A peek under the mask: exploring dental students' experiences through focus group discussions

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Abstract

Introduction Training individuals to become dental professionals involves addressing multiple challenges related to a student's learning experience. This study aimed to identify the learning issues and stress factors affecting dental students at a premier dental school in Malaysia. Focus group discussions (FGDs) were used to gather qualitative insights into students' experiences, highlighting common struggles across clinical training years.

Methods Thirty clinical-year dental students (Years 3–5) participated in online FGDs. A combination of theoretical and homogeneous purposive sampling techniques was employed to ensure diverse yet comparable perspectives across academic levels. The discussions were guided by a validated topic framework designed to explore students' learning needs, motivation, instructional strategies, curriculum content, learning environment, and academic performance. Thematic analysis informed by Braun and Clarke's framework was employed to extract key themes. Triangulation of FGD transcripts, field notes, and digital engagement patterns was conducted by cross-referencing verbal themes with non-verbal cues (e.g., facial expressions, camera use), enhancing the depth and credibility of insights into students' challenges and learning preferences.

Results FGDs revealed shared challenges among all clinical-year students, including difficulties transitioning to clinical training, balancing academic and clinical responsibilities, and coping with performance-related stress. The triangulation analysis highlighted discrepancies between verbalized concerns and observed engagement patterns, revealing underlying anxiety, self-doubt, and cognitive fatigue. Students preferred structured guidance, interactive learning methods, and timely feedback. While confidence increased with clinical experience, assessment transparency and workload concerns remained prevalent. Preference for student-centred, experiential, and reflective learning strategies was common.

Discussion FGDs provided distinct insights into the unique challenges faced by dental students, highlighting the need for a supportive and adaptive educational environment. They also emphasized the importance of student-centred learning (SCL), which incorporates experiential and reflective practices to enhance academic performance and well-being.

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Conclusion This study highlights the challenges faced by dental students including clinical transition difficulties, inconsistent feedback, assessment anxiety, and heavy workload, emphasizing the importance of academic support and tailor-made SCL strategies. Triangulated data revealed that unclear expectations and passive teaching further compounded stress. Addressing these through structured mentorship, active learning strategies, transparent assessments, and constructive feedback can enhance academic performance and support student well-being.

Keywords Learning experience, Focus group discussions (FGD), Learning challenges, Student-centred learning (SCL), Academic performance, Stress

Introduction

Students typically encounter challenges and opportunities daily during their educational experiences. For dental students, the educational journey usually spans five years, demanding significant endurance. This journey revolves around obtaining professional qualifications and extensively involves students' overall academic performance, which indicates competency. Educators can support dental students in meeting rigorous training requirements through various instructional strategies, thus facilitating academic and professional success.

Educational experience in dental education goes beyond the curriculum content; it encompasses the physical learning environment, psychological well-being, social interactions, and instructional strategies utilized by educators. These components significantly impact the content and delivery of education, shaping students' and educators' expectations and behaviors [1]. Understanding the interconnectedness of these elements is crucial for educators and institutions striving to enhance their learning experiences.

Student learning needs can be evaluated through surveys, interviews, discussions, and observations. Educators should explore diverse instructional strategies that address students' varying learning needs to equip them with 21st-century skills. Integrating knowledge through theoretical learning concepts, including learning styles (LS), motivation, cognitive development, and sociocultural influences, into educational practices is essential for establishing effective and engaging learning environments. These approaches will enrich students' educational experience and enhance their academic performance. Tailored instructional strategies ensure that all students have equal opportunities to excel and flourish in their educational pursuits, fostering inclusivity and personal well-being in the academic setting. They recognize the profound impact of educational experience on students' academic achievement, mental well-being, and subsequent professional paths.

Utilizing focus group discussions for exploring dental students' learning needs

Focus Group Discussions (FGDs) are essential in enhancing dental education, as they serve as a platform for gathering diverse student viewpoints [2, 3]. These discussions aid educators in recognizing and comprehending dental students' distinct challenges and requirements for promoting transparent and candid communication. By engaging in FGD sessions, students actively identify problems and generate solutions, directly impacting curriculum development and teaching methodologies, also known as instructional strategies. This method enriches the comprehension of student experiences, ensuring that educational approaches are consistently enhanced to cater to changing needs, thereby establishing a more efficient and adaptable dental education framework.

FGDs offer many advantages and support educators in capturing the distinctive perspectives of dental students throughout their academic journey [4, 5]. Apart from facilitating a deeper insight into students' inclinations and educational requirements, students can collectively contribute ideas on how modifications or advancements could enhance their learning processes and mental well-being, providing educators with practical guidance for curriculum development and instructional practices. FGDs are extensively utilized in developmental initiatives and social sciences, convening individuals with relevant expertise for a structured dialogue that yields valuable insights into specific subjects. These discussions have emerged as cost-efficient and promising options for gathering qualitative data, bridging the realms of scientific enquiry and local wisdom in participatory research [5].

