Acta Scientific Dental Sciences

Volume 10 Issue 11 November 2026

Review Article

# Learning Environment in Dental Education – A Narrative Review

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**Scopus Id:** https://orcid.org/0000-0003-3114-3015

**DOI:** 10.31080/ASDS.2026.10.2159

**Received:** September 16, 2026

**Published:** November 02, 2026

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## Abstract

Learning environment (LE) is acknowledged as a vital and critical element to provide quality health profession education. Institutions, educators, and health professionals all over the world have recognised how important it is to foster a positive learning environment. A favourable LE is a predictor of not only students' satisfaction but also their learning outcomes and academic achievement. Studies have reported a positive correlation between LE and the quality of patient care. On the contrary, less favourable LE has been observed to generate high levels of stress, depression and burnout amongst dental and medical students.

To evaluate LE, different quantitative and qualitative approaches such as focus groups, semi-structured interviews and closed-ended questionnaires are used. One of the most popular validated questionnaires is the Dundee Ready Educational Environment Measure (DREEM). The DREEM inventory is a generic instrument that has been used to assess students' perception of the LE across different health care–related fields that include dentistry, medicine, pharmacy, and nursing. The wide adoption of DREEM enables comparison of the educational environment across fields and nations.

Another important facet of LE is the technology enhancement. Technology-enhanced learning (TEL) transforms health professions education by integrating digital tools, virtual environments, and artificial intelligence into clinical and laboratory training. Virtual simulations and telemedicine recreate realistic clinical scenarios and communication training to build diagnostic reasoning before bedside interaction. TEL is particularly impactful as it ensures that future healthcare professionals are well-prepared to meet the demands of modern medical practice. Given the continuous advancements in educational technology, there is a pressing need to examine the integration of these technologies in this field.

This review emphasises that Dental Colleges should consider the learning environment as an essential component of educational quality rather than an incidental feature of the curriculum.

**Keywords:** Learning Environment; Dental Education; Mentoring; DREEM; Student Perception; Psychological Safety; Stress; Burnout; Feedback; Technology-Enhanced Learning

## Introduction

Significant strides have been made all over the world towards reforming the educational process of health professions. This is aimed at optimising the health care delivery system and ultimately improving the health of the people. The domains that have been clearly identified in the process of education are Affective, cognitive and psychomotor and these formulate the foundations of curriculum followed in health profession education. Teaching methods followed in the dental and medical courses conducted in India and elsewhere are almost streamlined and that could improve the standards in the previous decades. But educational experts have found out some limitations experienced in achieving the desired standards amongst the professionals. This is not because of the inadequacies of the curriculum or the teaching learning methods. It is attributed to the environment in which learning takes place. Health professionals want their learning and work to be meaningful, stimulating, empowering, collaborative, and respectful. Many professionals experience high levels of depression and burnout as well as distress and marginalization and/or exclusion. Learning and work environments for health professions' learners, educators, and practitioners should receive serious attention and modifications which contribute to better outcomes for the patients.

Learning Environment (LE) plays a central role in learning, formation of the identity, professional development and well-being. Conceptualization and assessment of impact of the LE upon trainees, dates back to the mid twentieth century, when academic interests lay primarily in exploring the LE's impact upon undergraduate medical training [1-3].

The term learning environment (LE) encompasses the physical, social, psychological, educational, and organizational setting where students, residents and faculty interact to gain professional expertise. It includes the physical space (Class rooms, labs, clinics and wards), facilities and resources available for learning, the quality of teaching, social climate (interactions between teachers, students, other staff and peer relationships) assessment practices, institutional culture, and opportunities for academic and professional development, psychological safety (whether students feel safe to raise questions, admit mistakes and express concerns without fear of humiliation) and institutional culture (rules, norms and ethical values upheld by the institution). Students' perceptions of these factors can influence their motivation, engagement, satisfaction, academic achievement, and overall educational experience. Educational theorists often refer to the environment as the "third teacher"—after the parents and the classroom educator [4].

Dental education presents a distinctive learning environment because students progress through several interconnected settings during their training and presently through digital and virtual platforms. The transition from theoretical learning to simulation and subsequently to patient care requires students to familiarise and adapt to different educational and social environments. The clinical environment is particularly important because students learn not only through formal instruction but also through observation, supervised practice, interaction with patients and other members of the dental team, and participation in authentic clinical decision-making. The learning environment in dental clinics blends hands-on patient care with close professional supervision and teamwork. It acts as a bridge between classroom theory and real-world practice [5].

