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GAMIFICATION OF ANATOMY TEACHING: strategies for remote study of anatomy

GAMIFICAÇÃO DO ENSINO DE ANATOMIA: estratégias para estudo remoto de anatomia

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ABSTRACT
The teaching and learning of Animal Anatomy is always very challenging for both the teacher and the student, a challenge that has been increased immensely with the emergence of the new coronavirus, almost completely changing the way of teaching, reflecting in new methodologies of active learning. With this, the present work aims to report the experience and results of such methodologies applied to the remote teaching of Animal Anatomy in the context of higher education, 2020, second semester, at the Universidade Estadual da Região Tocantina do Maranhão (UEMASUL), Brazil. In a class of 40 students aged between 19 and 35 years old, a division into six groups, which was determined to have developed a digital material in the format of a didactic game of their choice and that would present among the contents studied. The result of the groups was effective for the creation of various teaching materials, such as a website, booklet, game and quiz, aimed at learning anatomical knowledge.
KEYWORDS: Teaching-learning; Education; Veterinary

RESUMO
O ensino e a aprendizagem da Anatomia Animal sempre são muito desafiadores tanto para o docente quanto para o discente, desafio esse que foi aumentado com o surgimento do novo coronavírus, mudando quase que totalmente a forma de ensino, refletindo em novas metodologias de aprendizagem ativa. Com isso, este trabalho tem como objetivo relatar a experiência e os resultados de tais metodologias aplicadas ao ensino remoto de Anatomia Animal no âmbito do ensino superior em 2020, 2º semestre, na Universidade Estadual da Região Tocantina do Maranhão (UEMASUL). Numa turma de 40 alunos de faixa etária entre 19 e 35 anos, houve a divisão de seis grupos, onde foi determinado que cada grupo desenvolvesse um material digital em formato de jogo didático de sua preferência, que apresentasse os conteúdos estudados. Teve como resultado a criação de diversos materiais didáticos, como site, cartilha, game e quiz, que agregaram na aprendizagem efetiva do conhecimento anatômico.
PALAVRAS-CHAVE: Ensino-aprendizagem; Educação; Veterinária

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INTRODUCTION

The year 2020 started with several challenges that completely changed the routine of the population worldwide. With the emergence of the new coronavirus (SARS-CoV-2) that spread around the world quickly, and soon after, in mid-March 2020, the classification of a COVID-19 pandemic was decreed by the World Health Organization (WHO) reflecting here in Brazil immediately with the suspension of face-to-face classes for an indefinite period. Classes returned in a totally different way than usual, carried out remotely through technological mechanisms that facilitated communication as far as possible by helping a lot in this new stage of teaching.

The implementation of remote teaching was one of the great challenges that arose with the pandemic (COVID-19) as a matter of necessity, especially for Higher Education, which is the focus of the present work by prioritizing a contextualized and very well applied teaching, which seeks to the student's learning process more effectively through the application of different pedagogical approaches (COSTA and SANTOS, 2021). In this way, teachers and students had to adapt to the new reality caused by the new coronavirus, reflecting on new teaching methodologies that began to be used through different programs, applications, and social networks as educational tools (PASINI *et al.*, 2020). Therefore, the teaching of Animal Anatomy for higher education also had to undergo new methodological approaches, using these technological resources for the development of this topic as practical as Animal Anatomy, present in the contents that make up the discipline of Descriptive Anatomy of Domestic Animals.

In the Bachelor's Degree in Veterinary Medicine, the study of Animal Anatomy is indispensable and totally essential. According Versalius (1543), "Anatomy must rightly be regarded as the solid foundation of the entire art of medicine and as its essential introduction." The discipline is the basis for clinics, especially for students who have never had an initial contact of theoretical and practical study with such structures. A large part of its workload consists of practical classes, as it is one of the most effective ways of offering real contact, however, it does not diminish the importance of the theoretical part, which is also essential.

In this way, remote teaching, in such a pandemic period, it was impossible to carry out practices in laboratories in such a risky way as not to compromise everyone's health, so it was up to the teachers and assistants (monitors) to find new ways, alternatives and pedagogical teaching tools that contribute in an effective way to the learning of students, in topics related to animal anatomy, such as the functioning of systems and the composition of the organs of each system of the animal organism, approaching its structures, compositions and anatomical positions.

