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# Exploring Dental Students' Perceptions of their Clinical Learning Environment: A Qualitative Study to Evaluate the Curriculum

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## Abstract

Learning in a clinical environment is central to a health professionals' educational journey including Dentistry. Implementation of curriculum within the clinical learning environment (CLE) prepares dental undergraduates for professional practice. Evaluation is an important part of curriculum design which provides the evidence to support improvements and continuous development. Engaging learners in evaluation process creates a learner centered approach which has well documented benefits to inform educators if learning needs are being met from their perspective. To explore dental student's perceptions of their CLE to evaluate the implementation of the Bachelor of Dental Surgery (BDS) curriculum. Four focus groups were undertaken with a total of 16 participants to explore their learning experiences. Students were asked to identify what they perceived as enablers and barriers which affect their learning and make suggestions for improvement. Transcripts of audio data were thematically analyzed, coded and themes identified. The themes identified related to teachers' attributes and improvements in physical facilities that enable their learning and pressure to perform the required quantity of clinical procedures, perceived inadequate supervision of chairside teaching, and lack of specific feedback on performance. Suggestions for improvements provided useful insights on issues related to perceived challenges. Learning could be improved by exploring quality of consultations over quantity to mitigate low patient availability, lack of treatment materials to meet clinical procedure requirements, and utilising simulation to gain valuable experience. Finally, developing small units of dental communities of practice (CoP) to facilitate learning opportunities could enhance the learner's experience.

## Introduction

Learning in the clinical workplace is central for all health professionals' educational programmes including Dentistry. Dental clinical learning often involves the performance of irreversible operative procedures on patients, mandating the utmost caution (Fugill, 2005), within the learning environment. The term 'learning environment' encompasses not just the physical locations where students are gathered, but also involves a variety of factors contributing to optimal learning (Maudsley, 2001). Chan (2004) described the 'clinic learning environment' (CLE) as a multidimensional entity with a complex social context where there is an interactive network of factors that

influence students' learning outcomes. These factors, according to Flott and Linden (2016), include the physical space; psychosocial and interaction factors; the organizational culture; and teaching and learning components. The relationship between the learning environment and students' academic achievements is a useful focus for educators and researchers. Thus, highlighting the need to study the student's learning environment as perceived by the students because their experience of the environment shapes their behaviour, and engagement with the curriculum which impacts learning (Harden, 2001; Soemantri et al., 2010). In recognition of the importance of this, the international dental education working group recommend that students' perspectives should be considered in all discussions and decisions about dental education programmes (Divaris et al., 2008).

Implementation of curriculum enables the varieties of learning and teaching activities within the clinical learning environment (CLE) to prepare dental undergraduates for professional practice. Learners are the central figure in curriculum implementation process because implementation takes place as they acquire the planned experiences, knowledge, skills, and attitudes aimed to enable effective function in society (Chaudhary, 2015). Thus, evaluation is necessary to ascertain student engagement with the curriculum and it is an important part of curriculum design which provides the evidence to support improvements and continuous development. Engaging learners in evaluation process creates a learner centered approach which has well documented benefits to inform educators if learning needs are being met from their perspective. Although there are considerable numbers of student perspective studies (Anderson et al., 2011; Halawany et al., 2017; Henzi et al., 2006; Kossioni et al., 2014; Krois, Kossioni, Barlow, Straub-Morarend, et al., 2018; Krois, Kossioni, Barlow, Dos Santos, et al., 2021; Polyzois et al., 2010; Popoola & Denloye, 2015; Serrano et al., 2021) used to evaluate effectiveness of CLE in Dentistry, only a few studies have reported students' perceptions using qualitative methods (Ansary et al., 2011; Ebbeling et al., 2018; Fugill, 2005; Lanning et al., 2012; Victoroff & Hogan, 2006). The use of qualitative methods has the advantage of providing in-depth narratives which can explain the learner perspective from a diverse group of learners (Ringsted et al., 2011). A common theme identified by the students in most of these studies was the impact of the clinical teacher characteristics (approachability), teaching approaches (quality of feedback, inclusive and supportive). Most of the studies used a mixed method approach of data collection using qualitative questions in surveys which required a written response to open-ended questions, however this method does not provide the opportunity to probe answers given in the surveys. Therefore, to gain a better understanding of students' views of their CLE, this exploratory investigation used a focus group approach to address the research question: How does the dental clinical learning environment impact students' learning? The purpose of the study is to evaluate the CLE as part of continuing efforts to improve the implementation of our Bachelor of Dental Surgery (BDS) degree programme curriculum.

