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Exploration of the Perception of Morphofunction Learning in Students of Dentistry at the Universidad Regional Autónoma De Los Andes, Campus Santo Domingo, Ecuador

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Abstract

In the year 2022, after a period of virtual learning, facing the return to the classroom represents a challenge for both teachers and students. Several factors play a crucial role during lessons, especially in the subject of morphofunction, which is fundamental for future dentists. In this context, it is essential to use didactic resources that promote a solid theoretical basis. The laboratory plays a transforming and enriching role, turning anatomical concepts into something palpable, tangible, visible and experiential. Through the application of playful activities on anatomical models and the use of simulation software, the educational objectives are effectively achieved. An opinion survey was carried out among all the first semester students of the Dentistry course at the Universidad de los Andes (UNIANDES), with the purpose of evaluating the preferences regarding the didactic resources used for learning morphofunction. This research will allow obtaining valuable information about the preferences and needs of students, which will facilitate the adaptation of educational strategies and promote meaningful learning in the subject of morphofunction.

Keywords: *Virtual learning, Morphofunction, Odontogentists, Laboratory*

1. Introduction

According to the description offered by the Royal Spanish Academy, the term "perception" encompasses a number of meanings, among them is the "internal sensation that results from a material impression generated by the bodily senses". In the educational context, it is essential to orient teaching towards meaningful learning, taking into account the way in which students acquire and process information.

When approaching the teaching task, it is essential to understand how students perceive and process the sensory information presented to them. Each individual has their own mechanisms and strategies of perception, which may vary depending on their previous experiences, their previous knowledge and their socio-cultural context. That is why teachers must take these factors into consideration when designing and developing their teaching strategies.

Recognizing and understanding how information gathering processes occur in students involves considering how bodily senses, such as sight, hearing, and touch, interact with the environment and process the stimuli presented to them. This implies taking into account the importance of using didactic resources and pedagogical strategies that stimulate the senses and promote a multisensory experience in the teaching-learning process.

By being aware of students' perception processes, teachers can adapt their teaching methods, use different sensory modalities, and offer learning opportunities that fit students' individual needs. This will facilitate the understanding and retention of information, promoting more effective and meaningful learning.

It is the organs of the senses that are responsible for collecting this information, which will then be processed in the cerebral cortex, so and in a simple way we have just named some of the most important participants in this process. Likewise, understanding how the human brain works is currently the subject of neuroscience.

But while it is true, learning will happen when the mind is able to amalgamate the information that is provided through all the senses and make a deep link with existing information, it is vital to know how the information is going to be delivered. In the way of teaching biological sciences such as Morphology, Histology, Physiology, Embryology among others, a point to take into account would be the way to present the information to the receiver who is students, taking into account primarily that according to the perception we will have two main types of learning: the visual and the auditory. According to De la Parra, in individuals the visual learning style predominates in 40%. While the auditory style corresponds to 30% and another 30% to a kinesthetic style. (1)

Within the didactics we will find techniques and strategies to facilitate knowledge to students and the use of different pedagogical methods in teaching, which for anatomy since its inception has been based on the dissection of cadavers, evolving to anatomical pieces prepared for dissection, today tools such as simulators, 3D images, Anatomical models are in the laboratories of Study Centers with the final objective of achieving the management and evaluation of knowledge in students. (2) (3).

2. Materials And Methods

This In the present study, a survey (4) designed specifically to investigate the perception of learning from the Morphofunction chair in first-semester students of the Dentistry Career of the Regional Autonomous University of Los Andes UNIANDES, Santo Domingo headquarters, Ecuador, during the period from May to September 2022. The questionnaire consisted of five relevant questions, selected specifically for this research. The participation of students in the study was voluntary, and a total of 61 responses were collected from a potential universe of 64 participants, representing a response rate of 95%.

