# Assessment of the use and usefulness of the virtual Histology platform designed for first-year Dentistry students

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***ABSTRACT***

**Purpose**

The objective of this work is to assess the use and usefulness of the histology platform, within the context of mixed teaching or Blended Learning, designed for first-year dentistry students, and based on this, work on new strategies to improve their use.

**Methods**

This was a descriptive, quantitative, and cross-sectional study. For data collection, a Linkert-type self-administered structured questionnaire was used. The sample consisted of 63 first-year students of the Dentistry career.

**Results**

The results showed that the technological device most frequently used by students to access the platform was a cell phone (67%). Most students (90%) agreed that the didactic materials appeared well organized on the virtual platform, but when commenting on the visual aspect, only 21% responded that they considered it totally attractive. In the responses about the audiovisual material, 76% of the students stated that they would like to have more videos on each topic of study, and the majority agreed that short videos (less than 15 min) were more useful than longer videos.

**Conclusions**

It emerges as an important conclusion that there is a need to constantly change platforms, design materials that engage students, especially short videos, and ensure maximum use of this wonderful tool through structured and planned instructional guidelines.

***Keywords:***

Histology- Dentistry students-moodle.

## INTRODUCTION

As a result of the accelerated advancement of communications technology, virtual educational platforms have emerged as an online teaching alternative that allows students to acquire different types of knowledge with reduced access to traditional face-to-face training. Undoubtedly, during the COVID19 pandemic that the use of virtual platforms experienced exponential growth (Jaoua et al., 2022 ; Fauzi, 2022).

Among the numerous virtual platforms, Moodle is a free and open-source software tool that has been used worldwide by educational institutions. According to what was expressed by Ardila and Bedoya (2006), this platform is based on the socio-constructivist model, and its original design was developed as a collective and community-learning environment, favoring the construction of knowledge (Ardila and Bedoya, 2006).

Moodle offers the option of developing interactive teaching units made up of documents in different formats, videos, audios, construction of collaborative tasks, and the generation of links to web pages with specific content. It also allows one to develop scheduled evaluations and even has different instruments to collect statistical data from each student or from the whole. Numerous studies have analyzed its use as a pedagogical resource and evaluation tool, highlighting the advantages of virtual education (Claro-Vásquez , 2017; Porras,2016). However, within this context, there is an increasing controversy regarding the effectiveness of its indiscriminate use over face-to-face education. Among its disadvantages, Tamm, Sander (2019), and other researchers mention unequal access to technology, demotivation, and student isolation, as well as inadequate design of educational materials, among others (Sander, 2019, Parker, 2022; Al Rawashdeh, 2021).

The Faculty of Dentistry of the National University of Cuyoin Argentine, has a Moodle-type platform that is used by all teachers to host courses for each subject. Some subjects or complementary courses take advantage of this system to fully develop their theme in the virtual modality or, as in the case of the Chair of Histology, who uses the platform as a didactic complement tool to face-to-face classes. Thus, we

formed a mixed teaching system or Blended Learning. In this mixed learning system, the face-to-face activity directed by teachers forms the backbone, while the virtual platform is the place for mediated self-learning. Both integrate the flipped classroom format, which presents a background for medical science education (Rafi et al., 2019).

Unlike what happened with teaching during the period of isolation due to the COVID19 pandemic, in which virtual teaching was the only means available to students and teachers, when face-to-face teaching resumed, the educational content of the virtual platform became to be one more tool in the teaching process of human histology and embryology.

In this way, teachers and students adapted the original method to the new teaching scenarios. However, as face-to-face activities take place, we have observed a deterioration in the appropriation of the contents mediated in a virtual way, which is why the need arises to evaluate how the student benefits from the said content.

The objective of this work is to assess the use and usefulness of the histology platform designed for first-year dentistry students and, based on this, work on new strategies to improve its use.