A high-quality clinical and educational learning environment contributes to the development of core competencies, professional identity, and clinical decision-making skills. A supportive learning environment promotes positive interactions with faculty, academic staff and peers, fosters confidence, and critical thinking and encourages student centred learning. LE should provide regular performance-based feed back to the learners, point out errors, give methods to bridge the gap between theory and practice and reduce avoidable clinical anxiety. LE also include the availability of infrastructure, learning material, dedicated learning time, advanced digital armamentarium and high quality patient care. Learners should be made aware of the organisational culture with clarity and it can considerably reduce the anxiety of the learners. Conversely, excessive academic pressure, inadequate supervision, poor teacher–student relationships, lack of psychological safety, and an unsupportive institutional culture may adversely affect students' learning experiences and well-being [6,7].

An important development in the field of LE was the evaluation of learning environment. Different tools were developed and the first one was the medical school learning environment survey introduced in 1970. By 2010, nearly 19 tools have been developed and many studies were conducted. Congruent results could not be obtained because of the differences present in the questionnaires

used. This necessitated the formulation of a globally recognized questionnaire. In 1997, Roff., *et al*. from University of Dundee, Scotland, developed a benchmark tool named Dundee ready educational environment measure (DREEM). DREEM is a multi-cultural and independent tool useful for assessing the educational environment and student learning. Moreover, it provides with reliable feedback regarding the weakness and strength of the educational environment [8,9].

DREEM assesses students' perceptions of learning, teachers, academic self-perception, atmosphere, and social self-perception. The instrument has subsequently been used extensively across different countries and health-professions disciplines and has also been applied in dental education.

The dental profession's continuing service to society is safeguarded by academic dental institutions that recruit, educate and develop the future members of the profession. Academic dental institutions should aim to prepare students to enter the practice of dentistry as professionals, informed citizens, and enlightened leaders in a changing the health care system. Certain principles have been formulated to shape the dental educational environment viz. critical thinking, life long self directed learning, humanistic values, development of research acumen and evidence based oral health care. Critical thinking is the fine thread that weaves together different educational experiences of the students. A mature critical thinker raises vital questions and problems; gathers relevant information and interpret it to arrive at well reasoned conclusions; thinks with an open mind and communicates effectively. In an ideal educational environment students can express freely without fear [10].

Dental students have traditionally been encouraged to memorise huge quantity of factual knowledge. It becomes highly impracticable in the context of new discoveries and applications which incidentally make the dental curriculum over crowded. Students should therefore be encouraged to learn by themselves and teachers should instruct the students on the methods of 'learn how to learn'. Lifelong learning is the hallmark of a dedicated professional and it should be considered as the responsibility of the professional.

Academic dental institutions should adopt a humanistic pedagogy that inculcates respect, tolerance, understanding and concern for others. A humanistic approach is characterized by close professional relationships between faculty and students, fostered by mentoring, advising, and small group interaction. A humanistic environment will develop inter personal skills for learning, patient care and for making valuable contributions to the profession.

Academic dental institutions play an inevitable role in developing new knowledge, transferring that knowledge for the improvement of the oral, craniofacial, and systemic health of the public, and educating the next generations of researchers and scholars. The educational environment should be conducive to develop favourable research temperament. The dental curriculum should be based on evidence based dentistry (EBD). Faculty should practice EBD and model critical appraisal before the students in the dental school clinics [11].

This narrative review discusses the concept and evolution of the learning environment prevailing in dental education, its major physical, educational, clinical, psychological and social components, methods used for its assessment, factors influencing students' perceptions, and strategies for creating a supportive and effective environment for dental learning.

## Learning Environment - the concept and definition

The concept of the learning environment is broader than the physical setting in which learning happens. It includes the interaction between learners, teachers, curriculum, educational resources, institutional culture, and the social and psychological climate. The terms learning environment, educational environment, and educational climate are frequently used interchangeably in the health-professions literature. The learning environment generally refers to the circumstances and conditions experienced by the learner, whereas educational climate is often used to describe the prevailing atmosphere or culture of an educational institution. The Glossary of educational reform defines a learning environment as the diverse physical locations, contexts, and cultures in which students learn. It replaces the narrow idea of a traditional classroom with a broad ecosystem that includes interpersonal interactions, institutional policies, and tools [12].

