Students' Perceptions of Effective Classroom and Clinical Teaching in Dental and Dental Hygiene Education

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Abstract: Effective teaching behaviors have been studied in various arenas in higher education. However, there is limited research documenting effective teaching behaviors in dentistry and dental hygiene. Our qualitative study attempts to define effective teaching in both the classroom and clinic for dentistry and dental hygiene students. A total of 175 dental and dental hygiene undergraduate students nominated a total of forty instructors for teaching awards, providing a total of 695 qualitative statements reflecting their teaching in two learning contexts: the classroom and the clinic. Seven categories of effective teaching qualities were identified: individual rapport, organization, enthusiasm, learning, group interaction, exams and assignments, and breadth. Based on the frequency of the themes, effective teaching in the classroom was best defined by organization and rapport, whereas in the clinic, rapport was the most frequently described behavior. Moreover, dentistry students perceived enthusiasm as an effective teaching quality more frequently than did dental hygiene students, whereas dental hygiene students provided more responses to learning. These findings can provide guidance in preparing undergraduate dental and dental hygiene educators to enter the teaching environment. The ultimate goal to be achieved from identification of effective teaching qualities, as determined in this study, is improvement in clinical and classroom teaching for dentistry and dental hygiene programs.

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Effective teaching is critical for student learning, especially in professional fields such as dentistry and dental hygiene. These professions are often taught by expert clinicians who, for the most part, have limited or no prior formal teaching training.¹⁻³ In far too many professional programs like medicine, dentistry, dental hygiene, and nursing, effective teachers are produced by happenstance rather than design.¹ The expert knowledge and technical skills of professionals are assumed to “serve as adequate qualifications” for effective teaching, although this is an “antiquated theory.”¹ Nevertheless, every year numerous dental and dental hygiene faculty receive awards for their excellent teaching efforts.^{1,2} What is it that best describes the effective teaching behaviors of these teaching award winners?

The goal of this study was to define effective teaching in both the classroom and clinic for dentistry and dental hygiene students. These findings can provide guidance in developing undergraduate dental and dental hygiene education, as teachers are being prepared to enter the teaching environment. The

ultimate goal is the improvement of dental and dental hygiene teaching.

Literature Review: Effective Teaching in the Oral Health Professions

Literature on teaching and learning abounds in almost every area in higher education. In many professional schools, specific journals are dedicated to the dissemination of discipline-specific information on effective teaching and student learning. Examples include *Academic Medicine*, *Medical Educator*, *European Journal of Dental Education*, *Journal of Dental Education*, *American Journal of Pharmaceutical Education*, and *Journal of Nursing Education*. However, information specific to effective teaching behaviors in the classroom, laboratory, and clinic are relatively limited in the health setting, especially in dentistry and dental hygiene. Research that has been

conducted tends to highlight the clinic³⁻¹⁰ instead of the classroom¹¹ and laboratory settings.¹¹ For the most part, educational research in nursing,¹²⁻²⁶ medicine,^{4,5,7,9,10,15,27-33} and the arts³⁴⁻⁴⁵ is much more prolific than in dental education, so it provided helpful direction for our study.

Effective Teaching in the Classroom

A study by Talwar and Weilin¹¹ identified qualities that both full- and part-time dental educators perceived important in an effective teacher. Their findings suggest that, for didactic instruction, clear organization was most important. A comparison between full- and part-time instructors demonstrated differences in perceived lecturing skills as most important for the former and clear organization and subject knowledge as most critical for the latter. Moreover, women dental educators valued basic lecturing skills as most important, whereas men perceived organization and subject knowledge as critical. This study of classroom instruction demonstrates the importance of organization, lecture skills, and basic knowledge. It may also reflect a difference in gender paralleling orientation: female instructors may show more people-oriented behaviors, whereas male instructors might be demonstrating more task-oriented behaviors.

Studies on effective teaching behaviors in the classroom are limited in dentistry and dental hygiene, as well as in nursing and medicine, but are prolific in the arts. These studies reveal that effective teaching in the classroom includes behaviors such as organization, enthusiasm, empathy, rapport, clarity, general knowledge, and being available for students.³⁴⁻⁴⁵

Effective Teaching in the Lab

A paucity of literature exists on effective teaching behaviors in the laboratory, not only in nursing and medical studies, but also in the sciences. The Talwar and Weilin¹¹ study identified what dental educators perceived as effective laboratory instructor qualities, which included clear goals and expectations. Full-time instructors perceived fair standards as most important, whereas part-time instructors perceived constructive feedback, availability, and time allocation as equally important.