Therefore, this study aimed to investigate the learning needs of dental students, focusing on academic performance and stress levels among undergraduate students at the Faculty of Dentistry, Universiti Malaya. Within this study's scope, FGDs can serve as a platform for students to offer input on instructional strategies and curriculum structures. Direct feedback from students can be invaluable in shaping forthcoming educational approaches to improve their needs. Furthermore, the cultivation of soft skills, such as communication, teamwork, and leadership, is significant. FGDs offer profound insights into student requirements, which can be utilized to formulate effective educational strategies.

Methodology

Ethical approval was obtained from the Medical Ethics Committee of the Faculty of Dentistry, Universiti Malaya (Ref No: DF DO1801/0036 (L)). The primary research

method in this study was FGDs, which aimed to identify learning issues related to academic performance and stress among dental undergraduates.

A purposive sampling technique was employed, in which participants were recruited via institutional email invitations to all dental undergraduates enrolled in clinical years (Years 3–5) at the Faculty of Dentistry, Universiti Malaya. Inclusion criteria required students to be currently undertaking clinical training and willing to participate voluntarily. Those who expressed interest completed an informed consent form through a secure online platform (Google Forms). A total of thirty students were purposively selected and stratified into three focus groups, each comprising ten participants, to ensure balanced representation across academic years and promote open, structured discussion. These arrangements created an environment where students could comfortably share their opinions while ensuring methodological rigor through structured facilitation, triangulation of perspectives, and systematic analysis, thereby contributing meaningfully to dental students' learning needs assessments [6]. Simultaneously, it aimed to gather a broad spectrum of insights reflecting the distinct perspectives and issues relevant to each stage of their academic journey, capture diverse viewpoints and provide comprehensive information on the learning needs of dental students.

The FGD topic was based on an extensive literature review and focused on identifying gaps and enriching the comprehension of previous studies on learning challenges, academic performance, and stress among dental students. Two dental experts and a psychologist subjected the discussion guide to content and face validation before initiating FGD sessions (Table 1).

FGDs were conducted during the COVID-19 pandemic in March and April 2020. Therefore, three FGDs were conducted virtually, each involving ten students. The main researcher and an observer oversaw the sessions, which were digitally recorded to capture the depth of the discussions.

In addition to transcribed FGD data, observational field notes were systematically extracted from recorded online video sessions. These field notes captured non-verbal behaviors, response delays, digital engagement patterns, and interaction dynamics that were not explicitly verbalized in transcripts. Observations included variations in facial expressions, gaze direction, speech patterns (e.g., pauses, hesitations) and online camera engagement. This approach provided an additional layer of analysis to triangulate verbal responses with digital behavioral indicators, enhancing the credibility and depth of thematic interpretations.

The duration of each FGD session ranged from 90 to 120 min (about 2 h), following a standardized procedure and sequence outlined in the discussion guide. Prior to each session, participants were briefed on digital etiquette, including muting microphones when not speaking and keeping cameras on to support observational analysis. The ground rules emphasized confidentiality, respectful engagement, and active participation to foster a safe and productive virtual environment. Each query was deliberated until data saturation was reached before proceeding with the subsequent question [6].

A thematic analysis with a codebook and deductive orientation was carried out in order to ensure methodological rigor when analyzing the data from the focus group discussions (FGD). This approach is particularly suited to applied health research where consistency of coding across multiple transcripts is critical, primarily when based on established theoretical frameworks or predetermined research objectives [7, 8]. The analysis began with the development of an initial codebook, which was deductively derived from the study's conceptual

Table 1 FGD topic guide for learning issues related to academic achievement and stress levels in terms of students' needs

Domain	Leading questions: Give your opinion or feedback on current dental teaching and learning regarding students' learning needs.	Probing questions must include (students' expectations, problems faced, suggestions for improvement)
Motivation related to learning	1. Are you proud to be a dental student? 2. How do you rate your motivation level pre-clinical and clinical years? (Only for clinical students) 3. What type of student are you?	1. Compared to medical students. 2. Have you become an average student? 3. Showing pictures of students during lectures, sleeping, looking at their own handphones, talking to each other, etc.
Teaching Methods and Content.	1. Do you think the current teaching method is acceptable for the students? 2. Is the content adequate? 3. Do you have any suggestions for improvement?	1. Explain the weaknesses and strengths of current teaching methods, etc. 2. What do you feel about CBR, PBL, Seminar, Fieldwork, etc?
Learning Environment	1. What do you think of the allotted time for teaching/learning and other activities in the faculty?	1. Were the learning resources sufficiently provided? 2. Opinions about the lecturers and supporting staff 3. Allocation of learning and clinical times 4. Students' timetable.
Academic performance	1. How do you rate your academic performance? 2. How do you rate your clinical skills?	1. General opinion on overall performance, problem-solving, and clinical skills.
Conclusion	Are there any other questions related to the discussions? Summary of the FGD	

