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*** Original article**

Animal use for teaching and research purposes: pros and cons

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Abstract
Teaching and research activities are historically performed with the use of animals in search of knowledge and benefits to both of them. This article is based on the existence of a new paradigm for animal use in academic studies, and aims to discuss how science applied to laboratory animals, a common practice by students of Medicine and Biological Sciences at the Federal University of Rio Grande (FURG), contributes to academic and professional training. The conflicts generated by this issue have become clear in the points raised in this article, revealing the need for reflection on ethical animal use in teaching and research activities. One of the major conclusions is that Laboratory Animal Science needs to emerge as a provider of expertise on the use of animals for didactic-scientific purposes.

Keywords:
ethics; teaching; research; science; animals

Introduction

As life on Earth changes, some beings adapt and set standards and forms of interaction with other beings. History shows that man has defined these types of interactions with the environment through time, usually by dominating and transforming nature as a function of his observations and needs.

In education and research, many activities are performed using various environmental resources in order to deepen knowledge of a subject; one of them is the use of animals for didactic and scientific purposes in search of knowledge and benefits to both people and animals. Studies of human and veterinary interest about animal use of animals have been conducted since ancient times, as stressed by Raymundo and Goldim (2007, p.12):

> "Hippocrates (450 BC) used to associate the appearance of sick human organs with those of animals with a clearly didactic purpose. Anatomists Alcmaeon (500 BC), Herophilus (330-250 BC) and Erasistratus (305-240 BC) performed vivisections on animals to observe structures and formulate hypotheses about

> the functioning of such structures. Later, in Rome, Galen (129-210 AD) was perhaps the first person to perform vivisection with experimental goals, i.e. to test variables of changes made to animals" (RAYMUND *et al*., 1997).

It can be seen, therefore, that science has historically been influenced by philosophy. Some schools of thought maintained that animals had no soul; hence they were unable to feel pain. However, Pythagoras (582 - 500a.C) already stated that "kindness to all non-human creatures was a duty" (ibid., p. 08).Thus, we find that questions about animal use have always accompanied the development of science.

The first animal protection movements emerged in Europe in the nineteenth century. According to Diniz (2006) "Since the end of the last century, man has been trying to adopt a new attitude towards nature, randomly exploring its features, whether they are mineral, vegetable or animal". This relentless pursuit of new technologies and new knowledge is historical and peculiar to man, and allows mankind to get new achievements, and hence further development.

In this context, the use of animals in the teaching and learning process in biomedicine has led science to question the existing paradigms in order to promote debate and reflection on conflict situations, so that scientific practice is based on ethical principles and animal welfare.

Thus, this study aimed to assess the knowledge of students of Medicine and Biological Sciences (licenciate and baccalaureate) on Laboratory Animal Science by examining how such degree programs contribute to their education at the Federal University of Rio Grande.
To achieve these goals, the researchers i) assessed how the issue of Laboratory Animal Science was approached in degree programs (licenciate and baccalaureate) in the Medicine and Biological Sciences ; ii) checked whether practical lessons with animals constituted a pedagogical framework in academic teaching; iii) analyzed if the students recognized the importance of specific knowledge concerning the use of animals in teaching or research; iv) identified the varied perceptions attributed by the students on the use of animals for teaching and research, i.e. their opinion on whether or not it was necessary to restructure the curriculum regarding the use of Laboratory Animal Science courses in Medicine and Biology degree programs (licenciate and baccalaureate).
In parallel, this study drew upon Bioethics and Laboratory Animal Science as theoretical underpinnings because such fields intertwine and, thus, enable multidisciplinary lessons that can contribute to animal welfare by developing alternative methods to animal use in academic teaching and research.

Bioethics

In his book *Bioethics: bridge to the future*, published in 1971 (cited in Feijó, 2005), American biologist Van Rensselaer Potter conceptualized bioethics as a science that would ensure the survival of life on the planet, grounded on the importance of the biological sciences. Besides, according to Clotet, quoted in Feijó (2005):

> "The term bioethics seeks to focus on the ethical reflection about the phenomenon of life. It is common knowledge that there are different forms of life and also different ways of considering life-related ethical aspects. The fields of study and application of bioethics, therefore, have a plural character and encompass issues such as ecological ethics, duties to animals, development ethics and the ethics of human life" (FEIJÓ, 2005).