The learning environment can be considered as a multidimensional construct.

The physical dimension is the most tangible component of learning and that includes classrooms, laboratories, simulation units, clinics, libraries, information technology infrastructure, and other educational resources. The traditional setting of rigid rows of desks is replaced with flexible arrangements to facilitate group work. Appropriate lighting, ventilation, temperature, acoustics, ergonomics, and adequate space can contribute to a comfortable and effective learning setting.

The psychological dimension includes students' sense of safety, confidence, motivation, belonging, stress, and well-being. When physical dimension is seen and touched, the psychological dimension is felt. A strong psychological environment encourages students to stretch their abilities while receiving the guidance. Closely related to this is the emotional dimension. The students should feel valued, respected and heard. Their brains are primed for learning. Stress and anxiety can block the ability of the brain to process new information.

The educational dimension denotes curriculum organization, teaching methods, learning opportunities, academic support, feedback, and assessment.

The social dimension includes relationships among students, teachers, clinical supervisors, patients, and other members of the healthcare team. The most profound learning happens outside the classroom walls. Experiential learning environments are based on the philosophy of "learning by doing." Field experiences, simulations and collaborative projects promote learning. Along with this, soft skills are also learned viz. communication skills, adaptability and problem solving ability.

The organizational dimension incorporates institutional policies, leadership, management, communication, and the broader culture of the educational institution.

Blended and hybrid dimension allows students to attend physical class for complex discussions, lab work and group projects. For lectures, online platforms are used and students watch recorded lectures at home. Flipped class room is a good example of the hybrid mode [13].

A learner-centred learning environment is an educational setting that shifts the focus of instruction from the teacher to the student, prioritizing individual needs, active participation, and student autonomy. In olden days the teacher assumed the role of an authoritarian provider of knowledge. Now teacher's role is that of a guide or a facilitator. Student is no more a passive listener of the teacher or lecturer. Student is encouraged to discuss, undertake projects requiring hands on experience and gains skills of problem solving. The LE should provide freedom to take responsibility and foster intrinsic motivation. Learner should do self and peer assessment in an attempt to build critical self awareness about how they learn [14].

Learning environment in dental education may be conceptualized as the totality of physical, educational, clinical, social, psychological, technological, and organizational factors experienced by dental students during their education and clinical training, which collectively influence their learning, professional development, well-being, and educational outcomes.

## Preclinical learning environment

Dentistry requires a high level of psychomotor skill, manual dexterity, visuospatial ability and coordination. Without achieving proficiency in technical skills, a trainee cannot undertake many procedures on patients. Skill training is imparted in two stages: 1. Preclinical training using manikin simulators (Phantom heads) 2, Clinical training on live patients. During preclinical training students gain hand – eye coordination, spatial awareness and fine motor control. Preclinical training period provides really a risk free environment even if errors are committed. Once the students gain confidence with phantom heads, they can handle real patients without anxiety. Preclinical training allows the students to repeat the techniques many times on typodonts. Modern simulation systems like Virtual Reality offer objective assessments and instant digital feedback [15].

During preclinical training, the supervisor should provide timely and constructive feedback on the student's knowledge, competence and expected level of performance. Feedback that is specific, actionable, and delivered close to the learning activity can facilitate skill acquisition and improvement greatly [16].

It has been observed that students who have completed preclinical training have performed much better during the clinical postings. Students might have gained increased understanding on the relevance of procedures because of the repetitions and practice [17].

Preclinical training period of dental courses is a period of transition where learners continuously move beyond their comfort zones to synthesize new knowledge, build their professional identify, and develop the clinical skills and perspectives necessary for oral health professionals. Most of the students feel stressed, overwhelmed by the quantum of work, exhausted and hopelessness. Students really need support from the instructors, friends and family members to overcome this particular stage of their course. The challenges experienced during the training negatively impacts their well-being. It is desirable to consider inclusion of nurturing teaching approaches in the learning environment to support students' wellbeing and performance [18].

## Clinical learning environment

Clinical learning environment in dentistry requires safe physical facilities, supportive faculty supervision and a structured transition from preclinical labs to patient care in clinical settings. The physical facilities are specified by the National Dental Commission of India and all the recognised dental colleges do have the physical space and equipment in the clinics. Similarly, staff pattern is also specified. A planned educational framework that helps dental students move safely and effectively from practicing on artificial models to treating real humans has to be implemented. The transition is carried out with early clinical exposure, simulated real world environment, soft skills training and supportive mentorship.