The survey was administered using Google's FormsApp platform, which allowed for efficient and reliable data collection. This digital platform facilitated the systematic and secure collection and organization of responses. Once the answers were obtained, the data was organized in a table using the Microsoft Excel program for subsequent analysis. Through tabulation techniques and calculation of percentages, the collected data were analyzed and summarized. This analysis allowed to obtain significant results that reflect the perception of the students about the learning of the Morphofunction chair. (12,13,14)

Data analysis was carried out using tabulation and percentage calculation techniques, which allowed to identify patterns and trends in student responses. These results provide a detailed view of students' perception of learning in the Morphofunction chair, which can be very useful for teachers and those responsible for curriculum design. The information obtained through this survey and its analysis contributes to improving the quality of teaching of the Morphofunction Chair. The results can serve as a basis for designing more effective learning strategies and developing improvements in teaching methods. In addition, they provide valuable feedback to identify areas for improvement and strengths in the educational program.

In summary, in this study a survey was used to investigate the perception of learning from the Morphofunction chair in first-semester students of the Dentistry Career. The collected data were analyzed using tabulation and percentage calculation techniques, which allowed to obtain significant results and provide valuable information to improve teaching methods and the design of more effective learning strategies.

3. Results and Discussion

After collecting data about the perception of morphofunction learning in students of the Dentistry Career at the Santo Domingo campus of the Universidad de los Andes (UNIANDES), during the period between May and September 2022, the results obtained are presented below:

Table 1. Of the didactic resources used, which do you consider to help you understand the subject of Bones?

Teaching resources	Answers	%
Anatomage	13	21
Books	4	7
Anatomical models	44	72
Total	61	100

The analysis of the data shows that three didactic resources were used to understand the theme of bones: Anatomage, books and anatomical models. Of the 61 participants surveyed, the following answers were obtained as to which resource helped them most to understand the topic of bones:

Anatomage: 13 participants (21%) indicated that this resource helped them the most.
Books: 4 participants (7%) mentioned that books were the resource that helped them the most.
Anatomical models: 44 participants (72%) stated that anatomical models were the resource that helped them the most.

From these results, it can be seen that the majority of participants (72%) considered anatomical models to be the resource that most helped them understand the subject of bones. This suggests that anatomical models were effective in visualizing and manipulating bone structures, which facilitated learning and understanding of the subject.

Importantly, a significant number of participants (21%) mentioned that the Anatomage resource helped them the most. Anatomage is a digital resource that allows you to visualize and explore the human body in 3D, which can provide a detailed and realistic representation of bones.

On the other hand, only a small percentage of participants (7%) considered books to be the resource that helped them the most. This may be because books provide theoretical information, but perhaps do not offer the same viewing and manipulation experience as anatomical models or digital tools.

In conclusion, the results indicate that anatomical models were the didactic resource most valued by the participants to understand the subject of bones. However, it is important to consider that each student may have individual preferences and different learning styles. Therefore, it is advisable to use a variety of didactic resources to address the learning needs of students and provide them with multiple opportunities to understand and assimilate the content effectively.

TABLE 2: Of the following anatomy simulators which helped more in the study of the subject

Anatomy simulators	Answers	%
Anatomy learning	40	66

Anatomage	21	34
Total	61	100

The analysis of the data shows that two anatomy simulators, Anatomy Learning and Anatomage, were used for the study of the subject. Of the 61 participants surveyed, the following answers were obtained as to which simulator helped them most in the study of the subject:

