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ORIGINAL ARTICLE

Brazilian National Exam on Students´ Performance (Enade) in Dentistry: Quantitative and Qualitative Analysis of the 2016 National Exam

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Abstract

Objective: To analyze the Brazilian National Exam on Students´ Performance (Enade) on Dentistry, with regard to its specific contents, and discusses the subareas dealt with on Community Health. **Material and Methods:** A documentary and descriptive research on the 2016 Enade was undertaken. The textual contents of the questions were processed by IRAMUTEQ and analyzed by lexicographic techniques Descending Hierarchical Classification and Word Cloud. **Results:** Community Health (12 questions), with 40.0% of the exam´s contents, was the field with the greatest amount of questions. Subareas 'Management and Public Health Policies' and 'Administrative and Operational Management' featured five questions each (16.7%). Quantitative and qualitative analysis of the textual corpus detected 2,601 occurrences of words, mean 86.7 words per question. There were 858 different words, out of which 547 (average over 3.1 occurrences per question), which were included by the software within the Descending Hierarchical Classification. Five classes were provided: "Humanization", "Management", "Strategy Family Health", "Health Policy" and "Integrated Clinical Practice". The latter predominated (25.4%), characterized by the terms: anamnesis ($\chi 2=16.1$), lesion ($\chi 2=12.6$) and exam ($\chi 2=12.1$). **Conclusion:** "Community Health" was predominant in the 2016 Enade and showed the importance of the theme within the professional profile of the future dentist. Contents on "Health Policy", "Strategy Family Health", "Humanization" and "Management" also proved to be relevant.

Keywords: Educational Measurement; Education, Graduate; Teaching; Dentistry.

Introduction

Since the mid-1990s the assessment of higher education in Brazil has been in the limelight among educational policies. Periodic evaluations of higher education courses and higher institutions and the exam became mandatory for all final-year students since 1996 [1]. Assessment was regulated by the National Exam for Courses (NEC), also known as 'the big test', with eight applications between 1996 and 2003 [2].

NEC provided relevant items for discussion and identification of distortions of the Pedagogical Projects of Courses and its implementation, aiming at an improvement in the quality of higher courses [3].

Since 2004, NEC was replaced by the Brazilian National Exam on Students´ Performance (Enade) as a segment of the National Evaluation System of Higher Education (Sinaes). The Enade is applied once in every three years and verifies several areas of professional competences and capacities within a more comprehensive assessment process. The exam includes ten discursive and multiple-choice objective questions dealing with general formation, and thirty discursive and multiple-choice objective questions with specific contents [4].

Sinaes is characterized as a mixed model, featuring evaluation and regulation. It aims at ensuring teaching conditions provided by higher education courses and verifying final-year students´ performance through the Enade [5].

The National Education Plan (PNE) was introduced ten years afterwards. It has been intended to be a planning tool of the State, which guides and guarantees the implementation and improvement of public policies on Education. PNE 2014-2024 established several guidelines for higher education in Brazil, among which may be mentioned the importance of assessments for the improvement of Enade with a 60% or more increase in students´ performance during a five-year period, starting from 2014 [6].

Assessment should be a constant policy in higher education. National exams for the evaluation of students´ performance, comprising a test and a perception questionnaire, should be followed and studied throughout the evaluation cycles.

Current research analyzes the 2016 Enade in Dentistry with regard to its specific composition and verifies the marked subareas within the Community Health field.

Material and Methods

Study Design

A documental and descriptive research based on the 2016 Enade for the Course of Dentistry was undertaken. Test items were analyzed by consulting the electronic site of the Instituto Nacional de Estudos e Pesquisas Educacionais [7]. Further, a quantitative analysis was also carried out by classifying discursive and multiple-choice questions according to the field of competence listed in Resolution 63 of the Federal Council of Dentistry (CFO) [8]. The areas are listed below:

a) Maxillofacial Surgery and Traumatology (Art. 42);

b) Operative Dentistry (Art. 52);

c) Temporomandibular Joint Dysfunction Syndrome and Orofacial pain (Art. 54);

d) Endodontics (Art. 56);

e) Stomatology (Art. 58);

f) Dental Radiography and Image Processing (Art. 60);

g) Dental Implants (Art. 62);

h) Forensic Dentistry (Art. 64);

i) Geriatric Dentistry (Art. 66);

j) Occupational Dentistry (Art. 68);

k) Dentistry for Patients with Special Needs (Art. 70);

l) Pediatric Dentistry (Art. 72);

m) Orthodontics (Art. 74);

n) Functional Jaw Orthopedics (Art. 76);

o) Oral Pathology (Art. 78);

p) Periodontics (Art. 80);

q) Maxillofacial Prosthesis (Art. 82);

r) Dental Prosthesis (Art. 84);

s) Community Health (Art. 86).