Therefore, the objective of this work was to describe the use of learning strategies through active methodology such as gamification to carry out evaluations of curricular content through the tools provided by Google and software creation. The experience and results of such methodologies applied to the remote teaching of Animal Anatomy are demonstrated by presenting from the language and didactic strategies that contribute to efficiently spread among the students the morphophysiological needs of the veterinary medical professional.

MATERIALS AND METHODS

The current work is an experience report of remote classes held in higher education as an active methodology for gamification to take advantage of the discipline "Descriptive Anatomy of Domestic Animals", the context of study focused on the Bachelor's Degree in Veterinary

Medicine, offered by the Universidade Estadual da Região Tocantina do Maranhão – UEMASUL, located in the city of Imperatriz, in the state of Maranhão, Brazil (Figure 1).

This experience was accompanied by the teaching professor of the discipline, and by three assistants of the subject, one monitor, and two doctoral students. The accompanied class comprises the students taking the course of 2020, 2nd semester, composed of 40 (forty) students (Figures 2 and 3), aged between 19 and 35 years old, both by students from the city of Imperatriz and from surrounding municipalities (Figure 1).

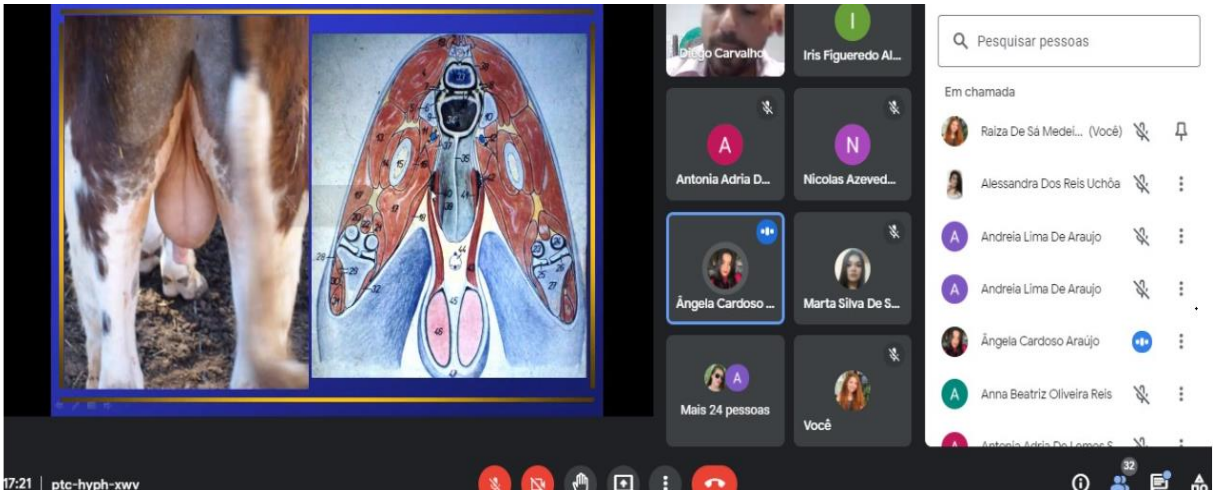

Figure 1 – Class 2020, 2nd semester: Remote discipline "Descriptive Anatomy of Domestic Animals" from the Veterinary Medicine Course (Bachelor's Degree) offered by the Universidade Estadual da Região Tocantina do Maranhão - UEMASUL.

Proposals for learning were organized together with the academics through the Whatsapp group and it was programmed that together with the synchronous classes carried out through the Google Meet platform, there would be the elaboration of complementary activities, using platforms such as Kahoot, Socrative, Sigaa UEMASUL and Google Forms, for the application of interactive questionnaires covering educational subjects. In addition to this approach, it was also discussed with the teachers, which was developed by the interactive software in a game model with the knowledge addressed in the classes through the "game", so that the interaction between the academics occurs. As a result, the class was divided into six (6) groups as the main theme the content of Osteology, and as sub-themes that were presented skull bones, neck bones, vertebrae, bones of the thoracic limb, bones of the pelvic limb and bones of the trunk.