Bioethics, which is oriented to the treatment given to animals, is a current issue that many theorists have been discussing and researching. One of them is Peter Singer, through his book "Animal Liberation". According to Singer, cited by Menegotto (2006), "Animals could be used sporadically in activities aimed at the development and welfare of human beings, provided that the benefits justify the means employed".

There are several approaches to animal use in teaching and research, promoted by scholars and practitioners in biomedicine and philosophy, prompting discussions and reflections of a scientific and ethical nature. These reflections aim to elucidate differences and establish suitable didactic-scientific practices based on ethical principles.

Different ethical approaches address the issue of animal use in teaching and research, but there are several recent studies referenced in the two following areas: *Deontology* – a radical approach which does not accept, under any circumstances, the use of animals in procedures that will cause them some kind of suffering; and *Utilitarianism*, whereby animal use is accepted as long as it does not subject animals to unnecessary suffering. According to Paixão (2008), "The assertion that the use of animals in teaching is fundamental for animal experiments to continue to exist, does not confer moral legitimacy to either party; it just establishes the logic of the relationship between them". These ethical issues are globally expressed in the scientific literature and in social events, a trend which is also followed in Brazil.

Maturana (1993) states that ethics is related to the concerns we have with the consequences of our own actions on the world. If the world is important to us, then we have ethical concerns. These concerns can be seen in the fact that many universities are developing actions on these issues in order to provide teachers, students, researchers and others involved in the matter, with insights on the relevance of ethical and technical aspects regarding animal use in science and education. The Federal University of Pelotas (UFPEL) stands out as a pioneer in Brazil in banning the use of live animals for teaching purposes in all their degree programs. The Federal University of São Paulo (UNIFESP) has gained attention by implementing alternative methods; for example, using mice made of PVC for microsurgery practice. The adoption of this practice demonstrates that scientific knowledge about teaching and animal testing can help develop the critical and scientific thinking of those involved in animal testing and, thus, generate new scientific behavior.

The debate on the use of animals in Brazil for both science and education has recently boosted the approval of specific national legislation on the subject (Law 11794 of 8 October, 2008), which established the National Council for the Control of Animal Experimentation (CONCEA). This council requires that institutions using animals in teaching and research or experimentation must apply for CONCEA accreditation. Moreover, as a prerequisite for accreditation, each institution also has to establish its own Ethics Committee on Animal Use (CEUA).

Laboratory Animal Science

The use of animals in science and education is justified through scientific advances promoted by this practice; it is considered a prerequisite to improving the quality of life of animals, humans and nonhumans and, therefore, of social welfare. However, it is necessary to improve and implement mechanisms to regulate the knowledge-oriented use of animals.

> "When we accept the acquisition of scientific knowledge + humane methods as objective criteria, we deconstruct old beliefs about the use of

> animals in experimentation and favor men, without excluding the perception of experimental animals as sentient beings" (LIMA, 2008).

These and other implications related to animal use in teaching and research comprise Laboratory Animal Science. Through the development of this new area of science, animals no longer have a mere supporting role but rather become the main actors in the academic and scientific milieu. Today, many recognize that any factor exerting direct influence on animal welfare can alter the results of experiments or practical classes conducted with animals. Thus, laboratory animal science contains knowledge about the general rules of operation of laboratory animal husbandry facilities and about general care when animals are used in teaching and research practices.

In Brazil, the Brazilian Society of Laboratory Animal Science (SBCAL) brings together professionals involved in this area of knowledge and orientates Laboratory Animal Science activities such as technological innovation and refinement in animal experimentation; production of transgenic lines and knockouts; reduction in the number of animals used in research; nutritional aspects of laboratory animals; biosecurity in the production of laboratory animals; alternatives to animal use in teaching and experimentation; ethical evaluation of animal experimentation; animal welfare; scientific impact of innovations in the accommodation of laboratory animals; use of biological markers to evaluate animal welfare; recommendations for teaching and training of human resources; health and genetic standardization of laboratory animals; sanitary control of laboratory animals; regulations on the use of laboratory animals; good laboratory practice (GLP); identification and reduction of stress, discomfort and pain. These are areas that require not only technical information but also ethical attitude and ethical considerations from the professionals involved with these practices. According to Frajblat *et al*., (2008):

> "The development of science in favor of man cannot and should not serve as a foundation for the disrespectful, widespread use of animals. We need to be ethical towards the need for scientific development and adopt measures to reduce animal suffering and promote animal welfare. It is important to remember that the credibility of research results depends on the welfare experienced by animals during research implementation, the sensitivity of the researcher to understand their sufferings and needs, and common sense in decisions and attitudes" (FRAJBLAT *et al*., 2008) .

