

Faculty and Students' Perceptions on Experiential Learning Based Anatomy Dissection Hall Sessions for Medical Undergraduates

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Introduction: Experiencing is essential to learning anything in life. Medical educators across the world aim at achieving profound learning experiences for their students. Several applications of experiential learning into health professions education have been witnessed over the past two decades. Though many researchers have tried to implement authentic learning experiences in medical education, only a handful have been able to demonstrate its effectiveness in anatomical sciences education. In this study, the authors asked the question – Can experiential learning-based dissection hall sessions be innovated to improve the contextual learning of anatomical sciences during early clinical exposure?

Methods: Three experiential learning theory (ELT)-based sessions were conducted. Perceptions from faculty and students were collected.

Results: The satisfaction index of the students' perception of the ELT based sessions was of 96.1% and for faculty was 100%. The emergent facilitating factors in the learning process were found to be: more profound and interactive contextual learning experience; improved problem-solving approaches based on dominant skill activities of dissection hall; and learning experiences created to cater to different learning needs of students. The optimal facilitator to student ratio range suggested for these sessions was 1:10 to 1:15.

Discussion: The faculties were motivated to utilize this learning experience to further research teaching innovations at the present institution. Experiential learning-based sessions applied to anatomical sciences education can effectively foster positive student engagement and profound learning experience.

Keywords: anatomy practical sessions, case-based learning, contextual learning, dissection hall teaching, experiential learning

Introduction

Experiential learning advocates how individuals learn by their perceptive reactions to the experience that any situation provides in life. In educational psychology, education by way of experiential learning is the transformation of individuals' cognition whereby they can construct the meaning behind their experiences. So the underpinning principle behind experiential learning is constructivism. This theory explains how learners decipher an experience, give a unique connotation, and organize actions around these interpretations.

In medical education, the situations that can leave a lasting learning experience can be: preclinical phase undergraduates cadaveric dissection, clinical phase undergraduates savoring the patient experience in clinical clerkships, postgraduate residents learning from caring for the inpatients in clinical clerkships hospitals, or trained physicians enhancing their mastery of clinical skills.¹

Works of many educational psychologists like John Dewey, Kurt Lewin, Jean Piaget, Malcolm Knowles, David Kolb were associated with experience as the source of learning. David Kolb put forward a four-stage cyclical model of knowledge development that combined individuals' conscious recognition and transformation of experience. These were concrete experience, reflective observation, abstract conceptualization, and active experimentation.² Over the last few

decades, researchers have carried the work of Kolb experiential learning theory (ELT), not lacking a few critiques, to explicate a variety of situations catering to the learning of medical students during graduation, postgraduation, and clinical practice years.³⁻⁵ The primary critique of Kolb's model of ELT neglected the social context. In a medical school of today's technological world of millennials, authentic experiential learning needs to liaison deep into the roots of social learning theory, considering learning as a consequence of the situatedness in the social environment. The fundamentals of this socio-cultural interlinkage understand that learning is scaffolded on the expression of inner speech and within the zone of proximal development.⁶ The modern socio-cultural theories take into consideration outcome-oriented joint action taken as a group rather than individual interaction. There was a paucity of literature in implementing ELT-based pedagogies to enhance the contextual learning of students in early clinical clerkship in basic sciences.

Literature suggests increased interest and better student engagement is seen in active, experiential learning based activities in understanding practical anatomy.^{7,8} The deficit of clinical experience in students' transition from higher secondary schools to the abruptness and vastness of the medical college curricular environment creates diverse reactions. The current anatomy pedagogy in universities used to impart practical training lacked contextual understanding amongst the first-year medical students. The regulatory body introduced early clinical exposure as a part of the new competency-based curriculum to be imparted to medical undergraduates. The smoother transition into clinical practice of budding doctors justifies the rationale of introducing early clinical exposure: to orient towards the competency-based curriculum which has a community/ society based practice; to make students more confident to approach patients; provide for an outside source of motivation; create more self-awareness, and generate a sound scaffolding around their theoretical knowledge.^{9,10} Hence to impart the relevant clinical context to the structural composition of the human body, deliberate reflective practice into the dissection hall learning experience was initiated in this study. The authors innovated early clinical exposure sessions using Kolb's experiential learning cycle, taking into account social learning in a small group environment, incorporating the premise of situated learning, triggered with authentic anatomical practical-based experiences as shown in [Figure 1](#).

