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Original Research Article

Students perceptions about the pedagogic strategies for teaching-learning anatomy at university Eduardo Mondlane in Mozambique

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ABSTRACT

Background: From the need to develop a new curriculum for the medical course, changing the traditional model used for teaching Gross Anatomy it was sought to incorporate active teaching methodologies which can allow students to be more involved in the process of knowledge construction. The way in which Gross Anatomy is delivered in most Faculties of Medicine has been seen as a big challenge to the teachers and the students too as a consequence of permanent changes that are required in order to be in line with the technological development. This study aimed to explore the student's perceptions about the effectiveness of the strategies and resources, used in teaching-learning Gross Anatomy in the medical course at EMU.
Methods: Data were collected using a questionnaire administrated to those medical students who attended (1st and 2nd year) Gross Anatomy subjects, in November 2018. Descriptive statistics and data content analysis were performed. The sample comprised 171 students.
Results: A convergence of strategies preferred by the students involved in the study was seen. It was recognized that Gross Anatomy curriculum was designed based on the limitations of the use of cadaver dissection, with the emphasis on applied anatomy and learning in small groups using other resources, including computer assisted learning based on the 3-D Slicer software.
Conclusions: It appears that the students' desire is that the teaching-learning strategies used in Anatomy classrooms at UEM might contribute to their better training for the professional challenges when graduated. They perceived that with the strategies used for teaching Anatomy, they are being very well prepared to get in an entrepreneurial, transformative profile and are able to learn more complex contents in order to provide a qualified health care to people in the performance of their future functions as doctors.

Keywords: Active leaning, Anatomy, Medical education, Teaching-learning strategies

INTRODUCTION

In higher education, it is commonly noted that students look for training as an opportunity for social advancement. Teaching activity is characterized by the permanent challenge of education of professionals to establish interpersonal relationships with students, so that the teaching-learning process is articulated and that the methods used meet the objectives that they propose.[1-4]

Much debate has arisen about how the teaching of anatomy occurs. This is polarized for those who favor the dissection of human corpses and those who support new teaching modalities (for example, self-directed learning, problem-based learning (PBL), and computer-assisted learning (CAL). These views tend to be supported by traditionalists (predominantly surgeons and anatomists) or by modernists (predominantly educators), respectively.[2,5] From the need to develop a new

curriculum for the medical course, changing the traditional model used for teaching Gross Anatomy it is sought to incorporate active teaching methodologies which can allow students to be more involved in the process of knowledge construction.[1,5,6] The way in which Gross Anatomy is delivered in most Faculties of Medicine has been seen as a big challenge to the teachers and the students too as a consequence of permanent changes that are required in order to be in line with the technological development. To put teaching strategies into practice, the teacher need to know the students, consider the dynamics of the class, study and select the appropriate methods.[4,7] Attending classes and listening to the professor's lecture is no longer a guarantee that the student will learn. Undoubtedly, the teaching of gross anatomy in medical schools is seen as a cornerstone of medical education, leading the teacher to plan the activities assuming that the ability to do so is crucial to stimulate greater interest and contribute for learning effectiveness. This is especially relevant for students in higher education, who need more dynamic and diverse learning methods. Technological advances and the naturalization of strong behavioral changes, especially among young people, increase the tension in the search for methodological alternatives that can attract students to the world of knowledge, which requires certain rigor and discipline. When incorporating teaching strategies deemed more active, it became necessary to assess their relevance and effectiveness. The focus of concern is therefore, if the didactic updating of teachers has not kept pace with global globalization and the decrease in funding for higher education, a probable lack of harmony between teaching procedures, methods and strategies and the profile of students, harming the teaching-learning process.

On the other hand, it was conceived that when learning a content, one also learns a certain way of thinking and elaborating it, which is why each area requires ways of teaching and learning that explain the respective logic. In fact, teaching strategies are techniques that use different means and conditions to promote learning and that should be used since so that students can appropriate new knowledge more easily.[1,3,5,8] Considering the dynamism of the modern world, the teaching professionals who work in the health courses feel particularly pressured by a highly demanding external environment, however they must provide students with a high level of education and solid training.[2,9,10] The mission of learning becomes more difficult when analyzing the precariousness of educational systems and the social gaps that are widening, especially in the poorest countries. The ability of the teacher to identify these differences and choose the teaching-learning processes that best adapt to the characteristics of the students, with whom he/her works and which consider the characteristics of the content under discussion, may make him more successful in his/her craft education.[11] It is also noted that the teaching and learning procedures are articulated with each other and operationalize desired results within a certain theoretical perspective.[4]

