

How Were Modified the Human Anatomy Study Habits During and After Confinement By the COVID-19 Pandemic?

¿Cómo se Modificaron los Hábitos de Estudio en Anatomía Humana Durante y Después del Confinamiento por la Pandemia del COVID-19?

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SUMMARY: During 2020 and 2021 the anatomy subject was developed by online classes. In 2022, face-to-face teaching activities were resumed. The objective was to compare the autonomous study habits of two student generations that coursed the Human Anatomy subject in online and face-to-face mode. Two groups of students were asked to fill-out an online questionnaire. Online Generation (OL) (n=185) and Face-to-face Generation (FF) (n=154). The difference between both groups was the learning activities. OL received only online classes, and FF received theoretical classes and laboratory activities in face-to-face sessions. The most of OL subjects had greater clarity about the contents (71.9 %) and the depth (50.8 %) that they should study them, in contrast with FF (58.4 %, $p = 0.0124$ and 24.7 %, $p < 0.0001$ respectively). In OL, 47 % spent more than 4 hours weekly studying human anatomy, whereas in FF 68.2 % ($p < 0.0001$). In both groups, the most important resource was the Video Recorded Classes (90.8 % in OL, and 83.1 % in FF). For OL, the three priority resources were exclusively electronic: 1) Video Recorded Classes, 2) Apps on smartphone or tablets, and 3) Apps on laptop or computer. FF generation prioritized: 1) Video Recorded Classes, 2) Anatomy Atlas, and 3) Class Slides. During the COVID-19 pandemic, the students that received only online classes were able to plain their study time in a better way than those were in face-to-face classes. However, they spent less time to study the topics. In addition, it was possible to determine that students prefer digital resources (video classes recorded and apps in smartphone or computer) over traditional resources such as textbook and anatomy atlas. It proposes to consider these results in the Human Anatomy subjects design, in virtual or face-to-face mode.

KEY WORDS: Anatomy; Online Education; Study Habit; Pandemic; COVID-19.

INTRODUCTION

The Human Anatomy is considered a basic science. This subject is present in the first levels of the curricula of medical and health sciences programs given that the knowledge of human body structure is the basis to understand its functioning. Generally, the students are not asked to have previous knowledge, which makes this subject needs an important amount of teaching hours and autonomous study time. Theoretical classes with cadaveric-based instruction is the traditional method used to teach anatomy. This

methodology, however, is used in conjunction with other method such as prosection, medical imaging, living anatomy and multimedia resources (Estai & Bunt, 2016).

In March 2020 the Chilean authorities decreed confinement measures to face the COVID-19 pandemic and to limit the spread of the virus. All the educational system had to change from face-to-face classes to online classes and the Anatomy teaching activities were not the exception.

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The University of Santiago of Chile made available to students a virtual learning platform to facilitate the interaction between students and teachers. In addition, the synchronous online classes were carried out using a video chat software, at similar format to face-to-face classes, until 2021.

These actions transformed the way which the teaching and learning activities were developed. The students could not study in contact with the cadaveric material. Thus, the students were forced to choose other resources for reaching information during their autonomous study time. Then, in 2022, face-to-face teaching activities were resumed, and the zoom platform was no longer used for synchronous online classes. With the aforementioned it, it is worth asking if the study habits of the students have changed since face-to-face classes were resumed. If this answer is resolved, it will be possible to obtain information that will allow teachers to better direct the teaching-learning process towards the achievement of learning outcomes.

According to the above, the objective of this study was to compare the autonomous study habits of two student generations that coursed the Human Anatomy subject in online and face-to-face modalities.

MATERIAL AND METHOD

Subjects. The sample was composed of 339 students who were enrolled in the Human Anatomy subject at University of Santiago of Chile in 2021 and 2022. For all the analysis, the sample was presented according to the year in which they coursed the subject. Therefore, we identify two groups: Online Generation (OL) and Face-to-face Generation (FF). The main difference between both groups was the learning activities. Generation 2021 received only online classes using virtual resources, in contrast to Generation 2022 which received theoretical classes and laboratory activities in face-to-face sessions.

Assessment tools. The subjects participated voluntarily in this study according to the Helsinki's declaration and following the guidelines of the Institutional Ethics Committee of the Universidad of Santiago of Chile. In the last two weeks of the course, the students were asked to fill-out an online questionnaire designed by the team of professors of the human anatomy unit.

The instrument had eight questions to collect information about the study habits, grouped in two areas: 1. Planning the study time, and 2. Resources for getting information. The sentences were designed using Lickert's

scale for the planning study time item, and multiple selection questions for the other item. The Lickert's scale was expressed according to the following scale: 1 = Totally disagree, 2 = Disagree, 3 = Indifferent, 4 = Agree, 5 = Totally agree.