Materials and Methods

The lesson methodology used ELT and the paradigm for student learning was based on social constructivism and situated learning theories. The Government Institute of Medical Sciences (GIMS), Greater Noida, institution ethics committee approval number is GIMS/IEC/HR/2021/13. After review and approval by the Institutional Ethics committees, a sensitization session followed for the students and faculty about introducing this approach into the teaching and learning process of the students. Participation in the study was voluntary for the students. Students gave informed consent before the collection of feedback data on the sensitization session. The design is a cross-sectional descriptive study with the following research question:

1. "Is it possible to implement ELT into the teaching of preclinical students for improving the dissection hall learning experience?"
2. "How satisfied are the students with the implementation of ELT for anatomy dissection hall sessions?"

Preliminary Preparatory Work

A representative from the anatomy and clinical departments of surgery and medicine formed the core group who defined the learning objectives of each of these ELT sessions and prepared the clinical case scenarios for these sessions. A typical case scenario comprised of the paper-based clinical case with cues and learning objectives focus on the basic sciences.

Session Structure and Topic Format

The authors conducted three ELT sessions for 99 students of Phase I of the MBBS course. The selection of students is done by convenient sampling. They conducted each of these sessions on a group of 33 students. After a baseline lecture on the basic anatomy of the region, the students then underwent a modified dissection hall teaching methodology based

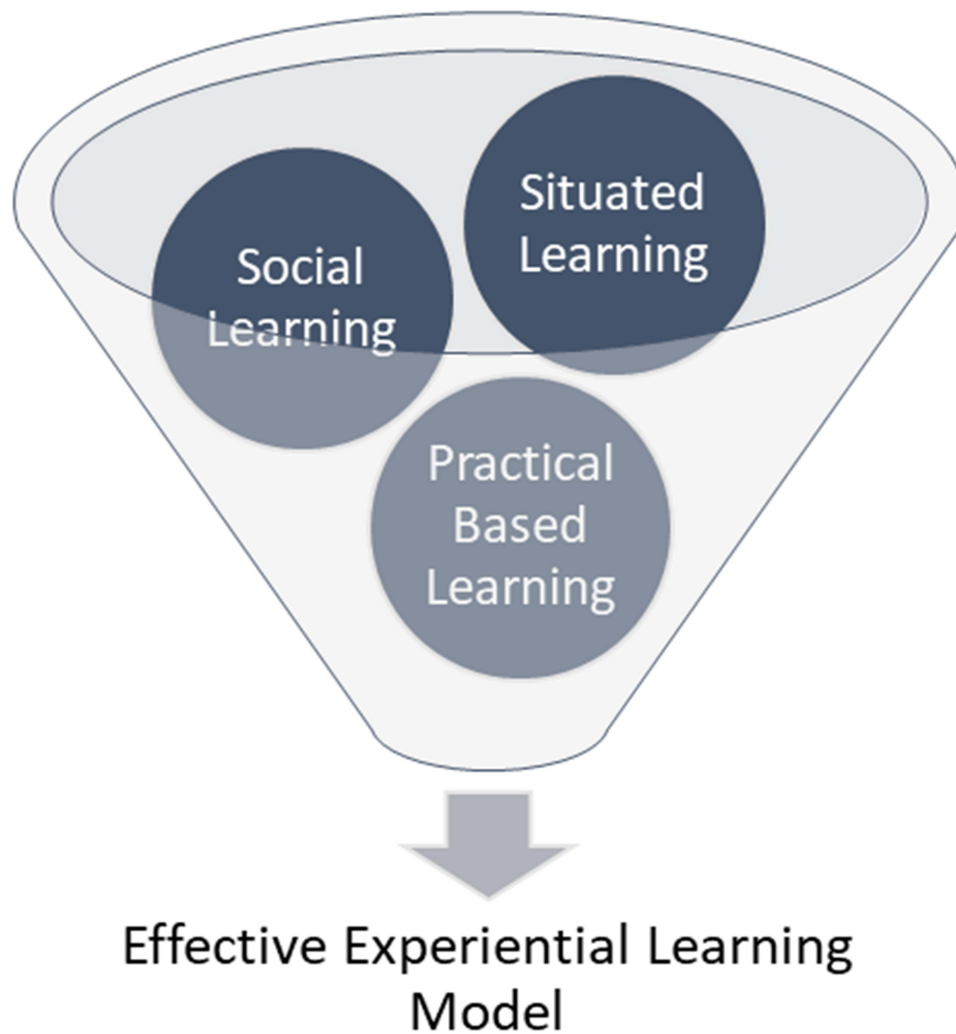


Figure 1 The theoretical framework used for innovating the experiential learning sessions in anatomy.