Early clinical exposure may include observation of senior students and practising dentists, interaction with simulated or standardised patients, and participation in simple procedures under supervision. Such experiences can help students become familiar with the clinical setting, patient communication, infection-control procedures, teamwork, and professional behaviour before undertaking more complex care.

As for as possible, preclinical laboratories should, resemble the clinical environment in equipment, ergonomics, workflow, and infection-control principles. Similarity between simulation and clinical settings can reduce unnecessary physical and cognitive adaptation when students enter the phase of patient care. Soft-skills training can improve communication, empathy, behavioural management, and professional interaction through structured activities and simulated or standardised-patient encounters. This will make the student ready to face patients with complex histories. Virtual and digital simulation can provide additional opportunities to practise communication and decision-making in realistic scenarios. Orientation programmes for students entering clinical training can clarify expectations, responsibilities, professional conduct, and routes for seeking supervision [19].

## Learning of skills in dentistry

Learning clinical skills in dentistry involves the integration of psychomotor performance, relevant scientific and clinical knowledge, clinical reasoning, and interpersonal communication. A common instructional sequence is explanation of the procedure and its rationale, demonstration by the instructor, supervised performance by the student, and repeated practice with progressive feedback. Early performance may involve imitation of the demonstrated technique; with practice and supervision, the learner gradually develops greater independence and proficiency. Instructors should remain available and approachable and should provide constructive guidance rather than humiliating or expressing punitive criticism. Presence of instructor in the clinic is very crucial because faculty retains the ultimate legal responsibility while progressively recognising student autonomy [20,21].

## Teacher-student relationship and mentoring

Mentoring is a one-to-one relationship between a more experienced person (mentor) and a less experienced person (mentee). The mentor supports the mentee in acquiring knowledge, developing skills and professional attitudes, and achieving mutually agreed educational or professional goals. The term "mentor" is believed to be derived from Homer's epic poem, Odyssey. It is also related to the Sanskrit word 'Mantri' which means advisor (to the ruler). International mentoring centre defines "Mentoring as a collaborative, dialogic and reflective learning relationship characterized by mutually inspirational learning agreements and shared responsibilities. This relationship is designed to facilitate individuals' or teams' personal and professional development, fostering awareness, expanding choices and enhancing capabilities." If a person identifies some challenges in life or profession, he can overcome those by the mentoring process. The mentee should have responsibilities such as commitment to the process, openness to feedback, and willingness to reflect on challenges and learning needs.

The value of mentoring has recently been emphasised realistically in educational settings. Studies from the past have shown that mentoring has many benefits for both the mentor and the mentee

[22-24]. Dental and medical students face considerable stress and anxiety during their studies which can affect their academic performance. Appropriate mentoring can provide guidance, psychological support, professional role modelling, and assistance with career development. Potential benefits include improved confidence, communication, professional growth, collaboration, and career planning.

From mentoring, the mentee gains psychological support, guidance on job progress, and a secure setting in which to test new concepts. The mentor too is benefitted by gaining confidence in mentoring, teaching, and creating a collaborative environment. The good relationship not only helps in making curricular reforms but also to promote positive educational environment, that in turn increases student performance [25]. In the present context there is no requirement that the mentor should be at a higher career level than the mentee. In traditional mentoring both academic and clinical mentor- mentee relationship, it is advised that the mentor to be one career level above the mentee in order to give the mentee with the proper research and professional counsel [26].

Successful mentoring requires active participation from both mentor and mentee. Mentors should be able to listen, empathise, provide constructive feedback, and maintain appropriate professional boundaries. Although mentors cannot resolve every difficulty encountered by students, attentive listening and structured guidance can help learners develop confidence and a stronger foundation of knowledge, skills, and professional attitudes.

Contemporary dental education assigns much value to humanistic approach that replaces intimidating or authoritarian training practices with professional relationships based on mutual respect, fairness, trust, and emotional intelligence. Students develop elements of professional identity partly through observation of faculty behaviour. Instructors who demonstrate integrity, compassion, clarity, and fairness can foster student engagement and clinical effectiveness. Constructive feedback and respectful supervision also support learners' needs for autonomy, competence, and relatedness and may help reduce disengagement and burnout.