Effective Teaching in the Clinic

Although the classroom findings help to identify effective teaching behaviors in the general col-

lege classroom and may be generalizable to dentistry and dental hygiene classrooms, one needs to appreciate the qualitative difference in content and teacher-student interaction as one explores effective teaching in the clinic—a very different setting than the college classroom.⁴⁶ Moreover, the clinical setting compounds the closer proximity of instructor to student, coupled with close and continuing communication with clinical instructors, which results in the teaching style and rapport that instructors have with students. Thus, instructors can have a potentially greater influence on dental and dental hygiene students' learning in clinic than in classroom settings.⁴⁶

Clinical application for students, in which classroom learning is contoured into professional practice, is critical to the dental and dental hygiene education programs. Studies on effective clinical teaching tend to focus on different stakeholders: dental educators, both perceptual and anecdotal reflection data; senior dental students' perceptions; and third- and fourth-year dental students' clinical instructor evaluations. Dental educators generally perceived effective clinic instructor qualities to include constructive feedback and availability.¹¹ However, when dividing this group into full- and part-time instructors, the former perceived being a positive role model as most important, whereas the latter perceived fair standards, enthusiasm, and constructive feedback as equally important.¹¹ Moreover, women dental educators valued constructive feedback and availability as most important, whereas men perceived being a positive role model as critical.¹¹ For third- and fourth-year dental students, interpersonal relations skills, availability, and instructor-student relations were valued as being most important in a clinical instructor.⁴⁷ Coupled with these effective clinic teaching behaviors was the ability to maintain conditions for clinical learning, communicate with patients and students, and demonstrate the instructor's clinical competence and positive professional behavior for students to model.^{3,47} These findings are supported by a recent study in which senior dental students identified the following desirable clinical teaching behaviors: professional competence, approachable personality, punctuality, availability, consistency, practicality, understanding of the limits of student knowledge, and respect for the student/patient relationship.⁷ Overall, clinical teaching qualities of significance include rapport (i.e., availability, approachability, and student-patient relationships), role modeling, and feedback. Similar qualities have been found in a thematic review of the research literature on teaching in ambulatory care settings for medical education.⁹

Gaps in Studies on Effective Teaching in Dentistry and Dental Hygiene

Although the literature on effective teaching in dentistry and dental hygiene provides information for the classroom, laboratory, and clinic, it is limited, requiring much more research attention. Current studies represent a number of other challenges. First, most studies do not have a theoretical framework of effective teaching behaviors to guide their study.³¹ Higher education literature is prolific in identifying correlational and causal influences of effective teaching as well as providing a theoretical rationale for the effectiveness of a variety of teaching behaviors. As seen in Table 1, a meta-analysis of 1,049 studies on effective teaching demonstrated that the teaching behaviors most strongly correlated with student learning are organization, clarity, impact, course interest, openness, availability, and expressiveness.³⁴⁻³⁵ Marsh,⁴⁸⁻⁵¹ using confirmatory factor analyses, conceptualized effective teaching as: learn-

ing/value, instructor enthusiasm, organization/clarity, group interaction, individual rapport, breadth of coverage, examinations/grading, assignments/readings, and workload/difficulty. A number of studies have manipulated some of these teaching behaviors to measure their direct impact on student learning. For instance, organization is known to increase students' achievement outcomes,^{36,52,53} whereas expressiveness has been demonstrated to increase students' perception of control in the classroom and in turn their achievement outcomes.³⁷ These studies support Feldman's and Marsh's findings. Since it was critical to our study for a theoretical framework to guide research, we used Marsh's^{34,35,48-51} framework to identify the categories of effective teaching in both dentistry and dental hygiene.

Second, methods used to explore effective teaching behaviors in dentistry and dental hygiene have for the most part included senior dental student interviews,⁷ mailed surveys to dental educators,¹¹ closed-ended pre-defined teaching evaluation questionnaires completed by dental students,^{3,46,47} and anecdotal evidence.⁶ Given the risk of receiving a less than ideal response rate via mailed questionnaire (e.g., 57 percent),¹¹ our study had students participate as part of their class to encourage higher response rates.