At the end of each synchronous class, an activity was carried out that complemented the concepts studied in the class. In addition, at the end of the course, a questionnaire was carried out through the Socrative platform, evaluating the quality of remote teaching that was offered, in which the academics gave a grade from 0 to 10, also justifying the strengths and weaknesses. The outcome of these moments, in which a network of knowledge and interaction was formed between the academics, the teacher, and the assistants will be of interest to share.

RESULTS

The subject of "Descriptive Anatomy of Domestic Animals" is a very important curriculum component of the Veterinary Medicine course, it is a basic subject, as it is offered in the first semesters of the course and has the proposed objective of "succinctly showing the main organ systems, their organs and functions".

In order to carry out such works, enough time was made available for the elucidation of doubts on how to develop and for the elaboration. After this period, two (2) groups were organized per class, where each group explained the dynamics used and the purpose of the tool used, in addition to its use by other colleagues in the classroom.

The website developed by Group 1 has the subtheme "Skull Bones. The website is very dynamic, has topics for the study and demonstration of anatomical images, with class podcasts on skull bones, and also educational games that stimulate what was studied in the previous topics (Figure 2).

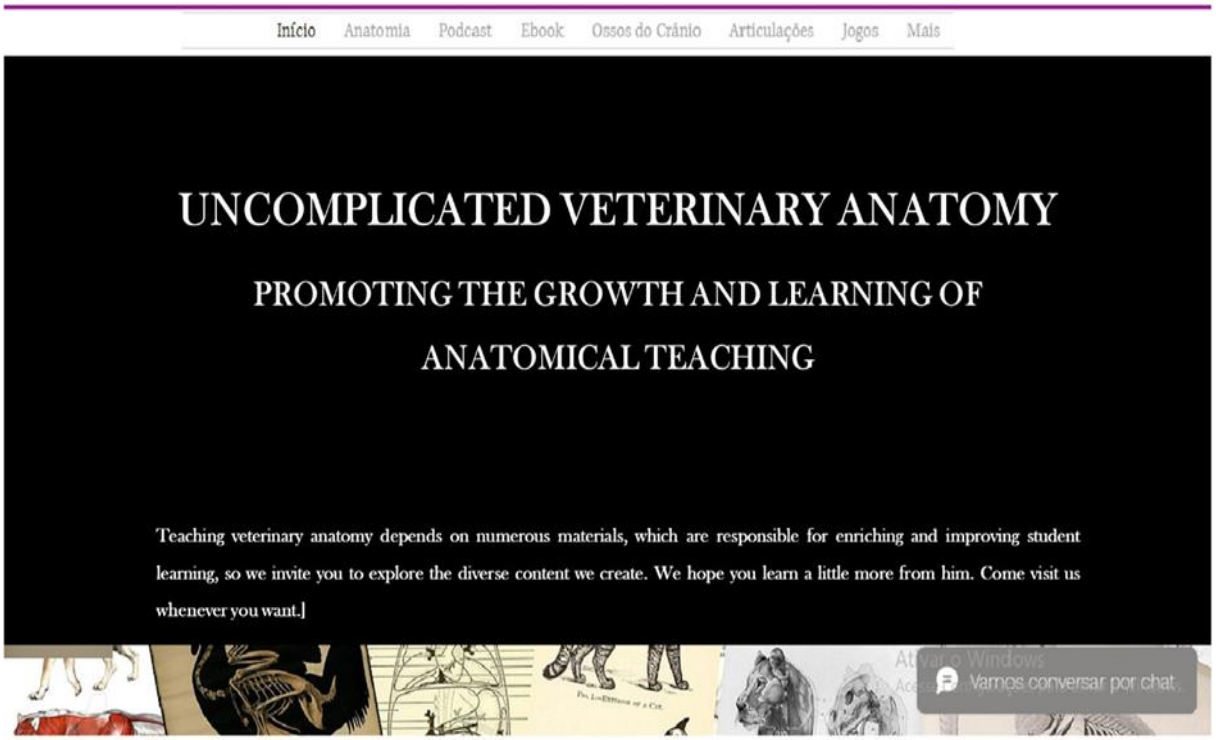

Figure 2 – Website: Uncomplicated Veterinary Anatomy, developed by Group 1 featuring the Skull Bones sub-theme.

