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Professional knowledge acquisition of dental students employed part-time as dental assistants

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Abstract

Introduction: Whilst admission to dental school in many jurisdictions requires applicants to shadow dentists or undertake work experience at a dental practice, little is known about the impacts on professional learning when dental students work part-time as dental assistants whilst concurrently studying dentistry. This paper explores what, how and from whom dental students who work as dental assistants acquire professional knowledges during employment.

Methods: This study draws on a qualitative analysis of interviews with sixteen senior dental students who have extra-curricular part-time employment as dental assistants in private dental practices.

Results: Analysis produced four themes that relate to students learning in the professional environment: students learn about the responsibilities, rhythms and routines of practice, as well as patient communication and interactions. Students embedded in the dental team noticed and related to the dispositions and the work of dentistry. Students learned from all members of the dental team including clinical and non-clinical staff (reception, administration, laboratory and sterilisation).

Discussion: Students used their experiences in a practice setting to further their professional education. The ability to "read" a situation and formulate an appropriate response requires the integration of complex and actionable professional knowledges.

Conclusion: This research study presents insight into the ways dental students employed as dental assistants are embedded in and learn from the dental team in a critically evaluative manner. Students professionally notice and make sense of complex practice environments whilst undertaking university studies to learn about practice routines, rhythms and responsibilities as well as advancing confidence in relating with patients. This study provides a stimulus for further research about the contribution of workplace experiences to dental education.

KEYWORDS
dental assistant, dental education, dental practice, dental student, professional knowledge, professional noticing

1 | INTRODUCTION

Many dental schools require that applicants give evidence of shadowing or work experience with a dentist or at a dental practice.[1] Such criteria place value on the display of a commitment to dentistry and an expectation that applicants gain an understanding of the nature of the work involved in dental practice. Key non-cognitive skills that applicants may gain through these experiences are of interest to dental schools and their admission strategies.[2] Once admitted to dental school, some students work in paid part-time employment in a dental practice extra-curricularly to their dental studies. Very little is known about the extent of this practice and the impacts for students who engage in this kind of work. Previously published literature gives some preliminary indications, but many gaps in understanding remain. A study of dental students in the Netherlands found that 25% of dental students worked about eight hours per week in a dental practice.[3] No association between prior dental assisting and performance in pre-clinical/clinical assessments was found in a study of Harvard School of Dental Medicine graduates.[4] Dental assisting, however, involves working in a practice setting and encompasses teamwork, patient management skills, clinical skills application and practising occupational health and safety procedures. Thus, it could provide practise in workplace activities where students learn about roles, expectations and responsibilities of their profession along with workplace cultures.[5]

In other disciplinary fields, literature has shown a positive connection between professional experience in workplaces during university study and learning outcomes. For instance, improved critical thinking skills, communication skills and teamwork ability were identified as potential benefits for students undertaking internships whilst studying business.[6–8] Career self-management and self-awareness are also outcomes of workplace learning that can facilitate successful entry into the professional labour market.[9,10] Despite the research about outcomes, there has been less research focussed on the processes students use to learn in the workplace.

Our orientation towards researching students who work as dental assistants during dental school is informed by Rooney and Boud's (2019) pedagogy of professional noticing[11] and Markauskaite and Goodyear's (2017) characterisation of the types of professional actionable knowledge.[12] Noticing is an essential skill that supports professional practice, and the capacity for noticing enables an experienced professional to "read" situations and make informed decisions. Rooney and Boud trace the relation between noticing and professional learning to indicate it is intentional,[13] can be learned and promotes learning in practice contexts. Markauskaite and Goodyear identify the actionable knowledges students need to learn, integrate and coordinate for professional practice. They are: conceptual, problem-solving, somatic and social knowledges and knowledge of the material environment.[11] Conceptual knowledge is a theoretically justified foundation that allows a professional to engage in practical problem-solving from situation to situation. Formulating and carrying out effective actions relies on knowledge of social relationships and the material arrangements of the physical location. Somatic knowledges provide a mechanism to sense and respond bodily with sensorimotor skills and interactions. Both these framings are helpful for considering how students' professional learning may be oriented as they work as a dental assistant and will be used within the data analysis.

