

Chapter 2.6

THE ACADEMIC ENVIRONMENT: THE STUDENTS' PERSPECTIVE

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Abstract

Dental education is regarded as a complex, demanding and often, stressful pedagogical procedure. Undergraduates, while enrolled in programmes of four to six years' duration, are required to attain a unique and diverse collection of competences. Despite the major differences in educational systems, philosophies, methods and resources available worldwide, dental students' views regarding their education appear relatively convergent.

This paper summarises dental students' standpoint of their studies, showcases their experiences in different educational settings and discusses the characteristics of a positive academic environment. It is a consensus opinion that the 'students' perspective' should be taken into consideration in all discussions and decisions regarding dental education. Moreover, it is suggested that the set of recommendations proposed can improve students' quality of life and well-being, enhance their total educational experience and positively influence their future careers as oral health physicians.

The 'ideal' academic environment may be defined as one that best prepares students for their future professional life and contributes towards their personal development, psychosomatic and social well-being. A number of diverse factors significantly influence the way students perceive and experience their education. These include 'class size', 'leisure time' and 'assessment procedures' ranging to 'relations with peers and faculty', 'ethical climate' and 'extra-curricular opportunities. Research has revealed that stress symptoms, including psychological and psychosomatic manifestations are prevalent among dental students. Apparently some stressors are inherent in dental studies. Nevertheless, suggested strategies and preventive interventions can reduce or eliminate many sources of stress and appropriate support services should be readily available.

A key point for the Working group has been the discrimination between 'teaching' and 'learning'. It is suggested that the educational content should be made available to students through a variety of methods because individual learning styles and preferences vary considerably. Regardless of the educational philosophy adopted, students should be placed in the centre of the process. Moreover, it is critical that they are encouraged to take responsibility of their own learning. Other improvements suggested include increased formative assessment and self-assessment opportunities, reflective portfolios, collaborative learning, familiarisation with and increased implementation of Information and Communication Technology applications, early clinical exposure, greater emphasis on qualitative criteria in clinical education, community placements, other extra-curricular experiences such as international exchanges and awareness of minority and global health issues. The establishment of a global network in dental education is firmly supported but in order to be effective it will need active student representation and involvement.

Introduction

Undergraduate dental education stands out as a unique pedagogical procedure. It involves the acquisition of required academic, clinical and interpersonal skills within four to six-year programmes. Such a challenge is unlike anything students have faced before, regardless of their pre-professional background. Moreover, the nature of practising dentistry (performing non-reversible operative procedures in such a confined space) while having personal responsibility for a patient's health, is considered stressful itself, posing another challenge to young undergraduates.

It is common ground that dental curricula should be scientifically based, clinically relevant, medically informed and promote social responsibility (1). According to Scott, the desired outcome of any dental educational programme should be the 'production' of dental practitioners who are ethical, competent to practice general dentistry at a level commensurate with the reasonable expectations of the society they are destined to serve, and committed to career-long educational and professional improvement (2). Furthermore, Manogue, citing additional desired characteristics of the 'new dentist', summarises that after the completion of a dental programme he/she needs to be both a good practitioner and a lifelong 'researcher' (3). It should be also noted that because of the changing role of dental practitioners towards 'oral physicians' (4), it is becoming necessary that dental programmes regardless of their level of affiliation to medical schools, should include medical courses with oral health relevance and instil this 'holistic vision' culture to graduating dentists.

A wide divergence of curriculum content, philosophy and tools employed in dental education around the world has been observed (2). This may be attributed to regional, societal and historical differences, but also to resource availability. Recent efforts at a continental and global level have focused on the discussion and agreement of commonly accepted competences and quality standards in dental education (5, 6). It is envisaged that the efforts towards convergence will facilitate the sharing of expertise and best practices through international networks and fora. This will encourage increased international mobility of dental educators and students, as well as promoting opportunities for inter-professional communication and exchange of views.

The 'need for change' in dental education is frequently articulated (7). The tools for achieving a gradual move towards higher standards exist. Some of the recent significant landmarks include the introduction of different versions of problem-based learning (PBL) (8-10), the establishment of comprehensive care clinics, the growing potential of ICT use (11), the academic progress files or 'portfolia' (12) and increasing opportunities for mobility of staff and students. However, there is a concern that novel approaches and educational advancements are restricted to those schools and countries where educational research is developed and more resources are available. As a result the divide between the 'pioneers' and well endowed schools compared to those in need of reform and/or in low income countries continues to expand.

Managing change in dental education is a complicated issue. Apart from the necessity of reaching broad consensus when discussing and implementing new methodologies, educational philosophies and innovations, a scientific or evidence-base is essential (13). A dental programme should also be acceptable and satisfactory to those involved in the process, including students, faculty and patients. In this respect, the 'students' perspective' is of fundamental importance in order to provide valuable feedback regarding the efficiency and acceptability of educational methods and, in more general terms, the 'overall learning experience' (14).

The input of dental students', the stakeholders, has been overlooked far too much (15). Nevertheless, the successful implementation of educational research outcomes relies upon the understanding of how students experience and perceive their studies and what would be a 'positive academic environment'. Nowadays, students are included among the 'agents of change' and their participation into the decision-making process of the school has been advocated in policy papers (16). However, they should also be encouraged to become 'innovators of educational change' (17).

There is a long-standing perception that students do not like their experiences in dental school, and a 'need for change' has become the common denominator in publications documenting their feedback. The ADEA Commission on Change and Innovation in dental education (CCI), quoting Christensen, reports that dental education nowadays could be described as 'convoluted, expensive and deeply dissatisfying to consumers' (7). The reports continues explaining that dental curricula have been characterised among others as overcrowded, inflexible and promoting memorisation of factual knowledge over reasoning based on evidence and critical thinking skills. In this environment students usually adopt 'convenient strategies', adapt themselves by becoming passive learners and are discouraged to become critical thinkers or lifelong learners. Another illustrative example comes from a recent survey of Canadian students (18) where it was revealed that undergraduates, throughout the duration of their studies, perceived dental school as a seldom-to-occasionally positive learning environment.