framework, enabling the identification of key constructs such as motivation to learn, teaching methods and content, learning environment, and academic performance. To maintain analytical consistency and transparency, two researchers independently applied the codebook to a subset of the transcripts, refining the operational definitions and resolving discrepancies through iterative discussions until consensus was reached. The final codebook was then systematically applied to the entire dataset, followed by thematic refinement through axial coding to identify relationships between codes and condense them into coherent themes [8]. This deductive codebook approach improved analytical reliability while maintaining theoretical fidelity, making it particularly suitable for the structured datasets generated. In addition, a detailed audit trail was created that documented coding decisions and theme development to ensure confirmability and transferability [9] thus maintaining the criteria for trustworthiness in qualitative health research.

Findings

Demographics of participants

Table 2 shows the demographic profiles of the dental undergraduate participants. Two-thirds of the participants were female, and more than 50% identified as Malay. The recruitment process was meticulously designed to achieve an equal gender distribution and to mirror Malaysia's ethnic composition: approximately 50% Malay, 23% Chinese, 10% Indigenous Bumiputera, and 6.7% Indian. This diverse demographic representation ensures a comprehensive understanding of students' perspectives.

Group A, B, and C insights were analysed to identify commonalities and variations across clinical year students. Data triangulation was employed by integrating FGD transcripts with field notes to ensure rigor and credibility.

Table 2 Demographic profile of FGD participants

Variable	Number of Participants *n* (%)
Gender	
Male	12 (40%)
Female	18 (60%)
Ethnicity	
Malay	16 (53.3%)
Chinese	9 (30%)
Bumiputera (Borneo)	3 (10%)
Indian	2 (6.7%)
Year of study	
Year 3	10 (33.3%)
Year 4	10 (33.3%)
Year 5	10 (33.3%)

Thematic analysis from focus group discussions

The themes were analyzed for each FGD group and compared until data saturation was achieved. This approach was purposefully selected to capture dental students' unique educational and personal obstacles at each phase of their education. Drawing from the FGD results, each academic year introduced fresh complexities in academic coursework [10] and practical training, significantly impacting students' stress levels, motivation, and specific learning requirements.

Theme 1: navigating towards transition phase

The shift from pre-clinical to clinical learning was a significant challenge for the junior clinical year students across all groups. The transition required adjusting to higher expectations, greater responsibility, and a more independent learning environment. The FGD reflected that many students initially felt overwhelmed by the workload and the expectation to perform at a high standard.

> *"The schedules are packed, and the lecturers expect us to perform like final-year students."*

However, most of them voiced that a lack of structured guidance contributed to feelings of confusion and insecurity.

> *"There are no clear protocols to follow, and we often feel lost."*

Most students described increasing engagement and motivation to learn as they progressed, but stress levels remained high due to growing clinical expectations.

> *"I enjoy clinical years much more than pre-clinical, but I also feel a lot more pressure to perform well."*

Students grew more confident as they progressed into the later clinical years, yet external pressures and feedback from the lecturers occasionally distracted them.

> *"Lecturers keep correcting my work, and over time, it makes me question my abilities."*

Of course, the everyday worries were fear of failure and peer comparisons, which were commonly cited stressors.

> *"I don't want to repeat the year; I worry about failing all the time."*

Theme 2: what drives and challenges student motivation?

From FGD group A, B,C, it is shown that motivation was shaped by personal aspirations, family support, faculty

support, and self-confidence. For example, the key factors sustaining motivation are reckoned below.

- Personal growth

"Each year presents new challenges, but I can see my knowledge and confidence improving."

- Family support

"My parents are my greatest source of motivation."

- Encouraging faculty and staff

"Supportive lecturers and staff make a significant difference in keeping me motivated."

Whilst factors undermining motivation were identified as having.

- lack of constructive feedback from lecturers

"We receive criticism, but without clear guidance on how to improve."

- self-doubt

"I often feel like I'm falling behind compared to my classmates."

- pressure to perform

"Early in my training, I was highly motivated, but constant corrections in the clinic have led me to question my abilities."

Theme 3: learning preferences and teaching approaches

Student participants from all groups similarly and consistently emphasized the need for structured learning, interactive teaching methods, and a balance between theory and practice.

It was shown that interactive and clinical-based learning was widely preferred over passive theoretical instruction. At the same time, the students frequently emphasized the need for more interactive and creative teaching.

"We need more interactive and clinical-based lectures."
"Lecturers should find ways to make sessions more engaging."

The students felt that small-group discussions and case-based learning (CBL) helped them grasp complex concepts.

"Case-based learning helps me understand things better."

