

Perceptions of faculty and students on the Pediatric Dentistry clinical evaluation system at Piracicaba Dental School – UNICAMP

Percepções de professores e estudantes sobre o sistema de avaliação clínica em Odontopediatria da Faculdade de Odontologia de Piracicaba – UNICAMP

Abstract

Purpose: This study evaluated the perceptions of faculty, graduate and dental students on the Clinical Log Sheet (CLS) test, which was applied at the Pediatric Dentistry Clinics of the Piracicaba Dental School, UNICAMP, Brazil.

Methods: The CLS computed qualitative (punctuality, personal presentation, biosafety, and theoretical knowledge) and quantitative (number of procedures) items compared with standardized quality parameters. The CLS efficacy was assessed using questionnaires answered by graduate students and faculty (Q1) and by dental students (Q2). CLS consisted of nominal questions and lines to write down suggestions, based on previous evaluations.

Results: All faculty/graduate students and 64% of the dental students answered the questionnaires. Faculty/graduate students considered the CLS to be an adequate and useful system, and easy to understand the items related to clinical concepts and performance; most respondents preferred this system to a more subjective evaluation. The dental students reported that the CLS was a partially adequate and useful system, but they also preferred the CLS to subjective evaluation.

Conclusion: Overall, the opinions about the new Clinical Log Sheet evaluation system were positive. Periodical re-evaluations will be necessary to improve this instrument and accomplish satisfactory results in a teaching-learning context.

Key words: Education; clinical competence; dental students

Resumo

Objetivo: Este estudo verificou a percepção de alunos de graduação, pós-graduação e professores em relação à eficácia do instrumento de avaliação (IA) aplicado na Clínica de Odontopediatria da FOP-UNICAMP, Brasil.

Metodologia: O IA consistiu de avaliação qualitativa (pontualidade, apresentação pessoal, biossegurança e conhecimento teórico) e quantitativa (número de procedimentos) com pontuações correspondentes ao padrão de qualidade preconizado pela disciplina. A eficácia do IA foi verificada por questionários auto-administrados aos professores e pós-graduandos (Q1) e aos alunos (Q2), com questões nominais e espaço para sugestões, baseado em avaliações prévias.

Resultados: Obtiveram-se 100% de respostas dos professores e pós-graduandos e 64% dos alunos de graduação. O Q1 evidenciou o IA como adequado, útil, com pontuações suficientes, facilidade de aplicação dos conceitos das atividades clínicas e do desempenho dos alunos e preferível à avaliação subjetiva, quando notas são atribuídas sem categorias específicas. O Q2 mostrou o IA como parcialmente adequado e útil, com pontuações excessivas, sem destacar áreas de dificuldade ou diminuir chances de reprovação, mas foi também preferível à avaliação subjetiva.

Conclusão: O IA foi considerado um sistema padronizado eficaz de avaliação, mas adequações e re-avaliações são necessárias para aprimorar o instrumento e determinar resultados satisfatórios no contexto ensino-aprendizagem.

Palavras-chave: Educação; competência clínica; estudantes de odontologia

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Introduction

Dental clinics is a challenging learning environment for faculty and students, in which the student is a trainee clinician responsible for patient care, and the dental clinics is simultaneously a patient care facility and a learning center. In this setting, students are expected to have competency in several areas, including technical skills, broad basic knowledge, professionalism, and empathic ethical behavior (1). Moreover, the students need to develop treatment plans for their assigned patients and perform a number of procedures to accomplish the clinical requirements for graduation (2).

To provide effective education, university faculty is responsible for preparing practitioners according to the standards of a particular profession. Teaching typically involves supervision of a trainee by an experienced clinician. As a consequence, clinical education usually involves a wide range of teaching modes. Clinical supervision may be defined as the "provision of monitoring, guidance, and feedback on matters of personal, professional, and educational development in the patient care context" (3). In addition, effective supervision includes joint problem-solving by students and instructors, in combination with feedback, reassurance, and theory-practice linkage (4). Dental faculty should continually evaluate clinical procedures performed by students in order to assess developing technical skills and clinical judgment. The assessment of student's clinical competence is of paramount importance, and there are several means to evaluate student performance during clinical activities (5).