**Context and Rationale**

The BDS programme of the University of University of Lagos, Nigeria is a 6-year programme which includes a one-year study of pre-medical courses followed by a two-year basic medical and clinical science programme. In the fourth year, the dental students undergo laboratory-based simulation training in operative and prosthetic dentistry. During the fifth and sixth year of study, theoretical activities such as lectures, seminars and tutorials are combined with clinical rotations in the different specialties of Dentistry. The aim of the clinical curriculum is to

acquire clinical skills necessary for identification, treatment, and prevention of common dental problems and the promotion of health. The students also need to demonstrate interpersonal and communication skills with patients, their families, peers and demonstrate teamwork with professional associates. To achieve these aims, students are exposed to clinical activities including observation, demonstrations of clinical procedures, chairside teaching and are required to perform dental procedures on patients under the supervision of their teachers and senior resident doctors. The students are required to meet specified clinical procedures performed on patients and these form part of their eligibility for examinations. Our CLE is a tertiary hospital setting where both undergraduates and postgraduates are trained under different administrative teams, namely the University and the Hospital. The teachers are part of the academic faculty of the University and are also hospital specialists (Consultants). The clinical setting is department based, according to specialties in Dentistry and the students are organised to rotate through all the departmental clinics as junior (fifth year) and then senior students (sixth year). Evaluation of teaching and learning activities in medical and dental areas of the curricula has been an on-going process mostly using questionnaires. There has been no evaluation of the student experiences in the dental CLE using a qualitative method which would aim to address a gap in the evaluation approach, with the purpose to provide in depth information to drive and support improvements in the implementation of the curriculum.

## Method

### Conceptual Framework

The educational framework used to underpin this study was evaluation (Stufflebeam, 2003) and situated learning theory (Collins, 1988), which can be applied to explain how learners developed the required skills in the dental CLE. Stufflebeam's Context, Inputs, Process and Products (CIPP) evaluation model was used to provide a clear structure of the on-going evaluation of the BDS programme's curriculum, more specifically focusing on the process element of the model. Process evaluation provides data on the day to day running of a programme and the quality and effectiveness of the teaching and learning processes (Brewer, 2011; Stufflebeam, 2003). Exploring students' experiences of their learning in the CLE will provide educators essential information to drive change and improve the learning experiences and curriculum learning outcomes to ensure learners are prepared for clinical practice. Learning in the social context of the dental CLE involves transformation of theoretical classroom learning to real-life application of the knowledge in patient care. According to Sweet et al. (2009), dental clinical teaching encompasses the application of a range of educational theories while being a good example of situated learning which Collins (1988) defines as: "the notion of learning knowledge and skills in contexts that reflect the way the knowledge will be useful in real life". This concept is applied in dental CLE whereby students learn dental practice within their learning environment, performing procedures on patients while being supervised by clinical teachers. In the dental CLE, students interact with teachers, peers, dental care providers and patients, learning in this workplace environment is fundamentally social and embedded in everyday activity, context, and culture (Lave & Wenger, 2009). Lave and Wenger (2009) describe the concept of a community of practice (CoP), as a situated learning environment where the newcomers become old-timers through a process of legitimate peripheral participation i.e. learning from the more experienced clinical staff to become full participating members of the established community of dentistry. Students' learning is directly impacted by the members of that CoP, therefore, to understand student learning experiences in the dental CLE, this study adopted the socio-cultural

perspectives of situated learning theory and its sociocultural concepts of CoP, legitimate peripheral participation and identity formation which has been proven useful as a theoretical framework in medical education research (Lave & Wenger, 2009; Wenger, 2021).

**Ethics Approval, Study Design and Data Collection**

Ethical approval to conduct this research was obtained from the institutional ethics committee (CMUL/HREC/12/20/799). All participants were informed about the process and purpose of the study and signed a consent form prior to commencement of the focus group discussions. This study adopts a constructivist or interpretive research paradigm which assumes that the nature of reality (ontology) is subjective; contextualised, being sensitive to place and situation, and that multiple realities exist because each participant has a different view on the phenomenon being studied. This paradigm is therefore appropriate to explore the 'what", 'how' and 'why' factors within the dental CLE that impact students' learning either positively or negatively. The study assumes that the nature of knowledge (epistemology) is such that, knowledge is socially constructed through interaction of the researcher with research participants (Creswell, 2014). Thus, a qualitative research methodology using focus group methods and inductive approach was employed to generate the data.

The study population consist of undergraduate dental students in the fifth and sixth year of study. Purposive sampling was used to recruit a total of 16 volunteer participants, eight from year 5 and eight from year 6, using written announcements on notice boards, student groups and social media. A pilot focus group was conducted to validate the question schedule (see Table 1) which was made up of four-house officers (newly qualified dentists) that recently studied in the same clinical setting as the participants. The pilot study confirmed that questions were clear and unambiguous, whilst providing valuable experience for the researcher in conducting a focus group to ensure participants felt safe to share their stories. Participant written information was provided and written consent was obtained ensuring participants knew that they had the right to withdraw at any stage without giving a reason, and that the focus group discussions would be audio recorded and transcribed. Participants were encouraged to give open and honest answers without repercussions or effect on their learning. Each participant was assigned a unique identification letter "A to P" to ensure anonymity and confidentiality was assured with the aim to encourage an open dialogue about the learning environment.

