USE OF ACTIVE METHODOLOGIES FOR THE TEACHING OF NEUROANATOMY

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Abstract: In recent decades, more and more in higher education, active methodologies have been applied, playing a significant role in expanding knowledge. There is a consensus on the perception of the need to use practical tools that contribute positively to learning in neuroanatomy. Therefore, the present work aimed to present tools used in teaching practice based on active methodologies, of which the following stand out: - handout with boards for activities in class, where students identify neuroanatomical structures by colors and legends; - synthetic anatomical parts; 2D and 3D models; made in groups by themes; - sample of neuroanatomy; - group dynamics and pedagogical gymkhana

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of knowledge and social responsibility. Considering the experiences based on more than twenty years of the teaching staff in the exercise of higher education focused on health and aligned with the instruments for evaluating undergraduate courses at the MEC, it is relevant to define innovation as creative ideas that contribute positively to the quality of teaching and learning process. Finally, the activities demonstrated encouraged critical thinking, problem solving, decision-making and the practical application of the contents studied.

Keywords: Active Methodology. Neuroanatomy. Laboratory of Biological Bases of Behavior.

INTRODUCTION

Traditional teaching methods have been debated for many years because they focus on the simple transmission of information from the teacher to the student and use a standardized assessment. This discussion has been motivated by the importance that should be attributed to students' prior knowledge, as well as by the need to stimulate students' proactivity and collaboration throughout the educational process (SEABRA et al., 2023)element.

Several authors demonstrate that the adoption of active learning provides an improved academic performance by students in various undergraduate areas, resulting in reduced failure rates in the evaluation processes (AZEVEDO; AZEVEDO FILHO; ARAÚJO, 2022; PASTURA; SANTORO-LOPES, 2013; SAINTS; SASAKI, 2015).

Increasingly, in higher education, active methodologies have been applied and have played a significant role in the expansion of knowledge, the exercise of freedom, the autonomy of choices and decision-making, in addition to encouraging scientific initiation (ARAUJO et al., 2021)element.

In recent decades, the paradigm of health education has changed considerably in its priorities, contents, and methods. Empirically, some disciplines are seen as more difficult and complex, especially neuroanatomy (ARANTES; FERREIRA, 2016).

Currently, the teaching and learning process has been positively affected by innovations,

increasingly, the pedagogical objective has been guided by the evaluation of competencies. Some of the changes are consequences of the growing complexity of scientific knowledge and the improvement of technological means (FEITOSA et al., 2021)element. However, it is still a challenge to determine which tool is the best for the study of neuroanatomy, considering the diversity of knowledge of the students (ARANTES; FERREIRA, 2016).

Some strategies can be used to contribute to the identification of anatomical structures, in addition to synthetic and cadaveric specimens (SANDERS et al., 2019). The study of human neuroanatomy through the use of cadavers is relevant as it offers a deeper understanding of the topography of the body, allowing students to analyze the anatomical relationships between distinct organs and structures (PROHMANN et al., 2023)element.

However, the manipulation of the corpse by students is a practice that presents some obstacles, in most educational institutions, the cadaveric bodies are of people who died and were not sought by friends or family members who, according to Law No. 8,501 (BRASIL, 1992), can be used for teaching and research.

However, it is possible to notice a reduction in the availability of unclaimed bodies today. This is related to recent progress in the country's socioeconomic conditions, along with costly bureaucratic procedures for the regularization of unclaimed bodies (CURY; CENSONI; AMBRÓSIO, 2013; PROHMANN et al., 2023).

Thus, in recent years, as technology advances, diverse and varied teaching approaches have emerged to meet the need to use the cadaver as an educational resource. We can cite as examples the use of digital whiteboards, videos, 3D software, synthetic anatomical models and many other innovative methods (OLIVEIRA et al., 2020; SOUSA et al., 2023)element.

In October 2017, the Ministry of Education and Culture (MEC), through the General Coordination for the Evaluation of Undergraduate Courses of Higher Education Institutions (HEIs) presented new instruments for the evaluation of undergraduate courses where It includes innovation, which it called "successful practices or innovations" (CASTRO, 2011; DAVID; OLIVE TREE;

SCHALL, 2010).

Therefore, committed to the quality of teaching and focusing on the learning process in neuroanatomy, this work aimed to present tools used in teaching practice based on active methodologies.