Stomatology and Oral Pathology were placed under a single title and the field was called Stomatology/Pathology, due to related contents [1]. Basic fields comprised the following contents: molecular and cellular bases of normal and altered processes; structure and function of tissues, organs, systems and devices. Contents were applied to conditions within the health-disease process in the development of the practice in Dentistry [9].

Clinical dentistry deals with occlusion, operative dentistry, endodontics, periodontics, prosthesis, dental implants, anesthesiology, maxillofacial surgery and traumatology and dental materials used in clinical dentistry [9].

At least one question in the Exam provided the inclusion criterion in fields or specialties of dentistry. In the case of specific components, questions were classified according to the following fields: Dental Implants, Forensic Dentistry, Pediatric Dentistry, Stomatology and Pathology, Periodontics, Community Health, Basic Areas and Dental Clinics.

After classification, the questions on Community Health (CH) were distributed according to predefined objects in Art. 86 of CFO [8]:

a) Social-epidemiological analysis of issues on the community´s oral health;

b) Preparation and execution of projects, programs and other collective activities or public health activities to promote, reestablish and control oral health;

c) Participation at administrative-operational level of the multi-profession team through:

1. The organization of services;
2. The management at different sectors and levels of administration in public health;

3. Sanitary surveillance;
4. Control of diseases;
5. Education in public health.

Statistical Analysis

Classification results were shown through graphs and tables. In the case of qualitative analysis, the corpus or textual content of the questions in the 2016 Enade were processed by software IRAMUTEQ and analyzed by lexicographic techniques of the Descending Hierarchical Classification (DHC) and Word Cloud.

The Interface de R pour lês Analyses Multidimensionnelles de Textes et de Questionnaires (IRAMUTEQ) is a free software based on program R language, processing and analyzing statistics of texts and several textual corpora. Although developed by Ratinaud [10] in French, it currently has complete tutorials in other languages. IRAMUTEQ makes possible different forms of textual data analysis, ranging from simple ones, such as basic lexicography (word frequency), to multi-variegated analyses (DHC) [11].

Descending Hierarchical Classification is a method proposed by Reinert [12] to obtain word classes from textual corpora which, simultaneously, have a similar meaning/vocabulary and different text segments of the other classes. DHC organizes the qualitative analysis of texts within a dendrogram that graphically represents classes and their possible relationships. According to classes and $\chi 2$-type frequency/tests of words provided by IRAMUTEQ, the researcher tags them according to the meaning in the researched area.

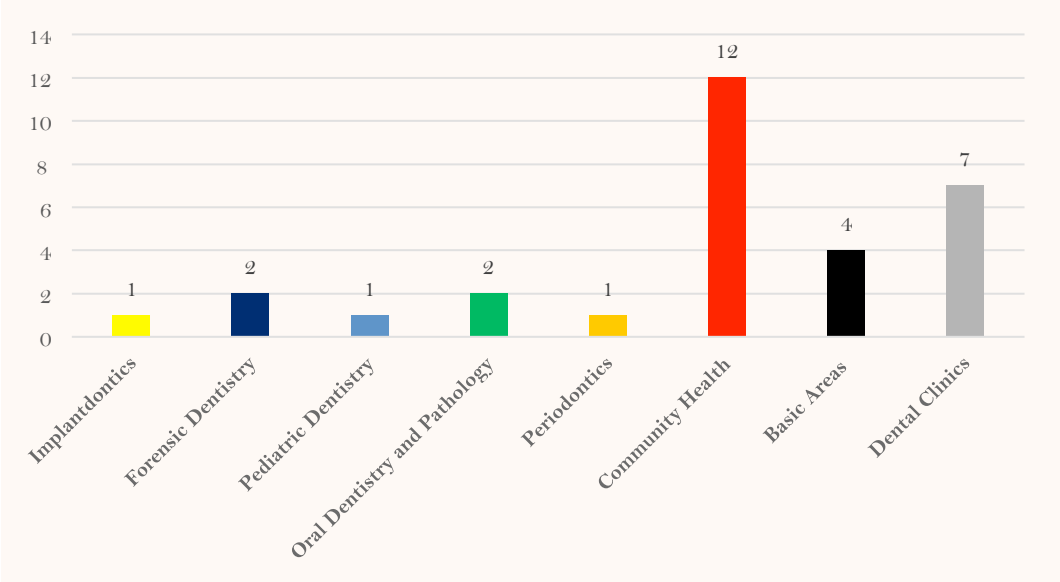
Word cloud is an analysis dealing with graphic representation as a function of word frequency and is identified visually by a software-generated figure. After processing the textual contents, an analytic model is built, composed of categories that correspond to word classes generated by IRAMUTEQ and DHC.

