

# Improving The Receptivity Of Students During An Anatomy Course Using Pedagogical Innovations

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## Citation

P Manyacka Ma Nyemb, J Ndoeye, B Faye, I Diagne, L Gueye. *Improving The Receptivity Of Students During An Anatomy Course Using Pedagogical Innovations*. The Internet Journal of Surgery. 2014 Volume 31 Number 2.

## Abstract

**Introduction:** Despite the many changes that anatomy has experienced in recent decades, it remains a fundamental discipline for physicians and surgeons. However, it must continually adapt to the context of modern pedagogy.

**Purpose:** to improve learning and interest of medical students in anatomy, we collected their opinion about innovations to make in teaching methods of that discipline.

**Materials and methods:** at the end of the academic year, an anonymous questionnaire was used to collect the opinion of students of first and second year. Medical students gave their point of views about formal magisterial courses, computer assisted teaching, examinations, practicals and laboratory dissections.

**Results:** medical students prefer live discussions during the last 30 minutes of the lesson, availability of all course materials on the website of the university, diversity of assessment techniques, improved learning materials during laboratory teaching and dissections, and varying pedagogical materials.

**Conclusion:** With some pedagogical innovations and improvement of learning material it is possible to increase the receptivity of medical students to anatomy teaching.

## INTRODUCTION

The gross anatomy is the cornerstone in the modern medical curriculum. Despite the changes currently affecting anatomy departments in many medical schools it remains a fundamental discipline for the training of all surgeons [1]. Learning anatomy and understanding the body's structures in relation to its functions have for centuries been the foundation of medical studies. The methods used to teach anatomy have changed significantly in recent decades and the advent of new technologies offers other possibilities to explore the anatomy of the human body.

Despite the interest of these new methods, in West Africa and Senegal many factors affect the teaching of anatomy [2]. The environment in which we operate is unfavorable and delays the development of an optimal pedagogy, even using traditional methods. The aim of this study is to report the proposals of medical students to improve anatomy teaching at the Faculty of Medicine of Saint-Louis in Senegal.

## MATERIAL AND METHODS

By the end of the academic year, we used an anonymous questionnaire to collect the opinion of first and second year students. The investigation focused on the anatomy taught between October 2012 and March 2013. Students were asked to express their opinions about formal magisterial courses, computer assisted teaching, examinations and laboratory teaching. A space was provided for observations and free comments. Data were collected using SPSS and Microsoft Excel software.

## RESULTS

Seventy-five of 88 students in total (85.2%) responded to the questionnaire. In L1 (first year or License 1), 44 of 55 students (80%) completed the questionnaire. In L2 (second year or License 2), 31 of 33 students (94%) completed the questionnaire.

About formal magisterial courses, 89.3% of students felt that the course objectives were useful. For 73.3% of them PowerPoint presentations do not facilitate understanding of the course. 32% of students feel that drawings on the blackboard or handouts are difficult to reproduce. 86.7% of

them think that the anatomy course should be held preferably in the morning. For 93.3% of them it is important to book the last 30 minutes for discussion.

54.7% of students felt that handouts should be made available to students on the university website, and for 84% of them the self-assessment tests are required. Students request to vary the type of question during the examination (72%), and to provide exercises on the website (93.3%). The tests shall include anatomy drawings for 78.7% of them, and for 84% they must necessarily be based on course objectives.

For 97.3% of students, practicals and tutorials in the laboratory are useful for understanding and even more important than formal magisterial courses for 61.3% of them. 54.7% think that visits to the anatomy laboratory are not well organized, and for 90.6% of them these visits must be more frequent.

In the free comments, students mentioned the lack of practical work and the scarcity of cadaveric dissection sessions, their preference for courses taught using blackboard, poor learning material conditions, the difficulty for understanding courses through videoconference equipment, the difficulty in understanding drawings on powerpoint slides.

More detailed results are presented in Table I.

### **DISCUSSION**

In our effort to improve the education provided to the students it is important to directly get students' advice. This process of self-criticism is taboo in our context in sub-Saharan Africa. However, it is essential in our effort to improve teaching.

We used an anonymous questionnaire for our survey. This type of tool is useful for collecting and analyzing information. Its anonymity improves the objectivity of responses; however students are limited in their choice of answer. In our questionnaire we provided a space for free comments, so that students can express themselves without restriction.

Nine out of 10 students believe that giving aims is useful for understanding the lesson. It is indeed essential to have the course objectives at the beginning of the teaching. Given the amount of information to be stored as and when teaching, it is important that student learning to be based on guidelines provided in the form of educational objectives. Moreover, these objectives allow L1 and L2 students to discuss

applications in clinical anatomy and medical imaging. This shows the importance of the formulation of objectives when we know that learning anatomy in a clinical and pathological context is an advantage for medical students [3]. Students can thus make the correlation between the shape and structure of the organs and their physiological functions. Studies [4] show that a few years later, most Master and PhD students express the need for an anatomy oriented towards clinics, medical imaging, surface anatomy and anatomy in living beings. Moreover, our study shows that more than 9 out of 10 students prefer the teacher to reserve the last 30 minutes for live discussion.