2 | RESEARCH QUESTION

Work in professional settings can afford but does not ensure authentic learning experiences. Based on students' experiences of working in paid employment as dental assistants extra-curricularly to, but concurrently with, their dental programme, this study aimed to examine how dental assisting experience contributes to their professional learning. Specifically, the research question is: What, how and from whom do students who work as part-time dental assistants in dental practices acquire professional knowledges in the workplace?

3 | METHODS

A qualitative research approach was adopted since the study explored students' experiences and constructions; that is, it sought to understand participants' social meanings in relation to their work as a dental assistant. Ethics approval for the study was obtained from the University of Sydney Human Ethics Committee—Project Number: 2018/204.

3.1 | Participants

In August 2018, any student who was enrolled in the four-year Doctor of Dental Medicine (DMD) postgraduate course at The University of Sydney and employed as a part-time dental assistant was invited to participate in the research study through an email invitation from an administrator to the entire DMD student cohort. The inclusion criteria included six months or more of consecutive dental assistant work. To recognise the multi-faceted roles that a dental assistant can perform, a broad definition of dental assisting was applied to include roles such as chairside assisting with a dentist, chairside assisting with a dental therapist/hygienist, dental receptionist, laboratory technician, practice manager and sterilisation/scrub nurse. Interested students contacted one of the student researchers (PL, KT, HM and AP) and were provided with a participant information statement about the research study. Sixteen students provided verbal and written consent to be interviewed.

3.2 | Data gathering

Demographic data about the participating students were collected. Semi-structured interviews provide flexibility for probing follow-on

questions to be asked of participants according to their initial responses. Thus, semi-structured, in-person interviews were conducted to allow the interview to unfold according to the participant responses. An interview question guide was formulated to encourage participants to think about motivations and provide examples of their experience so that avenues for exploration were opened up. The interview guide included questions to prompt the participants to give accounts of their dental assistant roles and responsibilities as well as consider the dental team and patient interactions. Excerpts of the interview guide feature in Figure 1. There were four interviewers in total (PL, KT, HM and AP), and two interviewers conducted each interview. Interviews lasted from 20 to 40 min, depending on the length of the participant's responses. They were audio recorded and then transcribed verbatim to facilitate data analysis.

4 | DATA ANALYSIS

Interview transcripts were analysed using thematic analysis[14] to map the range, nature and dynamics of phenomena. The first phase of analysis involved a systematic process of familiarisation, coding, charting and sorting data according to the research question: What are the students learning, how are they learning it and from whom are they learning? The researchers independently became familiar with the data collected by initially reading the interview transcripts to gain an overview of the data and note down initial codes and recurrent themes that were important to participants themselves. For example, the code of "hectic, go, go pace" was used when participants reflected on the relentless nature of the workplace and workday. Other initial codes about what students are learning included: communication tactics, dental teamwork and centrality of sterilisation. Second, we used the pedagogy of professional noticing[11] and professional actionable knowledge[12] as theoretical lenses to interpret the data.[15] This strategy facilitated interpretation of the orientations and infrastructure of professional learning in the dental practice context. The research group met three times with the aim of combining codes into themes. We compared the independent preliminary analysis and selected data extracts to further define the themes as they relate to the research question.

4.1 | Findings

Demographic information about the participants is presented in Table 1. Students currently enrolled in the senior two years of the course, DMD3 and DMD4, participated. Males constituted 31% of the group and females 69%; and the students worked in a mixture of dental practices, such as single-chair and multi-chair private practices, in both owner-operated and corporate-owned dental practices. Analysis of the transcript data produced two themes that relate to what students are learning from the professional environment: responsibilities, rhythms and routines of practice; and patient communication and interactions. The third theme relates to how students are learning: noticing dispositions of practitioners and the work of dentistry. The fourth theme identifies that students were learning from all members of the dental team in the practice. These themes are presented below in narrative form, and Table 2 demonstrates themes along with a brief description of each and indicative data extracts.