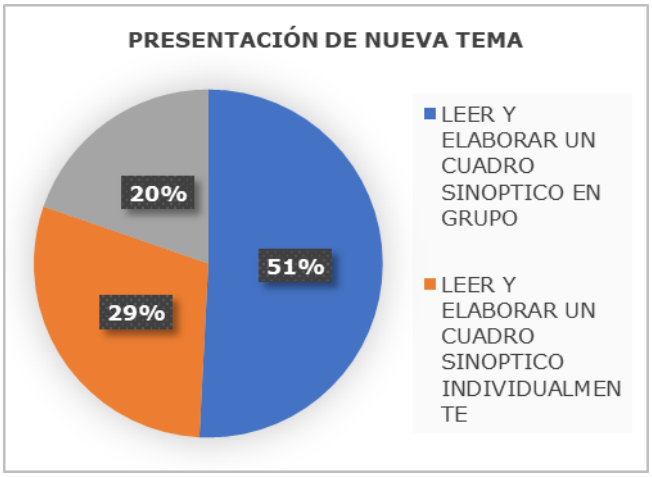
Anatomy Learning: 40 participants (66%) indicated that this simulator helped them the most. Anatomage: 21 participants (34%) mentioned that Anatomage was the simulator that helped them the most. From these results, it can be seen that the majority of participants (66%) considered that Anatomy Learning was the simulator that most helped them in the study of the subject. This suggests that Anatomy Learning was effective for learning and understanding anatomy, possibly providing interactive resources, 3D visualization, and study tools that facilitated the learning process.

On the other hand, a significant percentage of participants (34%) mentioned that Anatomage was the simulator that helped them the most. Anatomage is a 3D anatomy simulator that allows you to explore the human body in a detailed and realistic way, which may have provided an immersive and precise experience for the study of matter. It is important to note that each simulator has different features and functionalities, so there may be differences in terms of individual preferences and learning styles of students. It is advisable to use a variety of educational resources and tools to address the learning needs of students and provide an enriching and effective experience.

In summary, the results indicate that both Anatomy Learning and Anatomage were valued by the participants in the study of the anatomy subject, with Anatomy Learning being the most mentioned simulator as the one that helped them the most (66%). However, it is important to consider individual preferences and explore different teaching resources to provide an effective education adapted to the needs of students.

When a new topic is presented. That I facilitate your understanding:

Group presentation	**Answers**	**%**
Read and produce a synoptic table in a group	31	51
Read and produce a summary table individually	18	29
Read the chapter at home	12	20
Total	61	100



Data analysis shows that three methods of group presentation were used for the study: reading and developing a synoptic table in a group, reading and elaborating a synoptic table individually, and reading the chapter at home. Of the 61 participants surveyed, the following responses were obtained regarding group presentation preference:

Read and prepare a synoptic table in a group: 31 participants (51%) indicated that this method was their choice. Read and produce a summary table individually: 18 participants (29%) mentioned that they preferred this method. Read the chapter at home: 12 participants (20%) said they preferred this option. From these results, it can be seen that most of the participants (51%) preferred to read and elaborate a synoptic table in a group. This collaborative study method allows students to work together to summarize and organize information in a visually structured format, which can facilitate learning and understanding of the material. On the other hand, a considerable percentage of participants (29%) expressed a preference for reading and producing a summary table individually. This approach allows students to process information autonomously and develop their own understanding of the content. In addition, a smaller number of participants (20%) mentioned that they preferred to read the chapter at home. This option gives them the opportunity to study independently, at their own pace and in the environment, they consider most conducive to their learning.

Importantly, preferences may vary depending on each student's individual characteristics and learning style. Some may find more benefit in group work, while others may prefer individual study. The diversity of preferences highlights the importance of offering different approaches and group presentation options to suit students' needs and preferences. The results indicate that reading and elaborating a group summary table was the preferred group presentation method for the majority of participants (51%). However, it is important to take into account individual preferences and offer a variety of study methods to promote effective learning adapted to the needs of students.

In the study of the bones of the skull that helped him to understand better

Studying osteology	Answers	%
Drawing the bone	31	51
Make model and draw	16	26
Bone model	14	23
Total	61	100,0

Analysis of the data shows that three study methods were used for learning osteology: drawing the bone, making model and drawing, and using a bone model. Of the 61 participants surveyed, the following responses were obtained regarding study method preference:

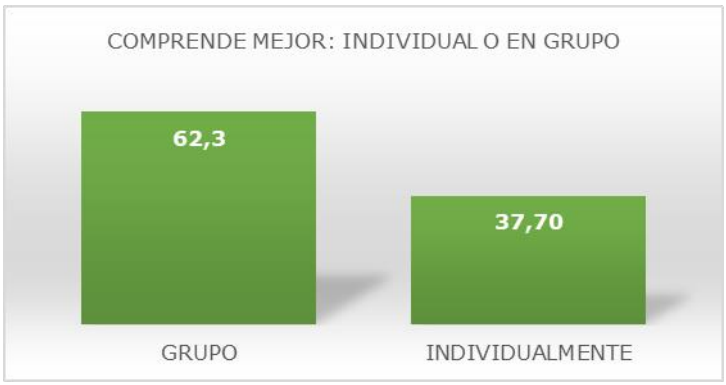
Drawing the bone: 31 participants (51%) indicated that this method was their choice.
Model and draw: 16 participants (26%) mentioned that they preferred this method.
Bone model: 14 participants (23%) said they preferred to use a bone model.

From these results, it can be seen that the majority of participants (51%) preferred to study osteology by drawing bone. This method allows them to visualize and represent bone in a personal way, which can facilitate the learning process by involving visual memory and the creative process. On the other hand, a significant percentage of participants (26%) expressed a preference for making a model of the bone and then drawing it. This approach gives them the opportunity to manipulate and build a three-dimensional representation of bone, which can help them understand its structure and characteristics more tangibly. In addition, a smaller number of participants (23%) mentioned that they preferred to use a bone model as a study resource. This option allows them to have access to a physical representation of the bone, which facilitates tactile exploration and detailed study of its characteristics.

Importantly, each method of study has its own advantages and benefits, and individual preferences may vary depending on each student's abilities and preferences. The diversity of options highlights the importance of offering different approaches and resources for learning osteology. The results indicate that drawing the bone was the preferred study method for the majority of participants (51%). However, it is important to take into account individual preferences and offer a variety of methods and resources to promote effective learning tailored to students' needs in the study of osteology.

It is easier for you to understand Morphofunction

Understand better: individual or group	Answers	%
Group	38	62,3
Individual	23	37,7
Total	61	100,0



Analysis of the data shows that two study approaches were used to better understand the topic: in groups and individually. Of the 61 participants surveyed, the following answers were obtained as to which approach allowed them to better understand the topic:

Group: 38 participants (62.3%) indicated that the group study allowed them to better understand the topic.
Individual: 23 participants (37.7%) mentioned that the individual study allowed them to better understand the topic.

From these results, it can be seen that the majority of participants (62.3%) found that the group study helped them better understand the topic. This collaborative study approach can facilitate discussion and exchange of ideas among group members, which in turn can provide different perspectives and approaches to understanding. On the other hand, a significant percentage of participants (37.7%) mentioned that the individual study allowed them to better understand the topic. Individual study provides the opportunity to focus on the material autonomously, follow a personalized rhythm and delve into the details according to individual needs.

Importantly, individual preferences may vary depending on each student's learning characteristics and personal preferences. Some students may find more benefit in group study, while others may prefer individual study. In addition, the most effective study approach may depend on the type of material, the complexity of the subject, and individual learning preferences.

In summary, the results indicate that both the group study and the individual study were valued by the participants to better understand the topic. The majority of participants (62.3%) found that the group study helped them better understand the topic, while a significant percentage (37.7%) mentioned that the individual study allowed them to better understand the topic. It is advisable to offer a variety of study approaches to suit students' individual needs and preferences. L

The data obtained from the survey show the following preferences and results:

Regarding the teaching resources used to understand the topic of bones, participants indicated the following:

72% of participants considered anatomical models to be the most useful resource.
21% mentioned that Anatomage was the resource that helped them the most.
Only 7% said books were the most useful resource.
In relation to the study of the subject of Morphofunction, the following preferences were found:
51% of the participants preferred to read and prepare a summary table in a group.
29 per cent preferred to read and produce a summary table individually.
20% chose to read the chapter at home.

In the study of osteology, the following preferences were found:

51% of the participants preferred to study by drawing the bone.
26% mentioned that modelling and drawing was their preferred method.
23% chose to use a bone model.