In this way, the student expects from teachers of general and complementary subjects to perform less prominently, since he/her tends to have the teacher in specialized areas as a professional model and from whom he/she expects the transmission of the knowledge and methods necessary to highlight his/her future performance in the working market.[12,13] Within this perspective, the way in which the teacher plans the activities for the classroom is decisive for the group of students in the audience to react with greater or lesser interest and to contribute to the way the class proceeds. Adjusting the teaching-learning strategies defined by the teacher with the students' perceptions about the real value and meaning of these strategies can help to create a curriculum adjusted to the needs and expectations of the whole society.[14] In the context of teaching-learning Gross Anatomy, dissection allows developing skills of identification of structures based on the touch that gives above all the 3-D appreciation. However, as a learning modality, dissection has been marginalized from medical curricula to the despair of some health professionals.[10,14] Particularly health professionals in the surgical field defend the experience with dissection not only to help learn anatomical details, but to familiarize students with the variation in anatomy. Thus, the student can gain an appreciation of fully exposed structures that cannot be seen through an operation window, but that can be inadvertently damaged.[10] So, in view of the need to develop a curriculum for the course of Medicine at UEM based on changing the traditional teaching and learning model of Gross Anatomy, an attempt was made to incorporate active teaching methodologies. It is of interest that the revisions of the undergraduate medical curriculum at the Faculty of Medicine of UEM have been occurred with little research on the main aspects of the knowledge necessary to support the options of philosophy, strategies or comparing teaching methods. On the other hand, there is no core national curriculum in Mozambique and, as a result, a new curriculum with small variations has been introduced and has been shown to be more of a role than an implementation one. At EMU, the procedure for teaching Gross Anatomy is still highly dependent on the skills of using the available teaching resources and on the characteristics of the teachers themselves, the search for more active teaching-learning strategies contributed to the introduction of the use of 3D slicer software.[12]

On one hand, the teacher-centered style predominates with the teacher, making a presentation, that is, traditional lectures, or engaging in teacher-student interactions in the tutorial model. Slides particularly from the Netter collection or others prepared by teachers are used as audiovisual aids, even during theoretical classes. On the other hand, the procedure for teaching Anatomy at UEM is still highly dependent on the skills of using the available teaching resources and on the characteristics of the teachers themselves. The teacher-centered style

predominates with the teacher, making a presentation, that is, traditional lectures, or engaging in teacher-student interactions in the tutorial model. Slides particularly from the Netter collection or others prepared by teachers are used as audiovisual aids, even during theoretical classes.1 Published data on the impact of these changes is scarce, meaning that it should be assumed that external evaluation or even accreditation would be carried out to all medical training programs, so that medical schools end up having recognized freedom to teach and evaluate their own work, with the immediate consequence of a great divergence in Medical Education in general and Anatomy in particular. In this context, this study aimed to explore the student's perceptions about the effectiveness of the strategies used in teaching-learning Gross Anatomy in the medical course at EMU. Thus, the guiding theme of this research is the teaching practice of the classroom, specifically, the teaching strategies used by the teachers of Gross Anatomy subjects and the way in which students evaluate such strategies and the impact on their performance as learners.

METHODS

A mixed methodology research design integrating both quantitative and qualitative approaches was chosen to guide the enquiry to generate the data required to meet the aims of this study. A questionnaire was developed by looking at the specific areas designed to best fit the Mozambique context with 25 items (applying 5-Likert scale from 1 to 5 where 1: Poor, 2: Fair, 3: Average, 4: Good, 5: Excellent) that assess three domains: students' perception of the effectiveness of teaching-learning strategies, frequency of use of these strategies and the use of teaching-learning resources, and a free response on the objective of the study. Students were informed about the study and their consent was duly taken for their voluntary and anonymous participation. Any chance of participant bias was eliminated by clearly explaining the objective of the study while obtaining their informed consent. There were no specific exclusion criteria and no participants withdrew from the study.

The questionnaire was administered in the last week of November 2018, and the students were asked to fill it and give back throughout the week at the Department of Morphological Sciences EMU. Of a total of 171 students choose to participate in this study (94% of response rate). The demographic data of participants were collected including age, gender, and year of the study. The data were collected in paper forms and transferred into Excel spreadsheet and SPSS used for statistical analysis. Descriptive statistics were presented, in Tables, as frequency. The narrative question was analysed using a thematic approach to identify emergent ideas and concepts expressed by participants. Key words, phrases and/or descriptions from the participants were documented. Convergence and divergence of data were noted, leading to the development of preliminary emergent themes. The themes were further interrogated and developed with reference to participants' original words.