In Table 1, the most commonly reported domains of student concerns are shown, and include examinations and grades, lack of time, lack of clinical faculty, faculty-student relations, financial aspects, etc. There appears to be a relative convergence in student concerns, from surveys of perceived stress provoking factors carried out in all continents (19-30). It is expected however, that students in developing countries, where lack of resources and infrastructure may pose limitations to their training, will face additional strains. Moreover, it must be stressed that the dental/medical community should be alert, sensitive and responsive to global health issues. This particularly applies to poverty-related diseases; especially in those regions where security, inequality, undrinkable water and starvation constitute the main threats to health and life. It is desirable that dental students develop increased social awareness and sensitivity, not only for their own but also for the 'global community'.

The significance of students providing feedback for curriculum planning and change is indisputable, and is well supported (3, 17, 31). 'Climate studies', as Till reports, exploring students' perceptions of their educational environment, have been successful in revealing the dissonance between expectations and reality in the 'dental student experience' (14). Miles investigated the differences between the expectations upon enrolment and the actual experiences at the end of the first year of medical students and comments that generally, students' experiences were less good than they expected, even though their expectations were low for some domains (32). This may have implications for the whole course of studies. As students progress on their course they become less satisfied and thus, less motivated. An alarming observation of Henzi et al. (15), is the very limited formal efforts to determine the 'students' point of view'. Indeed, there appears to be a 'gap' in our knowledge and understanding of the processes that accompany young individuals while they progress through their dental education. It is noteworthy that there is only a modest correlation between pre-admission tests and preclinical performance (33).

The Working Group approached the question of a 'positive academic environment' based on current research evidence and consensus opinion which formulate a students' perspective. Group members are aware that resource limitations, tradition and resistance of structures or individuals to change comprise the most important barriers against moving towards an 'ideal educational environment'. It is a shared opinion however, that a resolute and documented strategy is the cornerstone of change in the right direction. The report aims to define the desired properties and characteristics of a positive or ideal educational environment, addresses various domains on the students' 'overall educational experience' including commonly reported concerns and finally suggests practical improvements and recommendations.

Definition of a positive academic environment in promoting appropriate learning and acquisition of requisite competences

An ideal dental educational environment should enable students to acquire the necessary theoretical, clinical and interpersonal competences and expose them to 'clinical experiences' appropriate to the environment in which they are likely to be practicing dentistry after graduation. A dental programme should not only respect their psychological and physical health; it should also contribute towards their psychosomatic and social well-being, as well as the cultivation of ethical values and culture. A higher education environment, by definition, should foster both professional and personal development. It offers a unique opportunity to cultivate values such as cooperation, volunteerism, service to those in need and more. It is also of vital importance that dental students learn to become 'team-members' and effective communicators/collaborators with their peers and allied health professionals; this will obviate professional or even personal 'isolation' to which dental practice may be predisposed.

The curriculum must be delivered in an innovative manner including different methods to suit students with different learning styles and capacities. During their undergraduate years, dental students should gain self-confidence for independent clinical practice. Early clinical exposure and continuous self-assessment opportunities are considered fundamental.

It is commonly stated that students should 'learn how to learn'. This phrase accurately reflects the desired outcome of students leaving dental school with a positive approach towards knowledge acquisition, as well as a lifelong learning and a critical attitude (34). Involving undergraduates in research has to be an excellent way to build problem-solving and team-working skills, stimulate active learning and shape critical attitudes.

In a positive academic environment there must be special consideration for the well-being of students in terms of overall workload (hours spent in school and studying or preparing for exams) and facilities. Examinations are one of the major causes of stress for students. Therefore, particular efforts are necessary to make them constructive, an integral part of the educational process and not simply an 'obstacle' to graduation. Too often examinations are used as an alternative to effective teaching and learning methods. Furthermore, daily schedules should be designed so as to maximize student performance, contribute to student well-being and promote effective time management skills. The stress experienced in a dental school environment can be the precursor of 'burnout' later in professional life (35).

A cornerstone of any academic programme and university school in general, is the fundamental right of students to freely express their views and play an active role in the decision-making process. They must feel part of the process; 'in control' rather than alienated from strategising their own education. Moreover, staff and students relations must be based on mutual respect, understanding and openness. Criticism and feedback given by faculty should be constructive and students, in response, should adhere to norms of a written or unwritten ethical code.

A positive academic environment should provide stimuli and resources for dental students to effectively use all available means to broaden their horizons including: international exchanges and visits, participation in congresses, active involvement in student organizations and fora, research projects and electives, volunteer activities in local communities and elsewhere. These extra-curricular activities are valued by

students and can 'make a difference' in the overall experience of their studies. Selected significant domains of the academic environment are discussed below. An outline of the desired main properties of a 'positive environment' is presented in Table 2.

Methods of teaching

For a long time and in most schools until the present, teaching has been regarded as a synonym of learning. Most of 'teaching' is performed by the traditional amphitheatre lecture, during which information is presented to students, with no or limited opportunities for interaction. There is a strong tradition behind the 'amphitheatre lectures'. Nowadays, however, this approach is not considered the best, if applied alone. There is insufficient interaction, compared to other active learning approaches, such as small group interaction and PBL (36). Rossomando vividly describes the new challenges that dental educators are faced with today, when having to address the 'new generation' of dental students. They are increasingly familiar with modern means of information exchange and communication from a young age (37). Other research evidence indicates that clinical seminars and active group discussions are generally preferred by students compared to traditional didactic lectures (38). It should be noted however, that a traditional lecture may have other benefits that more modern approaches cannot match. Despite lacking interactivity, a lecture can be stimulating and inspiring.

Current research and common sense underline that the first step to facilitate long-term retention of information is to gain the students' complete attention; then involve multiple sensory systems (visual, auditory, somatosensory) e.g. auditory information with visual illustrations. But facts and events get into the long-term memory by rehearsing. This implies that most learning occurs outside the classroom, when information is been retrieved, revised, applied and mainly associated with other existing information or experiences (39). This is consistent with the trend of exposing students to 'blended learning experiences'; although the term 'blended learning' has attracted criticism (40). The Working Group's view is that 'blended learning experiences' should refer to students' exposure and access to information by a variety of means. As students' learning preferences, style and performance may vary considerably, offering a 'selection' of information access means, in-classroom, in groups and on-demand (web based), contributes to the so-called 'student-centred' educational process and environment. Offering students multiple ways to reach their educational goals places them in the epicentre of the process and encourages them to become responsible of their own learning; a critical ability for a lifelong learner.