Thus, it is essential to examine pedagogical practices that make use of animals in teaching and research activities at the Federal University of Rio Grande (FURG) by questioning not only the ends (results), but especially the means.

Methodology

Considering the proposed objectives, an exploratory and descriptive investigation was conducted to obtain realistic information that is required for problem identification and definition. For this reason, this study encompassed both field research and the review of the literature about the relevance of applying findings of Laboratory Animal Science in education and research. As observed by Demo (2000):

> "When conducted with logicality and explanatory power, theoretical research carries argumentative resourcefulness. Thus, although it may not determine immediate intervention in reality, it is essential to create basic conditions for efficient intervention. Concrete data arising from empirical work depend on the related theoretical framework to be comprehended, but they add significant value to theories" (DEMO, 2000).

Thus, data collection encompassed the administration of a structured questionnaire with closed questions, whose answers were analyzed quantitatively. According to Lankshear and Knobel (2008), well conceived and conducted quantitative research can point out interesting standards and trends in education. Participants were selected based on the following criteria: they had to undergraduate students of Medicine and Biological Sciences (licenciate and baccalaureate) at FURG; Biology students had to be in the first or last academic year while Medicine undergraduates had to be in the first or third year of medical school, because from the fourth year onwards they are busy with hospital training activities.

To ensure the reliability of the answers to the questionnaire, respondents remained anonymous. The questionnaire was administered in November 2009 in the following courses: Histology (Medical School, 1st year); Pharmacology (Medical School, 3rd year); Embryology (Biological Sciences, 1st year); Philosophy and History of Science (Biological Sciences, 5th year). Primary data were manually transferred into a database using a personal computer.
The percentages show that the findings emerged from data analysis done with the Excel and EPI-INFO 6.4 programs.

In parallel, a qualitative documentary research was performed to analyze the syllabuses of the Medicine and Biological Sciences programs (licenciate and baccalaureate) as well as the description of the courses identified as possible means of information as regards the issue of Laboratory Animal Science.

Analysis and discussion of data

The questionnaire was answered by a total of 102 students, whose distribution was as follows: 50 medical students (49.02%) and 52 students of Biological Sciences (50.98%). The average age of students was 21.6 years, and (69.6%) were female (female students were noticed to outnumber their male counterparts in both programs). The students seemed to be motivated by the research. Their answers revealed social experiences and knowledge acquired at university, because according to (FEIJÓ, 2005):

> "In a learning environment where teachers and students interact as they question whether or not animals should be used, the responses to such debate acquire paramount importance as they will guide future actions of future professionals whose decisions may or may not be influenced by their respect for life and non-human animals. Therefore, more reflection should be made on the use of animals for teaching purposes because of the resulting impact on students' professional development"(FEIJÓ, 2005).

Compiled from data from the questionnaire, the tables below show students' views on different aspects of animal use in teaching and research.

Table I –Answers to Question 1. At university, have you learned about the use of animals for teaching and research purposes?

DEGREE PROGRAM\ANSWER	YES	NO
Medicine	84 %	16%
Biological Sciences	63.4%	36.6%

Table II – Answers to Question 2. In your undergraduate studies, have you ever used any type of animal in teaching or research activities?

DEGREE PROGRAM\ANSWER	YES	NO

Medicine	96 %	4%
Biological Sciences	80.7%	19.3%

The analysis of the previous tables shows that most students in both courses had had prior knowledge and experience in the use of animals in academic activities. According to Regan (1993), quoted in Feijó (2008), one must consider the fact "that education is one field where the use of animals is very frequent". In addition, the figures show that medical students had received more information on animal use and made use of animals in their studies more often (96%) than biology students. Although the documentary analysis performed on the course descriptions found a lack of direct approaches to the issue of Laboratory Animal Science, the information gathered from the questionnaire showed that students are exposed to teaching situations that somehow address the issue.

More particularly, it can be inferred from the analysis of the percentages in Table II that pedagogical practices using animals are still common in these courses. According to Diniz *et al.*, (2006), the development of subjects such as pharmacology, toxicology, immunology and surgical techniques, which are compulsory for the School of Medicine at FURG, led to the increased use of animals. In Biological Sciences, only the course of immunology is compulsory, hence animal use is reduced, and the issue is less likely to be addressed.

