

North American Dental Students' Perspectives About Their Clinical Education

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Abstract: Many North American dental schools face the challenge of replacing the majority of their “boomer generation” clinical instructors over the next ten years as this cohort of faculty reaches retirement age. Developing a new cadre of clinical instructors poses a substantial faculty development challenge: what instructional techniques should be integrated into routine educational practice by the dental faculty of the future, and what aspects of the clinical learning environment should be addressed to improve the overall quality of the experience for patients, students, and the new cohort of instructors? To gain insight that might guide faculty development for new clinical instructors and enhance understanding of the learning environment in dental school clinics, this study addressed the following question: what are dental students’ perceptions of their learning experiences in the clinical setting? The purpose of the study was to evaluate the effectiveness of the clinical instruction from the perspectives of the actual “consumer” of dental education: the student. This consumers’ perspective was provided by 655 junior, senior, and graduate dental students at twenty-one North American dental schools who completed the Clinical Education Instructional Quality Questionnaire (ClinEd IQ) in 2003-04. The ClinED IQ examines four components of students’ clinical experiences: 1) clinical learning opportunities, 2) involvement in specific learning activities, 3) interaction with clinical instructors, and 4) personal perceptions about clinical education. With the exception of inconsistent feedback and instruction and lack of continuous contact with the same instructors, juniors, seniors, and graduate students rated their interaction with clinical instructors favorably (mean=4.76 on a 6.00 scale), but provided lower ratings for clinical learning opportunities (mean=4.26 on a 6.00 scale) due to concerns about the efficiency of the dental clinic environment and lack of opportunity to treat patients in a variety of clinical settings. Analysis of more than 1,000 written comments provided by these students indicated four areas of concern: 1) inconsistent and sometimes insensitive (patronizing, rude) feedback from faculty; 2) excessive amounts of noneducational “legwork” such as billing, patient scheduling, phone calling, completing paperwork, and performing other clinic operations tasks; 3) limited access to faculty because of insufficient numbers of instructors on the clinic floor or difficulty locating faculty when they were needed for coaching, work evaluation, and chart signatures; and 4) concerns about the strategies employed to meet procedural requirements that some students saw as ethically questionable. Junior, senior, and graduate dental students at twenty-one North American dental schools perceived that the strongest aspect of their clinical education was their relationship with the faculty, but also reported that the dental school clinic was often an inefficient learning environment that hindered their opportunity to develop clinical competency. Students also sensed that faculty shortages, a growing crisis for dental education, hindered their progress in the clinic and made learning less efficient.

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The skills and techniques that students develop during their clinical education are heavily contingent on their interactions with the faculty who serve as their coaches, mentors, and evaluators. Although faculty are extremely influential, exactly what instructional practices are most likely

to produce a high-quality learning environment in the dental school clinic? In much the same way as clinicians are looking for best practice evidence to guide patient care, clinical educators in the health professions, including those in dental schools, are now asking questions about the effectiveness of clini-

cal teaching strategies. In dental education, the desire to explore instructional best practices is driven in part by the realization that a large cohort of new clinical instructors will soon become the front line of dental education as substantial numbers of the current dental school faculty retire every year. For example, in 2003-04, more than 1,300 faculty left U.S. dental schools, and dental schools reported that they recruited approximately 1,250 new faculty, an average of more than twenty new instructors per school; more than half of the new faculty came directly from private practice.¹ Thus, many of the new generation of dental faculty will undertake instructional responsibilities with little or no teaching experience. Driven by the need to train a new generation of faculty, there has been an upsurge of interest in answering the following question: what school environment factors, teacher behaviors, and teacher characteristics, including personal attributes, are perceived by students to be associated with quality instruction and effective learning? The study reported in this article was conducted to help dental educators find answers to guide faculty development efforts for the new cohort of instructors who are assuming educational responsibilities in our dental schools. Accordingly, this article will 1) review the literature on clinical teaching effectiveness in health professions education; 2) present the perspectives of 655 dental students at twenty-one North American dental schools about their clinical education; 3) compare the findings from this study, which elicited the students' point of view, to the literature on clinical teaching effectiveness; and 4) discuss the implications of the data for clinical education and faculty development.

The Literature on Clinical Teaching Effectiveness in Health Professions Education

Over the past twenty-five years, David Davis et al. have conducted rigorous reviews of the research literature related to what educational methods are most likely to produce desirable changes in physicians' patient care strategies.²⁻⁴ These influential publications were the catalyst for similar reviews in health professions education that addressed a variety of questions: What constitutes "effective clinical instruction"? Do effective clinical teachers have unique attributes that less effective instructors do not

possess? Are there components of the educational process that are more effective than others in the clinical setting? These questions have been the subject of several comprehensive reviews,⁵⁻⁶ numerous observational studies and surveys,⁷⁻¹⁷ and countless anecdotal "teaching tips" guidelines,¹⁸⁻²⁵ primarily in the medical education literature but also, to a lesser extent, in dental education. Irby's massive summary of the literature for best practices in ambulatory teaching in medicine in 1995 remains the most comprehensive and most frequently cited review of clinical teaching practices.⁵ Irby identified four key factors that distinguish the "excellent" clinical teacher from other instructors: 1) serves as a positive role model of a competent and compassionate health care provider, 2) provides effective supervision and mentoring for learners, 3) employs a varied and dynamic approach to teaching, and 4) is a supportive person. Figure 1 identifies subordinate instructional strategies and personal attributes that Irby associated with each of these four domains based on an exhaustive review of the literature.