Assessment procedures and self-assessment

As mentioned above, a positive academic environment should focus on learning rather than performance. This is a great challenge. Today students have become accustomed to grades, performance criteria and rankings from a young age. Their world is one of competition and comparison. Combined with the 'perfectionist trends' that are often developed in dental school (41), dental students' focus on summative exams and ultimately higher grades, often competitively with peers, thereby creating a negative educational environment.

It has been claimed that proper assessment procedures may drive and stimulate deep learning, but this cannot be generalised (42, 43). In a positive academic environment, where assessment has clear objectives, is carefully planned and executed and provides immediate feedback to students, then it fulfils its role and comprises an integral part of the educational process (44). For this to be achieved, it

is necessary that assessment is frequent, on-demand (self-assessment), fair, relevant and not always linked with 'consequences' or else formal grades. Timing of assessments as well as prompt feedback on student performance constitute attributes that enhance the assessment's educational benefit. The multiple benefits of formative assessment opportunities are evident (43). It has also been shown that self-assessment abilities (a fundamental skill for a health professional - lifelong learner) are not directly related to subject knowledge and, with proper tools can be developed independently (45, 46). Contrary to what modern educational philosophies would suggest, most dental students have experienced the reality in which a semester- or year-long course is followed by a single formal exam that constitutes the only criterion of student performance. In this situation, it is logical and to be expected that students will develop strategies in order to maximize their 'once measured performance', which may entail memorizing question-answers, researching for older test-papers, or even cheating during the all-or-nothing examination. This is certainly not an environment that promotes meaningful learning. Sadly, it is a common experience. Multiple assessment and self-assessment opportunities throughout the courses and clinical training are strongly advocated. Small formative (non-graded) tests at the end of seminars/lectures, incremental examinations and on-line tools appear as useful additions that would enhance the students' levels of self-awareness, stimulate active learning and reduce examination anxiety. In order to maximize the positive effects of assessment, it is fundamental that remediation is available to students who appear to under-perform in summative assessments or request additional support after monitoring their progress with formative assessment.

New technologies - ICT

The rapid development and increasing use of ICT have significant implications both on dental practice and education. The potential and the advantages of ICT are indisputable (11). However, there are still many limitations that do not allow its full adoption for educational purposes. The introduction of ICT may be limited in schools in low income regions. Furthermore, computer literacy, familiarisation and acceptability of the new technology are still an issue in most countries. This includes students and staff. Reduced computer literacy undermines or at least limits the potential for successful ICT implementation in the dental school environment (47, 48).

In general, the implementation of ICT in dental education is viewed favourably by students. It offers greater information retrieval and interaction with peers, colleagues or faculty. It is more appealing due to graphic interfaces, multimedia content and continuing software upgrades. However, the implementation of new technologies should not be viewed as a panacea to correct problems in existing curricula (11). There has to be substantial planning in order to enable students to use effectively and appreciate web-based or multimedia applications. Moreover, these innovations should become a working part of the dental programme and not a passive repository of infrequently updated PowerPoint presentations. Students should be encouraged to become familiar with and use these applications, be given sufficient learning experience in order to avoid the effect of viewing these aids as an additional workload (49).

There are many possibilities in applying ICT into the daily routine of a dental school, in order to create a more positive academic environment. Students should be given full and free access to electronic journals. Furthermore, libraries should enable students to use computer facilities outside of the 'working hours' because not all students have a personal computer. Providing self-assessment modules or review

courses to students at an on-demand basis via the internet would be a helpful addition. Moreover, registration services and applications or course enrolments could be facilitated through web-services, thereby saving valuable time. The implementation of electronic patient records and 'paperless clinics' is a great advance and saves valuable time. In more general terms, it must be stressed that dental schools should prioritise the attraction of state funds and the investment in infrastructure and literacy of staff and students. International collaborative efforts should focus on the support and transfer of ICT infrastructure and know-how for application in low income regions.

Stress sources, related symptoms and strategies

The experience of severe stress and anxiety among dental school students is well-documented. Students often report stress-related symptoms that may range from mild anxiety to sleep and eating disorders, as well as reduced performance, inability to concentrate, hostility, depression and other debilitating effects (18-21, 23, 26-30). Commonly reported sources of stress are presented in Table 1. Particularly alarming however, is the finding that dental students, even in the early stages of their education, may demonstrate signs or a predisposition to the 'burnout' syndrome, which entails 'emotional exhaustion', 'depersonalisation' and 'reduced personal accomplishment' (35). Moreover, students who perform under severe stress, anxiety and their related symptoms may be more prone to violating the school's honour system or engaging in unethical behaviours, such as cheating.

Of course, some stress (a normal physiological response to any change of the internal or the external environment) is inevitable. Moreover, it has been shown that personality types, gender, sociocultural differences, coping styles, emotional intelligence and other individual characteristics may modify the stress provoking effect (18, 21, 29). Prophylactic measures should be the focus of dental programmes when dealing with stress issues. Early identification of individuals who may be more prone to it and implementation of stress management workshops in the study programme can be effective. It is important however, that the dental school provides further support and guidance for students showing the signs or symptoms of severe stress. Apart from the 'formal' and 'informal' support opportunities (50), all efforts should be made to implement a positive student-centred environment. Students may experience less stress or perceive their environment as less stressful when they are fully aware of what is expected from them and are able to discuss perceived skills and weaknesses. Providing them with an opportunity to influence or change things in the course of their studies will contribute to alleviating their stress. The more 'in control' of their education students feel, the more positive they will be when they encounter any challenge or difficulty.