4.1.1 | Responsibilities, routines and rhythms of the practice

This theme identifies that the students learned about the machinations of the practice environment. Overwhelmingly, the dental students who worked as dental assistants were motivated to learn from the practice environment as an adjunct to their formal dental course: "shows you what's out there after you graduate" (student 11) and "a dental assisting job has a direct peek into your future career" (student 15). Immersion into the practice setting established a mechanism for the students to come to know expectations, standards and responsibilities. The centrality of the infection prevention and sterilisation protocols, the rhythms of the surgery set-up and pack up each day and for each patient appointment was detailed unanimously. It was described as "tedious but needs to the done" (student 1). The busy and hectic, go, go, go, pace, was physically demanding: "It's definitely a physically tiring job. It's patient after patient, cleaning, doing this and that and maintaining infection control the whole time" (student 15). When running behind schedule, the pace felt more pressured, but brought out responses in the team such as: "to keep calm and keep pushing and powering through" (student 2). Sometimes the dental practice would be running over time: "I don't get much lunch often. Saturdays are busy like you couldn't believe. Someone will come in, say an emergency patient, you don't turn them away, so you see them. I'm happy to work through it, we all work through it, we're in it together so it's alright" (student 13). Thus, the students experienced how the social contract of dentistry and professional values practically function

Could you briefly describe your dental assistant role? What are your responsibilities? What is your typical day at work like?
Could you describe a memorable experience at work? What made it memorable?
Is there anything that you have learned about dentistry by working as a dental assistant?
Has working as a dental assistant influenced your understanding of dentist and dental assistant roles in the clinic? Give an explanation
Is there anything that you have learned about dentistry by working as a dental assistant that has surprised you?
What motivated you to find a dental assistant job while you are studying dentistry?
Would you recommend other dental students obtain a dental assistant job? Why/why not?

FIGURE 1 Excerpts from interview guide

TABLE 1 Participant profile

Student	Year of study	Male/Female	Practice type	Years employed
1	DMD4	Female	Multi-chair, private	1.5
2	DMD4	Female	Single chair, private	1
3	DMD4	Male	Multi-chair, private	3
4	DMD3	Female	Multi-chair, private	1
5	DMD4	Female	Multi-chair, private	11
6	DMD4	Female	Single chair, private	1
7	DMD4	Female	Multi-chair, private	2
8	DMD3	Female	Single chair, private	2
9	DMD4	Female	Multi-chair, private	0.5
10	DMD3	Female	Multi-chair, private	0.75
11	DMD4	Male	Corporate	2.5
12	DMD4	Male	Corporate	1
13	DMD4	Male	Single chair, private	3
14	DMD4	Male	Multi-chair, private	5
15	DMD4	Female	Multi-chair, private	1.5
16	DMD4	Female	Single chair, private	1

because they were embodied in the routines and rhythms of the dental practices at which students worked.

It was not only when running late that teamwork was noted. Teamwork was recognised as essential to keep the practice going: Actions like: "I might duck out to do some sterilisation" (student 13) and "When the receptionist was stepping out to lunch I would help at the front desk" (student 11) demonstrate the staff "work(ing) in harmony "(student 6). One student observed that the practice was tight knit: "It surprised me how much of a family the practice becomes" (student 9). Students came to understand and appreciate the roles of the various members of the dental team, including assistants, hygienists, principal and associate dentists. Of note was a strong realisation of the valuable role that skilful assistants play in the smooth running of the clinic (students 3, 5, 9, 10).

Various aspects of the practice management and daily tasks, such as interacting with the laboratory, contacting other practitioners, taking payments, insurance processes and efficient use of resources were observed: "I've learnt to portion how much I'm going to use something because you have to buy all this material and it's so expensive" (student 16). One student summed up: "You just learn how money works in the practice" (student 12).