Content Analysis was performed to interpret the textual corpus. Word frequency within the text and in qualitative analysis was calculated, whereas the set of characteristics within a determined content fragment was taken into account in qualitative analysis [13].

Since current research deals with public and secondary data, its assessment by the Committee for Ethics in Research was not required.

Results

The 2016 Enade exam comprised 27 objective and three discursive questions on specific Dentistry subject matter. There were 12 questions (40.0%) on Community Health, or rather, 10 objective and two discursive questions (Figure 1). There would be 14 questions (46.7%) in the exam if the questions on the contents of the interface between Forensic Dentistry and Community Health were to be taken into account (Table 1).



Figue 1. Distribution of the 2016 Enade specific component questions, according to the areas (n = 30).

Whereas Stomatology/Pathology was the subject matter of two questions (6.7%), comprising an objective and a discursive one each, there were four objective questions (13.3%) for Basic Fields. Dental Implants, Pediatric Dentistry and Periodontics had one question each (3.3%) (Table 1).

Table 1. Classification of Enade's questions in Dentistry - 2016 (n = 30), according to the area (specialty), type of question and frequency.

Area	Type	n (%)
Community Health	Discursive	2 (6.7)
Stomatology and Pathology	Discursive	1 (3.3)
Dental Clinics	Multiple-choice objective	7 (23.4)
Community Health	Multiple-choice objective	10 (33.4)
Basic Areas	Multiple-choice objective	4 (13.3)
Periodontics	Multiple-choice objective	1 (3.3)
Forensic Dentistry	Multiple-choice objective	2 (6.7)
Stomatology and Pathology	Multiple-choice objective	1 (3.3)
Dental Implants	Multiple-choice objective	1 (3.3)
Pediatric Dentistry	Multiple-choice objective	1 (3.3)
Total	-	30 (100)

IRAMUTEQ qualitative analysis showed 2601 word occurrences, including 858 specific words, with an average of three words for each type within the textual corpus. Further, 637 elementary units, or rather, 74.2% of total terms analyzed by DHC of text segments of different sizes, were detected, indicating a similarity degree in the vocabulary of the five classes: Humanization, Management, Strategy Family Health, Health Policy and Dental Clinics The latter class, characterized by the terms anamnesis ($\chi 2=16.1$), lesion ($\chi 2=12.6$) and examination ($\chi 2=12.1$) (Figure 2), was predominant (25.4%). Analysis comprised basic lexicography (word frequency) and variegated analysis (DHC) retrieved from the textual corpus of the 2016 Enade questions.