One of the main factors affecting evaluation of clinical performance is how to measure it. Measurement is defined as the systematic assignment of numerical values (6). A primary obstacle to accurate measurement is the variety of cases that can result in measurement errors or cause erratic individual performance (7). Using the traditional evaluation system, students receive their grades based only on the mean number of accomplished procedures and on their general attitudes in a clinical environment. However, this system is highly subjective, difficult to quantify, susceptible to individual faculty personalities, and also offers insufficient teaching opportunities and discussion time with students (8). As subjectivity can be reduced by using well-defined performance criteria (9), a new clinical performance assessment tool was developed at the Pediatric Dentistry Clinics of the Piracicaba Dental School, State University of Campinas (FOP-UNICAMP), Brazil (10). The new performance criteria were defined considering that competency-based standards are basic statements of outcomes, which identify the major attributes and reflect the knowledge, attitudes, values, and skills associated with each aspect of performance in the workplace, expressed in terms of professional performance (11). To guide this modification process, dental procedures of critical importance and increased number of periodical evaluations were established. In the previous evaluation system, the

students were given only one grade by the end of the semester. However, it is known that overall evaluation reliability increases proportionally to the number of evaluation episodes. Therefore, the student's evaluation would not be influenced by the effects of day-to-day performance variations of patients and students. Moreover, multiple trials would take these two factors into account and allow a more reliable evaluation of a student's knowledge level and clinical expertise (7). Thus, a well-structured student record of clinical performance, such as a log book, provides an excellent opportunity for self-analysis as well as reflects goal achievement in clinical practice (12). Assessment efforts should not only determine whether students acquire the knowledge, skills, and values that faculty and profession establish to be important (13), but also should provide a tool to enable students visualize the desired level of performance and give them detailed feedback on their actual performance. Most literature on clinical evaluation systems is concerned with grading and reliability. Little has been published regarding perceptions of faculty and students on evaluation *per se*.

Alumni and faculty' perceptions of the evaluation system collected by questionnaires is an effective mean to identify strength and weakness of the existing system (14). Thus, the aim of this study was to assess the perceptions of faculty and students on a clinical log sheet evaluation system at a Brazilian Dental School using a questionnaire survey.

Methods

The study protocol was approved by the Ethics Committee of the Piracicaba Dental School, UNICAMP (FOP-UNICAMP), Piracicaba, SP, Brazil (025/2007).

The methodology consisted of two parts: 1) description of the clinical log sheet (CLS) evaluation to allow better understanding of the competency-based approach, and 2) application of two questionnaires, so that faculty, graduate and dental students could rate the efficacy of the applied educational system.

Description of the Clinical Log Sheet

The Clinical Log Sheet (CLS) was developed by graduate students and faculty of the Department of Pediatric Dentistry to assess the clinical performance of dental students in the Pediatric Dentistry Clinics at FOP-UNICAMP. The CLS consists of standardized qualitative and quantitative items for clinical assessment.

The qualitative assessment (Fig. 1) covered issues such as punctuality, personal presentation, biosafety/organization/cleanliness, which were scored from 0 to 2, and theoretical knowledge applied to clinical procedures, scored from 0 to 4. The CLS also included a quantitative assessment (Fig. 2), in which the students developed treatment plans for each of their assigned patients and performed a required number of procedures. They were expected to complete the treatment plan for their patients and accomplish the clinical requirements necessary for graduation.