## METHODS

This is a descriptive quantitative cross-sectional study. A self-administered structured questionnaire was used for data collection. It is made up of 15 Likert scale-type items, each with five selection possibilities according to the following scale: 1: Totally agree or very frequently; 2: Agree or frequently; 3: Neither agree nor disagree-indifferent; 4: Disagree or infrequent; 5: Strongly disagree or never

The instrument was subjected to internal evaluation among eight teachers, and once corrected, it was validated with a sample of 20 first-year students. For the reliability analysis of the instrument to be used, Cronbach's alpha value was calculated to obtain a score of 0.85.The sample consisted of 63 first-year dental students who were explained the objective of the study and were invited to participate anonymously and voluntarily prior to signing the written consent.

In the first part of the survey, students were asked to enter their demographic data (age and gender) and to select the type of technology used most frequently to access the platform.

The second part evaluated the virtual platform. In particular, questions were asked about the organization of the didactic material in relation to each of the weekly practical tasks, the visual design, and the number of times the student consulted the platform before each face-to-face practical task.

The third part assessed the usefulness and use of a guided questionnaire. The guided questionnaire is a tool developed by the professors of the Chair of Histology and consists of a series of didactically elaborated questions following the sequence with which each topic or learning unit is developed in the Histology and Embryology textbooks.

## RESULTS

Among the 63 students who responded to the questionnaire, 80% were women aged 19 on average, and 20% were men aged 19.5 on average

The results show that the technological device most frequently used by students to access the platform was the cell phone (67%), although 24% still used, frequently or very frequently, the desktop computer as the main access element to the platform (Figure 1).

Regarding the way in which the content was presented on the platform (Figure 2), most students agreed that the didactic materials appeared well organized on the virtual platform (90% adding both items, agree, and totally agree), and that these didactic materials were consulted frequently or very frequently (99% adding both items). However, when giving their opinion on the visual aspect, only 21% responded that they considered it to be totally attractive. As can be seen in Figure 2, in relation to whether the didactic material is prepared according to what is required in face-to-face practical activities, more varied responses were registered, with 33% agreeing and 25% being indifferent on said topic.

Regarding the guided questionnaire (Figure 3), which, as previously explained, needs to be prepared in advance of the development of each face-to-face practical task, most

of the students (57%) completed it using books recommended in paper, available in the library of the faculty, while 32% frequently resorted to consulting recommended books, but through their digital version. 29% acknowledged that they rarely consulted recommended histology webpages and 33% remained indifferent. Figure 4 shows that 89% (adding both items: very frequent and frequent) completed all the questions in the guided questionnaire, and only 2% responded that they had not completed all the questions.

Fifthy seven percent of those surveyed were able to complete all of the guided questionnaires available on the platform, but 43% remained indifferent.of those surveyed were able to complete all of the guided questionnaires available on the platform, but 43% remained indifferent.

In the responses about the audiovisual material (Figure 5), it can be seen that no student responded that the audiovisual material was not helpful to understand the subject of study, even 76% stated that they would like to have more videos. Most agreed that short videos of less than 15 min were more helpful than longer videos.

Regarding the question: If the educational games on the platform aroused their interest, the majority (48%) answered that they were indifferent, and only 17% answered that they had completed all of them, but 44% said they agreed that the didactic games provided them with important pedagogical concepts. (Figure 6)

## DISCUSSION AND CONCLUSIONS:

From the analysis of the answers to the different questions posed in this work, it emerged that the online learning platform is a beneficial tool for dental students, but that it is not fully used. A possible explanation for this is the lack of visual attraction to content. Therefore, teachers need to make constant efforts in this area to maintain students' attention. Therefore, it is necessary for the same platform to offer permanent updates or improvements to its program or software.

As can be seen from the responses, students requested more videos per topic and showed a preference for shorter videos. This last point is important because long videos can cause distractions and loss of concentration, which coincides with the same conclusions expressed in the work of Guo PJ, Kim J, and Robin R (2014).