Third, it is important to be free from the limiting qualities of survey or closed-ended questionnaires. To collect a depth of data, often inaccessible using questionnaire techniques, a qualitative methodology was used to capture students' descriptions of effective teaching behaviors.

Fourth, most research thus far has dealt with perceptions of ideal teachers.^{7,11} In our study, the students identified actual teaching award winners, and the descriptions written by students to nominate these teaching award winners were used to identify actual effective teaching behaviors.

Fifth, the stakeholders involved in past studies of dental teaching effectiveness have represented senior dental students,⁷ dental educators,¹¹ and dental students in a clinical setting.^{3,46,47} Given that all students, not just senior students, are receiving classroom and clinical instruction, representation from all student groups is valuable to inform the research on effective teaching behaviors in dentistry and dental hygiene. Accordingly, we designed our study to obtain informa-

Table 1. Correlations between the instructional dimensions of effective teaching and student achievement

Instructional Dimension	Correlation with Student Achievement
1. Organization	.57
2. Clarity and "Understandableness"	.56
3. Perceived Outcome or Impact of Instruction	.46
4. Stimulation of Interest in the Course and Its Subject Matter	.38
5. Encouragement of Questions and Discussion and Openness to Opinions of Others	.36
6. Availability and Helpfulness	.36
7. Elocutionary (Expressiveness) Skills	.35
8. Clarity of Course Objectives and Requirements	.35
9. Knowledge of Subject	.35
10. Sensitivity to and Concern with Class Level and Progress	.30
11. Enthusiasm for Subject or Teaching	.27
12. Instructor Fairness	.26
13. Intellectual Challenge	.25
14. Respect for Students	.23
15. Feedback to Students	.23
16. Course Material	.17
17. Supplementary Materials and Teaching Aids	.11

Source: Adapted from Feldman KA. The association between student ratings of specific instructional dimensions and student achievement: refining and extending the synthesis of data from multi-section validity studies. *Res Higher Educ* 1989;30:583-645.

tion not necessarily covered in the current literature by including undergraduate students throughout the curriculum and across the oral health profession (i.e., dental hygiene and dentistry).

Methods

Our study focused on identifying effective teaching behaviors as defined by undergraduate dentistry and dental hygiene students' nominations of effective teachers in both clinical and classroom settings. To avoid the problems with past research on teaching effectiveness described above, we were guided by Marsh's theoretical frameworks of effective teaching behaviors; utilized the classroom setting to encourage high level of participation by all undergraduate students; asked students to write qualitative comments about actual versus hypothetical "ideal" effective teachers; and included all undergraduate students in both the dentistry and dental hygiene programs. The rationale for including both dentistry and dental hygiene students was that these two student groups share some of the classroom instructors and clinical workspace.

The independent variables were student type (dentistry and dental hygiene) and type of teaching (classroom and clinic). There were no Excellence in Teaching Awards for the laboratory setting at this school because of the limited number of laboratory teaching opportunities. Dependent variables were the various descriptions of effective teaching behaviors by students. Content analysis was used to organize the descriptions into one of the nine major teaching behaviors defined by Marsh.⁴⁸⁻⁵¹

The Dean's Excellence in Teaching awards are conducted annually at the University of Manitoba in the Faculty of Dentistry and School of Dental Hygiene. In the past, students in each class nominated and collectively chose one instructor for classroom teaching excellence and one instructor for clinic teaching excellence. However, this year, the procedure was expanded to include input from each student as to the selection of the instructors whom he or she thought were effective and the rationale or justification for choosing them. Students were asked to provide specific reference(s) to actual teaching behaviors that they witnessed as being effective. Dentistry and dental hygiene students were asked to nominate one classroom teacher and one clinical teacher.

To understand and make valid inferences from the written data, content analysis was utilized,⁵⁴

whereby the written content was broken down into individual phrases and/or individual words. From here, the items were classified into a finite number of categories for analysis. These categories were derived through the repetition of data and/or external sources such as previous studies, theories, and the like. Critical to our study was the derivation of effective teaching categories. Marsh's⁴⁸⁻⁵¹ theoretical classifications of teaching behaviors into nine factors were used to guide the qualitative theme analyses. As such, maintaining a reliable and valid interpretation was the most challenging aspect of content analysis.^{55,56} The nine factors reflecting Marsh's classifications of effective teaching are learning/value, instructor enthusiasm, organization/clarity, group interaction, individual rapport, breadth of coverage, examinations/grading, assignments/readings, and workload/difficulty. The validity and reliability of each of these teaching behaviors have been extensively tested and operationally defined.⁴⁸⁻⁵¹ The operational definitions of each of the nine teaching factors provided clarity in the classification of each of the qualitative statements made about the nominated teaching award winners. A research assistant trained in qualitative research and guided by the operational definitions of Marsh's teaching factors classified each of the 695 teaching statements.