4.1.2 | Patient communication and interactions

This theme demonstrates that students advanced their appreciation of the importance of skilful communication and supportive patient interactions to dental practice since the sentiment was expressed in most interviews: "You just realise ..... The main thing is just patient management. You learn to prevent things from happening" (student 14). The students discerned tactics, expressions and intentions the dentists and other staff used in building and maintaining relationships, expressing that everyone in the dental practice from reception to the assistants plays an important role in shaping the practice environment for patients: "He puts importance on connecting with the patient, making sure they are comfortable.... And I have taken that on myself" (student 8). They understood how patient experience was important for business, as "word of mouth travels very quickly" (student 12). A mechanism for patients to share grievances and telephoning patients to follow up after procedures were two strategies that students associated with positive patient relationships.

The dental students employed as dental assistants reported an increasing comfort in interactions with patients: "The more you are around patients, the more comfortable you are with your own patients" (student 9). By being in the practice environment, students built skills in getting to know people quickly, gaining connection and building rapport: "You know how to talk to people; you know how to calm them down for procedures. You just really know how to empathise with them. I feel more comfortable just making conversations with people" (student 16).

Students reported developing general conversation skills and specific skills in finding an appropriate communication strategy such as when deciding how to approach young children, how to relax anxious patients and when it may be better to communicate in a serious or a light-hearted manner. One student came to the realisation that "for some patients, the less you say the better" (student 3). Another talked about caring for "anxious patients a lot better now, considering now that I've had to assist a bunch of them. I can pick up on certain cues when they're terrified and how best to manage that" (student 13).

Other facets of communication that the students reported included learning to conduct interviews, explain findings and treatment plans and give oral hygiene instruction by listening to the dentist, or other practitioner (e.g. dental hygienist) during a patient appointment. They picked up aspects such as tone, terms and

TABLE 2 Themes with indicative data extracts

Professional learning	Theme	Description of theme	Indicative extracts
What?	Routines, rhythms and responsibilities of practice	Comments demonstrated students learned about the hectic pace and value of a tight-knit team to keep pushing ahead throughout the day. Rhythms centred around the material environment, sterilisation, set-up, pack up, equipment and business processes. Ways to interact with the laboratory, practice management strategies and billing skills were mentioned by students.	"It's patient after patient, cleaning, doing this and that and maintaining infection control the whole time" (student 15) "I don't get much lunch often. Saturdays are busy like you couldn't believe. Someone will come in, say an emergency patient, you don't turn them away so you see them. I'm happy to work through it, we all work through it, we're in it together so its alright" (student 13) "It surprised me how much of a family the practice becomes" (student 9) "I'm careful not to waste material because they cost money" (student 6)
	Patient communication and interactions	Comments reflected the variety of ways students' interactions with patients in the practice setting advanced their own confidence and repertoire of patient management and communication strategies. Students appreciated the importance of patient relationships to the practice and the need to build rapport quickly. Students spoke of learning to appraise a situation to judge the best communication approach and developing skills in explaining things to patients	"Listening to my dentist explain certain dental things to patients in a more casual and friendly way" (student 10) "I just want to be modest or humble with patients. I think it is because you build rapport and you make them comfortable and they actually like coming" (student 16) "There's quite a few dentists I've worked with who are great with talking to patients, so I've learned a lot of communication techniques from these dentists ..... Like explaining treatment..... the oral hygienist explaining perio disease, learning which terms he uses" (student 11)
How?	Noticing dispositions and the work of dentistry	Comments focused on the way students interacted with the material and social environment through noticing and listening. Students were able to discern several dispositions dentists need, such as clear decision making, calmness, perseverance and learning from mistakes. Students compared decision-making and clinical judgments with own thoughts and stances	"All of that is really on the spot, like, making decisions and making judgment calls" (student 10) "main thing is just not to get stressed and show it to your patients" (student 3). "I'm formulating something in my own head while the dentist is explaining treatment and it validates everything I have learnt and felt more ready as a student to move on and graduate 'yes, I belong here, I can do this' "(student 16)
From whom?	Learning from the dental team	Comments provided an understanding of the way not only dentists, but all members of the dental team were influential when it came to learning in the workplace. Dentists and other dental practitioners were eager to teach dental students.	"Regardless of who you are working with, you pick up how they interact with patients, the hygienist, other dentists" (student 1) "They'll ask the patient, you know 'x' is a dental student, is it ok if I talk about your case with her?" (student 15) "the place I used to work at had a practice manager, she was amazing, she was fair to all the staff, the place ran super smoothly" (Student 15)