Relations with Faculty

Relations and interaction with faculty constitute one of the most critical issues in any educational environment. This may be especially so in a dental school, where teaching, mentoring and patient treatment co-exist, in a pressing environment. A dental faculty member's role is not a simple one. There are a number of issues with which dental educators must cope. These include balancing teaching, research and patient treatment, attracting scholarship and meeting promotion requirements. Shortage of faculty in the US dental schools and the so-called 'brain-drain' is an immediate consequence of a 'sub-optimal quality of life' for new faculty (51), but this problem is global. It is therefore understandable that when educators are facing excess strains themselves, they cannot be performing at optimal levels. Students have commented on cases of sub-optimal communication from instructors. These are

perceived as unapproachable or uninterested in the students' learning, discourage questions, or provide unclear directions and feedback (36). There should be a clear distinction between clinical or research excellence and the values necessary to engage in teaching, instructing and mentoring. Formal training in pedagogy is of critical importance for educators, students and the reputation of the school. Such additional training could be in the format of non-mandatory seminars, continuing education and short courses for senior faculty. It should become a requirement in the appointment or promotion of new faculty. In this respect, the importance of students' feedback and evaluation of faculty and courses is an important component of a positive academic environment. The Working Group discussed the different styles of faculty and course evaluations, including the provision of mid-term course evaluation, anonymous feedback, and their limitations in different schools and countries.

Haden describes in a CCI paper (31) that when faculty and students exhibit humanistic values there is freedom to explore and to learn without intimidation. A humanistic approach is characterised by close professional relationships between faculty and students, fostered by mentoring, advising, and small group interaction. The working group stresses the significance of the mentor-mentee relationship and the importance of its early establishment. Through this mentorship relationship the undergraduate is guided towards his/her personal and professional development and is provided with counselling throughout the course of studies (52). Moreover, faculty recruitment and retention can be encouraged through the mentoring scheme.

A humanistic environment establishes a context for the development of interpersonal skills necessary for learning, for patient care, and for making meaningful contributions to the profession (17). Moreover, Irby identified four key factors that distinguish the 'excellent' clinical teacher:

- 1) serves as a positive role model of a competent and compassionate health care provider,
- 2) provides effective supervision and mentoring for learners,
- 3) employs a varied and dynamic approach to teaching,
- 4) is a supportive person.

Finally it is worth adding two relevant quotes that illustrate the ideal 'teacher model', of W.A. Ward: 'The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires.' and of E. Garrison: 'A teacher is a compass that activates the magnets of curiosity, knowledge, and wisdom in the pupils.' (<http://www.quote garden.com/teachers.html>)

Clinical training - Patient treatment

Clinical training is arguably the most critical phase of dental education. A common remark from dental students is that, while in clinics, they often regard basic science and theoretical courses of the previous years as irrelevant to their clinical training. Integrating basic sciences with clinical training is a unique challenge (53). However, the earlier the contact with patients is, the easier it is for students to put in context the information acquired from basic sciences. For instance, it is much easier to recall the biochemistry, physiology, pathology and pharmacology of diabetes when encountering a diabetic patient. It may be too late for this association to become 'functional' if biochemistry is taught as a stand-alone course in the third semester, and the patient treatment starts in the seventh. Fine-tuning basic sciences education to meet their clinical application is important in this respect. Early patient contact can be realised by observing and assisting in senior student clinics, participating in community clinics, or by actually performing simple non-invasive procedures, even in

the first year of studies. Moreover, it has been suggested that anticipatory stress responses of students in their non-clinical years may be triggered by anticipating the phase of clinical training (26). This is in line with the findings of Humphris, who suggested that early patient contact could be a protective factor for the exhibition of stress symptoms, in a multinational sample of students (35). It is therefore important that the introduction to patient care takes place as early as possible; preferably the first year. Students need to be acquainted with the job they will be doing for the rest of their career.

There is considerable student unease with the requirement or quoted system. In a recent paper of Henzi, one student quoted: "I am already viewing my patients not in terms of what they need and want, but in terms of what I need to graduate. I would prefer to concentrate on my patients as people and not as a container of operative points or fixed points" (15). This perspective illustrates the danger of an inflexible requirements system. Of course, there should be a minimum quantitative clinical experience in order for one to be considered competent but this should not be the sole focus. An ideal system would include progress-reflective files in which students monitor and document step by step their clinical work, self-assess their performance and also receive immediate and constructive faculty feedback. A student should be able to recognise his/her weaknesses easier this way and perhaps provided with the opportunity to focus more on them. This is an excellent way to increase his/her self belief and confidence for individual practice. Whereas, in a different (traditional) system, the student would rather think how to perform the last 5 cavity preparations needed to fulfil the quota and go home. Research has confirmed that emphasis on qualitative criteria and non-graded clinical systems are preferred by students (54-56) and that even in the absence of quotas the productivity of a dental student clinic may be maintained or even increased (57, 58). It is crucial that the above criteria and clinical requirements for graduation are clearly communicated to students, and are reasonable and achievable. Overwhelmingly, the time and quota constraints are considered to pose the largest burden to students. It has been observed that under severe pressures as such, some students may compromise their ethical and moral decisions.

Other issues in clinical training that are frequently encountered and need to be addressed, concern the adequacy and the 'professionalism' of the clinical faculty, the quantitative adequacy of patients, the 'exposure' of students to all areas of clinical dentistry and other effectiveness-related or bureaucratic issues which may lead to loss of chair-side time, patient discomfort and adding to student stress. The desired characteristics of a positive clinical training environment are summarised in Table 3.

Preparation for professional life, gaining of self-confidence

Preparing future health professionals entails much more than senior dental students' fulfilling their graduation requirements and clinical competences. In many cases, final year students or recent graduates feel unprepared or insecure as independent clinical practitioners, even though they may have had adequate clinical training. The most severe problems reported of first-year undergraduates in the Burk study were of emotional nature, related to academic performance (50). Moreover, students' self-confidence is a significant concern in all phases of the dental curriculum (26). In fact, the latter has been given as a driving force for choosing to enter graduate programmes. Of course, it is not expected that undergraduates will have achieved clinical excellence at graduation. Nevertheless their educational experiences must have equipped them with the necessary self-assessment ability, clinical reasoning,

initial self-confidence and preparedness for professional life and the safe independent practice of dentistry.

It has been proposed that a comprehensive clinical training environment has a lot to offer as well as early clinical exposure. Notably, an integrated patient care environment is one of the guidelines/recommendations made in the consensus document of the Association for Dental Education in Europe (ADEE) about the content of the European dental curriculum (16). Furthermore, Lalumandier reports the positive effects of first year US undergraduates spending over 100 hours providing sealants to underserved children (59).