Students for each of the four year cohorts in dentistry (D1, D2, D3, and D4) and in each of the two year cohorts in the School of Dental Hygiene (DH1 and DH2) assembled in separate groups. Students were instructed to independently identify two effective teachers, one for the classroom and one for the clinic. Instructors were chosen from a list of full- or part-time instructors provided to the students. Students were given two sheets of paper with the following information: choice of instructor (classroom or clinic) and the request to provide qualitative information on effective teaching about the instructor as to why he or she should be nominated. This study received ethical approval from the University of Manitoba's Health Research Ethics Board.

Results and Discussion

A total of fifty dental hygiene (twenty-six first-year and twenty-four second-year) and 125 dentistry (twenty-nine first-year; thirty second-year; thirty-four third-year; and thirty-two fourth-year) students participated in nominating teachers for the teaching award in each of the following categories: Dental

Hygiene Excellence in Classroom Teaching; Dental Hygiene Excellence in Clinic Teaching; Junior Dentistry Students Excellence in Classroom Teaching; Junior Dentistry Students Excellence in Clinical Teaching; Senior Dentistry Students Excellence in Classroom Teaching; and Senior Dentistry Students Excellence in Clinical Teaching.

Overall, there were 124 instructors in the Faculty of Dentistry (Dental Hygiene: three female and five male full-time, and fourteen female part-time instructors; Dentistry: eight female and twenty-four male full-time, and twenty-one female and forty-nine male part-time instructors). Only forty instructors (32.22 percent) from this pool were nominated for the teaching awards. A total of 695 comments were made for these forty instructors ($M=17.375$ comments/instructor). The educational developer at the Faculty of Dentistry and School of Dental Hygiene reviewed the students' responses and selected the six teaching award winners based on the frequency of students' written comments about teaching effectiveness. Instructors selected for the awards received from ten to twenty-four responses, whereas instructors who were nominated but not selected to receive an award received from one to ten responses.

As seen in the left column of Table 2, content analyses of the total of 695 responses yielded seven major teaching qualities that reflect many of the categories identified by Feldman^{34,35} and seven of Marsh's⁴⁸⁻⁵¹ nine effective teaching factors. These included (see column e for totals) individual rapport ($N=294$), organization ($N=150$), enthusiasm ($N=109$), learning ($N=66$), examinations and assign-

ments ($N=30$), group interaction ($N=25$), and breadth ($N=21$). Based on these findings, students in dentistry and dental hygiene classes identified both personal qualities (i.e., individual rapport, enthusiasm, and group interaction) and abilities/skills (i.e., organization, learning, examinations and assignments, and breadth). A closer look at the psychological dynamics of each of these qualities may provide the rationale for why students appreciated them. The following paragraphs review each of the seven qualities of effective teaching described by the students, identify subthemes related to these major categories, and discuss these findings in relation to the literature on teaching effectiveness. References to pertinent studies are provided in the discussion of these seven teaching effectiveness qualities.

First, individual rapport was described by 294 student comments including behaviors such as "instructor was friendly and interested in individual students," "made students feel welcome asking for help," and "was accessible to students outside of class." As shown in Table 3, sixteen themes defined individual rapport. These behaviors reflecting individual or interpersonal rapport are known to impact students' perceptions that the teacher knows them and cares about them and their learning,⁵⁷ and this, in turn, is thought to motivate students to do their best, so as not to disappoint their teacher's high expectations of them.⁵⁷

Second, organization was described by 150 student comments as "instructor provided clear explanations," "well-prepared course materials," "gave lectures that facilitated note-taking," and "followed

Table 2. Clinic and classroom teaching evaluations of dental hygiene and dentistry students