Teaching strategies consistent with effective supervision and mentoring include communicating clear expectations for students' behavior and performance, providing practical and helpful "just in time" teaching (commonly known as prompting), explaining concepts and techniques clearly at the students' level and then confirming their understanding, providing "how to" feedback in a nonbelittling manner, and understanding students' learning needs at different levels of training and adjusting teaching accordingly. In 2000, Heidenreich et al.⁶ reported the results of a comprehensive review of more than 600 articles on clinical teaching strategies in medical education that was conducted in an effort to identify empirical evidence supporting frequently recommended teaching strategies. Heidenreich et al. identified forty-one papers that reported either quantitative or qualitative data related to the eleven clinical teaching methods identified in Figure 2, but concluded that there was inadequate evidence to support the effectiveness of any of these techniques in spite of widespread student and faculty belief in the desirability of these methods. In contrast to Heidenreich et al., the various reviews conducted by Davis et al. identified a group of learning strategies that are strongly associated with modifying providers' clinical behaviors. These strategies include persistent feedback on performance in relation to standards, comparison of performance to other practitioners, emotionally intense activities such as

roleplay, observed performance and peer feedback, participation in live-action simulations that require decision making, personal reflection on performance, and notably, absence of lecture-based instruction.²⁻⁴

Many investigators have studied clinical teaching effectiveness and the clinical learning environment in dental school; these include Myers,¹³ Emling and Fritz,¹⁴ Romberg,¹⁷ Chambers et al.,²⁶ Manague et al.,²⁷ and McGrath et al.²⁸ Their studies reached essentially the same conclusions as Irby, Heidenreich, and other medical school investigators about “what effective clinical teachers do.” Teacher attributes associated with effective clinical teaching in dental school include providing specific feedback about performance, demonstrating an interest in teaching, making an effort to motivate students, knowing how to translate didactic information into patient care situations, explaining difficult concepts clearly, showing compassion, and approaching treatment in a proactive manner.^{17,26} Dental students also reported that the most effective instructors took their teaching re-

sponsibilities seriously, behaved in a professional manner during interactions with students and patients, and were technically competent.¹³

Feil, Knight, Guenzel, et al. conducted a number of studies in the 1980s and 1990s that demonstrated the importance of orienting learners prior to task performance, providing frequent “formative” (progress) feedback to students, guiding learners with questions, and helping students understand the desired outcome for a technical procedure.²⁹⁻³³ Behar-Horenstein et al.³⁴ in a dental school environment and Taylor et al.³⁵ in medical education (family medicine residency programs) both found that instructors in their respective settings were aware of teaching best practices such as guiding learners with open-ended questions to stimulate critical thinking, but rarely used these techniques when working with students.

McGrath et al.²⁸ recently pilot-tested an instrument known as the Effective Clinical Dental Teaching (ECDT) Inventory to gauge student views of clinical instruction. This instructional environment survey

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1. Serves as a positive role model of a health care professional
 - Clinically competent (makes correct decisions; self-corrects when wrong; stays current)
 - Composed and poised in stressful situations (i.e., maintains “grace under fire”)
 - Good rapport and communication with patients and other health professionals
 - Demonstrates personal flexibility and openness to different points of view
 - Models “self-criticism” (willing to candidly critique own performance)
 2. Effective supervisor/mentor of learners
 - Communicates clear expectations for students’ behavior, roles, and performance
 - Provides just in time teaching (priming): orients students to tasks and potential problems; provides prompts, suggestions, and what-if questions
 - Explains concepts and techniques clearly, briefly, at students’ level
 - Provides frequent and constructive “how to improve” feedback in a nonbelittling manner
 - Understands learning needs of students at various levels of training and adjusts teaching
 3. Dynamic approach to teaching
 - Teaches in patient’s presence; teaches while providing care; explains to student what is happening and why while providing care
 - Stimulates students’ critical thinking by asking students to assess and plan
 - Asks “why,” “what if,” and “how” to help students develop deeper understanding
 - Displays the 3 Es: Energy, Enthusiasm, Extra effort
 - Asks students to self-assess their performance
 4. Supportive person
 - Available and receptive: encourages students to ask questions and seek assistance
 - Gets off the pedestal: relates own learning experiences to students, including problems
 - “Fun” and easy to work with (e.g., cooperative, positive attitude, enjoys teaching)
 - Understands (remembers) sources of stress in a student’s life
 - Consistent approach when dealing with students (doesn’t “play favorites”)

Source: Irby DM. Teaching and learning in ambulatory care settings: thematic review of the literature. *Acad Med* 1995;70(10):898-931.

Figure 1. Irby’s four dimensions of clinical teaching excellence and components of each dimension

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1. **Orients learners.** Assesses students' needs, questions, and training prior to clinical encounters.
 2. **Prioritizes students' learning needs.** Tailors clinic experience to students' needs.
 3. **Provides problem-oriented learning.** Develops a theme for each clinic session to control variability in clinical education and provide structure.
 4. **Primes students for tasks and activities.** Gives brief "just in time" one- to two-minute orientations to students prior to contact with the patient or performance of tasks.
 5. **Guides students through case presentations with questions and prompts.** Coaches actively with questions to help students make associations that will lead to pattern recognition. Encourages students to focus on key facts and formulation of a differential diagnosis rather than long-winded descriptions of patient data.
 6. **Teaches in patient's presence.** Teaches while providing care and while student is providing care. Explains what is happening to student while personally providing care.
 7. **Limits teaching points.** Focuses on just one or two essential points during each encounter with students. Also limits corrective feedback to just one or two key points.
 8. **Models desirable patient care practices and professional behavior.** Provides a desirable role model for students to emulate.
 9. **Uses questions to teach.** Stimulates students' thinking with thought-provoking questions, which also allows teachers to assess students' comprehension by analyzing answers to questions.
 10. **Provides prompt, frequent, and helpful feedback.** Feedback is provided to help students enhance their skills and develop alternative approaches versus being provided to make judgments about competence.
 11. **Encourages students to reflect on learning experiences and self-assess.** Role models reflection by assessing own performance.

Source: Heidenreich C, Lye P, Simpson D, Lourich M. The search for effective and efficient ambulatory teaching methods through the literature. *Pediatrics* 2000;105(1):231-7.

Figure 2. Heidenreich et al.'s eleven frequently recommended clinical teaching best practices

elicits students' opinions about an instructor's skill in creating a positive learning climate, controlling the clinic, communicating goals, promoting understanding and retention, evaluating performance, providing feedback, and promoting self-directed learning. The authors of the ECDT suggested that the inventory can be used to collect data for assessment of instructors' clinical teaching effectiveness, but the ECDT was not available at the time our study was conducted.