MATERIAL AND METHODS

The present work was based on the qualitative nature and narrative approach, that is, it refers to the understanding and explanation of lived experiences of the teaching-learning process of the discipline of Laboratory of Biological Bases of Behavior (LBBC) that is inserted in the curriculum of the first periods of the Undergraduate courses in Psychology and Neurosciences of the Pontifical Catholic University of Rio de Janeiro (PUC-Rio).

Neuroanatomy guides the syllabus of the LBBC discipline, which has as its syllabus the identification of regions of the nervous system. The methodology adopted was based on the active participation of students, where the student becomes the protagonist of his own learning. The tools are employed through practical, collaborative and reflective activities, they are:

- Workbook with boards for class activities, where students identify neuroanatomical structures by colors and legends.
- Synthetic anatomical parts.
- 3D anatomy atlases, available online.
- 2D and 3D models, made in groups by themes, using different types of materials as part of the evaluation process.
- Neuroanatomy exhibition: students and monitors exhibit videos, anatomical pieces and models.
- Group dynamics: quiz (using the moodle platform and kahoot app) and pedagogical gymkhana of knowledge and social responsibility.

The scavenger hunts are worked in a playful way, where students participate in group tasks and collect donations (non-perishable food, clothes and hygiene items) that are donated to institutions that help people and communities in need.

All procedures had the participation of monitors (students who had excellent performance in the discipline) and teaching assistants (master's or doctoral students).

The selection process for monitoring the LBBC discipline takes place through a practical and theoretical test. The teaching assistants are teaching interns and are involved in a representative way in the training of the monitors.

Findings

Figure 1 presents illustrations of the booklet "Uncomplicating Laboratory Practices in Neuroscience"1 containing 186 pages, used as a tool in practical classes, where students identify neuroanatomical structures by colors and legends. On the right, three boards with drawings and neuroanatomical areas worked by the students during the classes of the LBBC discipline stand out. The content of the workbook is divided into two parts, the one especially focused on the LBBC discipline has 47 pages (containing the boards with the drawings) and their respective legends.

1 The workbook is offered to students through the page created for the LBBC discipline at PUC-Rio, available at: http://bio-neuro-psicologia.usuarios.rdc.puc-rio.br/assets/livro_completo.pdf - Accessed on: 06/30/2023

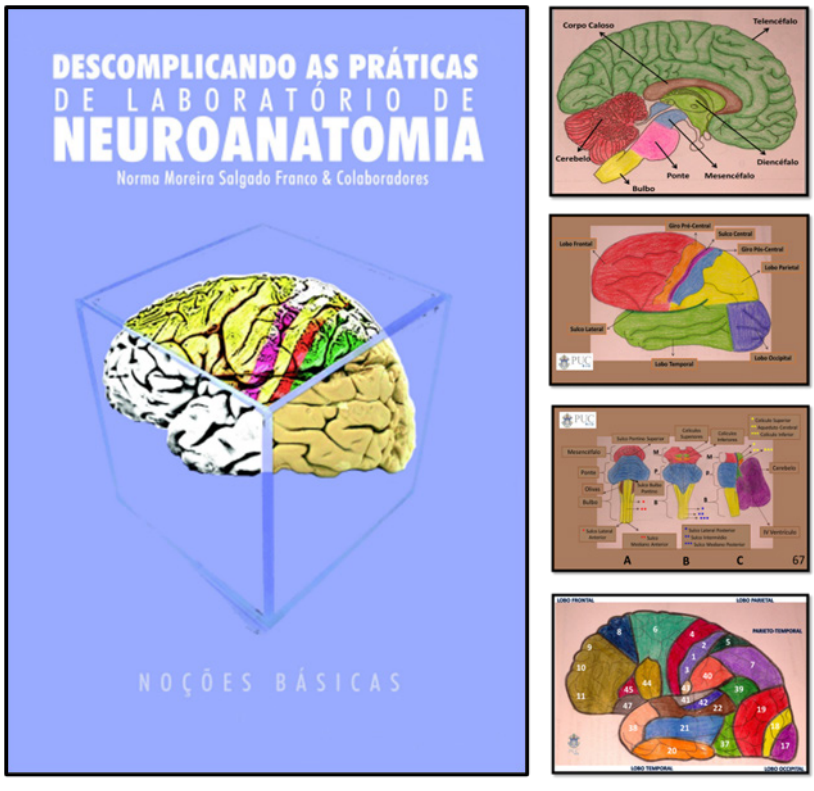

Figure 1 – Workbook and boards used in classes

In Figure 2 we can see photos taken during classes, where some anatomical pieces are used in practical classes by teachers, monitors and teaching assistants.

