Optimizing Dental Education through Competent Knowledge And

Skills in Basic Medical Sciences

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Abstract
This study leverages and harnesses the articulation of competent knowledge and skills in basic medical sciences and the relevance of medical techniques in the scientific and technological practices in dentistry. It established the predictive capability of the students of their lecture grades and laboratory performance so to recuperate the need to master techniques and skills on the dogmatic precision and accuracy of instrumentations in the dental practice.
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1. Introduction

Inequalities, together with service uptake, increasing patient expectations and the unprecedented growth in scientific and technological developments in dentistry, and the ongoing changes of the dental care systems and education are inevitable. Mapping out the future direction of dental education in our post-modern society is no easy matter (Valachovic, et al, 2001).

Citizens of tomorrow will need to stay abreast of these developments in science – making them informed of societal, political, and environmental decisions affecting the future of the planet. The need for critical thinking and data analysis skills by scientifically inclined students is crucial for furthering their science education.

In view of this, dental education must be revitalized to make it responsive to the need of the present era as most of the curriculum used today is based on models of education delivery of at least 30 years old. It must be equipped with techniques and instrumentation to emerge with basic medical sciences and technology if it is to significantly meet the current need and demand of dentistry. Emerging modalities of patient care underscores the importance of the knowledge and skills that the students have earned in their basic medical sciences towards basic dental and clinical science. This shall also include the methodologies that made them equipped with a functional learning schema leading to a threshold of knowledge and skills relative to the context of evidence-based rationales and emerging information/technologies practiced in the dental profession (Nuemann, 2004; Kuncel, et al, 2004).

Applications of these skills reconstruct the dental curricula and the dental training. Dogmatic methodologies are highly wanting as results of researches suggest that the incorporation of dynamic classroom activities pole-vaults students' academic performance or self-perceptions of their ability to work in teams. The use of CL in the classroom, student laboratory, or clinical setting may help prepare students for the role they will be expected to perform as laboratory professionals (Wilson, NHF et al, 2007).

The importance of science in any curriculum is always the emphasis of educators. Student's performance in such science subjects is one of the most talked about issues in the field of education. Past and present Secretaries of Education have voiced out the need for science competence among students as crucial factors in the development of the country. It is likewise the purpose of education to raise the level of awareness of science among all people, young or old, and to raise it as a numerate and rational citizenry, a productive workforce and a scientifically and technologically innovative society.

In dental education, the beginning of academic work, the basic medical sciences, precedes the clinical phases of this professional career. Knowledge of the basic medical sciences is necessary to clinical practice. The need for a strong foundation in these basic medical sciences must be recognized by the student clearly and early enough to motivate him toward an understanding of the importance of these medical sciences and their relationship to the problem he will have as he tends the afflictions of mankind, whether from the standpoint of research, teaching or practice.

Dental students must be "turned on to Science." The continued security of the professional career of dental students largely depends upon their knowledge of the basic sciences. The education of dentists, therefore, must prepare them for an expanded role as practitioners to be able to diagnose and treat all the diseases and disorders

that affect the oral tissues.

There is a need therefore, for an increase in the depth and breadth of pre doctoral preparation, or the teaching of basic medical subjects. More Internal Medicine, and Clinical Pharmacology, more Immunology, more Genetics and Molecular Biology will be necessary to diagnose and manage the many categories of special patients who are at risk for oral health problems.

Competence in the basic medical subjects is important for one to be a good dentist. An in-depth background on the medical sciences such as General Microscopic Anatomy, General Anatomy, General Physiology, Microbiology, General Pathology, and Pharmacology is necessary. These are the science subjects taken by the freshman and sophomore students with a total of 23 units for the First Year students, of which 13 are lecture and 10 are laboratory units and 10 units for the Second Year students, or 6 units lecture and 4 units laboratory. Imprimis, academic tasks need to be well defined as they are complementary inputs to more complex tasks that require the students the dogma of analysis and synthesis (Kuncel, et al, 2004).