In response to this requirement, the long videos were replaced by a sequence of short videos that were called "histology in 5 minutes," which is expected to arouse greater attention from students and will require a subsequent study of its effectiveness.

For the production of quality educational videos, in addition to the planning of dialogue and content, the use of certain technologies is required. This technology is not always available to teachers, leading to the production of home or elementary videos that are not attractive to students.

It would also be useful to have integrated video and image editors, which would prevent the teacher from resorting to external editing programs that are paid, in most cases, or only enable some basic functions or require new training.

Unlike those described by Rojas Mancilla et al. (2019), who found that the impact of the implementation of a learning tool based on games and competition, applied in a histology course, was positive and that students considered fun and interesting , in our case, they did not arouse the desired interest.

On the other hand, the team of Felszeghy et al., (2019), describes that they found improvements in learning with the use of the Kahoot® game software and the competition between groups of students.

In this work, despite using different gaming software alternatives, including Kahoot®, Mobbyt®, and Cerebriti ®, we did not obtain the same results.

Although the games created by our teachers sought to introduce the learning of concepts through gamification and aroused interest according to the surveys analyzed, they differed from the works mentioned in the non-implementation of competition between students.

It is possible that competition between students is an important factor in explaining the lack of effectiveness in the learning of the group analyzed in this study.

From our point of view, the guided questionnaire used in our platform is a powerful learning tool because it stimulates the mediated reading of specialty textbooks and forms together with videos, audios, etc., the baggage of material that the student has available to prepare the face-to-face class (inverted class modality or flipped classroom in English), making their presence more participatory and effective. Our appreciation coincides with those researchers who demonstrated, through systematic review and meta-analysis, the usefulness of the flipped class in the mixed teaching system or blended learning in health sciences students, including those of dentistry

(Hew, 2018; King el al., 2019; Shen et al., 2022). This hybrid method makes it possible to make better use of the time available for activities that require practice, as expressed by Craig et al., (2010); however, the total commitment of the student is needed to take advantage of the platform for prior self-learning.

This paper is agree with what Nuñez Cortes (2021) expressed in his editorial, who reflects that "there are contents that can be virtualized, others that require interaction, in addition to being able to be virtualized, and -finally- others that require physical presence, inexcusably," which is applicable to the subject Histology and Embryology.

In this research, we try to analyze the opinions of the students on one of the components of blended learning, in this case, the platform, which contains all the e-learning material to promote self-learning. From this analysis, it is necessary to make continuous changes in the platform to design attractive materials for the student, and through the structured and planned teaching guide, the maximum use of this wonderful new teaching tool can be ensured. We look forward to meeting these goals in the future and evaluate whether they have made improvements in learning.

## Limitations of the study:

The number of students surveyed was small; therefore, this study can only be extrapolated when the conditions are similar to those presented here.

## Conflict of Interest:

The author declared no conflict of interests.

## Acknowledgments:

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## FIGURES

**Figure 1: Degree use of different technological devices by first-year students to access the virtual platform (percentage%).**