One difference in the literature on effective clinical teaching in medical and dental schools is that dental students place more emphasis on evaluation skills in their reports of teachers' best practices.²⁶ Possible reasons for this include the fact that dental students are graded/rated far more frequently and in greater fine-grain detail than medical students due to the procedural nature of clinical dentistry. From a student's point of view, those faculty members who

are able to provide helpful and prompt feedback and accurate ("fair") evaluations are viewed as the most effective instructors. In contrast, Chambers et al.²⁶ reported that certain faculty members who saw themselves as experts were likely to be seen as poor evaluators by students because the expert evaluator was out of touch with students' actual capabilities and thus unrealistically expected "expert" level performance from the student. In this situation, students reported that they were graded down for performing at an appropriate level of competence for a student in training.

In order to identify best practices for evaluation of dental students, Manague et al.²⁷ surveyed dental faculty to identify their perceptions of the most effective evaluative techniques. Faculty members viewed self- and peer assessment, portfolio-based learning, the provision of consistent feedback to students, and

the use of objective criteria as areas that were crucial to student evaluation. However, when asked how often these evaluation techniques were implemented, faculty indicated that these methods were used infrequently. Manague et al. found that the most prevalent assessment tools in dental school were day-to-day observations and the number of competency exams (competency patients) completed. Although observations and completing competency exams were the primary forms of assessing student learning, the faculty perceived that these assessment methods were not particularly valuable to student development.²⁶

In summary, the literature related to the question of what constitutes effective clinical teaching in dentistry and medicine is extensive, but primarily comprised of observational studies, opinion surveys, and anecdotal “teaching tip” guidelines. There is limited evidence to support the actual influence of these techniques on students’ learning, although Davis et al. have associated a number of instructional strategies with positive learning outcomes in the realm of provider continuing education.²⁴ Key elements of “effective clinical teaching” are quite similar in both disciplines.

However, there are four limitations to these data that constrain generalizability. First, most of the observational studies and opinion surveys that form the basis for this literature were limited to one set of students in a single academic program or health care facility. Second, in many of these studies, the numbers of survey respondents or teaching observations were quite small. Third, studies that collected student impressions of clinical teaching by surveys and interviews or implemented protocols to observe teaching used a wide variety of data collection instruments—many of which were created by the investigators and not subjected to pilot-testing to verify validity and reliability. And fourth, much of the data that still provides the basis for assumptions about student perceptions of their clinical education were collected in the 1980s and 1990s. In our review of this literature, we did not find any studies that assessed the clinical education perspectives of a large number of dental students from multiple schools during the same time period using a single and validated clinical teaching assessment instrument that allowed assessment of both qualitative and quantitative information about student perceptions. Consequently, this study was designed to 1) elicit the opinions of a large number of students, 2) who represented multiple North American dental schools, 3) using a validated data collection instrument—the ClinEd IQ

(Clinical Education Instructional Quality Questionnaire), and 4) obtain both qualitative and quantitative perspectives from students.

ClinED IQ

The questionnaire used in this study to assess clinical teaching skills of faculty and other factors that influence learning in the clinic was the Clinical Education Instructional Quality Questionnaire (ClinEd IQ). This instrument was originally developed by Shipengrover and James and used to assess medical students’ perceptions of their clinical experiences; the original questionnaire was called the MedEd IQ.³⁶ The MedEd IQ was developed from an ethnographic study that assessed student learning in community-based practice settings and has been used in ambulatory medical settings to measure the clinical instructional process.³⁷⁻⁴⁰

The ClinEd IQ consists of three subscales and a fourth section that asks students to answer two open-ended questions related to the strengths and weaknesses of the program. Internal consistency coefficients range from .87 and .94 for the three subscales.⁴⁰ These data indicate that the instrument can reliably elicit student perceptions of their clinical learning environment. In summary, the MedEd IQ was selected because of its wide use in the health professions and evidence of reasonable reliability. The only modifications from the original MedEd IQ that occurred for this study were substituting the term “dental” for “medical” each time the latter word appeared in the questionnaire and changing the name to ClinEd IQ to provide a more generic title for the instrument.

The ClinED IQ contains forty-five questions, forty-three of which are in a forced-option (multiple choice) response format and two of which are open-ended. The multiple choice questions are broken into three subscales: Clinical Learning Opportunities (fifteen items), Involvement in Specific Learning Activities (thirteen items), and Interaction with Clinical Instructors (fifteen items). In general, items in the Clinical Learning Opportunities subscale asked students to assess aspects of the overall learning environment in the dental school clinic including the variety and challenge level of patient care experiences, efficiency of clinic operations, adequacy of resources and support, consistent contact with a core of instructors, and opportunity to work in different health care settings. Items in the Involvement in Specific Learn-

ing Activities subscale asked students to assess the extent to which they performed various patient care tasks during their clinical education. Items in the Interaction with Clinical Instructors subscale asked students to assess specific teaching skills of the clinical faculty including many of the techniques frequently described as instructional best practices in the preceding review of the literature. Items for the subscales Clinical Learning Opportunities and Interaction with Clinical Instructors were measured on a six-point Likert scale from “strongly disagree” (1) to “strongly agree” (6). Questions related to the scale Involvement in Specific Learning Activities were also scored on a six-point Likert scale with the following response options: no exposure (1), involved hardly at all (2), involved to a small degree (3), involved to a moderate degree (4), involved to a considerable degree (5), and involved to a high degree (6).

Methods

The research protocol described in this article was reviewed and approved as exempted research by the Institutional Review Board of the University of Texas Health Science Center at San Antonio on August 22, 2001 (IRB Protocol E-012-010).

An invitation letter was sent to the associate dean for student affairs of each North American dental school in the spring of 2002. This letter discussed the background and goals of the project as well as requirements for participation and timetables for completion. Of the sixty-five dental schools in North America in 2002, twenty-three (35 percent) originally agreed to participate in the study. Project materials were then sent to the associate dean for student affairs of these schools for distribution. The materials included copies of the ClinEd IQ Questionnaire, background information on the ClinEd IQ Questionnaire, a ClinEd IQ Frequently Asked Questions (FAQ) list, University of Texas Health Science Center at San Antonio Institutional Review Board (IRB) information sheet, and directions for the distribution and completion of the ClinEd IQ.