The students still appreciated traditional teaching methods but valued recorded lectures for revision and reinforcement.

"Being able to rewatch lectures online is really helpful for revision."

However, they expressed challenges due to the limited close supervision in clinical settings, which they believe made learning difficult.

"Supervisors have too many students at once; I feel like I don't get enough guidance."

Theme 4: stress and academic performance

The FGD revealed that stress is closely related to academic performance, with students from all groups reporting excessive workload, unclear expectations, and performance anxiety significantly affecting their ability to excel academically. At the same time, FGD findings highlighted that key factors such as academic stress, instructional strategies, and overall learning experiences were crucial in shaping students' academic performance. Heavy workloads and fear of failure emerged as dominant stressors, contributing to anxiety, reduced motivation, and challenges in information retention.

"Too many tests are scattered throughout the weeks, making it hard to focus on studying."

These stressors were often linked to adverse learning incidents, particularly when teaching methods were not aligned with students' preferred learning styles. Interactive learning approaches, clear guidelines, and timely instructor feedback were emphasized as critical to optimizing students' academic success.

"I constantly compare myself to others, making me doubt my abilities."

"I have gained more confidence throughout the years. To improve, we can have reflective sessions for lessons and clinics."

The FGD clearly shows that aligning instructional strategies with students' learning preferences was crucial for promoting positive learning experiences, increased engagement, and improved academic performance. Integrating psychological and pedagogical considerations into the educational approach was recognized as key to enhancing academic achievement and reducing stress levels.

Table 3 Online video-based field notes findings

Thematic category	Field notes observations (Online FGD)
Navigating the Transition to Clinical Training	- extended silence at first, muted microphones, and gaze aversion at the start of the session indicated discomfort, uncertainty and reluctance to share struggles. - engagement increased when peers validated each other's experiences, leading to more active unmuting and verbal affirmations. - mentorship discussions triggered stronger engagement, with students leaning forward and using more expressive gestures.
What Drives and Challenges Student Motivation?	- some students maintained eye contact with the online camera and gestured while speaking, while others avoided the camera, and leaned back. - obvious frustration surfaced through non-verbal cues (eye rolls, long paused, sighs) when discussing inconsistent feedback and grading subjectivity. - when discussing supportive faculty, students leaned closer to cameras, smiled, and spoke with greater confidence, suggesting the support impacts motivation**.
Learning preferences and teaching approaches	- the highest engagement was observed in CBL/PBL discussions, with students volunteering to speak and overlapping speech. Lecture-based learning prompted disengagement: Students remained silent, less engaged, or passively scrolled through the platform**. - placing their palm on their faces were observed, showing bored expression in passive learning formats. -the recorded video content received positive reactions, with students nodding and unmuting in agreement. -Students smiled, nodded, and leaned forward during interactive discussions, showing signs of enthusiasm and increased confidence.
Stress and academic performance	- students displayed clear signs of cognitive fatigue: frequent sighing, rubbing temples, and camera disengagement when discussing workload and assessments. - long pauses and nervous laughter were observed when discussing failure, indicating underlying anxiety.

Findings from field notes

Field notes from recorded online FGDs were analyzed to capture non-verbal cues, engagement shifts, and digital interaction patterns. These observations provided a deeper understanding of student experiences, particularly their cognitive and emotional responses to learning challenges. While some signs of disengagement were observed during passive learning sessions, students also demonstrated positive non-verbal cues during interactive activities. These included smiling, nodding, maintaining eye contact, and enthusiastic verbal participation, especially during case-based discussions. These behaviors suggest enthusiasm and cognitive engagement when learning aligned with their preferences [11, 12]. Table 3 summarizes key behavioral patterns throughout the main discussion of the FGD.

Findings from FGD triangulation

Using online FGD transcripts and video-based field notes provided a comprehensive understanding of student engagement, learning challenges, and instructional effectiveness. While students openly discussed clinical transition difficulties, motivation, and assessment-related stress, their non-verbal behaviors and digital engagement patterns revealed underlying emotions such as hesitation, frustration, and cognitive fatigue. Although students preferred interactive learning, video observations showed that engagement peaked during case-based discussions, resultant in the need for more active learning strategies [13]. Similarly, students verbalized concerns about inconsistent assessments, but physical cues such as sighing, prolonged pauses, and abrupt muting during these discussions indicated more profound frustration and anxiety than was explicitly stated. Table 4 below summarizes the triangulated findings, comparing verbalized concerns, observed digital engagement behaviors, and key takeaways for improving instructional strategies in online dental education.

Proposed frameworks form the FGD key findings

Figure 1 illustrates the relationship between academic stress, teaching methods (instructional strategies), learning experiences, and academic performance, supporting the thematic analysis and reinforcing findings from triangulated data. The diagram highlights how high workload and fear of failure contribute to adverse learning experiences, especially when instructional strategies do not align with students' learning preferences. This mismatch increases stress and hinders academic performance.