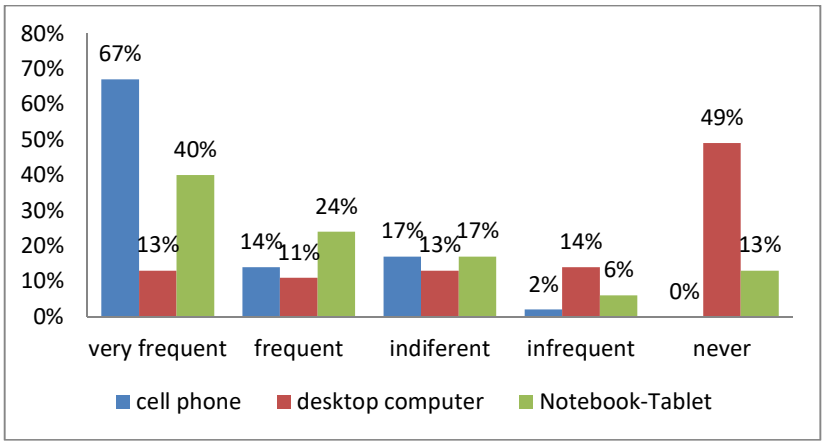

**Figure 2: Evaluation of the Moodle platform characteristics and its frequency of use by first-year students**

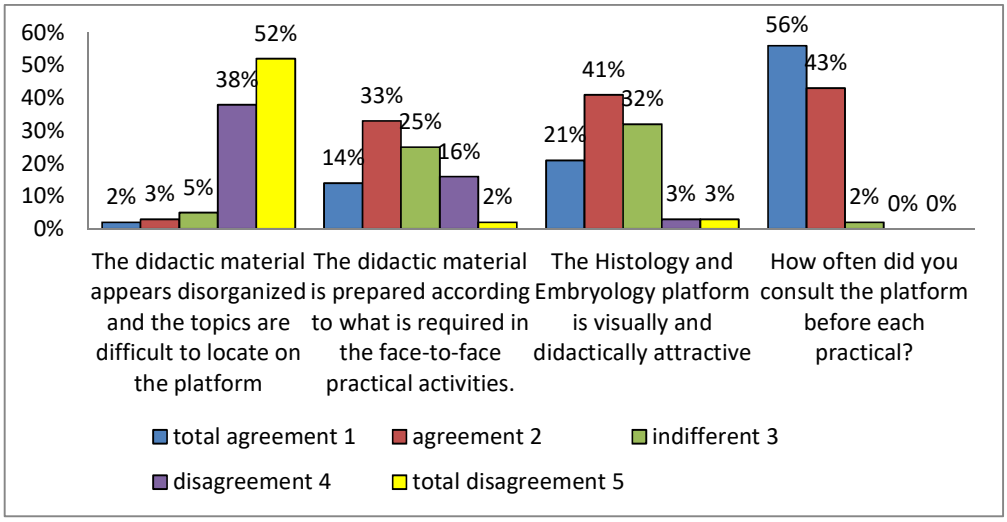


**Figure 3: Guided questionnaire, different instruments used by first-year students to complete**

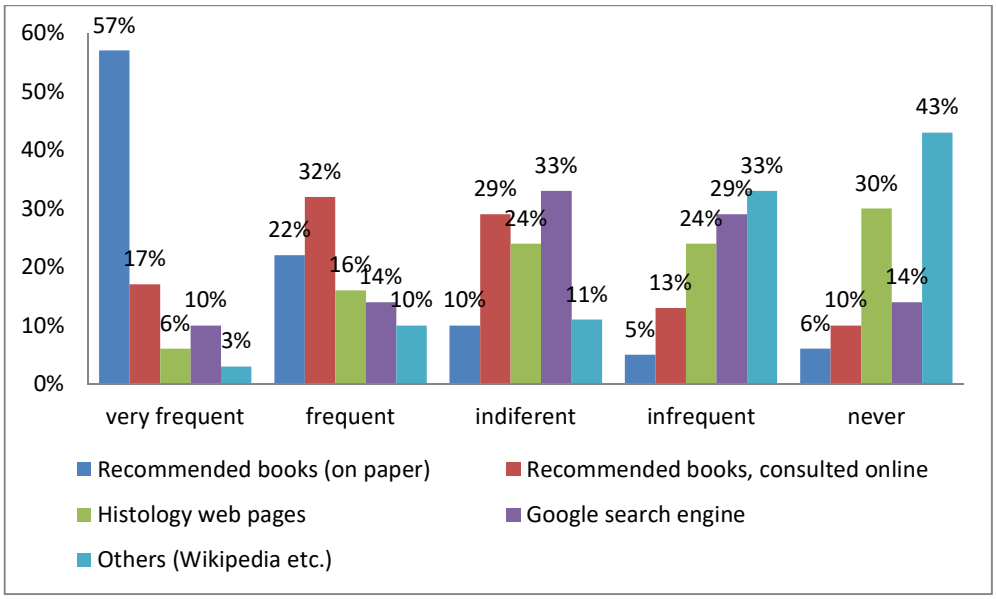