Twenty-one of the twenty-three schools (31 percent of North American dental schools) complied with the protocol and returned ClinEd IQ questionnaires from their students during the 2003-04 academic year. The participating schools included seven private and fourteen public dental schools; four were Canadian and seventeen were U.S. schools. The names of the participating dental schools and the to-

tal number of students who participated at each are provided in Table 1. The instructions requested that each school submit twenty completed questionnaires from juniors, twenty from seniors, and ten from graduate students who had graduated from the predoctoral D.D.S. or D.M.D. program at that school, for a total of fifty ClinEd IQs per school and an overall total of 1,050 (21 X 50). A total of 655 students consisting of 295 juniors, 252 seniors, and 108 dental graduate students completed the ClinEd IQ, producing a functional response percentage of 64 percent (655/1050). Budget restrictions prevented a second (follow-up) request for submission of additional questionnaires.

Data analysis consisted of identifying means and standard deviations within subscales as well as within students' class (i.e., academic year). Analysis of the handwritten and open-ended responses consisted of thematic analysis of more than 1,000 handwritten comments. Interpretation of themes and coding data was a collaborative effort between the lead author (DH) and an expert with extensive experience in qualitative analysis. Collaborating on coding was suggested by Denzin and Lincoln as a means to eliminate bias or assumptions that may arise when data is reviewed.⁴¹ The technique used for thematic representation and data coding was based on a protocol recommended by Taylor and Bogdan.⁴² This protocol includes 1) looking for words or phrases that capture the meaning of what is said; 2) as a theme is identified, comparing statements with other subjects and seeing if there is a concept that unites them; and 3) as different themes are identified, looking for similarities between them. The issues and factors described in the section “Thematic Analysis of Students' Written Responses” below represent commonly expressed student opinions that relate to specific themes.

Results

The means and standard deviations for each student classification (juniors, seniors, and graduate students) and the overall composite mean for each ClinEd IQ subscale are presented in Table 2. All three student groups provided the highest ratings for Interaction with Clinical Instructors (juniors=4.47 mean, 0.64 SD; seniors=4.70 mean, 0.59 SD; graduate students=4.85, 0.63 SD). Each of the student groups provided their lowest rating for Clinical Learning Opportunities (juniors=4.08 mean, 0.56 SD; seniors=4.26 mean, 0.56

Table 1. North American dental schools that participated in the ClinEd IQ study and numbers of students who submitted completed questionnaires

School	Junior	Senior	Graduate
Columbia University	15	16	10
Creighton University	19	15	0
Indiana University	15	15	11
McGill University	0	9	6
Marquette University	15	12	0
Oklahoma University	12	2	0
University of the Pacific	10	5	0
State University of New York, Buffalo	8	6	5
State University of New York, Stony Brook	36	34	9
Tufts University	15	15	9
University of British Columbia	10	8	0
University of Connecticut	15	15	10
University of Georgia	16	15	11
University of Mississippi	7	7	7
University of Missouri-Kansas City	14	5	6
University of Oregon	15	14	7
University of Pittsburgh	17	8	2
University of Saskatchewan	16	15	0
University of Southern California	15	12	4
University of Texas Health Science Center at San Antonio	15	19	10
University of Toronto	10	5	1
Totals	295	252	108

SD; graduate students=4.43, 0.63 SD). Ratings for Involvement in Specific Learning Activities were juniors=4.22 mean, 0.61 SD; seniors=4.27 mean, 0.63 SD; and graduate students=4.45, 0.75 SD. The overall composite ratings (combining all three student groups) for each subscale were as follows: Clinical Learning Opportunities, 4.26; Involvement in Specific Learning Activities, 4.31; and Interaction with Clinical Instructors, 4.67.

An analysis of variance was applied to determine if the responses of the three classes of students (junior, senior, and graduate) were significantly different. Responses among the classes were significantly different for Clinical Learning Opportunities,

$F(2, 653)=4.58, p<.05$, and Involvement in Specific Learning Activities, $F(2, 653)=18.30, p<.01$, but not for Interaction with Clinical Instructors, $F(2, 653)=2.48, p=.084$.

The percentage of all 655 students (juniors, seniors, and graduate students combined) who either agreed or disagreed with each item in the ClinEd IQ subscales are displayed in Tables 3-5. For the subscales Clinical Learning Opportunities and Interaction with Clinical Instructors, the six possible response items were consolidated into “agree” and “disagree” as follows: Agree=mildly agree, agree, and strongly agree; Disagree=mildly disagree, disagree, and strongly disagree. For the subscale Involvement in Specific

Table 2. Mean scores for juniors, seniors, and graduate students on each ClinEd IQ subscale and overall composite means

Subscales	Junior N=295 Mean/SD	Senior N=252 Mean/SD	Graduate N=108 Mean/SD	Composite Mean for Junior/ Senior/Graduate
Clinical Learning Opportunities	4.08/.56	4.26/.56	4.43/.63	4.26
Involvement in Specific Learning Activities	4.22/.61	4.27/.63	4.45/.75	4.31
Interaction with Clinical Instructors	4.47/.64	4.70/.59	4.85/.63	4.67

Learning Activities, the six response options previously described were consolidated as “low involvement” and “high involvement” as follows: low involvement (with specific learning activities)=no exposure, involved hardly at all, and involved to a

small degree; high involvement=involved to a moderate degree, involved to a considerable degree, and involved to a high degree.