Conversely, when instructional strategies match student learning preferences (e.g., interactive learning, structured educator feedback, and clear procedural guidance), the learning environment improves, leading to better engagement, confidence, and enhanced academic

Table 4 Triangulated findings in dental education practices

Theme	FGD (Verbal Responses)	Field Notes (Non-Verbal & Digital Cues)	Triangulated Insights
Navigating the Transition to Clinical Training	Students verbally expressed uncertainty and lack of preparedness, emphasizing the need for structured guidance.	Hesitation in unmuting, gaze aversion, and minimal initial engagement indicated discomfort in openly discussing struggles.	Students feel isolated in their struggles but gain confidence when peers validate their experiences. Active facilitation can encourage participation.
Motivation & Feedback	Inconsistent faculty feedback was a significant demotivator, while supportive faculty increased engagement and resilience.	Frustration surfaced during assessment discussions through sudden pauses, sighs, and disengagement. Smiling and confident speech increased when discussing supportive faculty.	Assessment inconsistencies are a significant stressor. Faculty mentorship plays a crucial role in motivation. Clear grading criteria and structured feedback are needed.
Learning Preferences & Teaching Approaches	Students strongly preferred CBL, PBL over passive lectures.	Peak engagement (leaning forward, expressive gestures, animated chat use) occurred in CBL discussions, while lecture-based learning led to less engagement and short discussions.	Interactive learning promotes deep engagement, evidenced by active gestures and verbal affirmations, while traditional lectures often led to passive or distracted behaviors. A hybrid model combining structured teaching with interactive elements is preferred.
Stress & Academic Performance	Students cited unclear expectations and fear of failure as significant stressors, beyond just workload.	Eye rubbing, prolonged pauses, nervous laughter, and camera disengagement occurred when discussing assessments. Engagement increased during suggestion of solution-focused discussions.	Students experience a high cognitive load related to unpredictable assessments. Transparent grading and structured workload distribution could alleviate stress.

performance [13]. The figure highlights the necessity of balanced structured guidance with active learning approaches and a student-centred educational approach to minimize stress and optimize learning outcomes in clinical dental education training [11, 12].

Discussion

Findings from FGDs with clinical year dental students

The FGD findings provided valuable insights into the factors significantly impacting dental students' learning journeys and academic accomplishments. The results emphasize the necessity of a well-rounded educational approach that integrates student feedback, stress management, and adaptive teaching strategies.

The development of FGD questions was based on existing literature, stressing the importance of setting up a conducive academic environment that considers students' viewpoints, addresses stress-related concerns, and emphasizes professional and personal growth [2, 4, 14]. Students' feedback revealed a profound awareness of their learning encounters, underscoring the need for adaptive teaching approaches and the continuous enhancement of dental education.

The FGDs with clinical-year dental students provided key insights into four themes: navigation towards the transition phase, their motivations, learning preferences and teaching approaches, stress and academic challenges throughout their academic years.

Navigating towards transition phase

The transition to clinical training emerged as a critical turning point, characterized by emotional hesitance and cognitive strain. Students expressed uncertainty, while nonverbal indicators, such as delayed responses and disengagement from the camera, revealed a more profound discomfort. Peer validation proved instrumental in encouraging participation and highlighted the importance of collective resilience within high-pressure learning environments [15]. This finding is consistent with adult learning theory, which posits that learners thrive in environments that are relevant, emotionally supportive, and socially interactive. This aligns with existing literatures suggesting that structured mentorship programs can mitigate transition anxiety and improve students' clinical confidence [10, 16]. Active facilitation by educators, through reassurance, prompting, and feedback, can further reduce learning anxiety and promote a collaborative, low-stakes environment conducive to professional growth [14].