Table 1. Focus Group Question Schedule

| | |
|---|---|
| **1.** | Can you tell us about your experience of learning in the dental clinic? |
| **2.** | What are the positive factors that aid learning in the dental clinics? |
| **3.** | What are the negative factors that affect learning in the dental clinics? |
| **4.** | What are your suggestions on how to improve learning in the dental clinics |

The focus groups were moderated by the principal investigator and observed by an independent member of academic staff from another Programme in the University with no teaching relationship with the participants to ensure an open and fair process was conducted. The question schedule (see Table 1) was developed based on the study objectives and previous similar literature consisting of four open questions which sought general views of

their learning experiences followed by specific questions to explore both positive and negative aspects of their experience, whilst providing the opportunity to offer how their teaching environment could be improved. This sequence according to Krueger and Casey (2001) is effective because it is human nature to be very critical of a product or phenomenon and ignore the positives. The moderator avoided leading the discussions while ensuring that the participants remain focused, and the discussion was not dominated by more vocal members of the group (Stewart & Shamdasani, 2014). All audio data were transcribed verbatim and each focus group transcripts were reviewed by two participants from each of the focus group to confirm the accuracy of the transcripts prior to data analysis.

**Data Analysis**

The generated data were inductively analysed to capture the reality of the participants. The six phases of thematic analysis described by Braun and Clarke (2006) was employed by the principal investigator. A large body of data was transcribed verbatim from the audio recording which involved several replays of the audio. This process aided immersion and familiarity with the data and role of the investigator as a teacher in the CLE also enabled an understanding of the contextual language used by the participants in the discussions which would not have been understood by someone external to the environment. The transcriptions were checked for accuracy by the observer which supports the reliability of the data.

## Results

A total of sixteen undergraduate students (7 males and 9 females) participated in the four focus groups each comprised of four participants. The age range of participants was between 21 to 30years. Five themes and ten subthemes emerged as shown in the Table 2.

Table 2. Themes and Subthemes

| THEMES | SUBTHEMES |
|---|---|
| **Learning experiences** | |
| **Teaching and Learning Activities** | Performance of clinical procedures<br>Supervision<br>Chairside teaching and learning<br>Feedback |
| **Enablers of learning / Barriers to learning** | Teaching and learning factors<br>Human factors<br>Physical environmental factors<br>Organisation of curriculum |
| **Improving learning in the CLE** | Improving learning opportunities to meet clinical procedure requirements.<br>Improve learning by formation of small dental units (CoP). |

Coded extracts from the data sets that relates to factors that enabled or negatively impact learning were theme as "enablers of learning" and "barriers to learning" respectively. These codes were further grouped into four subthemes. There was some overlap relating to participants' learning experiences and factors that impact their learning. The findings highlight the richness of the students' narrative and suggestions for improvement which are categorized into two subthemes.

**Theme 1: Learning Experiences**

The participants expressed their learning experiences in the CLE in both positive and negative terms. Negative experience of learning is mostly focused on the impact of attaining the clinical procedural requirements which they perceive as a distraction and stressful (see Table 3).

Table 3. Illustrative Quotes for Theme 1 Learning Experiences

| |
|---|
| *"Learning at the dental clinic has been very impactful, I've been able to learn a lot of clinical stuff and I've been able to interact with lot of patients.''* (Student M, Year 5) |
| *"My experience so far in clinical environment has been challenging with ups and downs, here and there."* (Student E, Year 6) |
| *''My experience in the clinic has been up and down I'll say, the up there is that I've been able to relate with patients, try out everything I've been taught in class in the clinic, carry out hands on procedures while the down part are the struggles to get procedures done.'' (Student N, Year 5)* |
| *''My learning experience in the clinic comes with a lot of challenges honestly I feel learning is not optimized in some clinics…. especially in restorative dentistry where you are looking for patients for procedures, you are also trying to get materials to be able to get those procedures done and then you are trying to pay for them, …. it is a lot on us as students and I'm not interested in learning when I come to restorative clinic, I just want to get my procedures done so that I can write my exams and pass, learning is not a priority for me for restorative dentistry.''* (Student D, Year 6) |

**Theme 2: Teaching and Learning Activities**

*Performance of Clinical Procedures, Supervision, Chairside Teaching and Learning, Feedback*

The students perceived that learning is sub optimal due to the high number of clinical procedures they must perform and felt no new knowledge is learnt from repetition of the same clinical procedure. They reported more pressure in some areas e.g., Restorative Dentistry Clinic. The pressures related to; low patient flow, non-availability of treatment materials, students having to buy materials to treat patients and conflict with dental nurses and supervisors. Students felt supervision could be more effective to improve their learning experience. Chairside teaching takes place mainly when a consultant is in clinic. They appreciate that learning occurs when they are actively engaged by the consultant on patient management or through observation and demonstrations of

procedures. The levels of feedback were deemed to be inconsistent or absent. Rating of completed work was deemed in basic terms such as good or bad, and debriefing was not common practice. Participants recognised that the role of feedback would help them to reflect and self- assess to improve performance. (See Table 4 for illustrative quotes).