on ELT. The authors innovated ELT based session on three different topics covering the contextual anatomy of the following structures:

1. Shoulder joint
2. Peripheral nerves of upper limb
3. Cubital region

The following three sub-headings of session organization covered all the topics in this module. Each topic covered was included in designated 2 hours of dissection hall teaching sessions. Every topic was validated by independent subject experts.

a) Before the dissection hall session – A day before beginning each session, the preceptors gave the students lecture compiled handouts (printed and PDF versions) and references of books to be read before the session to reinforce the concepts done in the class.

b) During the dissection hall session – Two hours of the dissection hall time were further divided into the following ascending levels in Bloom's taxonomy of knowledge acquisition as depicted in [Figure 2](#).

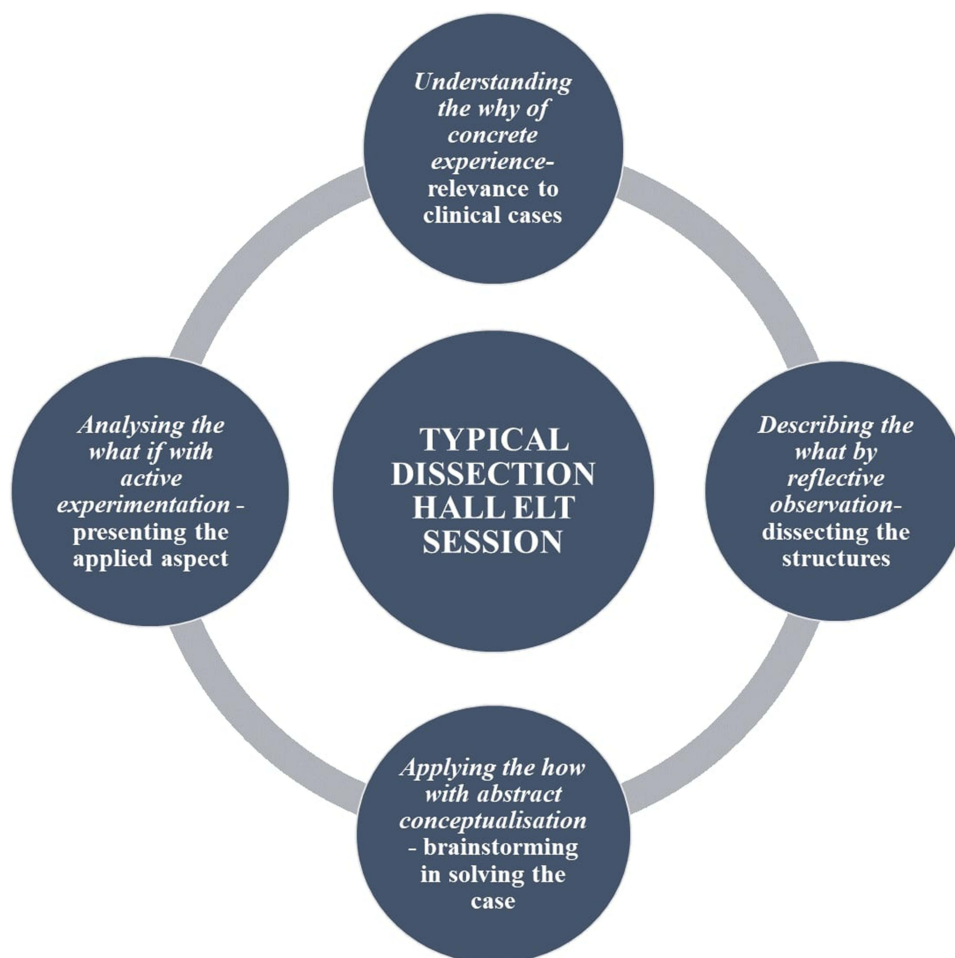


Figure 2 Cyclical representation of a typical ELT session with inclusion of every stage in the process of authentic learning experience (Adapted and modified from David Kolb's Experiential learning cycle).