In addition, Group 1 also elaborated practical questions related to its sub-theme in the Kahoot application, as a complement to its website presentation (Figure 3).

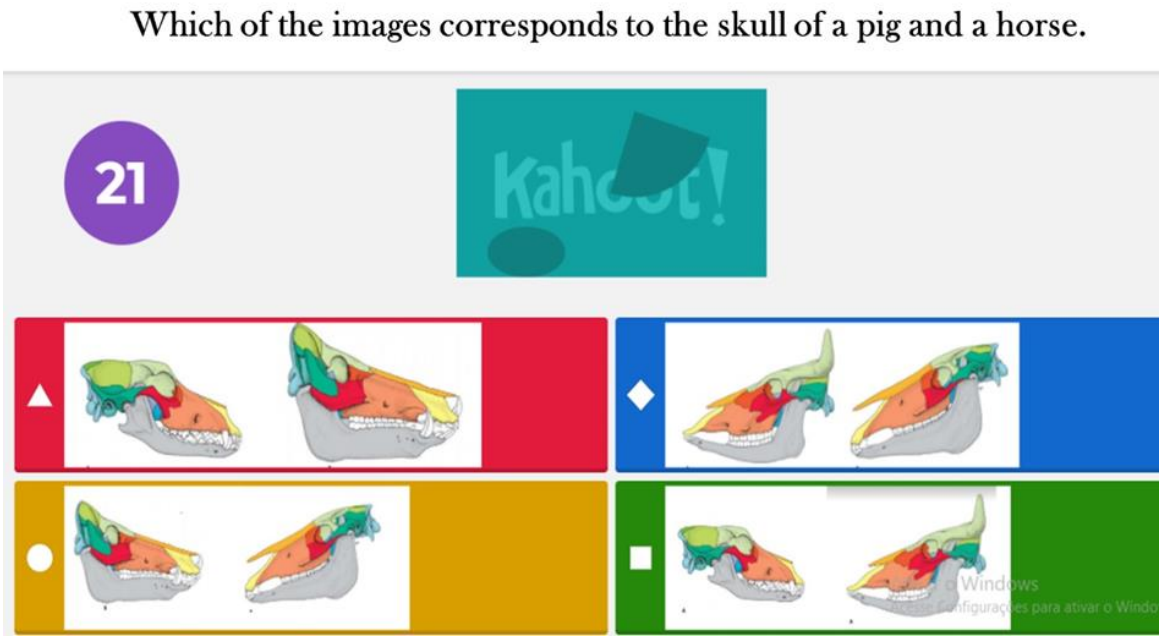

Figure 3 - Questions prepared to complement the subject addressed by Group 1.

Group 2 created an interactive game with a creative design of questions in game format, as if it were a console game of questions related to the Anatomy of the Neck, which was a sub-theme prepared by this group (Figure 4).