Table 4. Illustrative Quotes for Theme 2 Teaching and Learning Activities

| |
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| *Performance of Clinical Procedures* |
| *"We are trying to make procedures and it sometimes affects our patient's management because we are treating the disease not the patient, it affects our care to health because at that point and with the environment of no materials to treat patients. So, learning in clinic actually, place more mental stress on us the students compared to the academic stress." (S*tudent B, Year 6) |
| *"Procedures are very good, but they are not feasible when they are too many, repetitive and this makes it Ehmm very very frustrating to learn because we have to go for procedures and sometimes sacrifice learning."* (Student E, Year 6) |
| "C*arrying out successfully a procedure it's so difficult in both the fact that we have to source for patients and even when you get the patients in some department like Resto, what you need to do the procedure are not readily available."* (Student H, Year 6) |
| *''So while the procedures are also supposed to be an avenue for learning, because of the amount required and the level of importance attached, it sort of shifts the aim away from majorly learning to just doing it to make sure that you get all your procedures signed and you are eligible to write exams; so even if there's a level of practice that goes into it while you are doing your procedure, sometimes I don't know whether my scales are up to top as they should if I was really allowed to take my time and do just what I can…..''* (Student J, Year 5) |
| *Supervision* |
| *"At least, for the first procedure a student is going to go through or would do, a doctor is supposed to be with the student even if not all through at least in the beginning to observe when the student wants to take a major step and to actually know that the student is doing what is right."* (Student L, Year 5) |
| "Y*es for me, the procedures are a method of learning too in the clinic but I don't think it is enough because sometimes you are left alone to do these procedures and yes the SR or the consultant comes to supervise your work after you are done and not during the procedure so chances are that if I do a class one filling, composite filling ten times I'm going to do it the same way I did the number one."* (Student G, Year 6) |
| *Chairside Teaching and Learning* |
| *"Consultants in Surgery clinic have this way of making you learn; in that they are always involving you in their patients work up. They want you to be actively involved, they don't leave you behind, they are always asking you questions; they are always engaging you so it really helps you, so you can never forget with the way they teach and the way we learn in Surgery and in Child Dental Health clinics."* (Student D, Year 6) |

| |
|---|
| *Feedback*<br>*"I sometime get feedbacks Hhmm.. (laughs). The senior residents, the consultants they are really trying. In some departments they try their best whereby even after a procedure they still put you on your toes, by asking you what did you do wrong? So that the next time you are doing the same procedure you are getting it better and when a student looks back and assess himself, he sees himself improving but unlike some other department whereby they expect the improvement should be just self-driven without assistance."* (Student B, Year 6)<br><br>*"The supervisor just come at the end and see that it is ok, you have done it so you can go, the person doesn't even tell you OK, so how did you go about?'' (*Student L, Year 5)<br><br>*"There's minimal or no feedback from the SRs or the consultants, most of the time I just do a procedure, they look at it and say it okay or not okay.''* (Student D, Year 6) |

**Theme 3: Enablers of Learning**

*Teaching and Learning, Human, Physical Environmental and Organisation of Curriculum Factors*

The availability of knowledgeable and supportive teachers (Consultants) in the CLE provides students with the confidence to learn. Learning is maximised when they are given responsibility for patient management and performing clinical procedures provide the hands-on practical skills required for dentistry which reinforces learning from the classroom. The impact of COVID-19 disease prevention meant a reduction in the number of professional relationships with teachers is perceived to enhance their learning. Recent upgrading of the physical environment of the clinic, availability of better teaching and learning facilities such as new dental chairs and improved electricity supply are perceived as positive factors. Learning is aided by the organisation of clinical activities by days of the week, students can focus on what to learn and prepare in advance (see Table 5 for illustrative quotes).

Table 5. Illustrative Quotes for Theme 3 Enablers of Learning

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| *Teaching and Learning Factors*<br>*"For me, the positive factors are the fact that we have quality professionals, we have one of the best if not the best teachers here available for us, so it makes you confident to know that ok, I'm getting one of the best education or learning that I can."* (Student E, Year 6)<br><br>*"Having the consultants in clinics is a very positive factor for me because you get to ask any questions and there's is confidence, they bring with them when they are coming to the clinic."* (Student C, Year 6*)*<br><br>*"Attending to patients and planning the patient's treatment myself, its aides learning a lot, doing the clinics procedures, of course it helps because you learn a lot. it hangs on once you do something yourself, it sticks."* (Student C, Year 6) |

*"Positive factors that have aided my learning in the dental clinic, first, I'll say hands-on experience, the chance that we are given opportunity to practice some of the things that we learn in the classroom in the clinic makes it easier to really consolidate the knowledge."* (Student K, Year 5)