RESULTS

The sample comprised 171 participants, being 86 of first year and 85 2nd year. In each group the percentage of females was 58%. The majority of the participants (142, 83%) was in the age group of 21 years old, or less. Only 9 participants were more than 25 years.

Effectiveness of the strategies for learning gross anatomy

The responses summarized in Table 1, shows that the students that participated in the study, in general, still don't understand effectively that they must be the center of the knowledge building process and that, to the learning it is necessary to be in intellectual activity.

Table 1: Most effective class type.

Question 1: Which of the following modality (s) do you learn best from?					
Most effective class type =	**5**	**4**	**3**	**2**	**1**
Lecture (data show / overhead projector)	116	33	15	5	2
Theoretical and practical approach	88	69	13	1	0
Group-led study using prosections	70	29	28	31	12
Seminars	84	34	23	15	15
Dissection	106	55	8	1	0
Classroom debate/Scenarios	55	60	44	5	6
Surface anatomy (in vivo)	68	36	38	19	9
Case study	28	54	42	20	26
Monographs	33	56	48	18	16
Rating Scale - From [5 = Highest] to 1 = [Lowest]					

Thus, from the 171 participants who answered this set of 9 items a relatively large number of students (116, 68%) reported to learn better, either through the lecture (Expository class (data show / overhead projector)) with most of the students rating at higher level or by dissecting (106 students, 62%), as the second most preferred learning strategy. The strategies that most dispersed the students' opinions were case study, classroom debates, surface anatomy (in vivo) and writing monographs.

Though, it is important to highlight that almost all of the respondents rated more than one strategy at the same level, being the expository class, the group-led study, the seminars and the case studies, considered in a very scattered way, calling attention to the reduced vision of the effectiveness from the perspective of the participating. Theoretical and Practical strategy as well as Seminars were also rated as part of the most popular,

although by approximately 50% of the respondents (88 and 84 respectively 51,5% and 49%) (Table 1).

Frequency of use of teaching-learning strategies

The results presented in Table 2, allow to conclude that "Expository classes (using a blackboard, overhead projector, data show)" in fact is the most popular teaching strategy among the questioned students with 122 (71,4%) rating at highest level (5) as the most used teaching strategy in their anatomy classes, followed by the use of "theoretical and practical approach" which was also highly rated by 107 students (62,6%) . "Group-led study using prosections" was also rated by a large number of students (105, 61,4%) as being one of the strategies that they most liked in their learning process of Gross Anatomy.

Dissection was also highly chosen by 84 students at level 5 and 42 at level 4, which jointly makes a percentage of approximately 84% as a really frequent strategy used at EMU. The use of monographs , case study and surface anatomy as alternative strategies used for teaching-learning Gross Anatomy have been rated at lower levels of frequency more often than the others.

Table 2: Teaching strategies used.

Question 2: How do you rate the frequency with which anatomy teachers use the following teaching strategies?					
Teaching strategies used =	**5**	**4**	**3**	**2**	**1**
Lecture (using a blackboard, overhead projector, data show)	122	19	19	6	5
Theoretical and practical approach	107	36	12	9	3
Seminars	64	44	42	4	17
Dissection	84	42	17	12	15
Surface anatomy (in vivo)	36	30	66	11	28
Group-led study using prosections	105	50	8	4	2
Classroom debate/scenarios	38	77	27	17	11
Case study	28	54	42	20	26
Monographs	33	56	48	18	16
Rating scale - from [5 = Highest] to [1 = Lowest]					

Frequency of use of means of teaching-learning

The rating by the students of the frequency of use of teaching resources is shown in Table 3. It is noticed that the considered mostly used resource was the "data show" rated by 127 students (74%), followed by the use of prosections (101 students corresponding to 59%) and Maps and books rated 98 times (57%). Computer assisted learning was not very well recognized by the questioned students as one of the most used resource in teaching anatomy at the Faculty of Medicine of UEM, being rated at lowest level by approximately 60% of the total sample used (102 in a total of 171 students). The extra-class work was similarly chosen at good item levels 5, 4 and 3 with 46, 47 and 47 students respectively rating this item.