**Figure 4: Degree of frequency with which students completed a guided questionnaire (GC).**

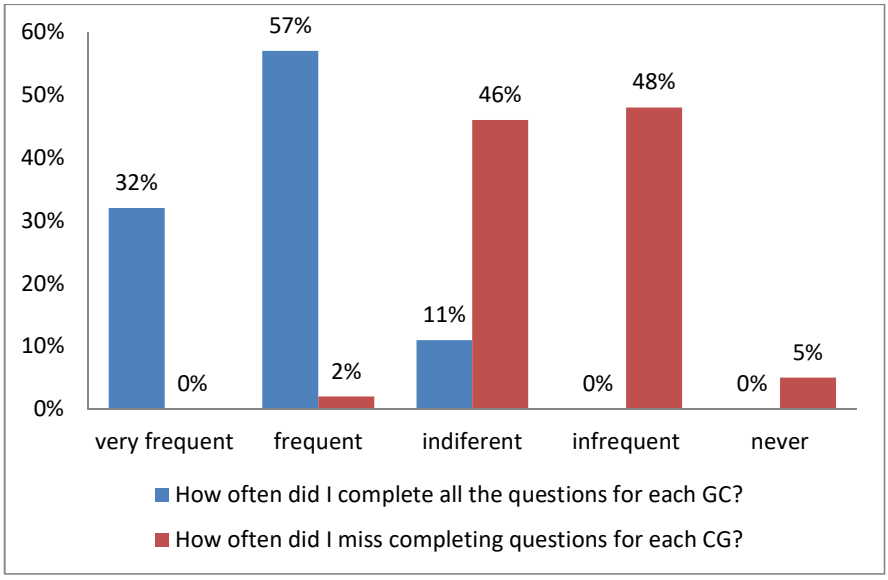


**Figure 5: Levels of acceptance of audiovisual material.**

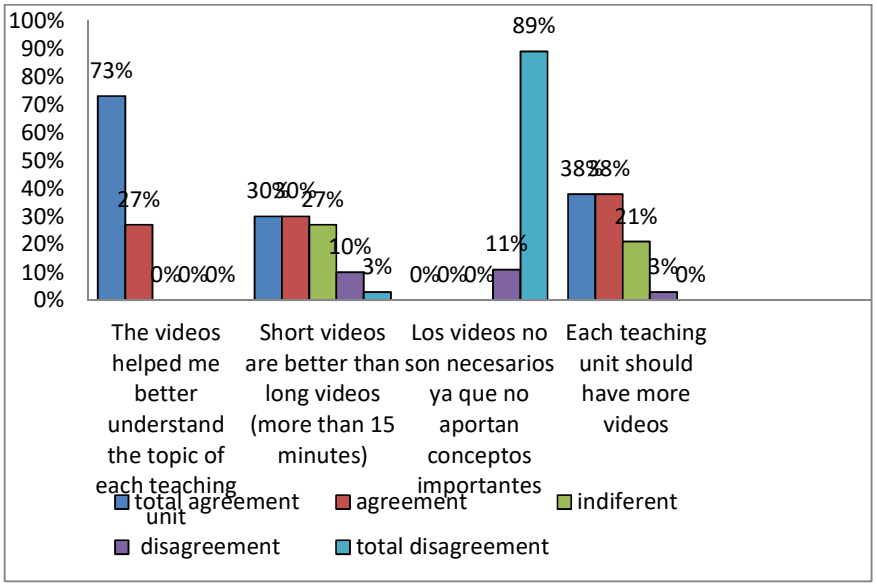

**Figure 6: Level of acceptance of didactic games.**