1. Understanding the why of concrete experience – The session began with few clinical case scenarios about the deranged anatomy of the topic under consideration, catering to the relevance of the knowledge.
2. Describing the what by reflective observation – The dissection skill of that region/ structure was used by students to describe the relationship of structure under consideration.
3. Applying the how with abstract conceptualization – After each dissection, a brainstorming session happened in the group of applying what they demonstrated in the dissection to the case scenarios presented to them initially.
4. Analysing the what if with active experimentation – This was the debriefing session with the preceptor, where the presenters in the group presented the key findings of the case discussions with counter questioning done in the small group.

c) After the dissection hall session – Immediately after the session, students reflected on the experience and filled the post session survey. The group did a peer assessment of their performance in the session and provided feedback on the facilitation process. The facilitators also reflected on the process of conduction of the session.

Experiential Learning Survey

At the end of the each session, a three-sectioned experiential learning survey received integrative reflective feedback on the application of ELT approach's whole experience. Section 1 comprised the demographic data. Section 2 consisted of

the 16 question survey analysing the student's perspectives on the efficacy of elements involved in conducting the ELT session. Reflection on the experience were taken and suggestions sought on improving such endeavors were taken on in section 3 with open ended questions.

Quantitative Data – Statistical Analysis

The quantitative part of the data was analyzed using SPSS software version 26.0. The students' perception of satisfaction was analysed by calculating the percentages of strongly agree and agree on the Likert scale analysis. The means and standard deviation of all the items on the Likert scale were calculated.

The experiential learning survey questionnaire was framed for the study with this concept of construct validity. The three medical educational experts (not directly involved in the study) reviewed the experiential learning survey to check for clarity of purpose and address the concerned issues. The measure of internal consistency for the experiential learning survey as calculated by reliability coefficient Cronbach's alpha was 0.96.

Qualitative Analysis

The faculty and students were sensitized about organisation of the ELT sessions. The feedback on the anticipation and preconceived notions about these sessions were collected.

Analysis of qualitative data from faculty members' and students' reflective feedback questionnaires after the ELT was done using a grounded theory approach to identify themes. The constant comparative method was used to identify themes and coding categories. The themes that emerged were coded and commented assigned to the codes.

Inductive content analysis was done, and all the comments were assigned to the themes identified. After discussing the criteria for the assignment of codes to text, recoding, and reassigning comments to the themes, a 100% agreement was achieved.

Results

Quantitative Observations

Faculty and Students Sensitization Session

The departmental faculty showed 100% satisfaction with the organization of the sensitization program. The total satisfaction for the students was found at 95.4% after an hour-long sensitization program explaining the ELT. The application of this to improve in regular learning for the students, future conduct of sessions, and doubts were cleared patiently.

Faculty and Students Experiential Learning Session

The experiential learning model was implemented on a batch of 99 students of preclinical phase of the MBBS course. Participation in the survey was voluntary. After filling up a participant consent form, we received 91 responses from 99 students, making the participation percentage of 91.9%. The nine students were lost in the survey due to absenteeism on the days of conduction of the session. The analysis excluded these students.

Analysis of the Experiential Learning Survey

Section 1 of the post-session – experiential learning survey contained the students' demographic details like name, roll number, and email id.

Section 2 data is represented in [Table 1](#). The 16 items Likert scale structured questionnaire were broadly categorized into five thematic headings:

1. Category A – Learning and comprehension in ELT sessions – Items 1–2
2. Category B – Cycle of experiencing, reflecting, thinking, and acting – Items 3–8
3. Category C – Motivation towards self-directed learning ability – Items 9–12
4. Category D – Overall organization of the ELT sessions – Items 13–14
5. Category E – Overall satisfaction and gain in confidence from ELT sessions – Items 15–16

Table 1 Mean and Standard Deviation of Students Responses in Section 2 of the Experiential Learning Survey Questionnaire on a 5 Point Likert Scale (ELT – Experiential Learning Theory, Std. Dev. – Standard Deviation, SA – Strongly Agree, A – Agree)