However, the question of whether or not animals should be used must comply with students' actual needs for skills training, so biomedical teachers are supposed to stimulate learning by discussing ethical values associated with respect for life.

Currently, some biomedical studies show that courses such as Surgical Techniques, Pharmacology and Physiology, among others, can replace the use of animals with various alternative methods available without prejudice to the classes. However, this change in methodology is a slow one, perhaps as a result of a lack of knowledge by teachers and a lack of technology or financial support for such changes in educational institutions. Einstein, however, quoted by Feijó (2008), "believes that the training of future biologists cannot be accomplished in alternative models, but in animals. These arguments show the need for teachers to constantly update on new trends in the teaching and learning process.

Table III - Answers to Question 3. In your opinion, how important is the use of animals for teaching purposes?

DEGREE PROGRAM\ANSWER	Very Important	Important	Of Little Importance	Unimportant
Medicine	58%	38%	2%	2%
Biological Sciences	17.3%	40.4%	25%	17.3%

Table IV - Answers to Question 4. In your opinion, how important is the use of animals for research purposes?

DEGREE PROGRAM\ANSWER	Very Important	Important	Of Little Importance	Unimportant
Medicine	82%	14%	4%	0%

Biological Sciences	26%	53.8%	17.2%	2%

Tables III and IV show the first instance of conflicting views on the use of animals in teaching and research: 96% of medical students believe animal use is either important or very important, whereas for Biology students this percentage is 57.7% for teaching and and 79.8% for research. This percentage difference between the two student profiles reveals the duality of views that can somehow be attributed to the curricular structure, because each program orientates students differently in the attempt to develop the knowledge and skills required by each profession. For example, Guerra (2004) argues that:

> "The decreased use of animals in scientific experimentation or in undergraduate education does not result from the belief that such practices are expendable and meaningless to the academic training of students; for example, medical students without previous training on animals will experience real difficulties later" (GUERRA 2004).

Guerra also believes that:

> "Some undergraduate students in the fields of Biological Sciences often show a certain aversion to using animals in their training classes and they either find it difficult to understand the logic and usefulness of practical classes or fail to extrapolate the knowledge from basic research to routine professional activity" (GUERRA 2004).

These contrasting perceptions have been changing the relationship between men and animals; in recent decades, moral and ethical concerns about this issue have emerged, especially with different concepts, and they are increasingly present in the daily life of students and teachers of Biological Sciences and Health. According to Feijó (2005), "biomedical teaching which relies on animal use was also influenced by the use of animals in science, and it objectively introduces views that support and oppose the use of living beings as a teaching tool".

Thus, Paixão (2008) believes it is essential to encourage the ethical debate on education policies - especially those concerned with the issue of "humanization" of prospective professionals - to leverage the development of new efficient methods of teaching and learning and ensure animal welfare. Currently, publications show that many schools of medicine and biology seek alternatives to using live animals in practical classes, and do not acknowledge such use when the result is already found in the literature.

Table V - Answers to Question 5. Have you ever participated in practical classes which adopt alternative methods to animal use?

DEGREE PROGRAM\ANSWER	YES	
Medicine	92 %	
Biological Sciences	40.3%	

Table VI - Answers to Question 6. Do you believe that alternative methods can replace the use of animals in teaching?

DEGREE	YES	NO	NOT ALWAYS

PROGRAM\ANSWER			
Medicine	8%	30%	62%
Biological Sciences	34.6%	3.8%	61.6%

Tables V and VI address the issue of alternative methods to animal use in teaching and show that 92% of medical students have participated in hands-on practice with the use of alternative methods, but only 62% responded that they cannot always replace the use of animals. There was no consensus in the responses of students of Biological Sciences due to the fact that only 40.3% participated in lessons with practical use of alternative methods, and even so, 61.6% believed that these methods cannot always replace the use of animals.