phrases used: "There's quite a few dentists I've worked with [who] are great with talking to patients, so I've learned a lot of communication techniques from these dentists" (student 11).

4.1.3 | Noticing dispositions and the work of dentistry

This theme explores how students learned from the practice environment in which they were embedded. Students noticed and were attuned to the different ways that different dental practitioners work—the order in which they do procedures, preferences with different instruments and different materials (student 7). Initially, when commencing the dental assisting role, they "learned what was what" (student 13), noticed materials, equipment and protocols associated with procedures and wanted to be more efficient with restorative work. Involvement in multi-step procedures, such as denture construction, over a relatively short time frame helped students understand the clinical sequencing of procedures they were learning at university: "I was doing them the next couple

of days and remembered exactly how to do the protocols" (student 7). Later, as the students were caring for their own patients on student clinics, there was increasing interest in collecting tips and tricks and learning from observing specific techniques, for example, impressions, local anaesthetic technique (student 13) and aspects of dentistry they were not exposed to in university student clinics (student 1).

By noticing and listening, the students recognised several dispositions that dentists need. On-the-spot problem-solving required the dentists to quickly make decisions and judgement calls (student 10). Perseverance was noticed as the way dentists manage a testing situation without giving up halfway through (student 10). Managing clinical procedures and how to deal with complications were identified: "The way she trouble-shoots or the way she manages the patient was something for me to learn" (student 12). Students noticed how the dentist kept calm and appeared self-assured when dealing with varying clinical situations, for example, a difficult extraction or unanticipated complication: "My boss is very confident. She never freaks out about any case she faces" (student 4). Learning from failure was another disposition observed. One of the dentists would show the student cases where things had gone wrong clinically (student 11).

The confidence-building effect for students of positive role models was described: "There are a lot of things I have seen my boss do, so that when I go into the clinic, I've seen him do it all the time, so I just visualise what he does, and it makes me more comfortable" (student 8). Frequent exposure to procedures helped provide reassurance as students performed the procedures for their own patients: "I was nervous at the beginning of third year because of injections. I mean seeing it all the time. It actually builds a little bit of confidence" (student 16).

Students compared the actions and expressions of the dentists they worked with to their own knowledge and decision-making logic: "I'm formulating something in my own head while the dentist is explaining, and it validates everything I have learnt, and I felt more ready as a student to move on and graduate" (student 16). One student talked about contrasting philosophies on treatment approaches: "(He would) restore a lot of abrasion lesions, where I'd be like 'nah'" (student 6). This comment may demonstrate that dental students do not passively accept the practices and approaches used in the workplace but critically evaluate them according to their own education to form their own stances.

4.1.4 | Learning from the dental team

As described in the first theme, the students' understandings of the workings of a dental practice were facilitated by interactions across the material environment, with patients and the whole dental team. The multi-faceted nature of dental assistant roles embedded the students firmly in the dental practice: "we sort of rotate but basically front desk [patient reception], sterilization, and assisting the dentist" (Student 5); "throughout the day, I'll just be chairside assisting and I'll take payments, and I'll welcome patients when they come in at reception, and I'll also pick up the phone" (Student 9).