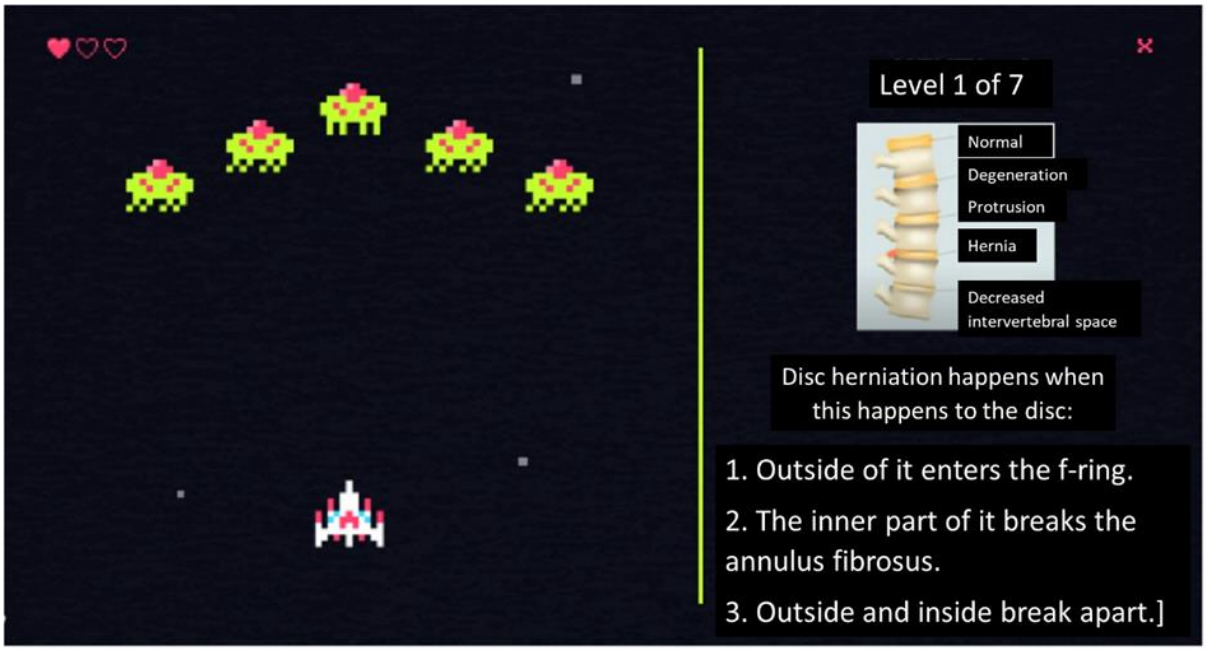

Figure 4 - Digital didactic game developed by Group 2, with the sub-theme Bones of the Neck.

Another material presented was an Educational Booklet on Thoracic Members developed by Group 4, which had the sub-theme of "Bones of the Thoracic Member", in which they presented dynamics for all bones present in such a limb, and their functions and differentiations between species (Figure 5).

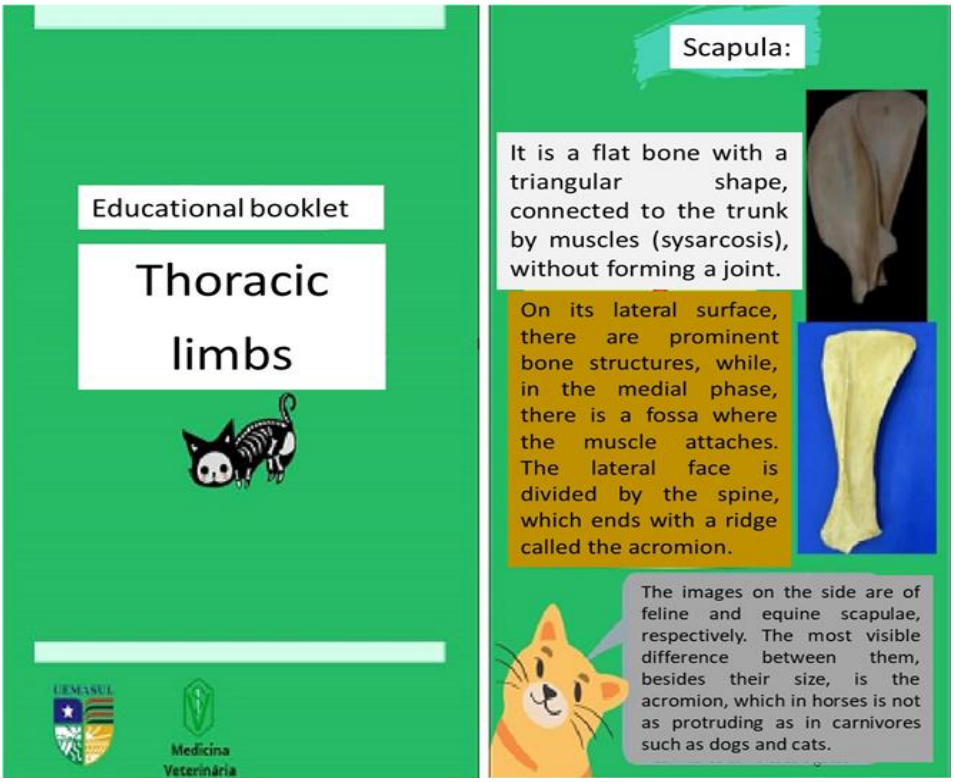

Figure 5 - Educational Booklet on Thoracic Member prepared by Group 4, with the sub-theme Bones of the Thoracic Limbs.