	STATE UNIVERSITY OF CAMPINAS PIRACICABA DENTAL SCHOOL PEDIATRIC DENTISTRY CLINIC															
Student name: _____ Registration number _____ Box _____																
Qualitative parameters	Month 1				Month 2				Month 3				Month 4			
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
Punctuality																
Personal presentation																
Biosafety, Organization and Cleanliness																
Theoretical knowledge applied to clinical procedures																
Daily score																

Notes: _____

Final Qualitative grade _____

Final Quantitative grade _____

Fig. 1. Clinical Log Sheet Evaluation – qualitative parameters

Semester's Activities																		
	Scores	Month 1				Month 2				Month 3				Month 4				Total
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	
Treatment plan	1																	
Radiography	1																	
Behavior management	1																	
Diet Diary	1																	
Biofilm index	1																	
Biofilm control	1																	
Dental prophylaxis	1																	
Fluoride application	1																	
Sealant application	1																	
Dental polishing	1																	
Provisory restoration	1																	
Restoration repair	1																	
Class I restoration	3																	
Class II restoration	4																	
Class III restoration	3																	
Class IV restoration	4																	
Class V restoration	3																	
Complex restoration	5																	
Indirect restoration	5																	
Endodontic temporary dressing	3																	
Pulpotomy	5																	
Pulpectomy	6																	
Tooth Extraction	3																	
Colleague assistance	1																	
Others	1-3																	
Attended patients																		
Absent patients																		

Fig. 2. Clinical Log Sheet Evaluation – quantitative parameters.

Questionnaires

The CLS perception of faculty, graduate and dental students on the CLS in the Pediatric Dentistry Clinics at FOP-UNICAMP was assessed using structured questionnaires, containing nominal questions and lines for suggestions, based on previous evaluation (10).

These questionnaires were answered by dental students (Tables 1 and 2), and by graduate students and faculty (Tables 1 and 3). All participants completed the anonymous questionnaires and were asked to return them to the researchers. There were 12 common questions (Table 1), 10 questions addressed only to dental students (Table 2) and 2 exclusively directed to graduate students and faculty (Table 3). Core domains were: faculty/student

relationship (a), skills important for dental clinical practice (b), CLS applicability (c), stress and learning stimuli perceptions (d), knowledge about the CLS (e), and potential failure and difficulties that might emerge (f) (Tables 1-3). Data were analyzed by descriptive statistics, Chi Square, and Fisher's exact tests.

Results

Demographic data and response rates of faculty/graduate students and dental students are shown in Table 4. The response rates for the two surveys did not differ – dental students-64%; Faculty/graduate students-100% ($P>0.05$). The overall results were in favor of the new competency-based system (Tables 1-3).

Table 1. Results of the common questions addressed to dental students (DS) versus faculty and graduate (F/GS) students.

1. Was the clinical log sheet adequate? (c)	Yes		Partially	No	
	DS [†] 38.5%	F/GS [†] 76.2%	DS 57.7%	F/GS 23.8%	DS 3.8%
					F/GS 0.0%
2. Was the clinical log sheet assessment stressful? (d)	Yes		Partially	No	
	DS 30.8%	F/GS 0.0%	DS 44.2%	F/GS 23.8%	DS 25.0%
					F/GS 76.2%
3. Was the evaluation able to highlight areas that presented more difficulties? (f)	Yes		Partially	No	
	DS 25.5%	F/GS 57.1%	UD 19.6%	F/GS 23.8%	DS 54.9%
					F/GS 19.0%
4. Were you aware of the criteria used in the clinical log sheet? (e)	Yes		Partially	No	
	DS 42.3%	F/GS 95.2%	UD 40.4%	F/GS 4.8%	DS 17.3%
					F/GS 0.0%
5. Were the qualitative scores standardized? (c)	Yes		Partially	No	
	DS 29.0%	F/GS 52.0%	DS 42.0%	F/GS 29.0%	DS 29.0%
					F/GS 19.0%
6. In your opinion, was the evaluation practical and useful? (c)	Yes		Partially	No	
	DS 34.6%	F/GS 81.0%	DS 46.2%	F/GS 19.0%	DS 19.2%
					F/GS 0.0%
7. Do you believe that ethnics, personality and/or gender might have influenced the evaluation? (a)	Yes		Partially	No	
	DS 40.0%	F/GS 0.0%	DS 15.0%	F/GS 10.0%	DS 44.0%
					F/GS 91.0%
8. Did the clinical log sheet allow the undergraduate student's clinical performance in the Pediatric Dentistry Clinic to be assessed? (c)	Yes		Partially	No	
	DS 22.0%	F/GS 81.0%	DS 53.0%	F/GS 19.0%	DS 26.0%
					F/GS 0.0%
9. Which evaluation system do you believe is the most appropriate? (c)	Subjective		Clinical log sheet	Another	
	DS 20.0%	F/GS 0.0%	DS 52.0%	F/GS 90.5%	DS 28.0%
					F/GS 9.5%
10. As regards the quantitative evaluation, were the scores adequate for each clinical procedure? (c)	Yes		Partially	No	
	DS 10.0%	F/GS 67.0%	DS 55.0%	F/GS 33.0%	DS 36.0%
					F/GS 0.0%
11. As regards the quantitative evaluation, the total required score was: (e)	Not enough		Enough	Excessive	
	DS 0.0%	F/GS 0.0%	DS 40.4%	F/GS 95.2%	DS 59.6%
					F/GS 4.8%
12. According to the qualitative evaluation, did you consider it adequate to be assessed by (e):	Yes		No		
Punctuality		DS 78.0%	F/GS 100.0%	DS 22.0%	F/GS 0.0%
Personal presentation		DS 85.0%	F/GS 100.0%	DS 15.0%	F/GS 0.0%
Biosafety, organization and cleanliness		DS 98.0%	F/GS 100.0%	DS 2.0%	F/GS 0.0%
Theoretical/clinical knowledge		DS 98.0%	F/GS 100.0%	DS 2.0%	F/GS 0.0%