*"I believe also this pandemic have actually even helped a bit in the sense that now the consultant to student ratio has reduced, we've been divided into smaller groups, so for me I noticed that learning is better unlike when we were usually crowded."* (Student G, Year 6)

*''The fact that the doctors are always willing to help and teach us is a positive factor.''* (Student O, Year 5)

*Human Factors*

*"The relationship between students and our consultants has been really really good, most of them if not all of them they are receptible to students even outside learning hours. I know students that even message them to ask questions or call them."* (Student G, Year 6)

*''The interaction generally in the clinic is great, the student - consultant relationship has been great and it enhances learning in that way.'' (Student E, Year 6)*

*Physical Environmental Factors*

*"Another thing is the new dental chairs. This has made the treatment easier because they are functional, they are adjustable so it makes the treatment smooth and easy than it used to be, also with the advent of the good electricity you can work anytime so your working is not dependent on whether there is electricity or not."* (Student H, Year 6)

*Organization of Curriculum*

*"In some departments, like Surgery, due to the fact that they have different compartmentalized days and activities, it aides learning more for me. You know that oh today I am going for SOP, tomorrow I'm going for EXO and other days I'm going for theatre, and you already have an idea of what you're looking out to read, what you are looking to learn on that day."* (Student A, Year 6)

**Theme 4: Barriers to Learning in the Clinics**

*Teaching and Learning, Human, Physical Environmental and Organisation of Curriculum Factors*

Number of clinical procedures is perceived to be a significant barrier to learning in the CLE. There are limited practical learning opportunities for students because of low patient flow in the CLE. This is further compounded by non-availability of treatment materials. The lack of perceived supervision in the CLE impacts learning as there are too many students in the clinical environment at one time which also reduced the benefits of consultant clinical demonstrations. Some consultants and resident doctors were perceived to be unapproachable which negatively impacted their learning experience. Poor interaction with other members of the dental care team such as the dental

nurses and technicians negatively impacted their learning in the CLE. Working conditions in the CLE is not conducive for learning especially when cooling of the environment is not adequate. The scheduling of some curricular activities (afternoon lectures) meant some students were not able to attend (see Table 6 for illustrative quotes).

Table 5. Illustrative Quotes for Theme 4 Barriers to Learning in the Clinics

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|---|
| *Teaching and Learning Factors*<br>*"Number one negative factor that affects learning is still the same procedure requirements of a thing, they are too many."* (Student G, Year 6)<br><br>*"Getting patients is usually a big deal especially when you have a lot of procedures to do and then some of the patients that come don't need the procedures you need to perform for example getting a patient for a metallic denture or complete acrylic denture, you can go through the clinical posting in prosthetics clinic without seeing a patient walking to the clinic that needs complete denture or metallic denture, so I have to go outside and actually look for these patients and then there's no material, that is, materials are not always available so I have to go out to buy these materials and then sometimes I have to pay for the patients treatment."* (Student D, Year 6)<br><br>*"For supervision, at least, for the first procedure a student is going through or would do, a doctor is supposed to be with the student even if not all through at least in the beginning to observe when the student wants to take a major step and to actually know that the student is doing what is right."* (Student L, Year 5)<br><br>*"Also, a negative factor is the number of manpower, if there is one doctor to ten 600 level students and five 500 level students, so what amount of clinical learning will I learn that day?"* (Student C, Year 6)<br><br>*"There are always too many students, like when consultants are doing some procedures, we won't be able to see it clearly."* (Student F, Year 6)<br><br>*Human Factors*<br>*"Some lecturers, they don't seem very approachable, and they have like a harsh demeanor so it makes it difficult to open up and to ask them questions." (*Student J, Year 5*)*<br><br>*"While practicing there is a better relationship between the consultant working with the nurses but with the student and nurses it is most likely there's no relationship at all even with the student nurses."* (Student F, Year 6)<br><br>*Physical Environmental Factors*<br>*"Sometimes the clinic environment itself when there's no light and it is hot and we've been standing for a while, we are not really in the mood to learn or assimilate anything. So, I think a conducive environment too makes it easier to learn."* (Student J, Year 5) |

| |
|---|
| *Organization of Curriculum*<br>*"No breaks, you have classes in the morning, you have clinic in the afternoon and then in the evening you have another one. So, most of the time those evening classes suffer because I'm not concentrating full time. I'm just there for attendance, I'm not actually listening." (*Year 6 Student D) |

**Theme 5: Improving Learning in the Clinics**

*Improving Learning Opportunities to meet the Clinical Procedure Requirements*

Learning opportunities could be improved by increasing public health awareness of dental care and available treatments to increase the patient flow in the clinic. Also, student exposure can be improved by partnering with other dental clinics in the community. They opined that the number of required clinical procedures is not feasible and the requirement number should be made with considerations for the environmental factors which affect their learning. They therefore suggested that the institution should explore funding streams where patients treated by students should be subsidized and the treatment fee could be paid into a dedicated account to purchase treatment materials for students' patients. More clinical demonstrations by the consultants are suggested along with the use of live video streaming to improve exposure to procedures. Increase practical sessions in the skills laboratory could be used to teach uncommon procedures not seen in the clinic to ensure students have the exposure to a variety of procedures (see Table 6 for illustrative quotes).