Critical thinking and lifelong learning

Scriven and Paul (Foundation for Critical Thinking www.criticalthinking.org) define critical thinking as the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesising, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. Contrary to what would be expected, it has been reported that students may decrease their problem-focused coping over time while in dental school (18). It should be emphasised however, that the variety of problem-solving opportunities presented during the course of studies should contribute towards students' improved critical thinking. The ADEA Commission on Change and Innovation in Dental Education has summarised proposed effective methodologies that contribute to the development of critical thinking skills, as well as the development of implicit and explicit memory. These educational strategies are presented in Table 4.

Minority issues

The role of education is fundamental in facilitating diversity exposure and preparing individuals to be effective communicators in multi-cultural environments of one contemporary mobile society (60). Moreover, it is expected that exposure in diverse cultures and cooperation among people of different cultural backgrounds will continue increasing. Understanding race, culture and ethnicity as they apply to health care, inter-personal skills and inter-cultural competences are critical for an effective dentist-patient interaction (60, 61). Dental students' perceived importance of multi-cultural awareness is high. Moreover, it has been shown that exposure to diverse cultures and the inclusion of diversity-specific content in the curriculum may be effective in producing positive attitudes and results (60).

A significant finding from the Veal study (62) was that minority dental students did not view faculty as a source of support and guidance. In fact, many of them were disappointed by the lack of diversity among dental school faculty. Although this finding may not be generalised, it is crucial to be aware of the unique challenges some students face. Specific suggested interventions included more outreach and recruitment of minority undergraduates, more information about scholarship and funding opportunities and increasing the percentage of minority faculty in dental schools. It is important to understand that hearing directly from minority dental students could be a first step in understanding the dental school experience from a different perspective.

The ethical environment

A consensus was reached that the perceived atmosphere, ethos and values of an educational environment are equally or even more important than the educational

content delivered. This implies that relations between faculty, staff and students should be based on understanding, cooperation, positive attitude and tolerance. This is critical, especially for a dental school setting, where patient treatment, teaching and research are taking place, and where quality standards and expectations are high. There also concerns that the stressful and pressing nature of the dental school environment may be predisposing students to violate ethical rules. Honesty has always been an issue in education. Students' cheating in exams has been a common observation, and several reasons have been given to explain this phenomenon (63). What is more important than detecting or penalising cheating, is creating an environment that discourages it or makes it meaningless; this has mainly to do with assessment methods used and also with a spirit of collaboration and non-competitiveness among peers. Furthermore, implementing written or unwritten honour codes is an effective way of making students aware of what is expected from them and what rules they should adhere to (64).

The absence of discrimination and harassment is crucial to the maintenance of a student-friendly environment. There must be a clear and firm school policy in respect of discrimination against gender, race, ethnicity and religious beliefs. Furthermore, a behaviour code should be agreed and communicated to faculty, staff and students. The observation that students often regard their educational environment as 'unfriendly' or 'threatening' must be addressed.

Extra-curricular activities/research involvement

As mentioned above, extra-curricular activities can make a difference in the total educational experience while in dental school and certainly comprise part of a positive academic environment. Students appear to value and demonstrate high motivation for parallel activities, such as volunteer and community projects. Moreover, there must be an encouraging and supporting environment for the development of student initiatives, which can contribute to an active learning environment. Participation in student organizations, unions and associations provides the platform and the forum for the expression and development of such initiatives, and should be encouraged. Local, national and international student associations will influence certain qualities necessary for those individuals who will eventually become leaders in the profession.

It is generally accepted that research involvement is a great stimulus for self-directed learning and cultivates critical attitudes. In this respect, students' exposure, involvement and active participation in research is crucial. This can be realised with individual or collaborative undergraduate research projects, but also with the involvement of undergraduates in research and projects in which graduate students and faculty participate. It should become a norm that a 'research requirement' of some extent is part of the undergraduate curriculum (16).

Student mobility and the so-called 'exchanges' have attracted much attention, particularly in the area of the expanding European Union (65). Despite the high appreciation of exchanges by students, negotiating formal exchange has proved to be bureaucratic, time consuming and due to the many obstacles, uninviting. For this reason, alternative ways of student mobility have been sought and are nowadays realised under the auspices of international student bodies such as the European Dental Students Association (EDSA) and the International Association of Dental Students (IADS), as flexible unilateral or bilateral exchanges, or simply 'visits'. The obstacles in student and staff mobility however, have been recognised and efforts are being made to resolve them. It is expected that with the introduction of the European Credit Transfer System (ECTS) and its consequent positive effects, official

exchange opportunities will increase and will be more practical (16). It is imperative that dental schools encourage and support dental student exchanges (incoming and outgoing), with all available means. The role of IFDEA could be pivotal in creating the necessary network of communication that will facilitate opportunities for mobility on a truly global level. Student exchanges or even simple 'short visits' consist a great opportunity to learn about differences between countries and culture in the field of dentistry and beyond. Furthermore, this is another way to enrich understanding of the significant diversity existing worldwide as well as increase the awareness of global oral health issues.

The significance of the 'students' point of view' and a Global network in dental education

The Working Group stresses the significance and the necessity of continuous, structured student feedback. This needs to be facilitated on the basis of individual schools, on national, continental and global level. Appropriate student representation should be encouraged in all schools. Local, national and international student bodies have so far been successful in providing the forum for the development of a collaborative student perspective, but this should be developed more. In this regard, the opportunity for a Global Congress Working Group dedicated to student affairs is welcomed and strongly supported.

Student representation and activity will be enhanced in a Global Network in dental education under the auspices of the reformed IFDEA. It is proposed that an IFDEA student committee is formed. In this framework, a new platform for international collaboration and increased opportunities for communication will be possible. The diversity of backgrounds, cultures and experiences among the student body will significantly contribute to new ideas, resolutions and proposals. It is also expected that the facilitation of experience and information exchange through this network will increase the awareness of the oral health community, including students in isolated areas. Being informed, is the first step before becoming sensitive and then actively engaged in the resolution of issues of global significance in (oral) health. Hopefully future generations will be better informed, more sensitive and pro-active in addressing poverty related diseases and inequalities.

Conclusions and Recommendations

It is evident that there is a large number of diverse and hidden factors, ranging from class size, leisure time and assessment procedures to relations with peers and faculty, ethical climate and extra-curricular opportunities that significantly influence the way students perceive and experience their education. Similarly, the actual content delivered through a programme may have little influence on whether its recipients are satisfied students. It is important to view dental studies from a student-centred perspective, in order to realise that education is much more than knowledge acquisition or training.