Table 3: Teaching resources.

Question 3: How do you rate the frequency with which the following teaching resources are used by gross anatomy teachers?					
Teaching resources used =	**5**	**4**	**3**	**2**	**1**
Data show	127	21	8	13	1
White board	47	51	34	5	33
Specific softwares like 3d slicers	21	4	31	11	102
Prosections	101	22	18	8	21
Manuals, Atlas, Maps, Books	98	44	17	3	8
Clinical cases	37	51	36	15	20
Extra-class work	46	47	47	13	17
Rating scale - from [5 = Highest] to 1 = [Lowest]					

How do the teaching learning strategies contribute in developing the skills expected in medical doctors?

In general, it was noted that there is a common understanding by the students in relation to the process of developing the skills needed by doctor and the teaching strategies adopted by their teachers and that these skills are stimulated and promoted throughout the teaching-learning process. Therefore, students underlined the existence of experiences that transcend the search for an association between theory and practice, going beyond the acquisition of knowledge towards the development of professional competence. In the experienced process, students highlighted experiences beyond technical learning, such as the acquisition of moral values, growth as a human being, importance to citizenship, respect and sensitivity in human relationships, incorporating concepts such as comprehensiveness, horizontality and autonomy in acquiring the knowledge sought, as well as ethical aspects particularly related to the use of the Dissection Laboratory (Table 4). Dissection, as teaching strategy was seen by 164 students (96%) as the method that puts them to develop the practice, realizing the professional reality that awaits them. On one hand, the use of Monographs in teaching Gross Anatomy, was stated by a majority of the students (137, 80%) as useful since Anatomy is a very large and important subject for the training of medical doctors and it is not possible to retain everything that is expected consequently this strategy encourages to learn. It makes students stay up to date and better understand the subject studied. It goes beyond the teacher's explanation, to arouse curiosity. While, on the other hand, the use of Lectures, refered by 101 students (59%) stated that as the teacher using practical examples from his/her daily work contributes to improving students' learning with a recognized impact on their performance in the subject. The group work with the use

of prosections was referred by 98 students (57%) who clearly stated that it serves very well as it allows debates between them and also allow to work communicating with others, developing leadership, responsibility and agility. Seminars, Case study and Debates were the less referred. However 78 (46%) participants stated that seminar encourages the students to give their opinions in a reasoned way, 59 (35%) students, have the opinion that Case study helps students understanding and approaching reality and that it also brings to them technical knowledge to analyze each situation, shows a little of the professional's life. At the bottom, the use of Debates was found as the less referred (only 21 students, 12%) although they have considered that it makes students get more involved and interested in the subject (Table 4).

Table 4: Summary of strategies and skills cited by the students during the interviews.

Question 4: In your opinion, in general, how do the teaching learning strategies contribute in developing the skills expected in medical doctors?		
Strategy	**Skills**	**Number of citations**
Monographs	Anatomy is a very large area and it is not possible to retain everything that is expected, and this strategy encourages learning to learn. It makes students stay up to date and better understand the subject studied. It goes beyond the teacher's explanation, to arouse curiosity.	137
Lectures	The teacher using practical examples from his daily work contributes to improving learning.	101
Seminars	Encourages students to give their opinions in a reasoned way	78
Case study	Help understanding and approaching reality. It brings technical knowledge to analyze each situation, shows a little of the professional's life.	59
Dissection	It puts students to develop the practice, realizing the professional reality that awaits them.	164
Debates	It makes students get more involved and interested in the subject.	21
Group work	Works with communication with people, leadership, responsibility and agility.	98

DISCUSSION

The purpose of this research was to identify the perception of students on the effectiveness of strategies for the teaching-learning Gross Anatomy at EMU taking into account1 that main challenge is the permanent change in the medical curriculum.

This study considers only the opinions of medical students from EMU. Students' opinion may vary across different universities and can be very different from anatomists' who are responsible for setting the standards and the learning outcomes of anatomy education. From the data analysis it was possible to conclude that the four types of classes that are most effective, according to students' opinion, are those in which the dialogued exposition, the group-directed study, the seminars and the dissection are used to work with Gross Anatomy subject at EMU. It is supported by the point of view that prosection is the most used aid for demonstration purposes whenever possible in teaching-learning Gross Anatomy, with some student involvement.[1]

Additionally, the results allow to infer that the teaching-learning strategies very often used in the teaching-learning process of gross anatomy were: Lectures, group-led study, seminars, dissection sessions and theoretical-practical approach.