For 73.3% of students, powerpoint presentations do not facilitate understanding of the course. The use of powerpoint slides allows for the teacher a better organization of the course and diagrams. The teacher is more comfortable with the ability to amplify a particular point. Designing and showing anatomical drawings is easier. However a significant proportion of students expressed their preference for formal magisterial courses on the blackboard. In our context this choice probably reflects the fact that many students are not yet accustomed to the use of computers.

However, students adapt to new technologies. Anatomy websites is a resource increasingly used by medical students in our context. A German study found that there is an increased demand for online anatomy resources [5]. It seems that websites are more motivating and interactive than conventional textbooks. In another study it has been shown that students who operate internet resources for learning anatomy were significantly better than the others [6]. In these websites, self-assessment exercises and real-time feedback is a crucial point because the student is able to know his weak points and correct them. 84% of students were in favor of self-assessment exercises.

One of the most important points in the teaching of anatomy is represented by practicals and laboratory teaching. For 97.3% of students, practicals in the laboratory are crucial and even more important than formal magisterial courses for 61.3% of them. For many authors, the dissection remains the gold standard for teaching anatomy [3]. In our context, dissection and prosection are as important as in developed countries. However, dissection sessions in the laboratory are rare in sub-Saharan Africa. Cadaver's dissection allows three-dimensional perception of anatomical structures of the body in an interactive way for students. It also helps to develop skills in spatial reasoning necessary for the understanding and interpretation of medical imaging [7]. However, the

dissection is expensive and costly in time, with emotional consequences for students. Even when learning material are good, laboratory dissections are experienced by students with much apprehension. The dissection is often the first experience of confrontation with death through the anatomical subject. These mandatory practice sessions are often anxiogenic for students and can cause many psychological consequences [8]. Moreover, formalinised tissues do not give an impression as accurate as living tissues. Thus for some authors [9], dissection is interesting especially for students who aspire to make a career in surgery.

The prosected cadavers enable learners to have the pre-dissected material. This method allows students to maximize their learning of anatomy using rare and fragile resources as human bodies. The prosection therefore represents an attractive option for medical schools financially limited [10].

For 54.7% of students, visits to the anatomy laboratory could be better organized, 90.6% of them think that they should be more frequent, emphasizing the scarcity of cadaver dissections. This result raises the problem of the difficulty of obtaining cadavers for teaching anatomy. In our context, barriers are legal, cultural, and economic. In a recent study, it was found that some populations are more favorable for the body donation [11]. Sociodemographic factors such as race, ethnicity and education also have a significant influence in the decision of body donation. In our country, all bodies used in anatomy are unclaimed bodies.

About body donation, the most relevant contribution is the establishment of a specific legal framework with the help of institutions and experts in law. This framework must be clear enough so that to establish a relationship of trust between donors and medical schools. Moreover, even if the use of unclaimed bodies is a temporary solution, it is important to make aware of the voluntary donation of human body.

In the free comments students particularly stressed the need to vary the teaching materials. Indeed, experience shows that the new teaching anatomy methods can be implemented in our context with excellent results [12]. A multimodal approach is essential to the teaching of anatomy. Although many teachers and learners mark their preference for dissection and prosection, other methods are needed and should be used whenever possible to supplement conventional courses [13,14]. The advent of the teaching of anatomy through computer-assisted interactive software is an important turning point. For a more complete pedagogy,

it is important to involve the study methods in living beings [15]: conventional radiography, CT, MRI, ultrasound, and laparoscopic videos and surface anatomy. It is also important to promote more interactive learning through workgroups.

## CONCLUSION

This work reports the opinion of students to improve the teaching of anatomy at the Faculty of Medicine of Saint-Louis. It shows the general changes that should be made to this discipline in sub-Saharan Africa. It appears that with some pedagogical innovations and improvement of learning material and techniques, it is possible to increase significantly the responsiveness and thus the interest of medical students to the teaching of anatomy.

**Table 1**

Students responses to the survey about new measures (N = 75)

PROPOSITIONS	Agree (%)	No opinion (%)	Disagree (%)
<b>COURSE:</b> objectives are useful for the learning and the review	89,3	4	6,7
PowerPoint presentations facilitates understanding	14,7	12	73,3
The last 30 minutes reserved for discussion are useful	93,3	4	2,7
Anatomical specimens improve understanding	84	13,3	2,7
The diagrams on the blackboard and handouts are understandable and reproducible	52	16	32
Anatomy lessons should take place in the morning	86,7	12	1,3
<b>INTERNET:</b> courses materials (PDF, drawings...) must be available on the website	54,7	25,3	20
<b>TESTS:</b> self-assessment tests are necessary	84	10,7	5,3
<b>ASSESSMENTS:</b> they should include a wider variety of questions to each test	72	17,3	10,7
They must be based on objectives given during the lesson	84	8	8
More than 2 assessments should be proposed before the final exam	60	8	32
Self-assessment questions should be available on the website	93,3	4	2,7
Assessments must necessarily contain drawings	78,7	13,3	8
<b>VISITS TO LABORATORY:</b> are they useful?	97,4	1,3	1,3
They must be more frequent	90,6	6,7	2,7
They are well organized	9,3	36	54,7
They are more important than formal magisterial courses?	61,3	16	22,7

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