It is important that the ethos of the educational environment is focused on learning rather than passive information delivery. In this respect, assessment procedures should be designed and offered in a manner that enhances students' awareness of their own knowledge and abilities, stimulate a continuous self-assessment mentality and promote self-directed learning. Moreover, the friendliness of any educational system is revealed by the experiences of those students who are having learning difficulties, and facing more strains; academic or otherwise. It is imperative that a dental education system respects the overall well-being and quality of life of its students and provides support to those who need it.

Suggested practical improvements

In addition to the attributes of an 'ideal' and positive academic environment, the following suggestions should be considered.

1. Integrate courses/subjects in a way that basic science and pre-clinical education are clinically relevant, thus creating a knowledge continuum.
2. Dental faculty involved in teaching/mentoring activities should be encouraged to have formal training (seminars, continuing education courses) on educational/pedagogic issues. Establishing a mentoring relationship early in studies is strongly supported for undergraduates.
3. Clinical training: establishment of comprehensive care teaching clinics, exposure to all areas of clinical dentistry, facilitation of early clinical exposure and clinical instruction by an adequate number of staff. Easy and on-demand access to laboratory or clinical simulation training facilities.
4. Consider ways for student stress management, coping and reduction: orientations, study guides and syllabi, provision of on-demand formative assessment opportunities, ample time to complete assignments and requirements, elimination of quotas, team assignments and collaboration with peers, study counselling and support services.
5. Ensure a friendly and inclusive educational environment for all students, regardless of gender, age, race, ethnicity or religious beliefs. Discrimination and harassment of any type must be identified and eliminated.
6. Provide opportunities and encourage students to engage in extra-curricular activities. Exchanges are highly valued by students, and there should be efforts to promote and facilitate this form of mobility, as a learning opportunity. Other electives such as involvement in community service, research practica and volunteer activities could enhance the overall student experience.
7. Invest in increasing computer literacy levels of students/staff. Support schools that do not have resources to allocate to ICT, include its applications in all curricula and ensure there is a smooth implementation phase.
8. Consider ways to decrease the growing educational debt of dental students in many countries, especially in cases where the majority of funding is allocated to research.
9. Include students in the decision-making process of the schools, value their feedback and carry out international standardised student feedback surveys.
10. Design summative assessments in a way that promotes deep/meaningful learning and critical thinking; provide many and different opportunities for assessment rather than a once-off determining final exam.
11. Place greater emphasis on qualitative as opposed to quantitative assessment criteria; consider non-graded education and the elimination of quotas.
12. Establish an international network of dental schools under the auspices of IFDEA with active student representation and involvement in the decision-making process. This could be achieved by an IFDEA student committee. This could also help remove current obstacles and promote unilateral visits and bilateral exchanges. Increase mobility of dental staff and students, as well as international collaborative opportunities.

Tables**Table 1. Most common dental student concerns and stress provoking factors**

Examinations and grades Faculty-student relations; adequacy of feedback given by staff/faculty Academic overload (amount of class work) Financial pressures Patient treatment (patients not keeping appointments, time constraints, communication problems) Lack of leisure time Meeting graduation requirements
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Table 2. Characteristics of a positive academic environment: the students' view

<p>Atmosphere of respect to all students, regardless of ethnicity, religion or gender Ethical climate; sense of fairness among administration, educators and students Focus on learning rather than performance Ample time to fulfil assignments and requirements Stimulation of active learning and critical thinking by exposure to research Orientation, study guides and complete information made available to students regarding the desired outcomes and assessments, before the commencement of respective classes Accommodation and respect of individual learning styles Encouragement of collaborative learning, team activities, cooperation and discussion among peers Continuous self-assessment opportunities; formative rather than summative assessments Study progress logs or portfolios Assessment procedures that are designed to promote deep and meaningful learning Provision of counselling and support services to students who face difficulties Encouragement of students to engage in extra-curricular, volunteer, cultural and athletic activities</p>
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Table 3. Desired attributes of a positive clinical training environment: the students' view

<p>Comprehensive care clinics; exposure to all areas of clinical dentistry Early patient contact (dental school, community placements) Competency based education; emphasis on qualitative rather than quantitative criteria Continuous self-assessment opportunities Clinical instruction: adequate staff, constructive and positive feedback Availability of on-demand clinical simulation training</p>
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Table 4. Effective educational practices for the development of explicit and implicit memory, and critical thinking (9).**Development of explicit memory & effective learning**

1. Communication of learning objectives for each class session
2. Organization of the subject matter in a manner that makes sense to the learner
3. Frequent in-class activity such as writing notes, analyzing problems, or answering questions
4. Use of mnemonics to aid memorization of factual information
5. Frequent in-class quizzing with immediate feedback on response correctness
6. Total amount of 'time on task' including in-class activities and personal study time
7. Summary of key points to remember ('take-home messages') at the end of each lesson

Development of implicit memory

1. Simulations in which students apply decision making for both well-defined, frequently seen problems and ill-structured, rarely encountered problems
2. Prospective simulations in which students experience anticipatory guidance by analyzing scenarios to predict likely problems and then develop coping strategies
3. Retrospective critiques of case scenarios in which actions are reviewed to identify errors as well as exemplary performance
4. Self-assessment of performance in comparison to best practice benchmarks
5. Written or verbal reflection on the meaning of experiences, especially how to avoid errors

Enhancement of critical thinking skills

1. Frequent use of questions by instructors that require students to analyze problem aetiology, compare alternative approaches, provide rationales for plans of action, and predict outcomes
2. Listening to the reasoning of expert practitioners as they 'talk through' their approaches to analysing and solving problems
3. Comparing data searching steps, strategies implemented, decisions made, and outcomes to that of expert practitioners who work through the same case scenario
4. Writing assignments that request students to analyze problems by discussing theories about causal factors, compare alternative solutions, and defend decisions about proposed actions