1.1 Objectives of the Study

The study sought to determine if a direct correspondence exists between the lecture and laboratory grades of freshman and sophomore dental students in their respective basic medical subjects and the perceptions of the students on the lecture and laboratory activities.

Specifically, the study sought to answer the following questions:

- 1.1.1   How did the freshman students perform in their lecture and laboratory classes in the three grading periods of the three basic medical subjects:
  - 1.1.1.1   Lecture grades and
  - 1.1.1.2   Laboratory grades?
- 1.1.2   How did their performance in the lecture relate with their performance in the laboratory in the following subjects:
  - 1.1.2.1   General Microscopic Anatomy,
  - 1.1.2.2   Biochemistry, and
  - 1.1.2.3   General Anatomy?
- 1.1.3   How did the sophomore students perform in their lecture and laboratory classes in the three grading periods in the three basic medical subjects:
  - 1.1.3.1   Lecture grades and
  - 1.1.3.2   Laboratory grades?
- 1.1.4   How did their performance in the lecture relate with that of the laboratory in the following subjects:
  - 1.1.4.1   Microbiology
  - 1.1.4.2   General Pathology, and
  - 1.1.4.3   Pharmacology?

2.   Methodology

The researcher utilized the descriptive method of research with emphasis on documentary analysis. The descriptive method is tenable when the purpose is to describe the prevailing characteristics of a group of persons in terms of how they performed in their science subjects in their respective year and if such lecture and laboratory grades are significantly related. Simple random sampling was done in the choice of students whereby 241 students were chosen from the 720 freshmen to comprise 33 percent of the total population of first year students. Likewise, 169 out of the 560 sophomores were included in the study. The researcher utilized two sets of statistical techniques, namely, descriptive and inferential statistics for an in-depth analysis of data gathered.

3.   Results and Discussion

3.1 Lecture and Laboratory grades of freshman students.

- 3.1.1   Lecture grades. In General Microscopic Anatomy, students' performance in the prelim was quite low (2.64), but slightly improved during the midterm, and went down again in the finals (2.55).

    In Biochemistry, results showed that although they found difficulty at the beginning (prelim –

2.5), their grades improved in the midterm and better still in the finals (2.49).

In General Anatomy, the same trend was noted, with difficulty at the beginning but improving steadily till the finals (2.31).

3.1.2   Laboratory grades. In General Microscopic Anatomy, performance of the students steadily improved from the prelim (2.34) to the finals (2.16). The same trend is noted in Biochemistry, starting with a grade of 2.47 in the prelims and ending with a high grade of 2.27 in the finals. This is not however, true with General Anatomy which went down during the midterm from 2.33 to 2.35, but managed to increase in the finals with a grade of 2.18.

3.2   Relationship between lecture and laboratory grades of freshman students.

There is marked and substantial relationship between laboratory and lecture grades in General Microscopic Anatomy, with a correlation coefficient of 0.5580, which is significant at the .01 level. Amount of variations noted for both variables reached 31.316 percent. The relationship with lecture and laboratory grades for Biochemistry is quite lower, with a computed correlation coefficient of 0.4154, significant at the .01 level and showing a proportion overlap of 17.256 percent. Relationship between lecture and laboratory grades for General Anatomy was found lowest among the three subjects, but still marked and substantial with a correlation coefficient of 0.4028, also significant at the .01 level, but showing a lesser proportion overlap of only 16.224 percent.

3.3   Lecture and Laboratory grades of the sophomores.

3.3.1   Lecture grades. The sophomores found Microbiology easy at the beginning, but it became difficult as the time went on from a grade of 2.10 in the prelim to 2.53 in the finals. It is the opposite for General Pathology, there they obtained in general failing grades in the prelims but managed to overcome and come up with a grade of 2.19 in the finals. They did not find Pharmacology as difficult, as they improved from a grade of 2.88 in the prelims to a grade of 2.47 in the finals.

3.3.2   Laboratory grades. Laboratory grades in Microbiology were very high during the prelim of 1.92 but reduced to 2.08 in the finals. For General Pathology, performance increased from 2.57 in the prelims to 2.25 in the finals. The trend however, changed in Pharmacology, since results were good in prelims, but decreased during the midterm, however, increased during the finals with a grade of 2.15.