Item No.	Questionnaire Items	Mean	Std. Dev.	% of SA & A
A. Learning and comprehension in ELT sessions				
1	The knowledge gained in these sessions were highly relevant in clinical context	4.82	0.44	97.8
2	By applying ELT, I am better able to correlate the knowledge of anatomy to clinical context provided	4.81	0.45	97.8
B. Cycle of experiencing, reflecting, thinking, and acting				
3	I feel more confident in discussing case scenarios after in-depth analysis in the ELT sessions	4.71	0.58	93.4
4	I was better able to understand the “why did it happen”, by experiencing the clinical case	4.76	0.52	95.6
5	I was better able to reflect on the case, by understanding “what went wrong”, with the help of the handouts given	4.80	0.48	96.7
6	I was able to think about “how” the relationship between the structures were involved in the disease process, after dissecting the region in the cadavers	4.75	0.55	94.5
7	I was able to understand “what if” the normal anatomy of the region get involved in the disease process, after the debriefing round table session	4.78	0.44	98.9
8	The cycle of experiencing, reflecting, thinking and acting, has increased my understanding of the anatomical perspective to the clinical case	4.75	0.51	96.7
C. Motivation towards self-directed learning ability				
9	The sessions has inspired me to read more about the topics for myself	4.78	0.53	94.5
10	I am confident that by using the cycle of experiencing, reflecting, thinking and acting, I would be able to solve other clinical problems in anatomy	4.68	0.58	94.5
11	I am motivated to use the cycle of experiencing, reflecting, thinking and acting, in solving clinical cases of physiology and biochemistry	4.75	0.55	94.5
12	This session has enhanced my ability to organise and plan my approach towards understanding clinical case scenarios	4.78	0.49	96.7
D. Overall organisation of the ELT sessions				
13	The ELT sessions were organised very well	4.75	0.51	96.7
14	The learning resource materials used like case scenarios, handouts, and prosected specimens were very helpful	4.85	0.45	96.7
E. Overall satisfaction and gain in confidence from ELT sessions				
15	I am overall satisfied after the small group session based on the application of experiential learning in Anatomy	4.74	0.53	95.6
16	The session increased my confidence in the understanding of the topic	4.76	0.50	96.7

Table 1 shows the experiential learning survey questionnaire items with the mean and standard deviation of each item's student responses. The higher percentage of responses in the strongly agree category (equivalent to Likert scale 5 scores) and agree (equivalent to Likert scale 4 scores) shows the acceptability of the experiential learning approach.