## Key roles of a mentor

- **Role Model:** Shares personal experiences, successes, and failures to inspire and demonstrate integrity.
- **Guide:** Walks alongside the mentee on their journey, points toward resources, and helps navigate challenges.
- **Coach:** Focuses on specific performance aspects, building skills, and offering constructive feedback.
- **Counsellor:** Listens actively and supports personal growth by offering a safe space to discuss workplace or emotional obstacles.
- **Sounding Board:** Listens carefully to new ideas and provides objective feedback without immediate judgment.
- **Advisor**: Helps set realistic career goals and assists in creating action plans for professional growth.
- **Challenger:** Pushes the mentee out of their comfort zone to spark new ways of thinking and problem-solving [27].

## The five pillars of mentoring

- **Interest:** The mentor shows a genuine, active interest in the mentee's personal goals, background, and aspirations.
- **Investment:** The mentor dedicates valuable time, energy, and expertise to help the mentee succeed.
- **Involvement:** The mentor actively participates in the journey rather than just offering passive advice.
- **Inculcation:** The mentor passes down vital knowledge, practical skills, industry insights, and lessons learned from experience.
- **Inspiration:** The mentor motivates and empowers the mentee to push past limits and reach their full potential [28,29].

The GROW model is a structured coaching approach that can be applied to mentoring and professional development. GROW represents Goal, Reality, Options, and Will (or Way Forward). The goal clarifies the desired outcome; assessment of the current reality identifies strengths and barriers; exploration of options considers possible solutions; and the final stage develops commitment to an achievable action plan. In mentoring of dental professionals, this framework can help both mentors and mentees to establish realistic goals, monitor progress, and use feedback and reflection to guide development [30].

## Digital and technology enhanced learning environment

Technology-enhanced learning (TEL) refers to the purposeful use of digital tools to make teaching more effective and learning

more engaging. In dental education, TEL may include learning-management systems, online resources, multimedia, digital assessment, virtual and augmented reality, simulation, tele-education, and artificial intelligence. Technology should be selected according to educational objectives; the technology should support the lesson rather than become the objective of the lesson itself.

### Advantages of TEL

- **Access to vast educational resources:** Digital platforms provide rapid access to textbooks, research literature, multimedia resources, tutorials, and other learning materials from any part of the world. This broad access in online learning enables students to pursue other interests apart from those offered in the classroom.
- **Supports independent learning**: Recorded lectures, demonstrations, interactive resources, and self-assessment activities allow students to learn at an appropriate pace and revisit difficult concepts.
- **Resource efficiency:** Digital resources can reduce dependence on printed materials and may provide cost-effective access to educational content, although implementation and maintenance of technology require institutional investment.
- **Promotes Collaborative Learning:** Technology greatly favours group work. Using technologies like video conferencing, shared documents and educational applications, the students can participate in group work in real-time regardless of their distance. It helps to develop teamwork, problem-solving and communication skills; the key competencies for the modern workplace. Technology helps to develop collaboration among students in group projects.
- **Enhances Student Engagement**: Students can gain deeper knowledge through interactive platforms, combined with elements of a game, as well as through the use of multimedia products. Fun in learning always enhances student engagement. Using videos, simulations and, virtual reality can help the educators to make the lesson more interesting and clearer to the unit.
- **Tailored Learning Experiences**: Technologies make it possible to adapt to individual learning trajectories. Software can adapt to learning styles of the student considering his/her needs, abilities, and speed. In e-learning mode, students can learn at their own pace or with pre-set intervals or replay or accelerated learning.
- **Strengthens Student-Teacher Relationships**: Technology enhances teacher student relationship through emails, educational messaging and platforms like learning management systems (LMS) such as Canvas or Moodle. Teachers can give feedback, respond to questions, deliver course materials and track progress regardless of time or place.
- **Supports learning motivation:** Interactive activities, multimedia, formative quizzes, and simulation can make learning more engaging and provide immediate feedback. Many gadgets that can be introduced in the class and will transform even the most boring topic into an adventurous learning.
- **Develops digital readiness:** Familiarity with digital technologies during education can prepare graduates for increasingly technology-enabled dental practice.
- **Creating Inclusive Learning Environments:** Technology has enabled flexibility in managing students with learning incapacities. Proper use of facilities like the screen reader, speech-to-text tools make it possible for learners with disability or learning difficulties to participate in the class effectively.

