

INVITED COMMENTARY

Dental Education

Variability between credit units dedicated to dental and clinical sciences in dental schools across the USA

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Abstract

Purpose: The Commission of Dental Accreditation (CODA) does not set minimum standards for clock hours of training in Dental and Clinical sciences. The purpose of this evaluation was to compare United States (US) dental schools for variability in clock hours. The current paper utilizes the American Dental Association's survey of clock hours of all US dental schools which is publicly available data. Clock hours survey from 2010 to 2011 was utilized and the analysis tool, JMP, was utilized to visualize and report variability.

Perspective: The current paper highlights the large variation in clock hours of training among core clinical subjects in accredited dental schools around the United States. For example, teaching Physical Evaluations; Oral and Maxillofacial; and Oral Diagnosis and Treatment Planning were 97.0; 126.6; and 74.4 h. Moreover, upper limit for hours of Operative Dentistry teaching was 1410 h and lower limit was 129 h. Various other fields of education do enforce strict requirements on educational clock hours. For instance, Massachusetts' General Law states that both private and public schools must have 900 and 990 h in a school year for elementary and secondary schools, respectively. However, no such stipulation exists in the field of Dental Education. CODA's mission is "to serve the oral health care needs of the public" and CODA must consider if the average dental patient would consider a dentist who attended the school delivering 1410 h of Operative Dentistry to be the same standard as a graduate of the school delivering 129 h.

Introduction

It has long been described that to become an expert in something, it requires 10 000 h or 10 years of preparation.¹ This initial proposition helped pave the way for a plethora of research into the field of study regarding "deliberate practice". Deliberate practice involves goal-directed activities that tend to be repetitive, with feedback, and is the way to reach high levels of expertise.² It is often studied in the field of psychology, and the conclusions regarding deliberate practice are regularly consistent in all fields, ranging from chess, to music, to medical education: increased quality credit units is associated with increased mastery.^{3,4}

This type of training follows a formal structure: repetitive performance of intended cognitive or psychomotor skills, rigorous skills assessment, and specific informative feedback.³ The majority of investigations into this field demonstrate that more credit units and increased practice leads to an improved ability to execute the target skillset at a high level.^{1,3-5} When evaluating the best 120 scientists of the 20th century, it was found that, on average, 10 years elapsed between their first publication and best publication.⁴ The idea of deliberate practice is not dissimilar to the intended goal of formal curriculum structure that already exists in the majority of US dental schools.

Table 1. Upper and lower limits of credit units per subject across all US dental schools

Subject	Upper limit of credit units	Lower limit of credit units
Physical evaluation and data collection	298	9
Oral and maxillofacial radiology	270	32
General medical emergencies	70	4
Dental emergencies	556	2
Oral diagnosis and treatment planning	454	32
Oral medicine	156	2
Oral and maxillofacial pathology	282	35
Orofacial pain and dysfunction	60	1
Anesthesia, pain and anxiety control	230	9
Periodontics	520	38
Endodontics	402	48
Oral and maxillofacial surgery	496	4
Hospital dentistry	162	1
Biomaterials science	189	12
Operative dentistry	1410	137
Esthetic dentistry	220	4
Prosthodontics: fixed and removable	1319	161
Occlusion	220	18
Implant dentistry	120	7
Pediatric dentistry	313	46
Orthodontics	303	11
Dental public health and prevention	252	12
Community based patient care	990	0
Other dental and clinical sciences	2738	1

Adapted from report 4 of the American Dental Association data on clock Hours for 2010–2011.¹²

Perspective

The purpose of this paper is to compare the US dental schools for variability in clock hours in teaching dental and clinical sciences; this includes didactic, laboratory, and clinical training. For the international audience of this journal, we will use the term “credit unit”, which also represents clock hours. Certainly, evaluating the quality of those credit units would be valuable, but is much more complex and beyond the scope of this assessment. The current paper aims to highlight the need for the Commission on Dental Accreditation (CODA) to clearly define and then prescribe minimum limits for the number of credit units in the core dental and clinical science subjects in US dental schools.

A comprehensive annual survey is conducted by the American Dental Association (ADA) among all the US dental schools, which are accredited by the CODA. The survey is sent out to all US dental school deans in mid-August and is due by November of the same year.⁶ Volume 4 of the survey involves curriculum format and credit units, and Table 1 is an adaptation of the same.