Table 2. Results of the questions addressed only to dental students.

1. Did the clinical log sheet evaluation minimize the chances of failure? (f)	Yes 15.7%	Partially 31.4%	No 52.9%		
2. Did you feel intimidated by the clinical log sheet assessment? (a)	Yes 23.1%	Partially 28.8%	No 48.1%		
3. Were the instructions about the clinical log sheet clear to you? (e)	Yes 50.0%	Partially 32.0%	No 18.0%		
4. Were you totally aware of the nature of the clinical log sheet evaluation? (e)	Yes 40.4%	Partially 32.7%	No 26.9%		
5. Did the clinical log sheet evaluation provide any learning stimuli? (d)	Yes 19.2%	Partially 30.8%	No 50.0%		
6. What do you think is the relevance of punctuality in your clinical routine?(b)	Very relevant 32.7%	Relevant 40.4%	Partially relevant 21.2%	Not very relevant 5.8%	Irrelevant 0.0%
7. What do you think is the relevance of personal presentation in your clinical routine?(b)	Very relevant 44.2%	Relevant 42.3%	Partially relevant 9.6%	Not very relevant 3.8%	Irrelevant 0.0%
8. What do you think is the relevance of biosafety, organization and cleanliness in your clinical routine? (b)	Very relevant 69.2%	Relevant 26.9%	Partially relevant 1.9%	Not very relevant 1.9%	Irrelevant 0.0%
9. What do you think is the relevance of biosafety, organization and cleanliness in your and your patient 's safety? (b)	Very relevant 84.6%	Relevant 13.5%	Partially relevant 1.9%	Not very relevant 0.0%	Irrelevant 0.0%
10. What do you think is the relevance of the theory applied the clinical practice in your clinical performance? (b)	Very relevant 63.5%	Relevant 32.7%	Partially relevant 3.8%	Not very relevant 0.0%	Irrelevant 0.0%

Regarding the *faculty/student relationship (a)*, most faculty, graduate and dental students agreed that ethnics, personality, and/or gender did not influence evaluation. Most dental students did not feel intimidated by the CLS application (Table 2).