3.4   Relationship between the lecture and laboratory grades of sophomores. There was a marked and substantial relationship between lecture and laboratory grades of students in Microbiology, with a computed correlation coefficient of 0.5594, significant at the .01 level as indicated by a computed t-value of 10.518. Proportion overlap reached 31.29 percent. There is lesser relationship between lecture and laboratory grades for General Pathology, but still marked and substantial, with a computed correlation coefficient of 0.4254, and significant at the .01 level. Proportion overlap reached 17.256 percent. It is however, in Pharmacology, where a low and negative relationship is noted between lecture and laboratory grades though not significant with a computed t-value of 1.216. Proportion overlap is less than 10 percent.

3.5   Perceptions of respondents on congruence of objectives, content, methodology, grading system and effects of lecture and laboratory activities.

3.5.1   Freshmen. The freshmen were asked on the congruence of the features of the lecture and laboratory activities.

Objectives. Students' responses on the congruence of objectives are noted by the magnitude of the weighted means which range from 2.95 to 3.97. Except in one aspect, they are in agreement with respect to the lecture and laboratory objectives. In one aspect however, they expressed doubts as to the similarity of objectives of the lecture and laboratory activities.

Content. Weighted averages ranging from 3.72 to 4.30 reveal that they agree that there is congruence in the content of lecture and laboratory subjects. Responses of the group are very similar in this feature.

Methodology. Weighted averages of their responses on methodology range from 4.19 to 4.37 asserting agreement on the congruence of methodologies for both lecture and laboratory.

Grading System. Freshmen have high assessments on the grading system adhered to by the lecture

and laboratory teachers, as indicated by weighted means ranging from 4.18 to 4.62. They strongly agree that lecture and laboratory teachers discussed with them the grading system at the beginning of the semester and that they were fully informed of the requirements of the course.

Effects. Weighted averages are not as high as the other features, which range from 3.80 to 4.08. But their responses are very similar and they all agree that there have been positive effects on them. Like positive attitudes and increased interest on the subject, although understanding of the lessons was rated lowest.

3.5.2   Sophomores. The sophomores were more frank than the freshmen in discussing the congruence of the lecture and laboratory activities.

Objectives. Firstly, they expressed doubts on the congruence of the lecture and laboratory on their objectives. Except this item, they however, agreed of its congruence in both lecture and laboratory as revealed by weighted means ranging from 3.14 to 3.65.

Content. The sophomores expressed doubts also on the congruence of the arrangement of topics in lecture and laboratory classes. However, with weighted means ranging from 3.47 to 3.85, in general, they did agree on the congruence of content of lecture and laboratory classes.

Methodology. Assessments of respondents on the methodology are very identical and fall in one category. With weighted means ranging from 3.88 to 4/10, they are in agreement with all the items in methodology.

Grading system. Sophomore students strongly agree that the grading system was discussed at the beginning of the semester and that they were informed of the requirements of the course. Other than this, responses on the rest of the items are similar and that they agree to the items on the grading system.

Effects. While sophomores discussed the positive effects of inculcating positive attitudes and increased interest on the subject, or on the value and personality development, they nevertheless, gave the lowest assessment on the understanding of their lessons.

4. Conclusions

4.1 In all instances, computed correlation coefficients for lecture and laboratory grades were positive and showed substantial relationship.

4.2 Lecture and laboratory grades for sophomores showed improvement from prelims to the finals except for a few cases. It was noted that the students specifically found General Pathology difficult at the beginning but they managed to improve and passed at the finals.

4.3 Relationship between lecture and laboratory grades were found highest in Microbiology but lesser in General Pathology although proportion overlaps were large to guarantee efficacy of prediction. It was however, in Pharmacology, where a negative and inverse relationship was noted between the lecture and laboratory grades indicating the inconsistency of content, objectives, and methodology of the lecture and laboratory activities.

4.4 There is a strong relationship between the lecture and laboratory grades in basic medical subjects if the same faculty members handle both.

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