*Improve Learning by Formation of Small Dental Units*

Creation of clinical groups or units where a small number of students are assigned to consultants who will be responsible for their learning activities throughout the clinical placement. Timetabled end of week or month clinical review of cases into their learning activities could provide a more structured approach to share experiences and learn from each other. Developing better multidisciplinary team working between dental students and student dental nurses, to build a mutual respectful relationship through pairing students to provide care for the patient and practice their respective roles. Combined faculty seminars to highlight the importance of a multidisciplinary approach in caring for patients.

Table 6. Illustrative Quotes for Theme 5 Improving Learning in the Clinics

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| *Improving learning opportunities to meet the clinical procedure requirements*<br>*"A way to increase the patients flow, if there's a way maybe more awareness, dental awareness to the society that would make people come more or visit the dental clinic more."* (Student I, Year 5)<br>*"Hospital might not be able to provide all these resources but there should be a partnership with outside clinics whereby we are still under supervision, but we can see all these advanced cases, at least to observe, so that when we go out our clinical skill can be sound."* (Student B, Year 6)<br>*"On how to improve learning in the clinic, I'll start from the procedures, if it can be balanced, spread out and not high and not feasible."* (Student E, Year 6*)* |

*"The clinics should set a feasible number of procedures we should be doing, for example, based on what we can get, telling us to do 20 S&Ps in one month, I feel it's not feasible, I feel like that would reduce the pressure on students, not that they would relax and do nothing but at least they know that I'm not going to kill myself over this."* (Student O, Year 5) *"So, maybe there can be a scheme whereby patients fees are at least subsidized, also, if there is way that the payment can be made into a certain body and that body will get all the materials and make sure it is always available."* (Student F, Year 6)
*"I also believe that for demonstration procedure, especially when it's a procedure that all students present cannot see, so maybe if a gallery is provided where we can be watching it from, so we don't need to crowd the place, I believe that can be worked upon and I believe that can enhance learning."* (Student G, Year 6)

*"Because of the large number of students in the clinic it's quite difficult to see certain procedures, we can also use videos perhaps videos shown in class even before getting to the clinic to try and familiarize ourselves with the steps of certain procedures. I feel like that would make learning easier in the clinic.''* (Year 5, Student I)

*"Apart from the normal things, there are some other things I don't get to see. Like for example, treating of bridge cases, so I feel like if there should be a pre-clinical practical where we learn just like what we did in the junior Op. Tech. lab to learning how to cut the cavities."* (Student H, Year 6*)*

*Improve Learning by Formation of Small Dental Units*

*"If like three students can be assigned to one resident and a consultant such that the resident or consultant is with you throughout your stay in the posting I think that can also help, so I know that this person is in charge of me and whatever I am doing in the clinic, I know that person is looking out for me."* (Student A, Year 6)

*"Doctors can be assigned to students, you know, a student knows that this is your primary doctor who you always have to submit to, so that no doctor gets overburden. So just assign to the doctors a sizeable number of student that they can handle and not having a situation of maybe just one or two resident or consultants handling all the students in the clinic. This will also help the doctors to manage stress while working with students."* (Student K, Year 5)

*"I just want to emphasize on one other thing, I would love if we could have a supervisor for each department that is concerned with students' clinical activities. I know we are all familiar with mental health issues, I realized that a lot of students usually go through mental issues, and they need to speak to someone, and we don't really have anyone to speak to."* (Student N, Year 5)

*"Daily or weekly assessment, whereby we sit down each month or like each week in a posting, to consider and ask us, What procedure did you do this week"?* (Student B, Year 6)

*"About the relationship between the students and the student nurses and also the staff nurses, maybe there can be a format whereby a student nurse is paired with a dental student, and they are work on a procedure to*

*complement one another, so it would build a mutual relationship."* (Student F, Year 6)

*"I mentioned something earlier about miscommunication among the students and the nurses and other technicians, we can have a seminar where we can all be enlightened on what we are supposed to do. It will make the relationship much better."* (Student E, Year 6)

## Discussion

This study explored the learning experiences of dental undergraduates of their CLE, the emergent themes provide useful data for the University to consider how learning needs are being met in relation to the clinical curriculum. The Process aspect of Stufflebeam (2003) CIPP evaluation model was used to evaluate the learning experiences to identify enablers and barriers impacting student learning. The students' narratives provide rich data on their perceptions of learning activities and learning gained in the clinical environment which include chairside learning, demonstration and supervision of procedures, and feedback on their performance of clinical procedures to meet the curriculum requirements.