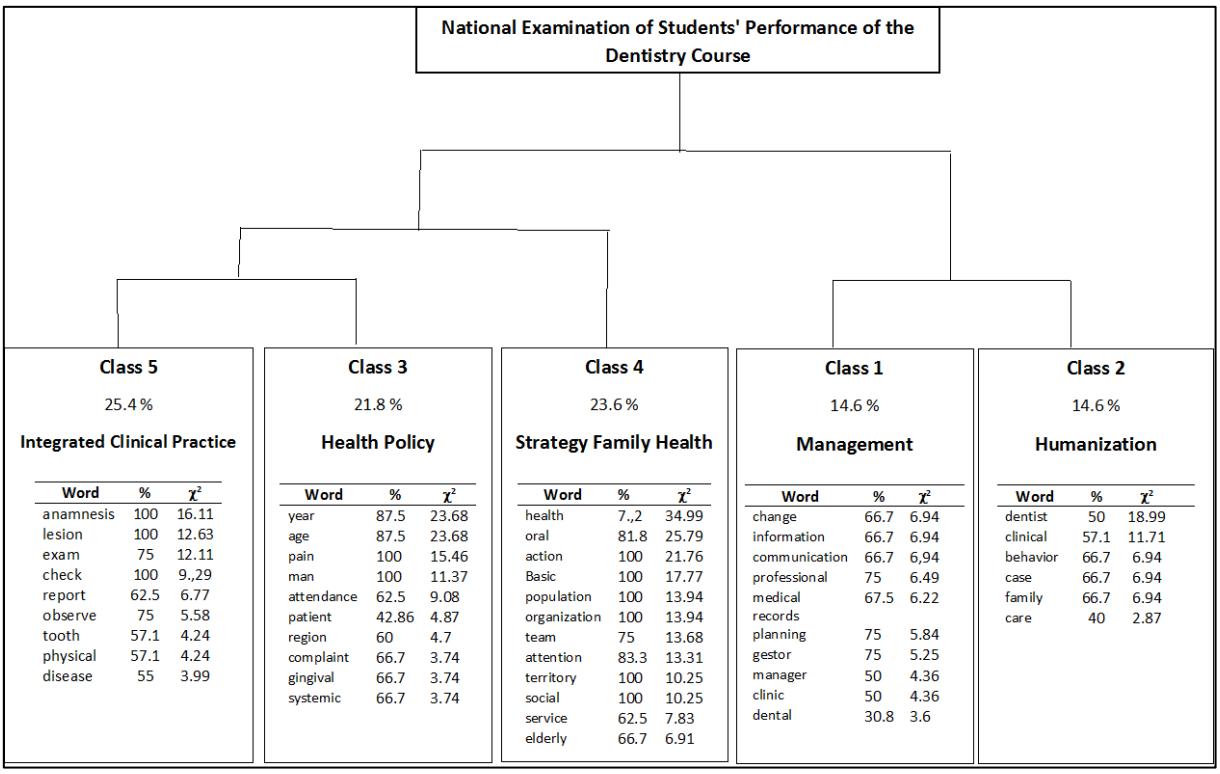


Figure 2. DHC Dendrogram with the partitions and content of the research corpus.

Word frequency equal to or over mean 3.1 were used for the construction of the dendrogram in Figure 2 and the subsequent analysis. Each class is described by the most significant words and their respective associations with the class ($\chi 2$).

Words with the greatest frequency such as health, dental, patient, attention, elderly were respectively repeated 34, 16, 14 and 12 times in the transcription of the headings of questions in the 2016 Enade (Figure 3).

Figure 3. Word cloud of the Enade 2016 statements.

Discussion

Actually the exam presented many questions on Dental Clinics, with seven objective questions (23.3%) on clinical issues matching the National Curricular Guidelines (DCN) of the Dentistry undergraduate course [9]. Examples of transdisciplinarity in the exam may be seen in question contents on endoperiodontal lesions and surgery/prosthesis/occlusion (Questions 14 and 24). Further, there would be 30.0% [9] broader items that would require knowledge on several other fields or specialties (Table 1).

Community Health has an important role in the formation of the dentist in Brazil and has featured well in the Guidelines in the Dentistry Course. In their professional profile, the Guidelines highlighted the following characteristics: general formation, social sensitiveness, trend towards learning [14].

Community Health is a specialty aiming at the study of phenomena that interfere in the community´s oral health through analysis, organization, planning, execution and assessment of health systems aimed at populations, with an emphasis on health enhancement [8].

Capacities and competence in Community Health are part and parcel of other Guidelines of several other health professions, especially Medicine. The desired profile requires that health professionals should meet technical quality in their formation plus social responsibility [5].

When Community Health is evaluated through time, one may perceive an increase in the number of questions on this specific field, as from the performance exam in 2004 (n=5; 16.7%), 2007 (n=7; 23.3%), 2010 and 2013 (n=8; 26.7%) [1]. There were 12 items (n=12; 40.0%) in the Dentistry section of the 2016 Enade.

An analysis of the Enade from 2004 to 2013 shows the interface of contents with kin fields throughout the years and in specific questions, especially those on Forensic Dentistry and Pediatric Dentistry, and, in certain cases, on Basic Fields and Occupation Dentistry. The interface dealt with issues, which may be studied and classified as within Community Health. They may also be considered as transversal competences present in trainee disciplines, clinic disciplines and final-year subject matters [1].

Another item for discussion is the interface in some specialties when the greater part of the fields evaluated (69.2%) seems to be independent of Community Health [1]. The Guidelines say that all Dentistry Courses should have a pedagogical plan for the students´ integral and adequate formation through an articulation between the areas of competence and teaching, research and learning extensions/assistance [9].