### Disadvantages of TEL

Despite these advantages, TEL has potential limitations. Excessive or poorly designed technology use may distract students and reduce sustained attention. Dependence on digital tools may also weaken opportunities for independent reasoning if learners use technology as a substitute for critical thinking. Inequitable access to devices, reliable internet, and digital resources can create a digital divide. Excessive screen-based interaction may reduce face-to-face social engagement, while technical failures can disrupt teaching. Concerns regarding privacy, cybersecurity, academic integrity, inappropriate use of artificial intelligence, and the quality of online information also require attention. Technology should therefore complement rather than replace meaningful human interaction, clinical experience, supervision, and professional role modelling.

Student is likely to interact less with other people because technology takes the leading role of communication. It could affect the student's interactions with his or her peers, understand their feelings as well as be able to communicate in a normal social setting. Technology is not foolproof. Systems can crash, internet may go down, and devices can malfunction. Such technical issues can disrupt lessons and cause frustration among both teachers and students. Another negative side is that students have found it easier

to search for information from the internet. Reference books and journals that publish original research have become alien to the students and dishonest behaviour has become popular. Privacy threat and cyber security threats have become serious matters of concern. Technology limits the physical activity of the students. This can affect the health of the student causing obesity and poor posture. Educators and parents should monitor screen time and encourage healthy habits.

Technology can enhance flexibility, accessibility, engagement, and learning activities when integrated purposefully. Conventional face-to-face education should therefore be thoughtfully blended with appropriate digital technologies, with attention to educational objectives, equity, privacy, academic integrity, and the development of interpersonal and clinical skills [31].

## The Dundee ready education environment measure (DREEM)

The Dundee Ready Educational Environment Measure (DREEM) is a widely used instrument for assessing learners' perceptions of the educational environment in health professions education. Developed by Roff and colleagues in 1997, DREEM consists of 50 items scored on a five-point Likert scale, giving a maximum possible score of 200 [8]. It assesses five domains: students' perception of learning, students' perception of teachers, academic self-perception, students' perception of atmosphere, and social self-perception. Its principal value is that it provides a multidimensional assessment from the learner's perspective and can help institutions identify strengths and areas requiring improvement. A systematic review found widespread use of DREEM across health professions education and reported associations between more favourable educational-environment perceptions and several learner-related outcomes [32].

DREEM has been applied extensively in dental education, where academic, preclinical, clinical, and social experiences interact to shape students' perceptions. Studies have demonstrated that the instrument can identify differences between phases of dental training and highlight domains requiring educational attention [33,34]. Interpretation should extend beyond the global score to examination of individual domains and items, because overall scores may conceal specific strengths or problems within an institution.

Studies conducted in Germany and Australia elicited positive perceptions of the dental educational environment while identifying comparatively lower scores in areas such as academic self-perception, social self-perception and aspects of the clinical learning environment. The instrument has also been used in Indian dental colleges, where DREEM scores have indicated a more positive than negative environment while identifying opportunities for improvement. More recent evidence continues to support the applicability of DREEM in dental education, including postgraduate programmes, although its interpretation should extend beyond the total score to evaluation of individual domains and items [35].

## The operational system of DREEM [36,37]

The evaluation is conducted under five domains as follows:

- Student's Perception of Learning (SPOL)
- Student's Perception of Teachers (SPOT)
- Student's Academic Self-Perception (SASP)
- Student's Perception of Atmosphere (SPOA)
- Student's Social Self-Perception (SSSP)

The scale used for evaluation is five-point Likert-type -ranging from

- Strongly disagree (0)
- Disagree (1)
- Uncertain (2)
- Agree (3)
- Strongly agree (4).
- Nine negatively worded DREEM items (items 4, 8, 9, 17, 25, 35, 39, 48, and 50) require reverse scoring before calculating domain and total scores

## Maximum score, score range, interpretation

### Global score 200

- 0 - 50 Very poor
- 51 - 100 Many problems
- 101 - 150 More positive than negative
- 151 - 200 Excellent

**Subscale**

**Perception of learning 48**

- 0 - 12 Very poor
- 13 - 24 Training is viewed negatively
- 25 – 36 A more positive perception
- 37 - 48 Teaching is highly thought of

**Perception of teachers 44**

- 0 - 11 Abysmal
- 12 - 22 In need of some retraining
- 23 -33 Moving in the right direction
- 34 - 44 Model trainers