	Clinic Teaching (a)						Classroom Teaching (b)						Dental Hygiene (c)		Dentistry (d)		All (e)	
	Dental Hygiene		Dentistry		Combined		Dental Hygiene		Dentistry		Combined		Combined		Combined		Combined	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Individual Rapport	56	62%	147	55%	203	57%	19	23%	72	28%	91	27%	75	43%	219	42%	294	42%
Organization	14	16%	34	13%	48	13%	23	27%	79	31%	102	30%	37	21%	113	22%	150	22%
Enthusiasm	4	4%	33	12%	37	10%	15	18%	57	22%	72	21%	19	11%	90	17%	109	16%
Learning	8	9%	21	8%	29	8%	17	20%	20	8%	37	11%	25	14%	41	8%	66	9%
Exams and Assignments	3	3%	15	6%	18	5%	2	2%	10	4%	12	4%	5	3%	25	5%	30	4%
Group Interaction	2	2%	12	5%	14	4%	7	8%	4	2%	11	3%	9	5%	16	3%	25	4%
Breadth	3	3%	4	2%	7	2%	1	1%	13	5%	14	4%	4	2%	17	3%	21	3%
Total	90		266		356		84		255		339		174		521		695	

course objectives.” As shown in Table 4, twelve themes define organization. The organization of course material, as exemplified by well-structured presentations, lecture outlines, headings, and subheadings, topic transitions, syllabi, and seriation of relevant points (placing relevant lecture content into a logical series, using “first,” “second,” etc.) were important to student learning.^{35,40,53,58} For instance, well-organized lecture content has a higher probability of being recorded as class notes.^{37,52,59,60} Organization in the form of outlines provides students with a knowledge structure, serving as an advance organizer, a quick and logical method of structuring the material that influences comprehension and facilitates encoding and retrieval of the material.^{37,52,60-63} In other words, well-organized information presented during learning enhances students’ memory of that information.^{37,60,61} Critical to an effective learning experience was the provision of a safe learning environment as provided by a set of clear objectives and outlines, with well-organized lecture notes and presentation.^{6,64,65} Thus, organization was seen as an important teaching quality by students participating in this study.

Third, enthusiasm or expressiveness was described by 109 student comments, such as the “instructor was enthusiastic,” “dynamic,” “energetic,” “humorous,” and “had an interesting style of presentation.” As shown in Table 5, ten separate sub-themes defined enthusiasm, each of which have been demonstrated in studies on expressive instruction.^{6,36,37,52,53,66} For instance, eye contact is thought to produce varying levels of compliance in students,

to create interest and challenge among students, and to increase a sense of personal relationship and intimacy between students and instructors.^{37,67,68} Furthermore, students who have had eye contact with their instructors during verbal presentations have higher recall scores on lecture material than those with no eye contact.⁶⁸ In addition, appropriate physical movement and/or audible changes associated with important lecture material tend to elicit student attention because they are thought to provide learning cues to important points. Body posture, gestures, and facial expressions are also thought to be important to attracting students’ attention.^{6,69} Relevant humor re-

Table 3. Individual rapport descriptors

Theme	Number of Comments
Friendly, easy to talk to, personable, approachable, interested in getting to know students	83
Helpful	55
Creates a positive, stress-free learning environment by being relaxed, easygoing, calm, patient; makes students comfortable	38
Fair; treats everyone equally	25
Kind, caring, considerate, understanding, generous	23
Available for questions/help outside of class and/or stays late to help students	19
Respectful; doesn’t make students feel stupid, intimidated, inadequate	17
Relates well to students	12
Understands and addresses students’ issues/problems; is flexible	6
Genuinely interested in patients	5
Excellent role model/mentor	4
Supportive and loyal	2
Down-to-earth	2
Not upset if students are legitimately late for class	1
Makes students feel important	1
Good mentor	1
Total	294

Table 4. Organization descriptors

Theme	Number of Comments
Clear and comprehensive explanations, instructions, and guidance	52
Well-organized, prepared, efficient	35
Provides good notes, handouts, and/or online material	16
Concise; doesn’t teach unnecessary material	10
Good use of visual material (slides)	8
Professional	6
Straightforward, direct teaching style	5
Excellent speaker/lecturer, articulate	5
Students know what is expected of them	4
Punctual	4
Practical, no-nonsense	4
Teaches at the right pace	1
Total	150

duces students' anxiety, maintains student interest, improves comprehension, enhances retention, and increases test performance.⁷⁰⁻⁷³ Expressiveness enhances students' scholastic behaviors such as attendance to subsequent lectures, the amount of homework completed, and academic achievement.^{74,75} Sometimes referred to as "enthusiasm," expressiveness might have an effect on students in the form of higher motivation and increased studying outside of instruction time.³⁸ Enthusiastic instructors who show high energy or a high level of interest in the content material also influence students. In one study, students who perceived their music instructor as exhibiting more expressiveness enjoyed their music lesson more, reported more positive effects, had a greater desire to learn, and demonstrated greater exploratory behavior.⁷⁶ Students' interest in a given topic is clearly influenced by the "enthusiasm" or expressiveness of their instructors.