All students commented that they learnt from the dentists with whom they worked. The dental student status of the participants likely played a role in promoting the learning opportunities. All but one of the students said that the dentists wanted to actively teach them: "Every patient that comes in – she'll tell them I am a dental student and she's teaching me something" (student 7). Thus, as well as a student self-driven learning orientation, the dentists also actively took on a "teacher" role.

For many of the students, there were interactions with other dental practice staff (e.g. practice manager, reception, hygienists and other dental assistants) in which learning occurred; "Reception, you've got to have someone who is quite savvy, really good customer service, knows Hicaps [insurance payments] inside and out, learning to manage the Medicare, chasing up patients" (Student 15). The variation in practitioner roles was noted by students: "sometimes I'd assist them [oral hygienist], and I would see them do an exo on a child" (student 1). Importantly, students were appreciative of the private practice environment and learnings from patients about the economic implications of dental care: "patients aren't able to do 30,000 fillings, implants, bridges, and crowns because of budget issues" (Student 13).

5 | DISCUSSION

"That's really how you learn you know – just watching people" (student 11). Participants in this study demonstrated that the notion of applying theory to practice is an over-simplified expression to describe student professionals learning how to perform their practice in context whilst taking account of the social and material environment. Professional noticing[11] entails noticing in context, a capacity to observe and "read" the emergent situation as it unfolds in an everyday professional context. These students described how they "read" situations, from patient appointments through to managing the practice instrument sterilisation processes, and further were readily able to decide how to act or notice aspects of significance, in routine and unexpected situations.

The students in the study used their dental school education in conjunction with extra-curricular dental assistant experience to advance their learning and notice learning itself.[11] The theoretical knowledge and introductory technical skill set acquired during the first few years of dental school provided a scaffold for dental students to notice professionally and respond in ways aligned to the professional and occupational cultures.[11] Without this foundation, aspects of higher thinking and critical evaluation may not be visible to an assistant. Participants felt a sense of "validation" and "confidence" whilst silently practicing their clinical judgement skills when assisting, re-affirming their own abilities and developing knowledge of the professional culture. There is evidence in this study that the students undertook reflection and critical evaluation. Whilst students may passively imitate workplace experiences when what is

observed through a lack of evaluation and reflection,[16] our finding is consistent with prior research about work-integrated learning,[17] which found that during work placements, students gain a better understanding of the importance of self-directed learning and of evaluation, such that they do not simply accept current practice as the best or only way of doing things.

Participants emphasised the advancement and enhancement of communication skills through working as a dental assistant by the processes of observing dental staff interactions with patients and by directly interacting with patients and trialling aspects with their own patients. Observing the dental practitioner gain rapport, demonstrate compassion and manage conflict as well as have discussions related to treatment options, finance and self-care strategies provided the students insight into the breadth of patient interactions within private practice. Hora and colleagues[18] point out that frequently, communication skills in professional practices are portrayed as simplistic and reductionist, when communication is more appropriately considered to be a complex and multimodal activity bound to certain and recurring professional scenarios. Thus, communication can be viewed as more than a generic skill, but rather a manifestation of the professional cultures and relationships amongst and between patients and members of the dental team.

The activities undertaken by the students can be further illuminated by reference to Markauskaite and Goodyear's (2017) types of professional actionable knowledge.[12] They argue that conceptual and problem-solving knowledge are insufficient on their own because professional practice takes place in a social and material environment. Somatic knowledge, such as perception, sensory and motor skills, is the glue that enables a practitioner to see logistical constraints, adapt to unfolding circumstances whilst drawing on conceptual knowledge, problem-solving knowledge and knowledge of the social arrangements of the practice and of the material setting. To illustrate the professional knowledges at work, we map out the architecture of a student's knowledge, in reference to the comment made by student 13, when they said: "I learned how to deal with anxious patients a lot better now, considering now that I've had to assist a bunch of them. I can pick up on certain cues when they're terrified and how to best manage that." Necessary conceptual knowledge underpinning this situation includes scientific understanding of anxiety states, tacit knowledge of various clinical presentations of anxiety and practical knowledge of various techniques and strategies to manage patients with anxiety. Problem-solving knowledge is displayed through contextual application to each patient situation and developing a plan of action. To act skilfully by interacting with patient and dentist in each situation, social knowledge of the local status hierarchy and navigating relationships is required. The student uses material knowledge to act skilfully by configuring the physical environment of the dental practice and at the chairside to best assist the patient. Finally, somatic knowledge allows the student to act skilfully by utilising motor skills, tone and pace of voice, sensory perception and spatial attentiveness to recognise and react to patient and dentist cues and behaviours that are encountered repeatedly.