References

1. Field MJ, Jeffcoat MK. Dental education at the crossroads: a report by the Institute of Medicine. *J Am Dent Assoc.* 1995; Feb: **126(2)**: 191-5.
2. Scott J. Dental education in Europe: the challenges of variety. *J Dent Educ.* 2003; Jan: **67(1)**: 69-78.
3. Manogue M, Brown G. Managing the curriculum--for a change. *Eur J Dent Educ.* 2007; May: **11(2)**: 75-86.
4. Giddon DB. Why dentists should be called oral physicians now. *J Dent Educ.* 2006; Feb: **70(2)**: 111-4.
5. Plasschaert AJ, Holbrook WP, Delap E, Martinez C, Walmsley AD; Association for Dental Education in Europe. Profile and competences for the European dentist. *Eur J Dent Educ.* 2005; Aug: **9(3)**: 98-107.
6. ADEA Commission on Change and Innovation in dental education. Call for comments: Competencies for the New General Dentist. Available at: <http://www.adea.org/ci/CallforComments09292006.pdf> (last accessed 17 Sept 2007)
7. ADEA Commission on Change and Innovation in Dental Education. The case for change in dental education. *J Dent Educ.* 2006; Sep: **70(9)**: 921-4.
8. Haghparast N, Sedghizadeh PP, Shuler CF, Ferati D, Christersson C. Evaluation of student and faculty perceptions of the PBL curriculum at two dental schools from a student perspective: a cross-sectional survey. *Eur J Dent Educ.* 2007; Feb: **11(1)**: 14-22.
9. ADEA Commission on Change and Innovation in Dental Education. Educational strategies associated with development of problem-solving, critical thinking, and self-directed learning. *J Dent Educ.* 2006; Sep: **70(9)**: 925-36.
10. [Rohlin M](#), [Petersson K](#), [Svensäter G](#). The Malmö model: a problem-based learning curriculum in undergraduate dental education. *Eur J Dent Educ.* 1998; Aug: **2(3)**: 103-14.
11. Nattestad A, Attstrom R. Introduction to Theme 4: The virtual potential. *Eur J Dent Educ.* 2002; **6 Suppl 3**: 125-6.
12. Pee B, Woodman T, Davenport ES. Developing teaching and learning innovations in dental training: the example of the Progress File Learning System. *Br Dent J.* 2003; Oct 25: **195(8)**: 463-6.
13. Masella RS, Thompson TJ. Dental education and evidence-based educational best practices: bridging the great divide. *J Dent Educ.* 2004; Dec: **68(12)**: 1266-71.

14. Till H. Climate studies: can students' perceptions of the ideal educational environment be of use for institutional planning and resource utilization? *Med Teach*. 2005: Jun: **27(4)**: 332-7.
15. Henzi D, Davis E, Jasinevicius R, Hendricson W. In the students' own words: what are the strengths and weaknesses of the dental school curriculum? *J Dent Educ*. 2007: May: **71(5)**: 632-45.
16. Plasschaert AJ, Lindh C, McLoughlin J, Manogue M, Murtomaa H, Nattestad A, et al. Curriculum structure and the European Credit Transfer System for European dental schools: part I. *Eur J Dent Educ*. 2006: Aug: **10(3)**: 123-30.
17. Rossomando EF. Biodontics: Dental students as change agents for dental school curricula. *Compend Contin Educ Dent*. 2005: Aug: **26(8)**: 578, 580-1.
18. Stewart DW, de Vries J, Singer DL, Degen GG, Wener P. Canadian dental students' perceptions of their learning environment and psychological functioning over time. *J Dent Educ*. 2006: Sep: **70(9)**: 972-81.
19. Muirhead V, Locker D. Canadian dental students' perceptions of stress. *J Can Dent Assoc*. 2007: May: **73(4)**: 323.
20. Morse Z, Dravo U. Stress levels of dental students at the Fiji School of Medicine. *Eur J Dent Educ*. 2007: May: **11(2)**: 99-103.
21. Pau A, Rowland ML, Naidoo S, AbdulKadir R, Makrynika E, Moraru R, et al. Emotional intelligence and perceived stress in dental undergraduates: a multinational survey. *J Dent Educ*. 2007: Feb: **71(2)**: 197-204.
22. Omigbodun OO, Odukogbe AT, Omigbodun AO, Yusuf OB, Bella TT, Olayemi O. Stressors and psychological symptoms in students of medicine and allied health professions in Nigeria. *Soc Psychiatry Psychiatr Epidemiol*. 2006: May: **41(5)**: 415-21.
23. Rosli TI, Abdul Rahman R, Abdul Rahman SR, Ramli R. A survey of perceived stress among undergraduate dental students in Universiti Kebangsaan Malaysia. *Singapore Dent J*. 2005: Dec: **27(1)**: 17-22.
24. Al-Omari WM. Perceived sources of stress within a dental educational environment. *J Contemp Dent Pract*. 2005: Nov: **156(4)**: 64-74.
25. Sugiura G, Shinada K, Kawaguchi Y. Psychological well-being and perceptions of stress amongst Japanese dental students. *Eur J Dent Educ*. 2005: Feb: **9(1)**: 17-25.
26. Polychronopoulou A, Divaris K. Perceived sources of stress among Greek dental students. *J Dent Educ*. 2005: Jun: **69(6)**: 687-92.
27. Acharya S. Factors affecting stress among Indian dental students. *J Dent Educ*. 2003: Oct: **67(10)**: 1140-8.