**Academic self-perception 32**

- 0 – 8 Feelings of total failure
- 9 – 16 Many negative aspects
- 17 - 24 Feeling more on the positive side
- 25 - 32 Confident

**Perception of Atmosphere 48**

- 0 - 12 A terrible environment
- 13 - 24 There are many issues which need changing
- 25 - 36 A more positive atmosphere
- 37 - 48 A good feeling overall

**Social self-perception 28**

- 0 - 7 Miserable
- 8 - 14 Not a nice place
- 15 - 21 Not too bad
- 22 - 28 Very good socially

**Individual items used for DREEM evaluation**

**Student's perceptions of learning (SPOL) – 12 items**

1. I am encouraged to participate in class.

7. Teaching is often stimulating.

13. Teaching is student-centred.

16. The teaching helps to develop my competence

20. The teaching is well focused.

21. The teaching helps to develop my confidence.

24. The teaching time is put to good use.

25. The teaching overemphasises factual learning.

38. I am clear about the learning objectives of the course.

44. The teaching encourages me to be an active learner.

47. Long-term learning is emphasised over short-term learning.

48. The teaching is too teacher-centred.

**Student's perception of teachers (SPOT) – 11 items**

2. The teachers are knowledgeable.

6. The teachers are patient with students.

8. The teachers make fun of their students.

9. The teachers are strict and controlling.

18. The teachers appear to have effective communication skills with students.

29. The teachers are good at providing feedback to students.

32. The teachers provide constructive criticism.

37. The teachers give clear examples.

39. The teachers get angry in teaching sessions.

40. The teachers are well prepared for their classes.

49. The students irritate and annoy the teachers.

**Academic self-perceptions (SASP) – 8 items**

5. Learning strategies which worked for me before continue to work for me now.

10. I am confident about passing this year.

22. I feel I am being well prepared for my profession.

26. Last year's work was good preparation for this year's work.

27. I am able to memorise all I need.

31. I have learned a lot about empathy in my profession.

41. My problem-solving skills are being well developed.

45. Much of what I have to learn seems relevant to a career in healthcare.

**Student's perception of the atmosphere / environment (SPOA) – 12 items**

11. The atmosphere is relaxed during ward teaching.

12. This school is well time-tabled.

17. Cheating is a problem in this school.

23. The atmosphere is relaxed during teaching.

30. There are opportunities for me to develop interpersonal skills.

33. I feel comfortable in teaching sessions socially.

34. The atmosphere is relaxed during tutorials.

35. I find the experience disappointing.

36. I am able to concentrate well.

42. The enjoyment outweighs the stress of the course.

43. The atmosphere motivates me as a learner.

50. I feel able to ask the questions I want.

### Student's social self-perception (SSSP) – 7 items

3. There is a good support system for students who get stressed.

4. I am too tired to enjoy this course.

14. I am rarely bored in this course.

15. I have good friends in this school.

19. My social life is good.

28. I seldom feel lonely.

46. My accommodation is pleasant.

## Discussion

A positive learning environment is an integral component of dental education and extends well beyond the physical infrastructure of a dental college. It encompasses the social, psychological, educational, clinical, and organisational conditions in which students learn and develop professional competence. A supportive environment characterised by respectful teacher–student relationships, effective communication, psychological safety, constructive feedback, appropriate clinical supervision, and opportunities for active participation can substantially influence students' engagement with learning. In dental education, where students simultaneously acquire theoretical knowledge, psychomotor skills, clinical judgement, and professional attitudes, the quality of the learning environment is particularly important. A favourable environment may promote motivation, confidence, self-directed learning, and satisfaction, whereas an unsupportive or highly stressful environment may contribute to anxiety, burnout, disengagement, and poorer academic or clinical performance [38].

Dental education involves multiple academic and clinical demands, including examinations, competency requirements, patient management, clinical productivity, and time constraints. When these demands occur within an environment characterised by intimidation, excessive competition, inadequate support, or poor supervision, students may experience considerable psychological stress. Conversely, environments that promote respect, inclusion, autonomy, and access to academic and personal support can help students manage educational demands more effectively. Psychological safety is particularly relevant because students should be able to ask questions, acknowledge uncertainty, discuss mistakes, and seek assistance without fear of humiliation or disproportionate punitive responses. Creating a positive learning environment should be regarded not simply as a matter that promotes student satisfaction, but as an important component that nurtures student well-being as well as professional development.