Motivation

Across all clinical years, personal and familial motivations were the primary drivers of students' educational commitment. Engagement and motivation improved with more profound clinical experience. However, differences in motivation were evident at various stages of training. The students reported significant performance
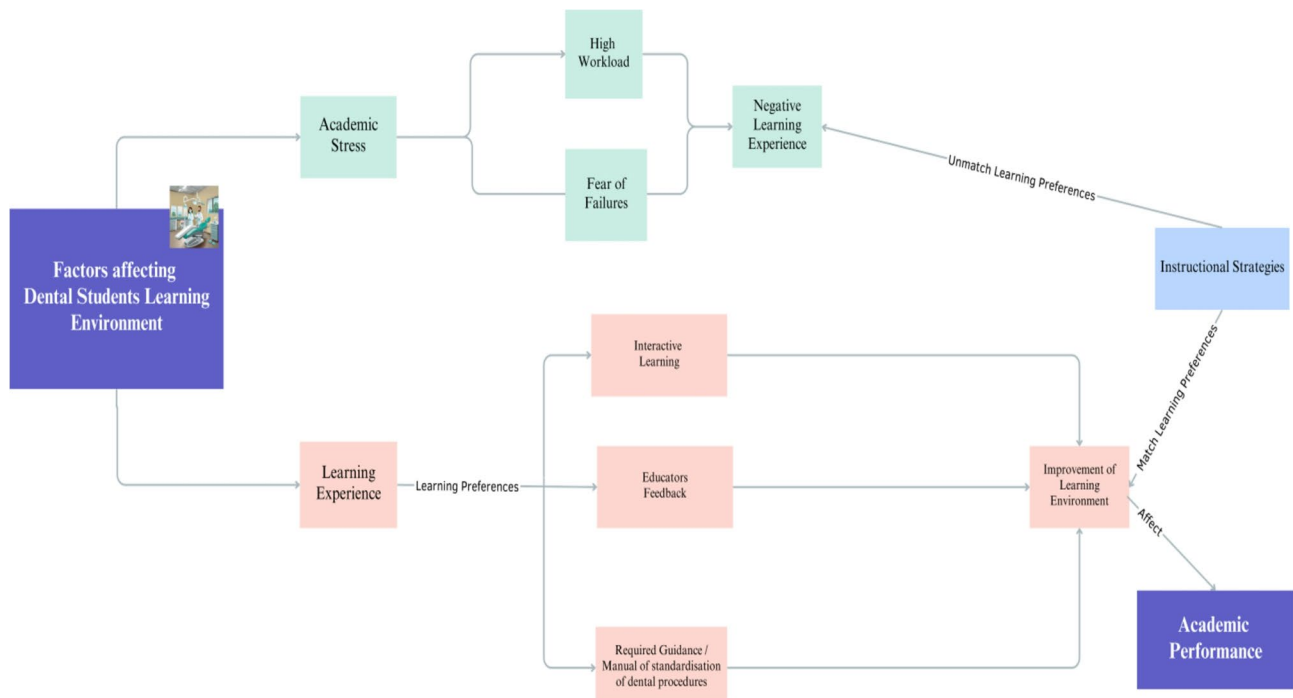
Fig. 1 Outcome of focus group discussions

pressure and a fear of failure during the early stages of clinical years, which impacted their confidence. They also struggled with a lack of clear feedback, further contributing to self-doubt. Peer comparisons heightened stress, particularly during the transition from pre-clinical to clinical training.

FGD field notes revealed more profound frustration through abrupt muting, sighs, and disengagement, particularly during discussions about assessment fairness. Conversely, discussions on supportive faculty interactions increased noticeable engagement, with students smiling, speaking more confidently, and leaning into the conversation. This suggests that faculty mentorship is crucial in sustaining motivation and engagement [11, 16]. Studies have shown that transparent grading rubrics and structured feedback mechanisms significantly enhance student confidence and reduce academic anxiety [14, 17, 18]. Standardized faculty training on constructive feedback and assessment transparency could address these issues effectively.

Notably, students' reflections on growing confidence as they progressed through clinical years indicate the development of self-efficacy. This was evident in their increasing willingness to handle complex procedures and in their recognition of personal growth. These patterns suggest that self-efficacy was reinforced through supportive supervision, progressive clinical exposure, and peer validation. Research indicates that self-efficacy plays a crucial role in sustaining motivation and academic engagement, particularly in high-stakes clinical environments [13].

Teaching methods

All clinical year students who participated in this study strongly preferred interactive and engaging learning experiences, particularly CBL, PBL and small-group discussions, which they found closely aligned with clinical practice [11, 12]. However, learning preferences varied by stage of training. Early clinical students favored structured, recorded lectures for revision, as they found transitioning to clinical learning overwhelming. Mid-clinical students valued small group learning but required more supervision to navigate clinical procedures effectively. Triangulation findings supported this preference, as engagement levels peaked during interactive discussions, where students leaned forward, used animated speech, and participated actively. In contrast, lecture-based learning resulted in visible disengagement, with students slouching, passively scrolling, or even yawning. These findings align with prior research indicating that active learning strategies improve knowledge retention, critical thinking, and clinical decision-making skills [11, 16]. A hybrid model that integrates structured lectures, active case-based discussions, and self-paced learning materials could better meet students' learning needs.

Stress and academic performance

Academic stress was shaped not only by heavy workload but also surrounding assessment practices [19]. Student responses conveyed apprehension, while observational notes such as long pauses and nervous laughter revealed deeper psychological strain. These findings highlight the

importance of transparent evaluation systems and targeted psychoeducational support.