Several limitations should be considered when appraising this research study. Generalisation of results is limited due to the single research site and the small and self-selected nature of the sample, which is not representative of the student cohort. Our data are based on interviews with a small number of volunteer dental students who had some particular experiences working in dental practices to share. The small number of participants means that the thematic analysis is contextually related to this group of student's unique experience, and thus not generalisable. The participants lacked heterogeneity of their stage in learning as only senior students (final two years of the four-year DMD course) participated. On the contrary, this cohort is an important group to assess professional learning in a practice setting, as they have learnt fundamental dental concepts and their clinical application. Thus, dental assisting experiences would be expected to provide further consolidation of knowledge and skills. Future research to address the study limitations could include a survey of an entire student body to understand the scale of the participation of current dental students in dental assisting work. A multi-university study or a study of recently graduated dentists could provide additional perspectives on the gains in professional knowledge and outcomes for students who work as dental assistants in private practices whilst studying dentistry. Furthermore, it would be interesting to understand whether and how such dental assisting can affect outcomes such as student academic performance or help improve fundamental health matters such as patient confidentiality, infection control, a people-centred-care approach and prevention-based practice. Exploration of differences amongst the dental students undertaking dental assisting jobs enrolled in undergraduate versus postgraduate programmes offers additional ways to research this cohort.

Cycles of pre-clinical and clinical observation followed by practise were identified by Horst and colleagues[19] as critical to dental students' learning. Drawing on a theorisation of apprenticeship, they demonstrated that students who observed in pre-clinical and clinical settings for more than fifty hours had higher levels of confidence in patient interactions, formulating treatment plans and in providing dental treatment to patients. The success of training episodes relies on the dental student understanding the connections between the dental practitioner's descriptions, the visual phenomena being observed and the profession's socially organised ways of seeing and understanding the events.[20] Thus, reconsidering apprenticeship and university education as complementary rather than a dichotomy could provide a mechanism to build more theoretical understanding of dental students' learnings whilst working within dental practice as dental assistants.

A noteworthy aspect of this study was the enthusiasm of the dentists who hired dental students as assistants with the apparent motivation to teach them. This is a different context to practitioners acting as clinical educators in university courses, and research about the role of the profession in the education of dental students to date has not explored this kind of arrangement. Therefore, the involvement and motivations of dentists to hire dental students as assistants certainly hold rich potential for

future research. Employment as a dental assistant during dental school offers students an experience of practice that extends beyond the university context. This study provides a stimulus to explore the implications of dental assisting as an educational activity within the formal dental curriculum. Dental programmes could consider encouraging students to seek extra-curricular employment as dental assistants or even embed assisting into the curriculum with further research to evaluate the effectiveness of professional learning in these roles.

6 | CONCLUSION

This research study focussed attention on what, how and from whom dental students acquire professional knowledges during professional work. It provides insight into the ways students learn about the rhythms, routines and responsibilities of dental practice and advance skills in communicating with and relating confidently with patients. Students learn in this context by noticing and make sense of the complex practice environment whilst critically referring to the course content from their concurrent university studies. Learning was not confined to interactions with the dentist as the students learned from all members of the dental team. The limited research about this topic provides a lot of scope for future research and assessment of the implications for the dental curriculum.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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