The students showed a lot of excitement for the development and also at the time of elaboration itself, in addition to being satisfied with the results presented at the end of the discipline.

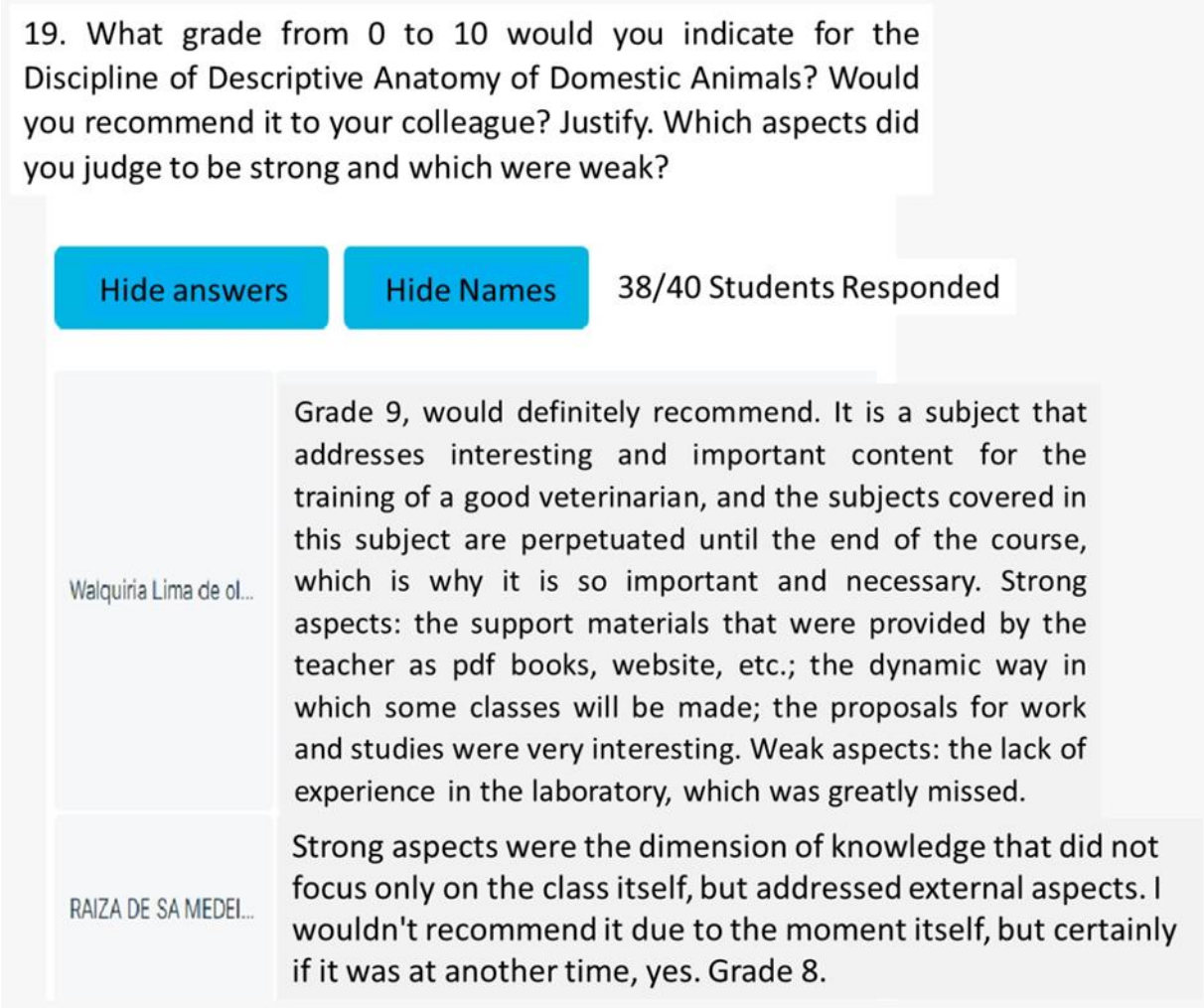

Figure 6 - Questionnaire carried out to evaluate the quality of the discipline "Descriptive Anatomy of Domestic Animals".