Fourth, regarding learning, sixty-six student comments said "the course was intellectually chal-

lenging," "stimulating," "valuable," and "increased students' interest in subject matter." As shown in Table 6, two subthemes defined learning. Knowledgeable in the content area was seen as very important to students, most likely providing the credibility the instructor needs to convince students that the material was genuine and important. Asking questions is an important aspect of encouraging student learning.³¹ Moreover, "articulate, knowledgeable clinical instructors" are thought to engage student learning.¹⁹ Although the category of "learning" seems rather broad in comparison to the other components of effective teaching, the two subthemes reflect those identified by Marsh's "learning" factor.⁵¹

Fifth, thirty student comments focused on examinations and assignments, making comments like "evaluation was fair and tested appropriate content," "assignments were useful/valuable," and "feedback was valuable." As shown in Table 7, four themes defined examinations and assignments. These comments suggest that students perceived that a sense of

fairness, timeliness, and elaboration of feedback^{19,29,31,77} and thoroughness of assessment in exams and assignments^{78,79} were important components of effective teaching. Each of these teaching behaviors enhances the sense of safety that students require to learn effectively.

Sixth, group interaction was described by twenty-five student comments with such phrases as "students were encouraged to participate in discussions," "share ideas," "ask questions," and "were given meaningful answers." As shown in Table 8, five themes defined group interaction. Given the significance of dentistry and dental hygiene students' future careers as practitioners working in teams, it was not surprising that they valued group interaction. Moreover, interactive peer-based learning enhances student

Table 5. Enthusiasm descriptors

Theme	Number of Comments
Makes class/learning interesting, enjoyable, fun	29
Enthusiastic, energetic, passionate	27
Encouraging, motivating	13
Use of humor	10
Hardworking, determined	9
Loves to teach; wants students to learn	7
Has high standards and motivates students to reach them	6
Positive attitude	5
Goes beyond the "call of duty"	2
Use of a variety of teaching techniques	1
Total	109

Table 6. Learning descriptors

Theme	Number of Comments
Knowledgeable, experienced, insightful, skilled	65
Teaches rather than just correcting mistakes	1
Total	66

Table 7. Examinations and assignments descriptors

Theme	Number of Comments
Fair in evaluating/testing students	14
Provides constructive criticism/feedback/advice	14
Allows students to do procedures without being marked	1
Thorough in evaluating students so mistakes aren't missed	1
Total	30

creativity, critical thinking, and experiential learning.⁸⁰ Benefits also include gaining insights into group dynamics, willingness to attempt more complex assignments, development of interpersonal skills, exposure to others' points of view, and preparation for the profession in the real world.⁸¹ Thus, group interaction was both perceived by students as an effective teaching award quality and, according to the literature, is valuable for student learning.

Seventh, twenty-one student comments described breadth with such statements as "instructor presented theories other than his/her own," "contrasted implications of various theories," and "discussed background of theories and current developments." As shown in Table 9, three themes define breadth. Each of these subthemes points to the importance of students being exposed to information representing a diverse knowledge base. This provides the credibility or legitimacy that students seek in learning from the experts.³³

Based on content analysis, seven teaching categories were identified in the nomination of effective teaching award winners, reflecting seven of Marsh's nine effective teaching factors.⁵¹ In most cases, the impact that these teaching qualities have on student learning is supported by the research literature. However, other distinctions identified in our study can be drawn. These include a comparison of the teaching context—classroom versus clinical—and a comparison between programs in dental hygiene and dentistry.