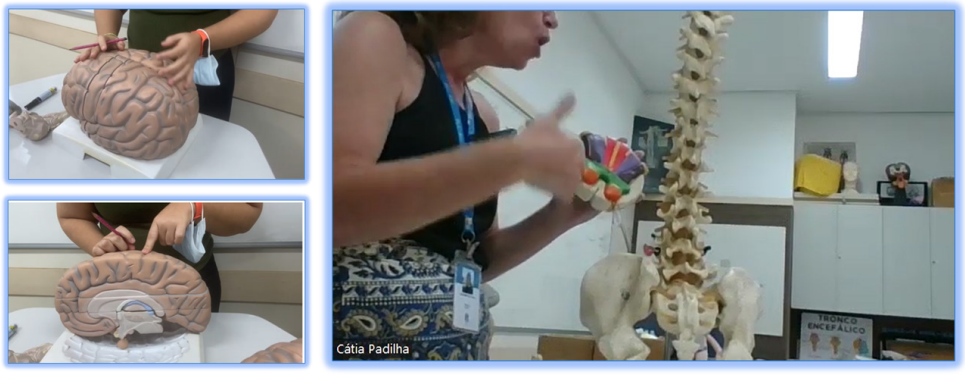

Figure 2 – Anatomical specimens used in class

In Figure 3 it is possible to highlight some models produced by the students and exhibited in the neuroanatomy exhibition that took place on the pilotis of the Cardeal Leme building, PUC-Rio, in the first semester of 2023.

Figure 3 – Models and on the right the neuroanatomy show

Discussion

The practice-based learning approach motivates students and empowers them to develop problem-solving strategies, providing a more dynamic educational experience in which they acquire knowledge and skills in an active and process-oriented way (GIMENEZ-LOPEZ et al., 2010)element.

According to Marques et al. (2021), in the traditional teaching method, students are limited to being mere consumers of knowledge, without being seen as creators. However, active teaching-learning methodologies transform this reality, promoting greater student engagement, stimulating

self-learning and creativity. Under this new perspective, students are no longer just receivers of information and start interacting with both the teacher and classmates, allowing them to experience more meaningful and deeper learning experiences.

The present study reinforced the heated discussions that currently permeate the field of teaching, addressing one of the most debated themes. Several authors describe the importance of choosing teaching strategies, and currently active methodologies have gained more prominence, proving to be a current and fundamental theme (DINIZ; OLIVE TREE; SCHALL, 2010; PAIVA et al., 2019; PEDROSA et al., 2011).

Educational institutions face constant challenges to create teaching approaches that improve the understanding and retention of anatomical knowledge (OLIVEIRA et al., 2020; PEDROSA et al., 2011).

Sanders et al. (2019), developed a pedagogical approach that implemented learning based on practical neuroanatomy classes, which differs from the usual teaching of neuroanatomy, in that it actively involves students in learning with satisfactory results.

Also in this work, the authors showed that it is possible to adapt methods developed in the laboratory to classrooms, with strategies based on retrieval in anatomy classes that are easy to apply, low cost and can be implemented in practically any educational environment (SANDERS et al., 2019) element.

CONCLUSION

Considering the experiences based on more than twenty years of the faculty in the exercise of higher education focused on the health area and aligned with the evaluation instruments of undergraduate courses of the MEC, it is relevant to define as innovation the creative ideas that contribute positively to the quality of the teaching and learning process.

The active methodology applied in this study valued the construction of knowledge in a

meaningful and contextualized way and promoted a more engaged, participatory and effective learning.

In this scenario of initiatives, academic monitoring also emerges as a tool for the training of qualified student-monitors – undergraduate and graduate students, who in this context were focused on learning neuroanatomy.

Therefore, the activities demonstrated encouraged critical thinking, problem solving, decision-making and the practical application of the contents studied.

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