The feedback was very positive, as can be seen in some answers from the students, and it can be said that the use of the active methodology in conjunction with the gamification system was very fruitful, the knowledge acquired during the entire development process was rewarding for all the participants involved (teacher, academics and assistants), in which there was questioning regarding the problems caused by the emergency situation, such as lack of practices, and difficulty of some academics due to inaccessibility with the platforms (Figure 7).

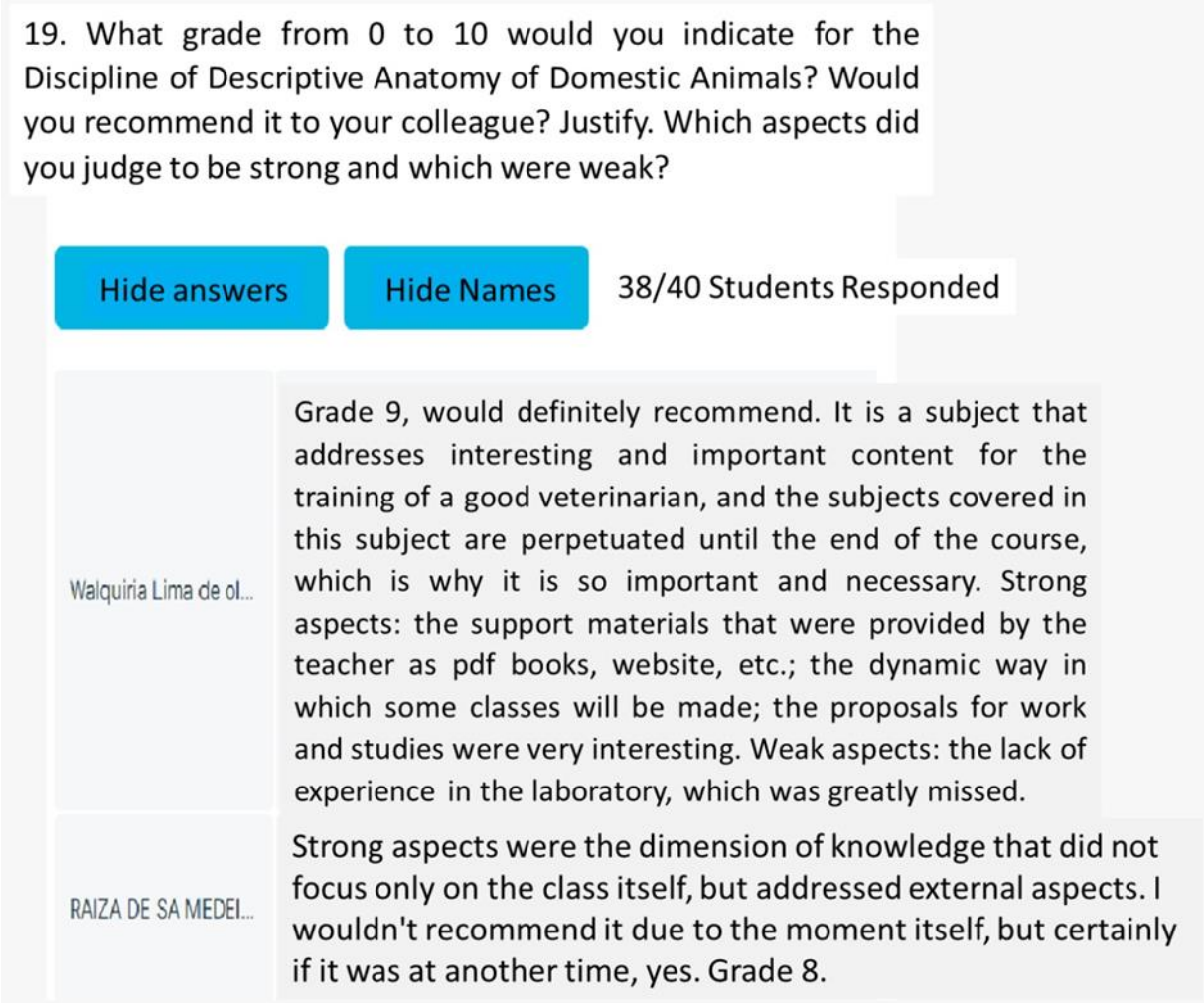

Figure 7 - Opinions of students evaluating from 0 to 10 the discipline "Descriptive Anatomy of Domestic Animals".