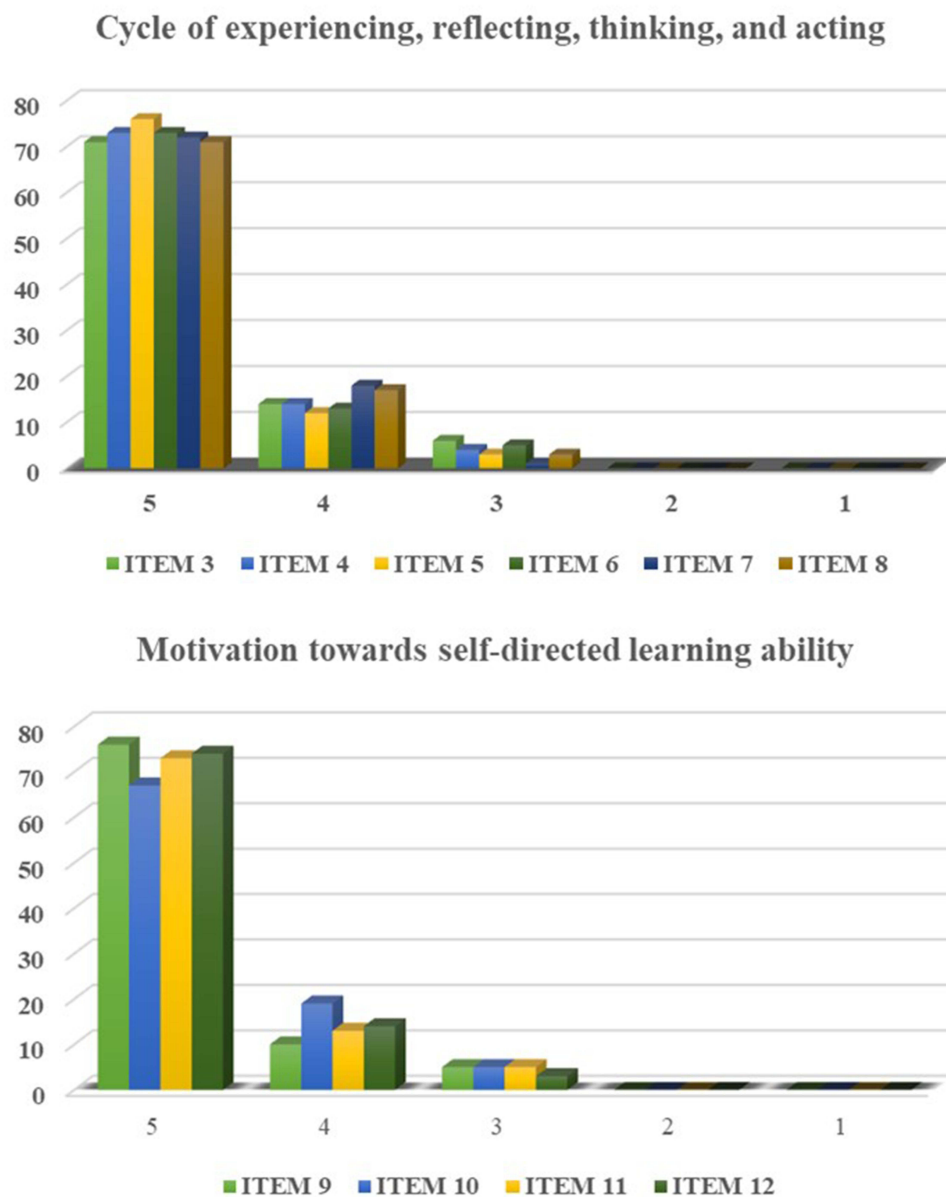


Figure 3 Bar chart representation of the frequency distribution of the students perception on item categorisation of experiential learning cycle and motivation for self-directed learning ability on a Likert Scale of 1–5 from strongly disagree to strongly agree.

The experiential learning survey's satisfaction index was increased (compared to the apprehensions from the sensitization session amongst students) to 96.1%.

Figure 3 summarizes the bar chart representation of Categories B and C, assessing the perception of the experiential learning cycle and self-directed learning ability.

Figure 4 summarizes the bar chart representation of Categories A, D, and E, assessing the perception of learning and comprehension, overall organization and overall satisfaction from the ELT sessions.

Qualitative Observations

Post Sensitization Feedback Component of Experiential Learning Survey for Faculty and Students

The faculty who were sensitized about the organization of the ELT sessions showed positive inclination towards the theory of experiential learning in improving their teaching pedagogies. The students were excited and curious about the new application into otherwise monotonous routine dissection hall teaching sessions.