### Enablers of Learning

They described teacher's attributes, student-teacher relationships and improvements in physical facilities that enabled their learning. Other factors in their CLE that enable learning reported by the students is the value of hands-on experience and the entrustment from their professors to treat their patients. This provides the valuable opportunity to transfer theory into practice and learning from the more knowledgeable one as reported from situated learning theory (Collins, 1988; Lave & Wenger, 1991, Wenger, 2011). They perceived that learning is achieved by interactions with their teachers, peers and dental nurses in the dental clinical setting which supports that learning is fundamentally social, embedded in everyday activity, context, and culture as described by Lave and Wenger (1991).

The socio-cultural perspectives of situated learning theory describe the concept of community of practice (CoP) as a situated learning environment whereby the newcomers become old-timers (novice to expert) through a process of legitimate peripheral participation. In the CoP, the newcomer learns from the old-timer who carry on the functions of the community where its members can discover or further a learning partnership related to a common domain (Lave & Wenger, 1991, Wenger, 2011).

### Barriers to Learning

A major barrier to learning is the stress of fulfilling their clinical procedure requirements which is heightened by low patient attendance and lack of material to treat patients. Students in a North American dental schools reported similar issues to this study regarding the pressures related to the number of clinical procedure requirements (Henzi et al., 2006). The practice of performing and repeating clinical procedures to achieve clinical competence assumes

that students learn by numbers of procedures and experience (Chambers, 2012). However, it was noted that, the number of procedures completed was not predictive of test case performance on initial licensure examinations and this was subsequently observed in other studies (Anziani et al., 2008; Chambers, 2012; Durham et al., 2007; Re et al. 2009). Therefore, Chambers (2012) suggests a more objective method which is not based on quantity, to determine clinical competence. In this study, the students also expressed barriers in their CLE which makes learning a stressful experience, corroborating previous reports from other dental undergraduates including Nigerian students (Alzahem et al., 2011; Popoola & Denloye, 2015; Sofola & Jeboda, 2006). The significance of stress and impact on performance and learning can lead to physical and psychological complications (Humphris et al., 2002), hence there is a need for our institution to address barriers cited by the students and their suggestions for improvements.

**Improving Clinical Learning Opportunities**

The students suggested how clinical competence should be measured considering the barriers of low patient attendance and lack of material to treat patients which affect their ability to meet their clinical procedure requirements. Amongst these are to facilitate more multidisciplinary training to build mutual respect amongst the dental team, improve public awareness campaigns in communities, partnership with community-based clinics where supervised learning is available and subsidized treatment fees for patients treated by students. Lannings et al. (2012) made similar suggestions in response to their students perceived lack of dental school patients. Previous audits of clinic records from our institution recognized the relative low patient attendance and the impact on learning and have taken measures in line with student suggestions. However, these efforts are yet to prove sufficient to completely solve the problem. The low patient attendance can be attributed to the lack of the national health insurance scheme for oral health; therefore, majority of the population still need to pay for dental treatment. The lack of treatment materials for patient care is also linked to the national issue of health finance and the hospital is limited by the subsidized fees paid by patients. In an educational environment such as ours, education and health care may have differing funding priorities, therefore improving dialogue and sharing research outcomes such as this small study could highlight student experiences and how their learning could be supported. Students recommended that the educational institution should be allowed to manage the funds of hospital patients treated by students and make treatment materials freely available to carry out the required procedures.

Regarding the above-mentioned barriers to learning in CLE, the participants suggested creation of clinical groups or units whereby small number of students are assigned to clinical teacher(s) who will be responsible for their learning activities in the clinic throughout a placement. These clinical groups can be likened to the concept of Community of Practice (CoP) hence, findings of this study support that dental clinical teaching is a good example of situated learning (Sweet et al. 2009). Therefore, based on student recommendations, a dental CoP in the CLE is proposed as an intervention for curriculum improvement to achieve the necessary competencies for professional practice. Whilst there is a paucity of educational research using the concept of CoP in dental education, several studies have reported this in other allied health professions. Students in nursing education CoPs reported an improved working environment and an increased in quality of clinical supervision (Nishioka et al., 2014; Ranse & Grealish, 2007). A recent report from dental students who experienced a CLE using a dental CoP model shows

the students strongly agreed that the model which was made up of students, faculty, other dental team staff and technology, benefitted their learning (Mills & Bernstein, 2021). Hence, implementing the concept of a dental Cop in our CLE may be a viable model for teaching the skills necessary for professional practice.

The participants also suggested the use of simulation as adjunct to developing their clinical competence. Simulation is used in dental education to enable students to achieve an acceptable level of competence prior to actual patient care (Gottlieb et al., 2013). Our students are taught using simulation in their fourth year of study, however they felt more simulation in their final years could meet a gap in their learning because of low number of patients attending the CLE. There are similar suggestions reported in the literature where virtual reality simulators have shown to be an effective training method for the development of operative skills in dental students (Buchanan, 2004). Therefore, an upgrade in the simulation laboratory to include more virtual reality-based technology systems could enhance student operative exposure.