Regarding the study approach, the following preferences were found:

62.3% of the participants felt that the group study allowed them to better understand the topic.
37.7% indicated that the individual study allowed them to better understand the topic.

These results highlight the importance of using a variety of teaching resources, group presentation methods, and study approaches to suit individual student preferences and needs. By providing diversified learning options and opportunities, understanding and the knowledge acquisition process can be improved.

The evaluation of morphofunction learning has been studied by many authors, it is well known that within the history of the faculties of medical sciences cadavers have been the means of choice for the study of anatomy, so much teaches the reality about the human cadaver that those who have worked with respect and objectivity cannot forget those classes (5)(6).

However, after a series of cases were presented in which the National Directorate of Crimes against Life, Violent Deaths, Disappearances, Extortion and Kidnappings (Dinased) initiated a technical process of verification of the identities of the corpses within study centers, and despite the fact that there is no prohibition for the study of corpses within our current regulations, some considerations persist to be taken into account when handling corpses in Study Centers are about. (7)

Today, we have the great advantage of having a variety of resources that allow us to safely and practically approach the study of biological sciences (8) however focusing on the dynamics of the group and having their feedback is in itself to offer a new vision to learning for both the student and the teachers (9,15,16).

Finding within the present research work that the anatomical models' models are somehow the tool of predilection for most of our study population shows how the senses are better organized before the materialization of the object of study, and that it is through the impact that occurs visually and kinesically that we can facilitate the delivery of that knowledge (10,17,18).

It is striking within the findings that preferences lean towards a simulator as in Anatomy Learning to be able to access navigation within the different anatomical structures, with which it can be assumed that it is nothing but the ease of accessibility in time and space that practical and simple applications such as those of handling on a mobile phone are those that result from choice by the students, But it is only the systematic and constant study that allows the strengthening of knowledge and there are some researchers who have considered unlimited and reinforced access to the class itself taught as a tool for the student. (8).

This also reaffirms the need that often arises in the class itself to be able to capture on video the explanation or what years ago we called the "recognition" of the bone pieces or the corpses exposed by the professors of anatomy and amphitheaters, there is reflected the need of the student to return to what at that moment called and captured the attention of his senses. (19)

From the above we can in turn deduce several questions, we are leaving and trusting that knowledge is subject to the storage of information on hard drives in our mobiles and laptops or we will really use this tool for the acquisition of knowledge, the means and the ways of learning are a formula that will continue to vary according to the growth and evolution of our societies and technology, And hence teaching is a constant exercise of renewal and vocation. Introduce a new topic and build the bridge to the knowledge of biological sciences such as morphology, embryology, physiologic, among others, as we have pointed out at the beginning, deserves an approach so that what is achieved is the approach to the subject, there has been no lack in this case the recommendation to "advance" the content of the class, through a reading of the chapter at home, but it has been nothing but the comprehensive reading in a group and the extraction and synthesis of these main ideas, as they were referred by the group under study, which led to the best approximation to the new topic offered within the Units of study of the Syllabable of the Matter of Morphofunction.

Nothing recreates knowledge more than what we can touch, and elaborate, contrary to what one might think our study group was mostly involved in the topics of Osteology when in addition to making graphics I also elaborate models of the bones, sample of what is learned with the senses is hardly forgotten. Finally, the fact that the pandemic modified learning processes (11), so according to Noor's work, students perceived that conventional face-to-face learning is irreplaceable, and we can see in our research the component of group and face-to-face learning facilitates the pathways of knowledge.

4. Conclusion

The students consulted belonging to the first semester of the Dentistry Career of UNIANDES, Santo Domingo prefer the Anatomical Models, in front of the simulators and books. On the simulators the students selected Anatomy Learning over Anatomage. Faced with the presentation of a new topic, the students agreed that they prefer to read the topic and elaborate a synoptic table in a group manner. When the students studied the subject of Osteology they were motivated and facilitated their study by the fact of elaborating graphs and models of the bones Finally the group study mode facilitated the study of Morphofunction in the students of the Dentistry career of Uniandes, Santo Domingo.

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