The 2016 Enade forwarded only three questions (10.0%) on Dental Implants, Pediatric Dentistry and Periodontics, with isolated and fragmented contents. Forensic Dentistry, Stomatology/Pathology, Community Health, Basic Fields and Dental Clinics revealed transdisciplinarity and transversality as a pedagogical proposal of the teaching-learning-assessment process of the performance exam analyzed.

Dentist formation in Brazil has been constantly criticized for its excessive technical stance. The concept of transversal contents should be underscored: they are basic teaching contents not

included in any area of the curriculum. Although stages are not defined, they extend throughout the formation cycle. Contents are the same for the education field but they are generally discarded by most dentistry courses in Brazil. In fact, they would have an essentially strategic trait in the wake of the criticism to dentistry formation [15].

A recent study with students of a government-run university in south Brazil revealed that curricular integration between professors of different departments and fields is one of the main changes within the curricular restructuring of that institute of higher education [16].

In their academic formation, students are subjected to technical and transversal competences: techniques are observed during the first years of the course, whilst the transversal competences are observed from the start of integrated clinical practice, during the final year and supervised training stages. In the case of final-year students of the Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil, transversal competences were highly significant in their formation. It must also be emphasized that current competences are provisional and subject to changes. Curricula should make possible such changes due to continuous reconstitution [17].

So that professionals may have the formation which corresponds to the Guidelines´ profile, or rather, focusing on the comprehensiveness and approach centered on the human being as a whole, it is mandatory to continually seek new forms of going beyond the model of traditional teaching which is still hegemonic in technical aspects and clinical treatments [18].

The subareas of Administration and Health Public Policies and Administration and Operational Management had five questions (16.7%) on the contents of Community Health, whereas two questions (6.7%) were presented on Epidemiology in Oral Health, following Art. 86 of CFO Resolution 63 [8]. Essential contents for the undergraduate course in Dentistry should be related to the health system in Brazil, the health-disease process, family and community, integral care within a regionalized, hierarchized system integrated to epidemiological conditions [9].

The 2004 – 2016 Enade exams reveal an increase in questions on Community Health. However, the increasing number of items on Community Health in these exams does not warrant a consolidation of the social field in pedagogical projects of Dentistry Courses in Brazil.

Class/categories represented by DHC (Figure 2) in the 2016 Enade revealed innovation and progress when compared to the national Dentistry exams between 2004 and 2013 [1,19]. Positive changes in the integration and articulation of the contents of different specialties, concern on the humanization of professional-patient relationships, contextualized basic fields with clinical and social situations and management contents in several questions were verified.

After the restructuring of the Dentistry Curriculum according to the Guidelines, the main evidences were integrated teaching, making possible the articulation between professors of different departments and disciplines, humanized care in health centered on the patient´s needs and emphasis on the students´ role as citizens, integrated clinical teaching organized by complexity of procedures and supervised trainee practice in Brazilian Health System scenarios [16].

Although several contents dealt with in national dentistry exams have been experienced in supervised trainee practice mandatory in the curriculum and in the Guidelines for the Dentistry Course, others are omitted and the Enade only evaluates the theoretical competence of the final-year students [1].

Supervised trainee periods are mandatory in most Dentistry Courses, with different hour loads and nomenclature. However, interpretations vary since their characteristics do not totally comply with the Guidelines and several disciplines and contents are still shown as trainee activities [20].

An in loco assessment of supervised trainee practice in each Enade exam would be important and necessary. In fact, the above only occurs in institutions with low performance. The Enade is a powerful evaluation tool of higher education, but it is incapable of bringing about changes in the curricular training practice and in other teaching-learning scenarios of several institutions, which do not totally comply with the Guidelines for several reasons [1].

IRAMUTEQ is presumed to contribute towards studies involving the textual corpora since quantitative and qualitative methods of analysis may be integrated, with greater objectivity and improvement in interpretation [21].

In the case of Word Cloud, clustering and graphic organization of the words are according to the frequency in the textual corpus and makes possible a fast identification of keywords and simple lexical analysis [22].

Lexical analysis is a type of qualitative research in texts, interviews, documents, assays or evaluation exams, such as the Enade under analysis. However, other approaches are extant, involving national evaluation exams and which may be undertaken to broaden the perspective and the significance of the evaluation of higher education as an educational policy.

Conclusion

Community Health was the predominant theme in the 2016 Brazilian National Exam on Students´ Performance (Enade). It revealed the theme´s importance for the future professional. Contents on Health Policy, Strategy Family Health, Humanization and Management proved to be relevant.

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