Students provided positive ratings for ten of the fifteen items in the Clinical Learning Opportuni-

Table 3. Percentages of 655 junior, senior, and graduate dental students who agreed or disagreed with statements in ClinEd IQ subscale 1, Clinical Learning Opportunities

Subscale Items: Clinical Learning Opportunities	Agree	Disagree
• I have experienced a good mix of patients, problems, and clinical experiences.	88	12
• The learning opportunities and mix of patients were too diverse, preventing me from developing proficiency.	11	89
• My experiences were repetitive and offered few new learning experiences.	21	79
• I increased my independence in caring for patients.	93	7
• I improved my communication and skills.	95	5
• I became more proficient in clinical skills because of opportunities to practice and receive feedback.	92	8
• I have had the opportunity to work in a variety of patient care settings.	69	31
• I have experienced a good mix of patients, problems, and clinical experiences.	88	12
• Things moved too fast for me to really learn anything.	22	78
• I felt like my time in the clinic was sometimes wasted with noneducational tasks such as calling patients for appointments, doing paperwork, standing in line at the cashier or dispensary, and waiting for faculty to check my work.	94	6
• The clinic functioned smoothly so that I could efficiently provide patient care.	46	54
• I did not feel like a useful member of the health care team.	11	89
• Support staff have been available and helpful.	81	19
• I had adequate resources available to me, which facilitated my learning.	80	20
• For most of my clinical education, I have worked consistently with the same instructors who know my abilities and learning needs, rather than having different instructors every day.	58	42

Table 4. Percentages of 655 junior, senior, and graduate dental students who indicated they had either high or low involvement with specific learning activities assessed by the ClinEd IQ questionnaire

Subscale Items: Involvement in Specific Learning Activities	High Involvement	Low Involvement
• Taking patient histories.	98	2
• Performing patient examinations.	99	1
• Taking the patient’s vital signs.	93	7
• Interpreting laboratory tests.	25	75
• Assessing radiographic images.	97	3
• Developing my own treatment plans.	91	9
• Making case presentations to instructors.	88	12
• Explaining the pathophysiology of patients’ health problems to instructors and answering questions about pathophysiology.	69	31
• Discussing assessment and diagnosis with patients.	96	4
• Providing patient education.	96	4
• Discussing the linkage of basic science concepts and clinic knowledge with my teachers in the clinic.	68	32
• Discussing the linkage of oral and systemic health problems with clinical instructors.	68	32
• Assisting faculty or residents with advanced procedures.	55	45

ties subscale. For each of these ten items, at least 78 percent of students provided the desired response, either “agree” or “disagree” depending on whether the item was stated positively or negatively. Students provided less favorable ratings for four items: “opportunity to work in a variety of patient care settings” (31 percent disagreed), “I felt like my time in the clinic was wasted with noneducational tasks” (94 percent agreed), “the clinic functioned smoothly so that I could efficiently provide patient care” (54 percent disagreed), and “I have worked consistently with the same instructors . . . rather than having different instructors every day” (42 percent disagreed). The level of disagreement for these four items was consistent across the three student groups and across the twenty-one schools.

On the Involvement in Specific Learning Activities subscale, students reported that they received frequent opportunities to perform important patient care tasks except for five items that received low involvement ratings from 30 percent or more of students: “interpreting laboratory tests” (75 percent), “explaining the pathophysiology of patients’ health problems to instructors” (31 percent), “discussing the linkage of basic science concepts and clinic knowledge with my teachers” (32 percent), “discussing the linkage of oral and systemic health problems with clinical instructors” (32 percent), and “assisting faculty or residents with advanced procedures” (45 per-

cent). There was some variability in student responses from school to school for this subscale, indicating that school-specific factors may have influenced student responses.

For the Interaction with Clinical Instructors subscale, students provided ratings in the desired direction (some of these items were also worded negatively) for all items except “provided consistent instruction and feedback” where 47 percent of students disagreed with the statement. Thirty-three percent of students disagreed with the statement “created an environment in which I felt comfortable accepting challenges . . . and encouraged me to ask questions without fear of being ‘put down.’”

Thematic Analysis of Students’ Written Responses

For the two write-in items on the ClinEd IQ, students were asked to describe examples of curriculum strengths as well as weaknesses of their program. Handwritten responses to each of these open-ended questions were submitted by 535 of the 655 students, resulting in more than 1,000 written responses. This section will first provide an overview of the main positive and negative themes that emerged from analysis of these data, which represented more than

Table 5. Percentages of 655 junior, senior, and graduate dental students who agreed or disagreed with statements in ClinEd IQ subscale 3, Interaction with Clinical Instructors

Subscale Items: Interaction with Clinical Instructors	Agree	Disagree
• Established an active role for me in patient care and gave me responsibility for managing patient care that was appropriate for my level of training.	94	6
• Failed to prepare me for patient encounters.	16	84
• Gave me specific and practical information that helped me improve my skills.	93	7
• Instructed me at my level of knowledge and expertise rather than at their level of knowledge.	86	14
• Provided consistent instruction and feedback.	53	47
• Brought to my attention techniques and strategies that I had previously not seen.	89	11
• Made every patient encounter a positive learning experience.	72	28
• Created an environment in which I felt comfortable accepting challenges, even at the risk of making mistakes and encouraged me to ask questions without fear of being “put down.”	67	33
• Improved my understanding of clinical practice.	92	8
• Discouraged me from taking risks or trying new things.	28	72
• Did not check my work frequently and did not provide me with timely feedback when I needed it.	18	82
• Demonstrated the value of respecting patient preferences even when they differed from my own.	82	18
• Encouraged me to become increasingly independent over time.	93	7
• Criticized me without offering suggestions for improvements.	27	73
• Responded promptly to requests for consultation, assistance, feedback, or evaluation.	74	26

one hundred pages of typed student responses, and will then demonstrate these main themes with verbatim and illustrative student comments.

Main Qualitative Themes

Two main themes emerged with regard to program strengths: 1) patient interaction and 2) knowledgeable faculty; these positive attributes were consistently expressed by students from all twenty-one schools. There were four consistently expressed student concerns: 1) limited number of faculty available to assist students in the clinic; 2) insufficient, inconsistent, and sometimes belittling feedback; (3) the need to perform considerable amounts of what students perceived to be noneducational administrative tasks to make the clinic function, such as calling and scheduling patients, doing excessive amounts of paperwork, and handling fee collection and billing; and 4) the stress and questionable patient care produced by trying to achieve procedural requirements. Two other commonly mentioned concerns in the anecdotal write-in comments were the lack of consistent advice that students received from instructors, which supports the students' low ratings of several items on the ClinEd IQ related to instructional consistency and lack of ability to work with the same set of instructors (i.e., working with different instructors from day to day).