Effective Clinical Versus Classroom Teaching Characteristics

As seen in Table 2, comparing the combined clinic teaching (column a) with the combined classroom teaching (column b) indicates a difference in rank ordering of effective teaching behaviors. For clinical teaching, individual rapport (N=203) was four times more frequently reported than organization (N=48) (44 percent difference), whereas in the class-

Table 8. Group interaction

Theme	Number of Comments
Encourages questions, new ideas, opinions, questions	9
Asks for feedback; is accountable	7
Answers questions thoroughly	7
Will find out answers for you if unsure	1
Lots of interaction in the classroom	1
Total	25

Table 9. Breadth descriptors

Theme	Number of Comments
Addresses real-world issues, makes material relevant, deals with applying classroom information in clinic	16
Keeps material up-to-date	3
Is open-minded	2
Total	21

room context, organization (N=102) was only slightly more frequently reported than individual rapport (N=91) (3 percent difference). These observed differences most likely reflect context differences. For example, the clinical, as compared to the classroom setting, compounds the closer physical proximity of instructor to student, coupled with close and continuing communication with clinical instructors, all dynamics that would encourage higher levels of rapport.⁴⁶ In most cases, this context was also defined by a much smaller and potentially intimate teacher-to-student ratio. Given these context-specific dynamics, rapport as defined by creating an open and trusting learning environment, highlighting tone-setting, facilitating, and role modeling were viewed as critical responsibilities for effective clinical teaching.^{6,19,21,22,24,25,28} Moreover, the content in the clinic was also qualitatively different from the content in the classroom.⁴⁶ In the clinic, theory was put into practice, and the qualities focus more on the psychomotor (e.g., tooth preparation) and affective (e.g., active listening to patients) abilities as compared to cognitive abilities rewarded in the classroom context (e.g., exams focusing on knowledge, application, and critical thinking). Thus, as future clinicians, dentistry and dental hygiene students value and benefit more from a teacher-practitioner who uses these humanistic qualities,^{19,21,22,24} as these same attributes will be invaluable as students use them with their patients.³⁰

In the context of the classroom, individual rapport (N=91) was only slightly lower than organization (N=102; differences of 3 percent). With a larger

teacher-to-student ratio, and with the significance of needing to know the material communicated in the classroom for application in the clinic, quality of organization was more frequently reported as defining an effective classroom instructor. This makes sense, given the direct impact that organization has on student learning. Surprisingly, organization was not described by students more frequently than individual rapport in defining the effective classroom instructor. This may be a consequence of the size of classes. Even though dentistry and dental hygiene instructor-to-student ratios (e.g., 1:32 dentistry; 1:25 dental hygiene) were higher than those found in the clinic (e.g., 6:1), they were still much lower than those found in the typical university classroom (anywhere from 1:40 to 1:400 or higher) that many of these students have experienced prior to their professional education. These smaller classes in dental and dental hygiene education allow for more intimate relationship between instructor and student and, most likely, caused this quality to be valued equally with interpersonal rapport.

Effective Dental Hygiene Versus Dentistry Teaching Characteristics

As seen in Table 2, comparing the combined dental hygiene (column c) with the combined dentistry (column d) teaching qualities indicates that individual rapport (43 percent vs. 42 percent), organization (21 percent vs. 22 percent), breadth (2 percent vs. 3 percent), group interactions (5 percent vs. 3 percent), and exams and assignments (3 percent vs. 5 percent) were described with fairly similar frequency, whereas differences were observed in enthusiasm (11 percent vs. 17 percent) and learning (14 percent vs. 8 percent).

Individual rapport and organization were the most frequently cited teaching award qualities, equally representing dentistry and dental hygiene evaluations. However, dental hygiene evaluations more frequently described “learning”-related teaching behavior qualities, whereas dentistry students more frequently described enthusiasm as a quality of effective teaching behavior. A number of interpretations may explain the differences in responses between dental hygiene and dental students. First, the subject matter of dental hygiene and dental curricula is considerably different in some areas, although some course content is shared. As a profession based on not only a solid biomedical science foundation but a strong emphasis on behavioral sci-

ence, dental hygiene is more patient-centered, focusing on critical interpersonal communication skills involving the patient, whereas dentistry tends to be more technically focused, with two additional years of training that focuses on numerous types of product development (partial dentures, crowns, etc.). This difference in discipline background might also reflect a difference in teaching culture. Another explanation for the different perceptions of teaching effectiveness qualities is the gender difference in students. Dental hygiene has a higher percentage of female to male students (96 percent/4 percent) than dentistry (50 percent/50 percent). Third, gender of instructors may differentiate types of effective teaching. Here again, dental hygiene was more strongly represented by female instructors, whereas dentistry was represented with more of a mix of female and male instructors. Dental hygiene instruction tends to use more formative evaluation in the clinical setting than does dentistry. In the classroom, dental hygiene tends to incorporate more out of class assignments and projects than dentistry does, whereas dentistry relies mainly on tests or examinations for didactic evaluation. However, it is important to note that in spite of some differences in perceptions of effective teaching behaviors between these two types of students, organization and individual rapport were equally and highly valued by both dental hygiene and dentistry students as effective teaching qualities.