The influence of the learning environment is directly related to the clinical performance. Clinical learning requires students to translate theoretical knowledge into practical decision-making while interacting with patients, supervisors, peers and other members of the dental team. Effective supervision and timely, constructive feedback enable students to recognise deficiencies, correct errors and progressively develop clinical competence. A supportive clinical environment can also encourage students to reflect on their clinical experiences. In contrast, an environment in which students are reluctant to seek clarification or report difficulties may allow errors and misconceptions to persist.

Dental education is inherently patient-centred, and patient experience is influenced by students' clinical behaviour, communication, professionalism, and decision-making. Students who learn in environments characterised by empathy, ethical practice, respect for patient autonomy, and appropriate supervision are more likely to incorporate these attributes into their professional identity. Psychological safety in clinical settings may also encourage students to discuss uncertainties and seek supervision, when necessary, thereby supporting safer patient care.

The Dundee Ready Education Environment Measure (DREEM) and other learning-environment evaluation instruments have contributed substantially to understand and to assess students' perceptions of the educational environment. However, quantitative scores alone should not be interpreted as a complete representation of the learning environment. Student perceptions provide valuable insight into the educational experience, but meaning-

ful improvement requires institutions to identify the underlying causes of negative perceptions and to respond through appropriate curricular, organisational and faculty-development strategies. Consequently, learning-environment assessment should be viewed as part of a continuous quality-improvement process rather than as a one-time measurement exercise. Dental schools worldwide use DREEM data to pinpoint curricular strengths, reduce student burnout, and compare institutional productivity against peers [33,39].

Teachers are the foundational architects of a constructive learning culture, acting as facilitators, guides, and emotional anchors who shape how students get engaged, feel, and succeed. To build an effective learning environment, teachers should build a student centred approach, nurture a robust teacher student relationship and integrate technology into the educational programme. Faculty development should address not only teaching and assessment skills but also mentoring, feedback, professionalism, inclusive teaching and psychological safety. Students should likewise be encouraged to participate in the evaluation and improvement of their learning environment. Such an approach can help dental colleges move beyond identifying problems towards developing sustainable educational cultures that support both learners and educators [40].

## Limitations of the review

This narrative review provides a broad overview of the learning environment in dental education; however, limitations should be recognised. The literature was not identified through a predefined search strategy with formal inclusion and exclusion criteria or quantitative synthesis. Consequently, this might influence interpretation of the evidence. Learning environment is also a multidimensional and context-dependent construct, and findings from medical or other health-professions education settings may not be directly generalisable to dental education. In addition, many studies rely on learner perceptions rather than objective educational or patient outcomes. Future systematic, longitudinal, and intervention studies using validated instruments and objective outcomes are required to strengthen the evidence base

## Conclusions

The learning environment is a fundamental determinant of the quality of dental education. A positive, supportive, inclusive and psychologically safe learning environment can enhance students' well-being, promote engagement and motivation, facilitate the development of clinical competence, and contribute to professionalism and patient-centred practice. Its influence is therefore multidimensional: what begins as an educational experience may ultimately affect the quality and safety of care provided to the patients.

Dental Colleges should consequently consider the learning environment as an essential component of educational quality rather than an incidental feature of the curriculum. Regular assessment of students' perceptions, combined with meaningful institutional responses, faculty development, effective mentoring, constructive feedback and promotion of respectful teacher–student relationships, can help create environments in which students are able to learn, develop and practise effectively. Ultimately, investment in a positive learning environment represents an investment not only in students and educators, but also in the future quality of dental practice and patient care. Creating a positive learning environment in dental education should be regarded as an educational and professional imperative.

## Conflict of Interest

The authors declare that they do not have any conflict of interest

## CRediT Author Contributions

Conceptualization- K. Chandrasekharan Nair, Review of articles- Pradeep Dathan; T. Mohan kumar, Initial draft preparation: Pradeep Dathan, Viswanath, Review and editing- K. Chandrasekharan Nair, Supervision-K. Chandrasekharan Nair.

All the authors have read and agreed to the published version of the manuscript.

## Acknowledgements

The authors acknowledge the use of an artificial intelligence language model developed by OpenAI, for assistance in editing and improving the readability of certain portions of the manuscript.

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