DISCUSSION

Gamification is a term translated into Portuguese that has English origin, gamification, being a term referring to the use of "games" elements in the learning context (COSTA *et al.*, 2020), in order to motivate individuals in a more relaxed way of teaching, making that through the gameplay it can also provide knowledge in a fun way, changing a little the view that teaching is difficult and complicated to understand. The utilizing different virtual methods of learning veterinary anatomy like virtual dissections, E-museum, 3D digital models or animations on virtual classroom platforms serves as a great saviour throughout this unprecedented pandemic, most importantly in prevailing socially distant world to continue the teaching connexion (KAPOOR and SINGH, 2022).

As said by Costa *et al.* (2020, p 3-4),

> [What is interesting is that in this period of pandemic, all teachers have come to see non-pedagogical resources as indispensable resources for the current school situation, thus respecting the standards of public health requirements. In this regard, the teacher took on other extra-classroom activities, adhering to the peculiar moment of the educational context. Thus, the teacher has the role of advisor and motivator, therefore, today, the role of the educator is to identify techniques on how to maintain the motivation of this student, ensuring the presence, participation in these remote activities and especially the quality of teaching. So, this is one of the great moments of the digital age, the era of reducing bureaucracy in the use of technology, using the application of gamification to promote knowledge in the student's home [...] – our translation].

Therefore, the active methodology was the alternative found by many education professionals to provide quality education that can transmit and perpetuate knowledge to students, in which it seeks more activities developed by the students, and together with gamification that brings a more dynamic and active teaching. It is worth mentioning that in this methodology, the teacher is primarily a mediator, assisting in the productions, which, when finalized, they presented characteristics of didactic materials. (COSTA and SANTOS, 2021). Machado *et al.* (2022) used established kits based on the ethical precepts of veterinary medicine. The acceptance of the kits was unanimous with the adhesion of all the students, who had the opportunity to experience the Anatomy class in its entirety, without leaving home. This didactic material is of great importance to make possible the deepening of the contents presented in the theoretical classes. The embryology is a science still to be explored in the field of methodologies active, few works were found, most using TBL or digital platforms; however, the authors agree that active methodologies are valuable tools in the teaching of embryology, capable of improving student motivation and engagement (GUILHERME GUEDERT *et al.*, 2022).

The search for quality education in a remote environment in a pandemic situation has many difficulties, such as inaccessibility to essential subjects for active participation such as the Internet, technological devices for accessing platforms and the socioeconomic factor of academics. One way found to minimize these barriers caused by emergency remote teaching was the distribution of 3,000 SIM CARD chips with 3G/4G technology, which, due to the resumption of academic activities, the State University of the Tocantina Region of Maranhão (UEMASUL) made public in Public Notices nº 32/2020 and nº 33/2020, that digital inclusion norms for the academic community should be implemented, aiming to guarantee, mainly, digital inclusion.

The factors found to facilitate such a teaching method that was implemented as an emergency was the active methodology, which has been gaining more and more prominence in the education scenario, complementing, or even replacing, the traditional teaching method. From this perspective, the education system focused on the implementation of didactic games, also called gamification, by making learning more playful, participatory and collaborative, which contributes to the holistic training of academics (MORANO, 2021). One of the challenges is to define an efficient methodology that guarantee results, especially with regard to the practice of human and animal anatomy. Therefore, digital acculturation is necessary and mandatory since this modality of teaching was awakened and has received notoriety by promoting extra moments for the subject of Anatomy even in non-pandemic times (COSTA *et al.*, 2021).

CONCLUSION

As reported, the adaptation of teaching due to the new mandatory health measure passed by the World Health Organization (WHO) was necessary, with the decrees for the suspension of classes in mid-March 2020, and we never imagined it would take so long to return to a classroom and resume traditional teaching, however, we are moldable beings, we have to adapt to the changes that come through life; with this, teaching drastically had to open spaces to methodologies that were not so necessary before or even banned from within the classrooms, which is the inclusion of technologies to improve teaching. In the post-pandemic future, it is possible to include such an active methodology together with face-to-face teaching, also due to the needs of the new National Curriculum Guidelines for Veterinary Medicine courses, which would greatly benefit learning.

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