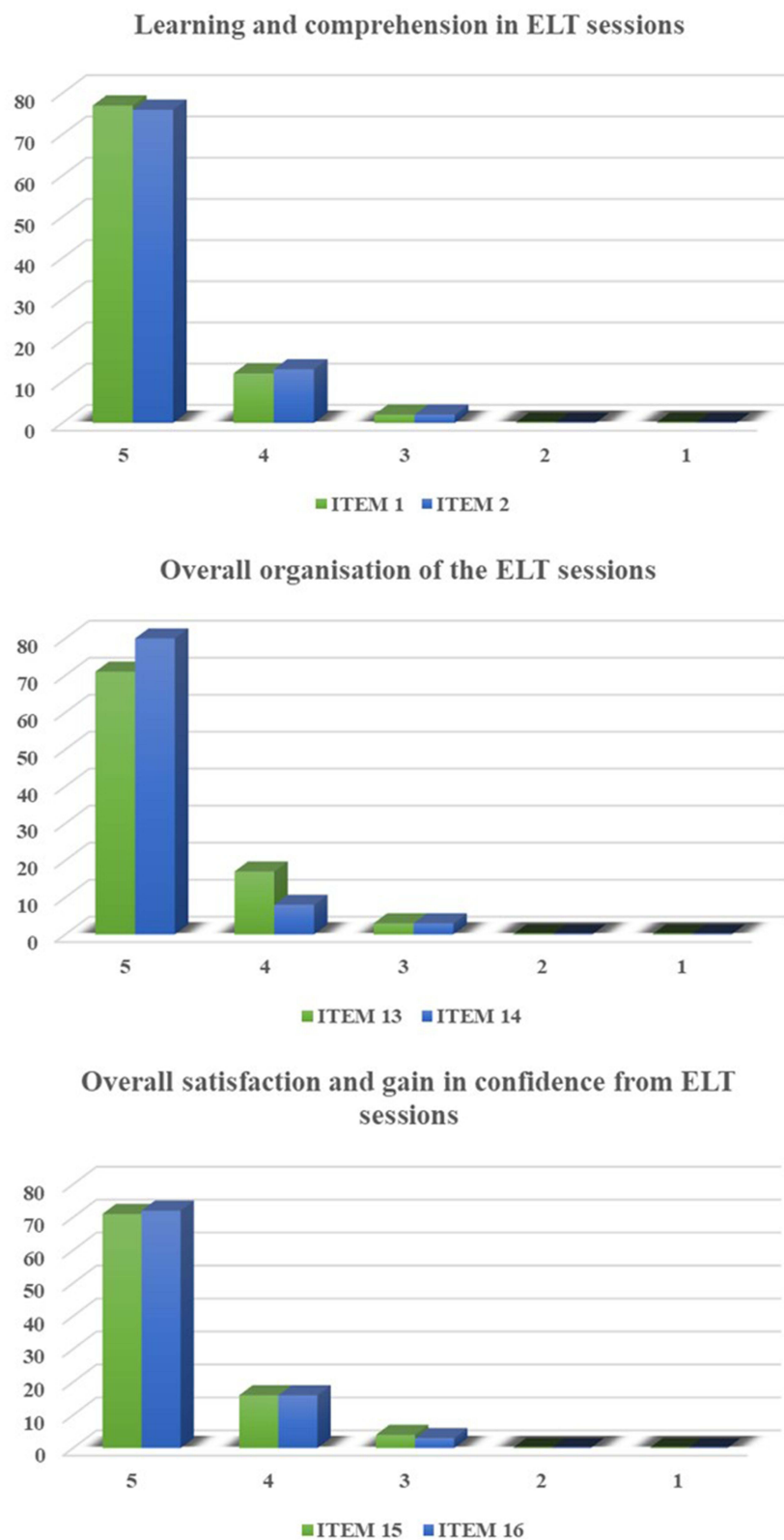


Figure 4 Bar chart representation of the frequency distribution of the students perception on item categorisation of learning and comprehension, overall organisation, and overall satisfaction on a Likert Scale of 1–5 from strongly disagree to strongly agree.

Table 2 Results of Qualitative Open-Coded Analysis of Facilitating Learning Experiences Derived from the Reflective Feedback Categorised on the Key Theoretical Frameworks Governing Experiential Learning

Theoretical Frameworks	Codes for Facilitating Experiences	Representative Comments, Words and Phrases
Practical based Experience	Skill based/ Cadaveric dissection based	“The dissection helped in learning the structures.” “By physical practices in dissection hall included along with lectures, learning is fun.”
	Early clinical experience	“The clinical cases that were given I am imagining myself as a doctor.” “Teacher gave us case and then made us to dissect the cadaver which helped us to relate our case with the cadaver.”
	Clinical case scenario based	“I liked the way that firstly case study was given to us then we experienced and understood the normal functioning and structures from dissection of cadaver and at last we identified what was the problem.” “Discussion of Clinical case before dissection helped in learning better.”
Social learning	Interactive	“...it was quite an interactive session.” “This was a very interactive session and we enjoyed it with learning.”
	Learning Strategy based	“We learnt about different type of learning strategies which are suitable for different type of students and we need to learn topics through application of these.” “In experiential learning we first analyse then reflect then conceptualise than we take action ... better method for understanding subject mainly anatomy.”
Situated Learning	Contextual & deeper learning	“The best part is correlation between applied portion and its content so that we can easily understand the topic.” “... how the benefits of such a method of learning like deeper insight and long lasting learning.”
	Guided Inquiry amongst peers based	“Learning by doing, and solving problems that we face in our common clinical practice.” “Experiential learning focuses on doing things on our own and learning ... something which will improve our way of learning.”

Analysis of the Post Session Feedback Component of Experiential Learning Survey

The feedback received from the students and the faculty after the conduct of the ELT session demonstrated a number of facilitators, and hindering factors to the learning experience. The suggestions to improve the future endeavours also gave us an insightful evidence. A representative sample of comments, words and phrases that coded for the facilitating learning experience of the ELT sessions is given in [Table 2](#).

Discussion

Theoretical Foundations of the Novel Experiential Learning Sessions

Educationists worldwide work tirelessly for the authentic transference of information and learners perturbed about the applicability of this transferred knowledge. This study which was based on the proposition of theories of situated learning, social interaction and exchange of clinical information and experiences, was able to create better transference and ensured applicability of the information transferred.^{1,11,12}

Theory of situated learning emphasises the importance of participants and the learning environment, with utmost highlight on the social interaction. In this study, the basis of situated learning was demonstrated by the social interaction in the small group. The inputs that students gave, influenced the thinking and learning processes of their peers. The fundamentals of situated learning were demonstrated by inner speech when the participants were able to voice their deliberations over the clinical case during the debriefing sessions converting internal thought into spoken language.^{6,13–15} Proficiencies to deliberate during the clinical case encounters serve as an extrinsic motivator and build upon a sense of professional identity.^{16,17} The facilitators were able to engage the students into the clinical case scenarios, encouraging them to learn from everyday contextual learning of the anatomical basis of the locally occurring clinical conditions. It

built on the constructivist aspect of experiential learning with the students sharing how meaningful these experiences have been for them.¹⁸