Chairside teaching is an opportunity to use a patient case to help students transfer existing knowledge to practice. It involves asking students questions which encourage them to be active in the process of their learning and thereby promote a deep approach to learning (McMillan, 2011). According to current learning theories, students learn by constructing their own knowledge by being active in the process of their learning (Biggs, 2003). In the dental CLE, being active in the process of learning is beyond completion of procedures, the student needs to communicate with the patient, make diagnosis, formulate, and defend treatment plans in discussion with the teacher. In this study, the students evidenced that chairside learning occurs in the dental CLE, and they learn better when they are actively engaged in a patient case with their teachers' asking questions.

However, due to the large number of students in the clinic they are unable to fully participate in effective chairside learning especially when it involves demonstration of clinical procedures. They suggested that learning from demonstration of procedures can be improved by recording and viewing from a gallery instead of crowding over the patient. Chairside demonstration is important in learning psychomotor skills, for effectiveness, teachers should be mindful that knowledge underlying demonstration is often tacit and not visible to the student, therefore they need to be clearly communicated as part of the demonstration (Fugill, 2005). The students perceived they learn better when student numbers in the clinics was reduced in response to the COVID-19 disease pandemic prevention protocol. Therefore, to maximize chairside learning beyond the COVID- 19 disease era, our institution needs to investigate balancing student – teacher ratio in the clinic.

In this study, the student perceived that the level of supervision and feedback impacts their learning and performance. Dental undergraduates have reported similar findings in other studies (Fugill, 2005; Henzi et al. 2006; Victoroff & Hogan. 2006). Supervision of students is essential for learning and prevention of harm to patients and feedback should aim to support self-assessment and improve performance (Wilson et al., 2015). In this study, the students reported an inconsistent feedback approach, often a single word is given to imply the procedure was good or not. Dental students have reported similar feedback comments which are not specific enough to improve performance (Fugill, 2005). Mager (1997) advised that useful feedback should be sufficient to provide information on the adequacy of the clinical outcome; diagnostic by providing detail on the shortcomings

and corrective actions that could potentially improve the clinical outcome. As a result, more feedback training should be offered for clinical teachers to facilitate strategies on how to improve student performance in the CLE.

The students reported positive working relationship with their teachers but struggled to connect with other of the team namely other dental staff and student nurses which negatively impacted their learning experience. A solution to building better working relationships could be sought using interprofessional education as recommended by Morison et al. (2008). In their 4th and 5th year of study, the students' proposed pairing of a dental student with a student dental nurse to provide patient care could be a viable solution to improve working relationships and building mutual respect. The student reported some issues with the physical facilities in the CLE but recognized the improvements which have been made, including availability of new dental units, better electricity and other teaching facilities which have been positive for their learning. This view contrasts with a previous evaluation report by the pooled students' group from some Nigerian dental schools (Isiekwe, 2019). The improvement in the physical environment follows recent general upgrade of the learning environment in response to the evaluation report and recommendations by the regulating and accrediting bodies. This shows the importance of evaluation of programmes which is necessary to bring about improvement.

This study is limited in the fact that the research was based in one dental school, with small numbers of participants therefore the findings are not generalizable. Also, the research could have been triangulated further to add research rigor.

## Conclusion

Employing the process element of Stufflebeam's CIPP model has provided the underpinning educational context to explore learners' perceptions of the teaching process involved with learning in the CLE. The richness of the qualitative narrative has provided a unique snapshot of students experience of the dental CLE in a focus group. The qualitative nature of the study has filled a gap in the evaluation methods used in many studies including our own evaluation approaches. The themes identified related to performance of clinical procedures, chairside teaching and learning, supervision and feedback activities have provided a valuable insight for the University and clinical supervisors regarding the perceived enablers and barriers which impacts learning and their ability to meet the curriculum requirements. Students provided feasible suggestions for change which have the potential to facilitate their learning further, namely consideration of the number of clinical procedures and how a more objective measurement could mitigate the low patient flow and lack of available treatment materials, as opposed to using number of encounters. Increasing the use of simulation and live video streaming could enhance the quality of teaching during clinical encounters providing more exposure to the Consultant led procedures. Utilising technology could provide a valuable solution if funding could be identified along with subsidising patient procedures treated by students. Developing small units of dental communities of practice (CoP) within the CLE, to share and facilitate learning opportunities could enhance the learner's experience. The role of community outreach clinics to raise dental health awareness could provide a rich source of patients and a useful learning environment for students with the potential to build a communities of practice network, where students could not only provide the awareness but have the clinical exposure to an authentic clinical environment where students

could gain more skills required to be a practicing dentist.

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