Reflective learning was recognized as a valuable tool for improving confidence and academic performance, helping students navigate clinical uncertainties and enhance their learning experiences. This aligns with the principles of resilience theory, which underscores the importance of adaptive coping, self-efficacy, and guided reflection in reducing performance-related anxiety. In parallel, structured time management practices and equitable workload distribution are essential to alleviate student stress while maintaining academic rigor [13, 20]. Institutions play a vital role in mitigating academic stress among dental students. Evidence suggests that clearly defined assessment policies, balanced workload distribution, and accessible mental health services are effective in reducing stress and enhancing overall student well-being [18, 20]. Therefore, it is essential for institutions to implement transparent evaluation frameworks and structured faculty support systems to alleviate pressure during clinical training [16–18]. Research indicates that structured workload distribution, clear assessment policies, and access to mental health resources can significantly reduce academic stress and enhance student well-being [13, 19, 20]Institutions should prioritize transparent assessment guidelines and structured faculty support mechanisms to reduce academic pressure [15, 17, 18].

These findings highlight the need for stage-specific educational strategies that provide structured support for the clinical year students and enhanced clinical-based interactive learning as they progress. Tailoring instructional approaches to these needs can foster more effective learning experiences and better prepare students for professional practice [11, 16, 21].

Comparative FGD findings
The FGD findings showed noticeable differences in confidence, stress management, and academic engagement as the participants progressed through the program. The clinical year dental students face significant stress from high testing frequency and erratic schedules, which disrupt their study routines and affect their ability to absorb materials effectively. These challenges are compounded by the transition from theoretical to more clinical-based learning, leading to stress from heightened expectations and initial exposure to hands-on practices [19–21]. The lack of structured feedback and guidance further exacerbates these problems; thus, it is crucial for academic support and intervention.

FGD findings showed that as the students adapted more to the clinical environment, they continued to experience stress related to increased clinical responsibilities and the complexities of balancing theoretical learning

with hands-on practices. Fears of failure and peer comparisons also peaked this year, reflecting a critical stage in which students solidify their skills and prepare for professional roles. In addition, enhanced problem-solving demands and greater expectations for independence contribute to further stress during pivotal training periods [13, 20, 21].

They also preferred reflective learning practices, demonstrating a mature perspective on continuous improvement and self-assessment. Positive feedback on teaching methods and learning experiences in the final year of study highlights the importance of supportive and effective instructional approaches, which have been crucial in fostering motivation and success [11, 16, 17].

Instructional strategies and motivational drivers
Student preferences for teaching methods and motivational factors reveal a strong alignment with interactive, clinically relevant, and emotionally supportive learning environments. Across all clinical years, students consistently favored case-based learning (CBL), problem-based learning (PBL), and small-group discussions, pedagogical formats that actively foster engagement, critical thinking, and self-confidence [22, 23]. These strategies not only supported content mastery but also reduced cognitive fatigue, as evidenced by higher levels of participation and enthusiasm during interactive sessions [11, 12]. Triangulated observations reinforced these verbal insights. During CBL and PBL discussions, students leaned forward, smiled, and spoke with greater confidence. In contrast, passive lecture formats triggered visible disengagement, including facial fatigue, reduced camera use, and minimal responsiveness. These behavioral indicators suggest that interactive teaching methods are not just preferred, they are essential for sustaining motivation and reducing stress [3, 4].

Students also valued adaptability in learning delivery, such as access to recorded lectures and a separation between clinical and theoretical components. These flexible formats helped them navigate demanding schedules and supported self-paced revision, particularly during early clinical years when the transition to hands-on practice was most overwhelming [1].

The preference for smaller groups and student-centred learning (SCL) reflects maturing educational outlook, with students increasingly seeking mentorship, clarity, and reflective spaces to consolidate learning [2, 17].

Reflective practice, in particular, emerged as a pivotal tool for fostering self-awareness and academic resilience. Students called for its integration into both lessons and clinical training, underscoring the importance of guided self-assessment [24, 25]. A study at Bristol University affirms that reflective practice contributes to long-term

professional development and lifelong learning by enhancing students' ability to evaluate their strengths, manage challenges, and set realistic goals [24].

From a motivational perspective, students cited a combination of intrinsic and extrinsic influences. While personal drive and family support were foundational, the quality of faculty engagement through encouragement, constructive feedback, and consistent expectations significantly shaped their academic outlook [13, 17]. Motivation was most vulnerable during transitions, peer comparisons, and periods of assessment ambiguity, often requiring targeted mental health support and structured feedback mechanisms [19, 20].

The literature supports the premise that instructional alignment with students' learning styles improves comprehension, motivation, and retention [26–28]. Furthermore, pedagogical strategies that promote intrinsic motivations, such as collaborative problem-solving and experiential learning, have been shown to enhance self-efficacy, academic performance, and resilience [13, 18, 29]. Ultimately, a responsive educational framework that combines structured guidance, interactive teaching, and personalized mentorship can elevate both motivation and academic outcomes. Educators contribute to a more confident, competent, and self-directed generation of dental professionals, aligned with broader goals of health equity and quality education by cultivating inclusive and ethically grounded learning environments [5, 15].