These differences of opinion presented by students regarding the replacement of animals by alternative methods may be influenced by several factors: first, by the lack of disclosure about the alternative methods available, or by the reluctance of certain teachers to replace the animals because they consider the new methods less efficient. According to Diniz *et al.*, (2006), "The replacement of animals in our country is not only a matter of ethics but also a legal matter. The Federal Law 9.605/98 provides penalties (three months to one year imprisonment plus fine) for using animals in pain-inflicting experiments, whenever there are alternative methods".
Moreover, the objection of conscience, ensured by the Constitution, can be used to guarantee the rights of individual students who refuse to attend or participate in classes that use animals. Morales (2008) believes that:

> "The use of animals in scientific research, especially mammals, has brought heated arguments by activists who are simply against it. Part of the arguments raised by this sector of society is based on the fact that alternative methods are able to replace the use of animals (a practice deemed obsolete) in research activities. Is this argument really accurate? How far society is willing to forego the use of animals in research and risk blocking the advancement of biological knowledge, testing and development of new drugs, vaccines and surgical methods?" (MORALES, 2008)

The use of alternative methods in higher education is considered to be an opportunity for educators to catalyze important didactic and pedagogical changes through methodological and technological innovations in science. Thus, whereas the percentages indicate that most students show doubt and uncertainty about this possibility, there is an evident need to shift old paradigms in search of new models, values, concepts, ideas and dialogues. In this line of thought, Moraes (2004) stresses that it is important to commit to moving towards a relational and reflexive consciousness, have a more comprehensive thinking and search for new theories and techniques to support not only our teaching practice and our knowledge construction processes, but also to contribute to developing human consciousness and improving the quality of life on the planet.

Table VII - Answers to Question 7. What's your opinion about the following statement? In scientific research, studies with animals are essential to the advancement of biomedical knowledge.

DEGREE PROGRAM\ANSWER	AGREE	DISAGREE	NOT SURE
Medicine	96%	4%	0%

Biological Sciences	44.2%	34.6%	21.2%

The table above shows that almost all medical students (96%) agreed on the statement. This may be justified by the curricular design and the pedagogical practices adopted, which influence students' perception that academic studies which make use of animals enable the development of skills involved in identifying, preventing and solving problems associated with people's health.
However, there was a discrepancy between the students of Biological Sciences; only 44.2% of them agree that such studies are indispensable, and 21.2% were unsure about it. These data deserve consideration: because Biological Sciences programs are among the ones that use animals in their training most often. Hence, their students should be able to express their opinion on the issue. When undergraduate students fail to express their point of view, they epitomize the lack of information, reflection and debate on the subject in the university environment, supporting the thought of Moreira *et al.,* (2009), who believes that institutions of higher education do not seem concerned about providing information on the interaction between animal experiments and developments in biological sciences. This is alarming because it is in institutions of higher education where training of top professionals and researchers takes place; hence such professionals cannot be unaware of conflicts of an ethical nature. Educational institutions should consider the importance of i) training professionals to develop balanced attitudes toward various issues, and ii) providing biomedical students with knowledge on the use of animals in teaching and research.

Table VIII - Answers to Question 8. In your opinion, should the use of animals for teaching and research take into account the implementation of Ethical Principles (Animal Ethics)?

DEGREE PROGRAM\ANSWER	YES	NO
Medicine	90 %	10%
Biological Sciences	98%	2%

Table VIII shows that most students in both courses believe in the application of ethical principles; 90% in Medicine and 98% in Biological Sciences have a positive position. This can be explained by the fact that the current discussion of ethics and bioethics has been fostered at FURG since CEUA was established there in order to regulate and support teachers, researchers, students and society at large about the morally appropriate management of animals. The objective of the CEUA is to examine the procedures of teaching and research previously to determine their compatibility with the law as well as notify CONCEA and health authorities of any accident involving animals. Staffed by veterinarians, biologists, teachers and researchers and a representative of animal protection societies, this multidisciplinary group aims to reduce conflicts of interest when assessing and approving of lesson plans and experimental protocols.

This institutional practice is aligned with the ideas of Feijó (2008), who notes that the most important function of an ethics committee oriented to the use of animals is educational, which is exercised through the assessment of procedures performed to animals, weighing the advance of knowledge or the educational value of any technique against the impact of this procedure in terms of pain and suffering, confinement and other situations of stress or death of a living being.

The teacher figure is especially important in teaching and research practices at university as a role model and a generator of knowledge for students. According to Feijó (2005), the influence of the teacher figure on the students is unquestionable, regardless of level of study. The human dimension of the teacher-student relationship may involve attitudes and values that transcend the context of books, classroom and other curriculum materials.

Meanwhile, issues of ethics and bioethics have been treated and publicized somewhat frequently by the media, academic seminars, conferences, animal-oriented non-governmental organizations, government and society. This idea concurs with the opinions of Raymundo and Goldim (2009):

> "Information is extremely important for teachers, students, researchers and the like to understand the relevance of topics related to ethical issues in scientific experimentation and, above all, engage in their practices by implementing research and teaching activities that are ethically and methodologically appropriate" (RAYMUNDO *et al.*, 2009).