For the issue *skills important for dental clinical practice (b)*, most dental students understood that skills were a very relevant factor of their clinical routine, safety, and performance. The *CLS applicability (c)* issue revealed distinct opinions among dental students and faculty/graduate students. While the first group (57.7%) thought the CLS was partially adequate, the majority of the second group (76.2%) considered it adequate ($P>0.05$) (Table 1). Moreover, 42.0% of the dental students considered that the qualitative scores were partially standardized ($P>0.05$) and that the CLS evaluation was partially practical and useful (46.2%) ($P>0.05$) (Table 1). However, there was a statistically significant difference between dental students and faculty/graduate students concerning the quantitative scores. Dental students thought it was not adequate, while the second group agreed the scores were sufficient for each clinical procedure ($P<0.05$). The dental students also believed that the CLS did not allow their clinical performance in the Pediatric Dentistry Clinics to be assessed, but the faculty/graduate students did not agree ($P<0.05$) (Table 1). Moreover, 71.4% of the faculty/graduate student group considered the CLS applicability adequate (Table 3).

Table 3. Results of the questions addressed only to faculty and graduate students.

1. Was the layout of the items adequate in the clinical log sheet? (c)	Yes 90.5%	Partially 9.5%	No 0.0%
2. What was the applicability of the clinical log sheet evaluation? (c)	Adequate 71.4%	Partially adequate 28.6%	Inadequate 0.0%

Table 4. Gender and age distribution among the participants

	Dental Students	Faculty and Graduate Students
Response rate	64% (n=52)	100% (n=21)
Female	75%	95%
Age (years)	24.1 ± 2.2	32.0 ± 8.4
Age range (years)	20-30	24-51

The *stress and learning stimuli perceptions (d)* analysis showed that the dental students considered the CLS evaluation as partially stressful (44.2%) (Table 1), and did not provide any learning stimuli (50.0%) (Table 2). In contrast, faculty and graduate students did not judge it stressful ($P<0.05$).

For the item *knowledge about the CLS (e)*, both groups were aware of the criteria used in the CLS evaluation, and 50% of the dental students considered that the CLS instructions were clear. Forty-four percent were aware of the nature of this type of evaluation, and 32.7% said they were partially aware of it (Table 2). Moreover, most dental students and faculty/graduate students agreed that punctuality, personal presentation, biosafety, organization, cleanliness, and theoretical knowledge applied to clinical practice were important qualitative items to be evaluated.

The last item, *potential failure and difficulties emergence (f)*, showed that most dental students (54.9%) thought that the CLS evaluation was unable to show them their deficient areas, while most faculty and graduate students (57.1%) had the opposite opinion (Table 1). Furthermore, most dental students (52.9%) did not think that the CLS evaluation minimized their chances of failure (Table 2).

Concerning individual suggestions, the most cited issues were: the clinical pediatric subject demands were not always compatible with patient treatment needs, suggesting that the score system of some clinical procedures should be improved. Question number 9 in Table 1 required a complementary answer if the participant had chosen the answer "another". The most common suggestions were that the CLS evaluation should be associated with subjective assessment and qualitative evaluation, rather than only with quantitative assessment.

Discussion

Differences of perceptions between faculty and students must be viewed with caution. Emotions can play an important role in the student's acquisition and retention of knowledge and future professional behavior. Seabrook (15) noted that the embarrassment, shame, and self-blame that students felt in response to being intimidated by their teachers led to their hiding what they did not know, and fostered an environment in which students were afraid to ask questions and clarify issues not completely understood. The present study evidenced some degree of discomfort, since 40% of the students felt that ethnics, personality, and/or gender could influence their evaluation, even though 48% did not feel intimidated by the CLS application. Conversely, a number of education theorists and researchers have observed that high-quality student-teacher relationship is associated with students' intrinsic motivation to learn (16), making this a crucial factor for the teaching-learning relationship.

Effective clinical instruction in Dentistry is associated with teaching responsibilities, technical competence, and work satisfaction (17). In a study by Chambers et al. (18), the ability to motivate students, explain difficult concepts, demonstrate real interest in the subject, show compassion and caring support, and be proactive were highly rated by students. Therefore, ideal dental education should include commitment to education care delivery, patient centredness,

comprehensive care experiences, and new approaches of teaching and learning to encourage clinical practice (1). In relation to the importance of skills for dental clinical practice, a competency-based assessment measures students' performance rather than previously defined standards. Competency performance requires students to apply their knowledge to solve clinical problems in a realistic context (1), and this assessment system needs to specify which levels of performance are acceptable or not. Our results confirmed that the students considered the skills assessed very relevant in their clinical routine.