Illustrative Examples of Students' Comments

Analysis of written comments indicated that juniors, seniors, and graduate students described similar strengths and weaknesses. Therefore, the thematic assessment was not subdivided among the three student groups. Direct quotes related to major themes are provided here to elaborate on the issues previously described. The primary positive experiences are presented first, followed by negative aspects of clinical education.

Patient Interactions. Not surprisingly, the most frequently described positive experience was the opportunity to work with patients. The patient interaction helped dental students increase their confidence when performing new skills. The following direct quotes from dental students illustrate this theme:

“One positive experience was being able to give comprehensive care to my patients and being involved in every step of the way—

from treatment planning to carrying out treatment.”

“Working in different environments such as the health department and in the emergency clinic provided a sense of autonomy and allowed the focus to be more on the patient as a person not the patient as a procedure.”

“I have a well-rounded patient pool with diverse needs and responsibilities.”

“I enjoy working with my patients and formulating a treatment plan suitable for each individual.”

“This school has a great patient pool (lots of work to be done). The school is well respected, so patients of all backgrounds come here.”

Knowledgeable Faculty. A second positive theme that was pervasive among the written comments centered on student appreciation for faculty who were perceived to be knowledgeable and eager to help. Students frequently described how fortunate they were to work with faculty who had a firm understanding of clinical skills and the ability to communicate these skills at the students' level of understanding. These written responses from students are representative of the numerous commentaries about the helpfulness of clinical instructors and also provide examples of many of the instructional best practices that have been identified in the literature:

“Our school has very knowledgeable instructors who encouraged me to try new procedures, become more independent, and expand my abilities.”

“I love it when faculty bring their clinical experience and share the different ways of restoring a lesion and allow you to ask multiple questions as to the pros and cons.”

“Instructors give positive feedback and never belittle me. They are always very open about sharing clinical advice and patient management. All instructors are approachable and amiable.”

“The clinic professors that I have worked with are excellent because they are patient,

willing to share their knowledge and expertise, understand that I am a student, are fair, and truly care about my education.”

“The faculty are very committed to educating us. They provide different insights, but at the same time I can disagree with their viewpoints and techniques. It is a very exciting and dynamic experience.”

“The faculty are very good at grading at my level of skill and allowing me to do just enough to slightly challenge these skills without feeling pressured or overwhelmed.”

The students’ written comments included far more descriptions of exceptional learning experiences than negative commentaries. Although students were positive overall, there were areas that students felt could be improved, including the teaching skills of the faculty. Notably, many of the positive commentaries about the instructional skills of the clinical faculty included the caveats “most of the instructors,” “some of our teachers,” or “certain instructors” as exemplified by the following comments:

“It all depends on your faculty coverage. Some people make you feel comfortable; some make you feel very uncomfortable and then it becomes more difficult to perform to a high level.”

“Certain instructors are great, extremely helpful and provide positive feedback, but other instructors are very difficult to work with. Whether I have a good day or not is almost 100 percent based on the instructor I have: sometimes great and sometimes not so great.”

“My clinical experiences are predictable based on which instructor will be in the clinic. We have some faculty members [clinicians] who are remarkable communicators. They are successful at communicating not only the areas that need improvement, but also the areas that we are presently strong in.”

Limited Number of Faculty or Faculty Who Are “Unavailable.” Students viewed their interactions with knowledgeable faculty as a highlight of their education, but a high percentage described situations in which the limited number of faculty hindered their progress in the clinic either because too few faculty

were assigned to clinic coverage or because faculty “wandered off” from the clinic and could not be located when needed to supervise patient care, evaluate work, or sign off on paperwork. One of the most frequent written observations was that lack of clinical faculty made it difficult for students to attend to patients in a timely manner. This proved frustrating to students who wanted the best possible care for their patients and also to meet the educational expectations of the various clinical departments. The following student comments represent this theme:

“There was not enough faculty coverage on the floor at all times. Considerable time was spent waiting for start-up checks and checks throughout the procedure.”

“Prolonged waiting for instruction and assistance during first-time procedures and more complex treatments, e.g., prosthodontics, RPDs, and complete dentures. This was the most recurrent and frustrating aspect of my dental education in clinic.”

“Some (not all) faculty fail to be efficient as clinical instructors—talking on their cell phones, talking to other faculty about golf, football, baseball, etc. Is this the proper way to spend clinic time? That time should be dedicated to teaching and helping students.”

“Getting faculty approval, advice, and signatures takes so long I see probably half the patients I otherwise could.”

“The faculty disappear. Instructors who are MIA.”

“Instructors are not available in a timely manner. If I have a question, oftentimes I will wait and wait, and due to the limited clinic time with my patient, I will go on with the procedure and skip waiting to get my question answered because I don’t have time. I feel this is a HUGE problem in my clinical education.”

The second most prevalent negative theme from the students focused on the clinical instructors’ approach to providing feedback. Many students noted that faculty had difficulty communicating useful feedback. The feedback theme had two subcategories: inconsistent feedback and condescending feedback.

Inconsistent Feedback. Student commentaries indicated that inconsistent feedback, and resulting inconsistent grades, were a common occurrence in dental school clinics. Students described situations in which two instructors would look at the same work performed by the students and each would give dramatically different feedback and assign different grades. The following comments, which were expressed in various forms by numerous students, illustrate student frustration with lack of instructor calibration:

“A big problem is inconsistent feedback and instruction because there are different standards between groups. Other groups get away with things while some will not. This is all very unfair to students.”

“Inconsistency of instructors. One will start a case with you and suggest their philosophy, then they are gone the next day and another teacher changes the way you do things; a waste of time.”

“Different instructors tell me to do different treatments for patients even though the treatment has already been approved by another licensed and practicing dentist.”

