless of specialty, providing high quality feedback during each teaching interaction is perceived by students as a most highly valued teaching activity. Educators may want to emphasize in their daily teaching those key teaching activities associated with effective teaching and in particular those that seem to be highly valued by learners in selected specialties or clerkship.

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