Summary and Implications

Our study identified seven categories of effective teaching qualities: individual rapport, organization, enthusiasm, learning, group interaction, exams and assignments, and breadth. The most frequently recurring theme across classroom and clinical teaching was individual rapport. However, this quality was most prevalent in the clinic, whereas organization was only slightly more prevalent in the classroom. Based on the frequency of themes, dentistry students provided descriptions of the importance of enthusiasm more frequently than did dental hygiene students, whereas dental hygiene students provided more responses that described “learning.” Students in both programs viewed individual rapport, organization, breadth, group interactions, and exams and assignments fairly consistently.

Based on this study, instructors attempting to impact student learning in the classroom should con-

centrate their efforts on organization. Literature supports the importance of organization as having direct and indirect impact on student learning. For the clinic, the critical teaching behavior as viewed by students was individual rapport. This goes hand-in-hand with the professional competency of being able to have a good rapport with patients and clinic personnel. Moreover, critical to the success of any oral health professional was a high level of rapport with people. Also significant were the other five teaching qualities identified in our study: enthusiasm, learning, exams and assignments, group interaction, and breadth. Each of these was fundamental to the learning of students. Formal pedagogical training to improve teaching effectiveness with current instructors⁶ and graduating students^{15,32} should begin by focusing on these seven teaching qualities, by providing instructors with the theoretical knowledge of these qualities, defining them, illustrating their known impact on student learning, and providing practical examples of how to engage in them as teachers. By doing so, the effectiveness of teaching in dentistry and dental hygiene programs will be enhanced.

Although two teaching behaviors—individual rapport and organization—achieved high levels of support from students' comments on effective teaching, the results of this study must be placed within the context in which these teaching behaviors occurred. In other words, the contextual elements at this Faculty of Dentistry and School of Dental Hygiene may dictate these specific teaching behaviors, and we must be cautious in generalizing these conclusions. Replication of this study using a similar methodology at other dentistry and dental hygiene schools in Canada and the United States would also provide opportunities to confirm the findings in other settings. If similar themes were demonstrated, then these results could be generalized to teachers in both oral health disciplines.

Second, this study relied on students' perceptions to define effective teaching qualities, and that is not a direct indicator of effective teaching.³¹ Although students are reasonably accurate judges of effective teaching processes,^{48,51,82} a stronger case could be made by having a trained observer in effective teaching behaviors highlight the teaching behaviors observed and couple this with students' perceptions of effective teaching behaviors.³⁸ Additionally, a linking of student and/or observer evaluations of effective instructors with student learning outcomes⁵³ might have enhanced the results. This would demonstrate whether the specific teaching behaviors iden-

tified also have a direct impact on student learning as measured by course grades, final GPA, and national board exams. One study, for example, manipulated two of these teaching behaviors (expressiveness and organization) through videotape delivery to directly measure the impact of each as well as their effect on student learning.^{36,53} Similar studies would provide more clarity as to the learning influences of teaching behaviors valued by dental and dental hygiene students.

Third, although a few distinctions could be made in this study, including clinic versus classroom and dentistry versus dental hygiene, what would be of further interest is a comparison of female versus male student selection of effective teaching qualities. Fourth, qualitative methodologies, as used in this study, were primarily descriptive, and thus, the generalizability and predictability were at best suspect. Fifth, it would also be of interest to ascertain dental hygiene and dentist instructors' perceptions as to what were effective teaching behaviors in the classroom and the clinic. Finally, as future practicing clinicians, we found it surprising that neither dental hygiene nor dentistry students indicated the significance of professional competence by instructors in the clinic. Future studies might find ways to measure the significance of instructors' clinical competence as perceived by students. Although many of the current findings were supported by teaching in other professions, a much broader examination is required in future research.^{7,13,14} In doing so, the ultimate goal of enhancing clinical and classroom teaching for dentistry and dental hygiene programs can be achieved.

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