“This department is a nightmare: no one agrees with each other and every appointment is a step backward, not forwards.”

Condescending Feedback. Students recognized that prompt, informative, and sometimes critical feedback was necessary for development of their clinical skills, but many described situations in which feedback messages were delivered in a manner that was abrupt and rude, embarrassing, and condescending especially when criticisms were communicated in open areas of the clinic where other students, patients, and faculty could hear the conversation. Students’ concerns about condescending feedback are illustrated by these comments:

“The faculty were downright rude to me and extremely critical, as I have been learning; I feel afraid very often in clinic. Sometimes I feel like no matter how hard I try, I can’t please certain faculty.”

“Every instructor says, ‘If you don’t know, ask!’ BUT when you do, you get chewed

out and they end up putting you down. They need to check their egos at the door.”

“At times I feel unsure about asking questions for fear of being ridiculed. Certain professors are too intimidating to ask questions [to]. I wish I could be more open about not knowing something without being scared of insulting comments.”

“Instructors try to make us students feel stupid in front of our patients by saying things like ‘Why didn’t you do this?’ or ‘Why did you do that?’ instead of just teaching us and saying, ‘The best way to do this is to . . .’”

“The faculty seem to be like a tiger in the bush just waiting to pounce on a mistake and to puff themselves up by making me feel small.”

Too Much “Leg Work.” The third most prevalent negative theme centered on the large amount of “leg work” that students are required to perform while working in the clinic. This extra work involved tracking down patients, completing paperwork, scheduling appointments, and performing other clinic operations tasks that students felt should be accomplished by support staff. These issues take away from patient care and require concentration on administrative activities that interfere with students’ chairtime with patients and accomplishment of educational requirements imposed by the clinical departments. These comments illustrate the high level of student frustration with excessive legwork that was expressed in their written responses to the ClinEd IQ open-ended questions:

“Too many hoops and hurdles. New things thrown at us constantly. Bombarded with paperwork. Lack of organization and communication between cashiers, administrative assistants, and other staff—we have to run around and search for answers.”

“Considerably more time spent ‘jumping through hoops’ than actually practicing dentistry. Significant time is wasted seeking assistance, finding/procuring instruments, equipment, and materials, and waiting for instructors. There is difficulty scheduling clinic chairs; therefore, I am frequently without an appointment on clinic days.”

“The paperwork, calling patients and often harassing them to come in, and the amount of lab work. I know that some of this is needed, but it takes away from time that could be utilized working on patients, trying to meet requirements.”

“Anything having to do with the clinic [is a weakness]; getting anything done is close to impossible.”

“I spend the majority of my patient clinic period running around looking for instructors, doing set up and clean up, getting told to do another consult, dealing with money issues, scheduling patients, etc. I feel that very little quality time is spent doing patient care.”

“The paperwork! The inefficiency! The money hassles! The bureaucracy is crazy.”

Impact of “Chasing” Requirements. More than 20 percent of the commentaries written in responses to the “weakness” question on the ClinEd IQ expressed students’ concerns about finding or “chasing” patients who had dental problems that matched up with the procedural requirements dictated by the various clinical departments.

“Weaknesses: Not having patients with the work I need in order to meet my requirements. Getting failing grades in clinic when the school could not provide patients for our requirements.”

“The requirement-based system fosters and reinforces inappropriate and unethical treatment of patients.”

“Finding required procedures and having the patients actually pay for them. I have been paying for a lot of procedures just to get my requirements done!”

“Requirements make it difficult to prioritize patients’ needs. I have to worry about my own needs sometimes more than the patients.”

“The requirements keep changing and are sometimes unrealistic! Dental school does not provide comprehensive care as much as the administration wants to say that it does.

The patients are often neglected so that we can prioritize requirements.”

“Many requirements for graduation are hard to come by. Too many deadlines: patients can’t always come to an appointment just to help meet a deadline.”

“Having both competencies and requirements has become extremely stressful. Our curriculum is supposed to be a comprehensive patient care environment, but each patient’s needs are unique, which prevents many of us from reaching our numerical requirements. We are now trading patients right and left to have the appropriate number of experiences.”

“Clinical requirements have possibly hindered overall patient care, dehumanizing the patient to the point where the patient is seen as a PFM. Requirements or certain procedures are done 1st for the sake of requirements (e.g., a bridge instead of monitoring oral hygiene for a sufficient time before the bridge).”

Discussion

The discussion will focus on two questions: how do the findings from this study, which elicited the students’ point of view, compare to the literature on clinical teaching effectiveness summarized in the introduction, and what are the implications of these data for clinical education and faculty development?

Comparison of Dental Students’ Perceptions to the Literature on Clinical Teaching Effectiveness

Figures 1 and 2 summarize the findings of Irby and Heidenreich et al. related to dimensions of clinical teaching best practices and characteristics of effective clinical instructors.⁵⁻⁶ Nine items are common to both Irby and Heidenreich et al. and are displayed in Figure 3 in relation to the students’ perspectives expressed in our study. Taking a scorecard approach, the student perceptions elicited by the ClinEd IQ indicate that clinical instructors routinely employ four of the nine dimensions/characteristics: orienting learners prior to patient