Thus, it can be assumed that ethical concerns are likely to increase, given the consensual answers to the questionnaire, the increased debate around the issue, and the conflicting situations triggered by ethics.

Table IX - Answers to Question 9. Laboratory Animal Science is a new field that underpins all sciences that use animals for teaching and research. It encompasses the development of knowledge of animal welfare and the search for alternatives that reduce or eliminate the use of animals in some areas of teaching and research. Do you think it should be included in the curriculum of undergraduate programs in biological and health sciences?

DEGREE PROGRAM\ANSWER	YES	NO
Medicine	68%	32%
Biological Sciences	90.3%	9.7%

Table X - Answers to Question 10. If you answered 'Yes' to the previous question, answer the following question: how should Laboratory Animal Science be included in the curriculum?

DEGREE PROGRAM\ANSWER	Content of a mandatory subject	Content of an elective	Content coupled with another discipline
Medicine	12.1%	45.4%	42.5%
Biological Sciences	42.5%	38.3%	19.2%

As previously reported, the use of animals in teaching and research practices in biological and health sciences is still frequent. Thus, there is another difference of opinion among the students; 68% of medical students approve of a course on laboratory animals in the curriculum. This result, coupled with the analysis of Table II - in which 96% of students say they have used animals in their academic studies - and the percentage of only 12.1% of students that advocate the inclusion of the subject as a compulsory subject, might make one wonder: *Can animal use desensitize students to its implications and make them regard it as a natural practice*?

However, 90.3% of the respondents from Biological Sciences expressed the need for a course on laboratory animals, and 42.5% agree that such contents should be provided in the curriculum through a compulsory subject.

Despite the difference of opinion, analysis of data obtained during the study highlights the importance of the questions, discussions and reflections on the teaching-

learning process with the use of animals. Creating opportunity for students to acquire knowledge on this subject is placed as a challenge to teachers. Thus, as the curriculum is a document that aims to guide actions in the socio-educational field, a pedagogical discussion is required around the use of Laboratory Animal Science in existing subjects or potential subjects. However, teachers have to be trained for this kind of subject, as they are responsible for providing the information required to implement discussions on the respect for life, safety and maintenance of animals used in university teaching and research.

According to Paixão (2008), "The use of animals in any educational setting will have an impact on animals and on students, who are targeted by the teaching-learning process". Also, according to Miranda (2009), ratifying established science is much easier and less strenuous. Experiencing changes calls for flexibility, critical thinking and humility. Science and education are not static, and require constant questioning of reality. This is the role of universities and professionals involved in these educational practices.

It was within this scientific context that the analysis of the indicators collected according to the goals allowed this study to be considered an intervention which, according to Demo (2000, p. 38), "can be assumed as the study promotes questioning, theorizes practices and produces alternatives, proposing methodological perspectives of action which can sustain intervention work beyond the research itself".

According to Minayo (2006, p. 13), "it is very naive to think that in an era of such accelerated changes which affect the two fundamental categories of human thought, space and time, the academic environment and research institutions could remain untouched".

Concluding Remarks

This research on a sample of university students in the biomedical field has proved that the "use of animals in teaching and research" actually promotes antagonistic positions even in related fields. The conflicts generated by this theme are evidenced by how the students answered the questions, which signal that these issues have to be addressed in the classes or as separate courses. It is relevant for students in those areas to have access to basic knowledge about laboratory animal science. This fact is relevant because these professionals are prospective opinion makers, as we all get ideas from our interactions with the world and these are strongly linked to our social life. It is thus believed that education has an important role in shaping these views; therefore, it should allow students to access knowledge that is coherent with their training to avoid misunderstandings arising from scientific content presented so often in a simplified or distorted manner, resulting in misunderstandings of the facts.

Thus, we highlight the interaction between teacher and student as an unquestionable aspect of transformation in student training. The challenge will then direct our efforts towards using alternative methods and refining techniques to reduce or eliminate the use of animals in teaching and research whenever possible in order to humanize future professionals and ensure ethical attitude towards animal use in academic practices and research.

Finally, as we recognize that the Federal University of Rio Grande (FURG) promotes important knowledge while developing teaching and research activities, we conclude that the results should be used to encourage the academic community to introduce methodological changes to the current treatment given to animals. In other words, teachers and students could develop their activities based on ethics and animal welfare through the emergence of Laboratory Animal Science.

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