The purpose of the ADA study is to monitor accredited predoctoral programs.

The present article utilizes volume 4, which includes publicly-available data that focus on the number of credit units spent in dental and clinical science education in each predoctoral program across the USA. The credit units’ survey from 2010 to 2011 was utilized, as it is the most recent data available. The analysis tool, JMP, Cary, NC, USA was utilized to visualize variability, upper and lower limits, as well as standard deviation.

The current article highlights a large amount of variation in credit units of training among core clinical subjects in accredited dental schools around the USA. For example, the upper limit for credit units of removable and fixed prosthodontics teaching was 1319, and the lower limit was 128. The credit unit measurement from the ADA data includes clinical, didactic, and all other forms of teaching. Is it reasonable to assume that the students receiving 128 credit units of training on this subject are equally well prepared as the group receiving 1319? We argue that one cannot assume consistency in training and clinical preparedness with such large amounts of variability.

Various other fields of education do enforce strict requirements on educational credit units. For example, Massachusetts’ general law states that both private and public schools must have 900 and 990 credit units in a school year for elementary and secondary schools, respectively.⁷ The Commission on Accreditation For Dietetics Education requires a minimum of 1200 supervised hours, in order to be eligible to become a registered dietitian.⁸ However, no such stipulation exists in the field of dental education.

More credit units alone does not always equal success. Learning is a multifactorial process, and it has been demonstrated that the amount of time devoted to activities specifically targeted at aspects of performance that need improvement is more important than just the concrete numbers of hours practiced.^{3,5} An investigation that evaluated deliberate practice in medical students found that students gradually learn how to make more efficient use of their time and resources.³ A caveat to this is that individuals in medicine have been shown to have poor self-assessment ability, and those with increased self-assessment achieved higher scores on examination.^{9,10} The aptitude to develop and sustain self-assessment skills through dental school would be critical to maximizing increased credit units by targeting those credit units at needed areas of improvement.

There has been a consistent demonstration in all other fields of an association between increased credit units and improved performance.^{1,3,4} However, this association has not been described in the dental education literature. In addition, the amount of credit units that each dental

school utilizes in its curriculum has not been previously described. There are currently 65 dental schools in the USA, and each has a unique approach to training dentists. Although the accreditation process is becoming more and more rigorous, CODA does not specify “how” a school should teach dentistry. Rather, CODA evaluates whether there is integrity in the way education, assessment, and remediation are delivered. However, there is a lot of variability between schools, and it is unknown if all students are getting the same quality and quantity of education. Moreover, CODA is beginning to consider various international schools for accreditation, and strong consideration must be given to setting guidelines for credit units of training to limit variability. Recall that any graduate from a CODA-accredited school can seek licensure in the USA; it is, therefore, a matter of patient safety to prioritize a rigorous accreditation process.

Three important limitations of this evaluation should be considered when reviewing the findings. First, the dental and clinical science topics were subject to interpretation by those completing the survey at each school, which could have introduced error. The findings could be a reflection of differences in interpretation, rather than a true difference between US dental schools. Additionally, the last subject in the ADA credit units’ survey is “Other dental and clinical sciences”, and demonstrates a large amount of variability (upper limit of 6205 and lower limit of 859). This miscellaneous category could have been misused by some as a catch-all and reflect errors in the other topics. However, the enormous amount of variability among all clinical

subjects must be reflected upon. The fact that CODA does not make guidelines for the number of credit units spent teaching in each subject area should be re-evaluated. The third limitation is that our data do not capture self-directed study hours; a limitation because dental school curricula are moving toward more self-directed experiences with flipped classrooms and problem-based learning.

CODA is the only authorized organization in the USA to accredit dental schools, and its mission is “to serve the oral health care needs of the public through the development and administration of standards that foster continuous quality improvement of dental and dental related educational programs.”¹¹ The word “standard” means “a level of quality” or “that which is considered acceptable or desirable”. An important question to consider for the dental community is whether the average dental patient would consider a dentist who attended the school delivering 1410 credit units of operative dentistry to be the same standard as a graduate of the school delivering 129 (Table 1). Recall that this ADA survey on credit units is publicly available data that any patient could access.

Conclusion

CODA must consider studying, defining, and setting minimum standards for the number of credit units dedicated to core subjects, such as operative dentistry. This would add an additional important detail in providing oversight to dental schools, which is particularly pertinent, as several international schools seek CODA accreditation.

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