Dimension/Best Practice Heidenreich et al. in bold type; parallel Irby dimension follows in regular type	Dental Students' Perceptions at 21 North American Dental Schools, 2004
Orients learners: Assesses students' needs and communicates clear expectations.	Students rarely mentioned orientation and expectation-setting as an instructor strength, but 84 percent indicated that their instructors prepared them for patients.
Prioritizes students' learning needs: Understands students' needs at various levels of training.	Eighty-six percent of students agreed that their teachers "instructed me at my level of knowledge," and there were numerous written comments about instructors' willingness to adapt teaching to student needs.
Primes students for tasks: Provides just in time teaching.	Responses to several categories in Table 5 and students' written commentaries indicate that most clinical faculty provided effective "just in time" assistance.
Teaches in patient's presence: Teaches while providing care; explains to student what is happening and why.	Seventy-two percent of students responded that teachers "made every patient encounter a positive learning experience," and 74 percent agreed that instructors responded promptly to requests for assistance. However, students described lack of access to faculty during patient care and lack of consistent advice as barriers to learning.
Limits teaching points: Explains concepts and techniques clearly and briefly.	Ninety-three percent of students reported that instructors "gave me specific and practical information that helped me improve my skills," and 89 percent said instructors introduced new techniques.
Models desirable patient care practices and professional behavior: Serves as a positive role model of a health care professional.	Written commentaries suggest that most instructors are exemplary role models, but some instructors exhibited less than professional attitudes toward students.
Uses questions to teach: Asks "why," "what if," and "how" questions; asks students to assess and plan.	Students rarely mentioned the use of questions to guide learning; 33 percent disagreed that instructors "encouraged me to ask questions without fear of being 'put down.'"
Provides prompt, frequent, and helpful feedback: Provides constructive "how to improve" feedback in a nonbelittling manner.	Fifty-three percent of students agreed that instructors provided consistent instruction and feedback, and 27 percent reported that teachers criticized without giving suggestions for improvement. The most frequent criticism of clinical teaching was insufficient, inconsistent, and sometimes belittling feedback.
Encourages students to reflect on learning and self-assess: Asks students to self-assess their performance.	Students rarely mentioned efforts by their clinical teachers to stimulate self-assessment or reflection.

Figure 3. Dimensions of effective clinical teaching identified by Irby and Heidenreich et al. and dental students' perceptions elicited by the ClinEd IQ

care, prioritizing students' learning needs and teaching at the students' level, priming students for tasks with "just in time" teaching, and providing a limited number of teaching points that are explained clearly and briefly. Student responses were mixed and difficult to interpret for two dimensions: teaches in patient's presence (teaches while providing care) and models professional behavior. Student responses suggest that three of the nine best practices are not routinely or effectively employed. The data indicate that clinical instructors do not rely heavily on questioning strategies to guide or stimulate student thinking, rarely ask students to reflect

on performance or self-assess, and often employ less than ideal strategies for providing feedback. In particular, the results suggest that many clinical instructors could enhance their technique for providing feedback with emphasis on improving delivery of the message based on the traditional communication heuristic: "It's not what you say, but how you say it." On the positive side, the perceptions of these 655 dental students suggest that several, but not all, of the commonly recommended clinical teaching best practices are being implemented in dental schools by a substantial number of clinical faculty.

Implications for Clinical Education and Faculty Development

The primary take-home message from these ClinEd IQ data is that dental students do not perceive that they gain as much from the overall clinical setting as they do from the interactions with individual clinical instructors. The dental students who participated in this study saw the clinical environment as being inefficient and characterized by non-productive down time that was devoted to noneducational tasks in order to “make the system work.” Students from virtually all schools commented on the impact of faculty shortages on the quality of the educational program, either “real” coverage shortages (not enough faculty on staff) or “availability” shortages (faculty cannot be found when needed).

The frequency of commentary about the barriers to meeting imposed clinical requirements and the students’ expressions of concern over this aspect of their education were surprising considering that the standard two educational program guidelines of the Commission on Dental Accreditation specifically forbid use of requirements as a measure of student performance. It is clear from students’ responses to the ClinEd IQ that the “requirement system” is still alive and well at many of the schools participating in this study.

Responses to the ClinEd IQ also indicate that students prefer more opportunity to work in a variety of patient care settings, not just the dental school clinic; prefer to work more consistently with a core of instructors rather than interacting with different faculty every day; and may not receive sufficient learning experiences in several areas, including interpreting lab tests and assessing oral and systemic health problems.

The ClinEd IQ data indicate that graduate students had the most favorable overall assessment of their clinical education. This finding is not too surprising due to the fact that graduate students often have more autonomy with regard to patient care than senior and junior students and are functioning at a higher level of proficiency, which is probably accompanied by lower levels of stress than that among junior and senior students.

This study was conducted in part to address some methodological issues related to assessment of students’ perceptions of what constitutes good clinical teaching. These methodological issues include use of different and unvalidated data collection instruments that make it difficult to compare and con-

trast findings, use of instruments that collected either quantitative (responses to survey questions) or qualitative (interviews and written observations) data but rarely both, small student samples from single schools that they may not be generalizable to other settings, and the fact that much of the data that still provides the basis for assumptions about what students “like and don’t like” in their clinical education was collected in the 1980s and 1990s.

Limitations

The questionnaire used in this study was initially designed for medical students. Although there are similarities between medical school and dental school faculty with regard to teaching clinical skills, some of the nuances used by each profession could have been lost when simply substituting “medical” for “dental.”

The sample of students was 655, which is probably the largest number of dental students to complete a qualitative assessment of the clinical learning environment. Although a large number, it still represents only 9 percent of all students in the clinical phase of dental school in 2003-04. However, we have no reason to believe that these students were not representative of their peers.

An important question from any study is whether the data collected is generalizable. Approximately one-third of North American dental schools participated in this study. The twenty-one participating schools included seven private and fourteen public dental schools and seventeen U.S. and four Canadian schools, so the sample was broadly representative. Four of the participating schools operated a curriculum based on problem-based learning (PBL) for the first two years of their program, and the other seventeen schools had conventional curricula at the time of the data collection. These school characteristics suggest that the findings may be generalizable to a wide variety of dental schools.

Conclusion

Clinical experiences in dental school encompass a wide variety of learning opportunities. Findings from this study demonstrate that, as a general rule, students viewed their clinical education as being a positive experience with four notable exceptions that students perceived to be largely out of their

control: 1) limited numbers and accessibility of faculty, 2) inconsistent and all too often inconsiderate feedback by faculty, 3) clinic inefficiency and lack of support resources, which required students to perform administrative tasks that detracted from opportunities to learn, and 4) strategies required to meet procedural requirements that were described by some students as being ethically questionable. These findings can guide the planning of faculty development programs for clinical instructors, particularly the new cohort of faculty who will take over from the rapidly retiring boomer generation in the next ten years.

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