Academic performance and stress

Feedback from students across different academic years demonstrated how educational experiences influence academic performance [13, 24]. Curriculum organization, mainly test frequency and scheduling, emerged as a critical factor. Most students reported stress and felt overwhelmed by frequent assessments, which could affect their academic performance. While students cited assessment stress, field notes captured non-verbal cues such as eye rubbing, prolonged pauses, and nervous laughter, suggesting a deeper cognitive load than was explicitly stated [2, 6, 20].

However, as they progress, some demonstrate improved confidence and academic self-assessment, illustrating the potential for long-term growth when supported by an adaptable SCL approach [24, 28]. Consistent with previous research, implementing structured workload distribution, transparent assessment frameworks, and accessible mental health services emerge as a critical strategy for mitigating academic stress and enhancing student well-being. These elements reduce anxiety and create a more supportive and sustainable learning environment for clinical-year dental students [13, 17, 20]. Institutions should prioritize transparent assessment guidelines and structured faculty support mechanisms to alleviate academic pressure [17, 18, 20].

Emphasis of FGD findings

FGDs highlighted the importance of engaging dental students in interactive and reflective learning strategies that align with the principles of SCL. Interactive CBL methods should replace passive lecture-heavy approaches to enhance engagement [11, 23]. This approach has been emphasized as crucial for developing problem-solving abilities, critical thinking skills, and competencies essential in dental education [4, 11, 22, 23].

Students across all academic years preferred interactive methods to enhance engagement and foster deeper understanding. The discussions also emphasized the need for adaptive teaching methods that cater to students' diverse LS by incorporating traditional and digital resources to create a dynamic and flexible learning environment [12, 22, 26]. Reflective practices were highly valued, with students recommending their integration into lessons and clinical practice to promote self-assessment and continuous improvement.

These findings suggest that a supportive and inclusive educational framework that prioritizes student feedback and engagement can significantly enhance academic performance and better prepare students for professional practice [9, 14, 17]. Standardized assessment policies and constructive feedback training for faculty are critical for sustaining motivation [13, 18]. Clear assessment guidelines and structured workload distribution can mitigate student stress and improve academic outcomes [13, 19, 20].

Figure 1 further reinforces these findings, illustrating how stress, learning strategies, and instructional methods impact academic performance. Aligning instructional strategies with student needs increases motivation, reduces stress, and optimizes academic outcomes, reinforcing the importance of a student-centred, well-structured dental education curriculum [13, 26, 27]. These findings resonate with the United Nations Sustainable Development Goals (SDGs), particularly SDG 3: good health and well-being, which emphasizes mental health support, and SDG 4: quality education, which promotes exploration of equitable, inclusive, and effective teaching strategies [11, 20, 22].

Limitations

This study has several limitations that should be considered when interpreting the findings. it involved clinical-year dental students from a single institution, which may limit the generalizability of the findings. Social desirability bias may have influenced self-reported data, affecting response authenticity. Although triangulation

with field notes and digital engagement added depth, these observations were subject to researcher interpretation and potential bias. Future research should consider multi-institutional samples, longitudinal designs, and mixed method approaches to enhance validity and generalizability.

Conclusion

FGDs with clinical year dental students revealed critical insights into their educational experiences, stressors and learning preferences. Integrating these findings into dental curricula can enhance educational frameworks by making them more inclusive, responsive and student-centred. By addressing diverse learning needs and prioritizing feedback-driven instructional strategies, institutions can improve academic performance and well-being. Structured mentorship, transparent assessment, and active learning approaches will better prepare students for 21st-century challenges, cultivating confident and competent dental professionals.

Abbreviations

FGDs	Focus Group Discussions
SCL	Student-centred learning
LS	Learning style
CBL	Case-based learning
PBL	Problem-based learning

Authors' contributions
Study design and methodology: LAS, RH, SHS, NI. Qualitative analysis: LAS, MMR. Framework: LAS, RH, SHS. Original draft preparation: LAS, RH, SHS. Manuscript review and editing: LAS, RH, SHS, NI, MMR. Research administration: LAS, SHS. All authors read and approved the final manuscript.

Data availability
The raw data are not publicly available in order to protect participant confidentiality in accordance with the Malaysian Personal Data Protection Act 2010 (PDPA).

Declarations

Ethics approval and consent to participate
Ethics approval for this study was obtained from the Medical Ethics Committee, Faculty of Dentistry, Universiti Malaya DF CD2117/0050/2174(L).

Consent for publication
Online Informed written consent for participation in the study and publication of the data for research and educational purposes were obtained from all student participants of the Faculty of Dentistry, Universiti Malaya.

Competing interests
The authors declare no competing interests.

Clinical trial number
Not applicable.

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