The experiential learning model described by Kolb was a cyclical process of learning experiences. Authentic learning occurs when the learners experience all the stages in the learning cycle.¹⁹ Based on this approach, the authors had innovated the experiential learning sessions where the students underwent all the phases of concrete experience, reflective observation, abstract conceptualization and active experimentation.

Applications of Experiential Learning Cycle

Experiential learning is now being adopted in many spheres of health professions education like medicine, dentistry, physical therapy, nursing education, etc., to varied extent of exploring learning styles and strategies to implementing the experiential learning cycle. This study reports the use of ELT using theoretical constructs of situated learning, social learning and authentic practical based experiences, for the early clinical experience of anatomical sciences for medical undergraduates. There are few studies that have pondered on experiential learning based sessions for anatomy practical sessions, but have differences in the nature of experiences the students have been exposed to. Due to which to compare this study with previously done studies using the same yardstick would be less fruitful.^{7,8}

Previous studies to integrate experiential learning into physical therapy curriculum by using simulation found overwhelming students satisfaction of 98% with gain confidence in their ability to provide quality care, interact with patients one-on-one, and participate in health advocacy through these simulation experiences.^{20,21} Another study on Nepalese medical students, which incorporated experiential learning through early exposure to primary health care centres could help students better understand the opportunities and challenges of such settings. They employed structured student reflections through the four stages based on Kolb's experiential learning cycle.²² Another first of a kind study based on experiential learning framework applied to the postgraduate medical education who were preparing for professional training in general practice and aimed to stimulate more student-centered learning.²³

In the first “understanding the why behind the concrete experience” stage of the ELT cycle, the students were introduced to the clinical case scenarios as narratives and role-playing of the patient encounter of case. The enactment of the case narrative aroused curiosity and wonder amongst the students and played well to increase their engagement with the class.

The second stage of the experiential learning cycle was “describing the what with reflective observation” of the cadaveric dissection of the relevant part occurring on the spot to demonstrate the relationships of the structures in situ, supplemented with reading materials for the active, reflective thinking of the students.

The third stage of the experiential learning cycle, the “applying the how with abstract conceptualization,” was done by a brainstorming session amongst the students deciphering the riddle of the clinical case scenario, with facilitation from the preceptors. The students were allowed to counterquestion and place arguments to support their judgments about the case to other participants. This positive social interaction by way of a zone of proximal development amongst the participants made their learning experience more profound.

The final stage in the session of “analysing the what if with active experimentation”, was done in the debriefing session when chosen presenters in the group presented their finding in front of the small group, giving the voice to the inner speech that occurs within all learners. The case solving was followed by a reflective discussion moderated by the facilitators within the group to get commitment from the students on making action plans for present and future learning.

Strengths of the Study

The study demonstrated the benefits of experiential learning to basic sciences application. It can be replicated as a model by researchers for similar or varied circumstances for improving the student engagements in health professions' education.

Limitations and Suggestions for Improvement

We did encounter certain limitations in conducting these sessions which need to be worked out for future applications of this model. So here are a few suggestions with this regard

- The COVID pandemic prevented bringing in real patients or standardised patients in the dissection hall encounters which were a limitation for the study. For future research prospects we would like to include real or standardised patients for these sessions.
- Training of the facilitators before the actual sessions is the bottleneck in attainment of the desired outcomes.
- Due to the current use of facilitator to student ratio was 1:33, it was realised by the students and the facilitators that problems occurred in forming effective group dynamics amongst the students. The authors suggest that a ratio of 1:15 to 1:20 could be used by researchers when aiming to introduce experiential learning for preclinical students.

Summary

Experiential learning can be implemented successfully for improving the learning environment of the students for basic sciences education. It can be effectively used to introduce the clinical clerkship or early clinical experience in the preclinical phase of medical graduate curriculum. Since this was a novel approach at the present institution, our future research should focus on applying experiential learning in other aspects of basic sciences education. The efficacy of such initiatives to be evaluated through the rigor of stringent program evaluations.

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Disclosure

The authors report no conflicts of interest.

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