With respect to the CLS applicability, perceptions of faculty and students were similar in relation to adequacy of the CLS and standardization of qualitative and quantitative scores. This can be considered a favorable view of the current evaluation system by the parties involved. However, there was a statistically significant disagreement for the quantitative scores for each clinical procedure and the dental student's clinical performance assessment. This could partially be explained by the fact that the dental students may be immature and sometimes are unable to understand the grading system as a tool to stimulate and help them to learn with discipline.

In the present study the dental students considered the CLS evaluation partially stressful and from their point of view it did not provide many stimuli for learning. Students have been concerned about the level of stress in the clinical environment for many years. Taleghani et al. (8) assessed a non-graded clinical evaluation of dental students and found that over 70% of the fourth-year students thought the system helped to foster a less stressful clinical environment. Further studies should investigate if there is a specific part of the evaluation system that causes student stress (this could be the grading system, the required procedures or the daily evaluation). Once the causes are known, changes in the evaluation system should be done to reduce student stress and provide learning stimuli. It is also possible that the students were unable to differentiate didactic strategies, and this could have masked the results. If assessment fosters a stimulus for student learning, assessment systems should reward exemplary students and motivate them to achieve a learning and performance level beyond the minimum requirements for their graduation (19). Even though the dental students find the procedure requirements stressful, no grading system is perfect. Procedure requirements still play an important role in student evaluation at FOP-UNICAMP because the students should perform all types of procedures to fulfill the Pediatric Dentistry Clinics curriculum, and not only because he/she wants to do it or not. Awareness of the evaluation system and clear instructions about the CLS were positively considered by the two parties. According to Walvoord and Anderson (20), establishing clear criteria for grading can help the process to be consistent and fair, assist faculty members to grade more consistently, explain expectations to students, and encourage students to participate in their own learning

process because they are able to envision performance goals more explicitly (19).

No agreement was reached in relation to perceptions of potential failure and difficulties that could emerge. The suggestions written in both questionnaires showed a high frequency of issues concerning the clinical procedures offered to students at the Pediatric Dentistry Clinics and their implications. The criticized lack of compatibility between clinical requirements and reduced availability of the right patient profile may demand re-evaluation, and this is related to the complaints shown in the present study. This problem may have compromised the assessment of students' competence and was an expected issue, as previously demonstrated by Hicks et al. (2).

When evaluating the reduced number of patients, the following problems may arise: students may perceive patients as means to accomplish a goal rather than individuals seeking professional treatment; students may become very dependent on patients who require specific procedures to complete the necessary clinical requirements for graduation; students may experience stress when they are forced to choose between performing comprehensive patient care and/or finishing their requirements (2). In view of these issues, faculty must re-evaluate the clinical requirements periodically to make further competency-based modifications to reassure that students can meet all the required clinical criteria.

In relation to the suggestions written in question 9 (Table 1), there was a preference for the CLS associated with subjective assessment and qualitative evaluation, rather than only quantitative assessment. The authors of the present

study agree with Hill et al. (19) that subjective assessment is not a tool that enables students to visualize the desired level of performance and gives them detailed feedback. Fallon et al. (17) also found that patient outcomes improved when direct supervision of the student clinician was combined with specific feedback.

The CLS already encompasses objective qualitative evaluation combined with quantitative parameters that are equally important in competency-based evaluation, which allows students to improve their clinical skills by practice. Thus, this new evaluation system has replaced the subjectivity of personal judgment by objective measurement to some extent. Statistically, the greater the objectivity of measurement, the higher the probability of a correct decision (7).

Conclusions

The overall opinions regarding the new CLS evaluation system were positive, although many refinements will have to be incorporated in the near future. In the context of the student's clinical assessment, it is necessary to constantly re-evaluate and improve the system to assess clinical skills and competency.

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