These strategies were applied using data show, prosections, Maps, Books, software and Atlas, these being the didactic resources used and considered by the students involved as effective for learning. It should be taking into account that the teaching-learning strategies described in the literature areneither absolute nor immutable, constituting tools that can be adapted, modified, or combined by the teacher, as deemed convenient or necessary.[2] Even in the context of this study, dissection seems to remain ideal for self-directed learning as it gives students the opportunity to explore a subject for themselves at their own pace, in a practical way and according to their own personal interests. Probably the most significant in the teaching-learning gross anatomy is related to the fact that students have, over time, shown a high regard for dissection as a resource for learning.[5] So, the challenge should not be to determine the supremacy of one methodology over another, but to maximize the learning benefit available from the different methods. The objective of including other strategies should be to develop reasoning skills, to allow learning within a relevant context, to encourage work-related skills and to promote self-directed learning. The proper use of dissections, prosections and softwars

(simulators) can fulfill these goals and have additional benefits.[12-14] Thus, through the results, it appears that the students' desire is that the teaching-learning strategies used in Anatomy classrooms at UEM might contribute to their better training for the professional challenges when graduated and they fill that, with the strategies used in their Faculty for teaching Anatomy, they are being very well prepared to get in an entrepreneurial, transformative profile and are capable to provide a qualified health care to people in the performance of their future functions as doctors. The surveyed students could externalize why specific teaching-learning strategies should be used to achieve the graduate profile and professional profile defined in the legislation and other documentation related to the training of Medical Doctors in Mozambique.

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REFERENCES

1. Rodrigues M. Impact of the teaching-learning anatomy in the training of medical doctors in Mozambique. EJPMR. 2015;2(4):664-81.
2. Hegazy A, Minhas L. Reflection of the Type of Medical Curriculum on Its Anatomy Content: Trial to Improve the Anatomy Learning Outcomes. Intl J Clin Develop Anat. 2015;1(3):52-63.
3. Fabbro M, Salim N, Bussadori J, Okido A, Dupas G. Active teaching and learning strategies: perceptions of nursing students. REME - Rev Min Enferm. 2018;22:e-1138.
4. Bekele A, Reissig D, Loffler S, Hinz A. Experiences with dissection courses in human anatomy: a comparison between Germany and Ethiopia. Ann Anat. 2011;193:163-7.
5. McHanwell S, Atkinson M, Davies DC, Dyball R, Morris J, Ockleford C. A core syllabus in anatomy for medical students - Adding common sense to need to know. Eur J Anat. 2007;11(S1):3-18.
6. Yaqinuddin A, Ikram M, Zafar M, Eldin N, Mazhar M, Qazi S, et al. The Integrated Clinical Anatomy Program at Alfaisal University: an innovative model of teaching clinically applied functional anatomy in a hybrid curriculum. Adv Physiol Educ. 2016;40:56-63.
7. Alhassan A, Majeed S. Perception of Ghanaian Medical Students of Cadaveric Dissection in a Problem-Based Learning Curriculum. Hindawi. Anat Res Int. 2018;2018.
8. Elizondo-Omana R, Guzman-Lopez S, Garcia-Rodriguez M Dissection as a teaching tool: past, present, and future. the anatomical record (part b: new anat.) 2005;285b:11-5.
9. Topp K Prosection vs dissection, the debate continues: rebuttal to Granger. Anat Rec (Part B: New Anat) 2004; 281:12–14.
10. Rizzolo L. Human Dissection: An Approach to Interweaving the Traditional and Humanistic Goals of Medical Education. Anat Rec (New Anat.) 2002;269(6):242-8.
11. Benly P Teaching Methodologies on Anatomy- A Review. J Pharm Sci Res. 2014; 6(6):242-3.
12. Afonso-Suárez M, Skareb A. Pujol S, Rodrigues, M. Diao B, Septy M, Ruiz-Alzola R. A Medical Technology Training Program: Enhancing Quality Education in Africa. ESIHISE 2019: Blue Herons Editions.
13. Pawlina W, Lachman N. Dissection in Learning and Teaching Gross Anatomy: Rebuttal to McLachlan. Anat Rec B New Anat. 2004;281(1):9-11.
14. Ettarh R. Anatomy Past and Present: Evolution of Curriculum and Teaching in Anatomy. Austin J Anat. 2014;1(2):1009.

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