28. Rajab LD. Perceived sources of stress among dental students at the University of Jordan. *J Dent Educ.* 2001: Mar: **65(3)**: 232-41.
29. Sanders AE, Lushington K. Sources of stress for Australian dental students. *J Dent Educ.* 1999: Sep: **63(9)**: 688-97.
30. Westerman GH, Grandy TG, Ocanto RA, Erskine CG. Perceived sources of stress in the dental school environment. *J Dent Educ.* 1993: Mar: **57(3)**: 225-31.
31. ADEA Commission on Change and Innovation in Dental Education. The dental education environment. *J Dent Educ.* 2006: Dec: **70(12)**: 1265-70.
32. Miles S, Leinster SJ. Medical students' perceptions of their educational environment: expected versus actual perceptions. *Med Educ.* 2007: Mar: **41(3)**: 265-72.
33. Curtis DA, Lind SL, Brear S, Finzen FC. The correlation of student performance in preclinical and clinical prosthodontic assessments. *J Dent Educ.* 2007: Mar: **71(3)**: 365-72.
34. Gaengler P, De Vries J, Akota L, Balciuniene I, Berthold P, Gajewska Met al. 1.1 Student selection and the influence of their clinical and academic environment on learning. *Eur J Dent Educ.* 2002: **6: Suppl 3**: 8-26.
35. Humphris G, Blinkhorn A, Freeman R, Gorter R, Hoad-Reddick G, Murtomaa H, et al. Psychological stress in undergraduate dental students: baseline results from seven European dental schools. *Eur J Dent Educ.* 2002: Feb: **6(1)**: 22-9.
36. Victoroff KZ, Hogan S. Students' perceptions of effective learning experiences in dental school: a qualitative study using a critical incident technique. *J Dent Educ.* 2006: Feb: **70(2)**: 124-32.
37. Rossomando EF. PowerPoint presentations to the video game generation. *Compend Contin Educ Dent.* 2006: Mar: **27(3)**: 200-1.
38. Brunton PA, Morrow LA, Hoad-Reddick G, McCord JF, Wilson NH. Students' perceptions of seminar and lecture-based teaching in restorative dentistry. *Eur J Dent Educ.* 2000: Aug: **4(3)**: 108-11.
39. Robertson LT. Memory and the brain. *J Dent Educ.* 2002: Jan: **66(1)**: 30-42.
40. Oliver M, Trigwell K. Can 'Blended Learning' be redeemed? *E-Learning*, 2005: **2: 1**: 17-26.
41. Humphris G, Kaney S. The encouragement of 'perfect' health professionals. *Med Educ.* 1998: Sep: **32(5)**: 452-5.
42. McLachlan JC. The relationship between assessment and learning. *Med Educ.* 2006: Aug: **40(8)**: 716-7.

43. Olson BL, McDonald JL. Influence of online formative assessment upon student learning in biomedical science courses. *J Dent Educ.* 2004: Jun: **68(6)**: 656-9.
44. Manogue M, Kelly M, Bartakova Masaryk S, Brown G, Catalanotto F, et al. 2.1 Evolving methods of assessment. *Eur J Dent Educ.* 2002: **6: Suppl 3**: 53-66.
45. Leisnert L, Mattheos N. The interactive examination in a comprehensive oral care clinic: a three-year follow up of students' self-assessment ability. *Med Teach.* 2006: Sep: **28(6)**: 544-8.
46. Mattheos N, Nattestad A, Falk-Nilsson E, Attstrom R. The interactive examination: assessing students' self-assessment ability. *Med Educ.* 2004: Apr: **38(4)**: 378-89.
47. Mattheos N, Nattestad A, Schitteck M, Attstrom R. Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends. *Eur J Dent Educ.* 2002: Feb: **6(1)**: 30-5.
48. Mattheos N, Schitteck MJ, Nattestad A, Shanley D, Attstrom R. A comparative evaluation of computer literacy amongst dental educators and students. *Eur J Dent Educ.* 2005: Feb: **9(1)**: 32-6.
49. Mattheos N, Nattestad A, Christersson C, Jansson H, Attstrom R. The effects of an interactive software application on the self-assessment ability of dental students. *Eur J Dent Educ.* 2004: Aug: **8(3)**: 97-104.
50. Burk DT, Bender DJ. Use and perceived effectiveness of student support services in a first-year dental student population. *J Dent Educ.* 2005: Oct: **69(10)**: 1148-60.
51. Trotman CA, Haden NK, Hendricson W. Does the dental school work environment promote successful academic careers? *J Dent Educ.* 2007: Jun: **71(6)**: 713-25.
52. Romberg E. Mentoring the individual student: qualities that distinguish between effective and ineffective advisors. *J Dent Educ.* 1993: Apr: **57(4)**: 287-90.
53. Valachovic RW. Making science clinically relevant. *J Dent Educ.* 1997: May: **61(5)**: 434-6.
54. Taleghani M, Solomon ES, Wathen WF. Grading dental students in a "nongraded" clinical assessment programme. *J Dent Educ.* 2006: May: **70(5)**: 500-10.
55. Taleghani M, Solomon ES, Wathen WF. Non-graded clinical evaluation of dental students in a competency-based education programme. *J Dent Educ.* 2004: Jun: **68(6)**: 644-55.
56. Yip HK, Smales RJ, Newsome PR, Chu FC, Chow TW. Competency-based education in a clinical course in conservative dentistry. *Br Dent J.* 2001: Nov 10: **191(9)**: 517-22.

57. Holmes DC, Trombly RM, Garcia LT, Kluender RL, Keith CR. Student productivity in a comprehensive care programme without numeric requirements *J Dent Educ.* 2000: Nov: **64(11)**: 745-54.
58. Dodge WW, Dale RA, Hendricson WD. A preliminary study of the effect of eliminating requirements on clinical performance. *J Dent Educ.* 1993: Sep: **57(9)**: 667-72.
59. Lalumandier JA, Victoroff KZ, Thuernagle O. Early clinical experience for first-year dental students. *J Dent Educ.* 2004: Oct: **68(10)**: 1090-5.
60. Novak KF, Whitehead AW, Close JM, Kaplan AL. Students' perceived importance of diversity exposure and training in dental education. *J Dent Educ.* 2004: Mar: **68(3)**: 355-60.
61. Hewlett ER, Davidson PL, Nakazono TT, Baumeister SE, Carreon DC, Freed JR. Effect of school environment on dental students' perceptions of cultural competency curricula and preparedness to care for diverse populations. *J Dent Educ.* 2007: Jun: **71(6)**: 810-8.
62. Veal K, Perry M, Stavisky J, Herbert KD. The pathway to dentistry for minority students: from their perspective. *J Dent Educ.* 2004: Sep: **68(9)**: 938-46.
63. Whitehead AW, Novak KF. A model for assessing the ethical environment in academic dentistry. *J Dent Educ.* 2003: Oct: **67(10)**: 1113-21.
64. Turner SP, Beemsterboer PL. Enhancing academic integrity: formulating effective honor codes. *J Dent Educ.* 2003: Oct: **67(10)**: 1122-9.
65. Christensen L, Suhr CM. Erasmus. *EDS Mag.* 1990: May: **(1)**: 15-7.