Session Classes Characteristics. In 2020 and 2021, the teaching activities were developed as synchronous online classes, which meant that the teachers delivered classes in a real time through the Zoom software (Zoom Video Communications, Inc. San José, California, USA). The University of Santiago of Chile made available to students a virtual learning platform to facilitate the interaction between students and teachers (UdeSantiago Virtual). In this virtual space, the teachers uploaded all the learning resources such as class notes, exercises, books, articles, class presentations, online forum and audiovisual content. The evaluations were taken on this virtual space too. Moreover, a 3D anatomy atlas (Visible Body™, Argosy Publishing, Inc. Massachusetts, USA) was used to replace the face-to-face practical teaching activities developed in the anatomy laboratory.

In 2022, the authorities decreed the relaxation of the confinement measures, and all the face-to-face teaching activities were restarted. UdeSantiago Virtual continued being used mainly as a repository of learning resources. The face-to-face sessions was carried out with the same lecturers, program, contents, planning and learning evaluations.

Data Analysis. For each variable, frequencies and percentages were calculated. The variables obtained from the 5-level Lickert's scale were treated as non-parametric variables (Joshi *et al.*, 2015). For comparisons, non-parametric t-test (Mann-Whitney test) was used using $p < 0.05$ as the statistical significance level value. All analysis were performed using the statistical software GraphPad Prism 9 for Mac (San Diego, California, USA).

RESULTS

The sample was equivalent to the 44.25 % of all students. One hundred and eight were men (31.9 %) and 231 were women (68.14 %) with an age mean of 19.5 years. The characteristics of the subjects in each group are resumed in Table I.

Table I. Sample characteristics by group.

	Online Generation (n = 185)	Face-to-face Generation (n = 154)
Men (%)	35.1	27.9
Women (%)	64.9	72.1
Age (years)	19.9	18.9

The first item of the assessment tool had as an objective to collect information about how the students plan their autonomous study time. This item was formed by four specific aspects: a) Certainty about the contents that the students must study, b) Certainty about the degree of depth of the contents that the students must study; c) Certainty about the information resources that the students will use during their study time; and d) Certainty about the personal time that the students will spend studying the subject. All results of this item are shown in the frequencies graphic of Figure 1. For the assertion “Before starting my anatomy study time, I am always certain of the topics that I have to review”, a 71.9 % stated to be “Very agree” or “Agree” in OL, in contrast with the 58.4 % in FF generation. Significant differences were found between both groups ($p = 0.0124$) (Fig. 1A). For the assertion “Before starting my anatomy

study time, I am always certain of the depth with which I have to cover the topics that I must review”, a 50.8 % stated to be “Very agree” or “Agree” in OL, while the 24.7 % in FF generation. Significant differences were found between both groups ($p < 0.0001$) (Fig. 1B). For the assertion “Before starting my anatomy study time, I always have certain about the getting information resources that I am going to use”, in OL the 66 % stated to be “Very agree” or “Agree”, and the 55,8 % in FF generation (Fig. 1C). For the assertion “Each week I plan the time that I will spend to study anatomy”, the 27.6 % stated to be “Very agree” or “Agree” in OL, while the 35.1 % in FF generation. This is the aspect that had less agreement percentage in the sample studied (Fig. 1D). In these two last aspects did not find significative differences ($p = 0.1538$ and $p = 0.3087$, respectively).

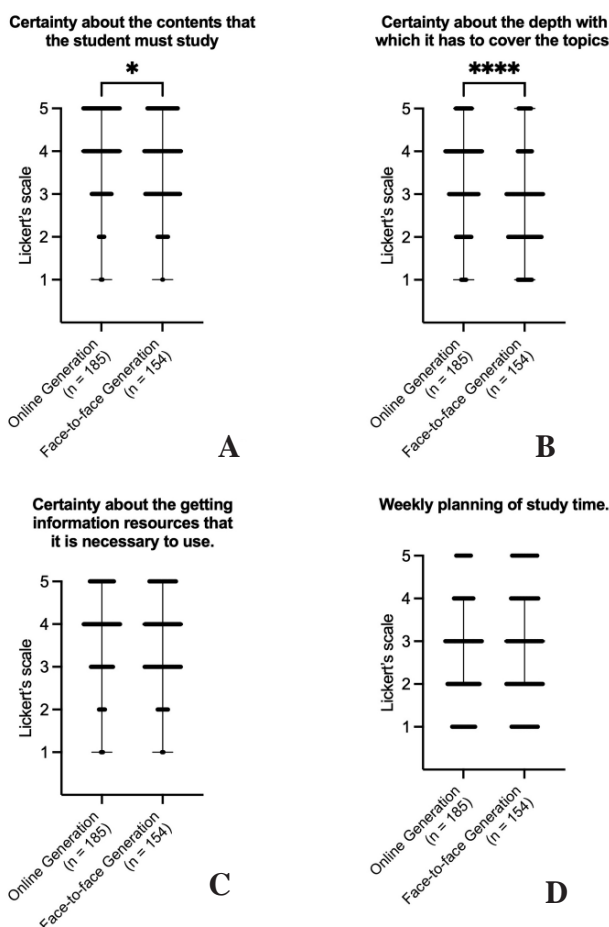


Fig. 1. Outcomes got from the planning time study item. The y-axis represents the Lickert’s scale and the horizontal bar represents the subject’s frequency in each Lickert’s scale level. In the x-axis are represented the two groups studied. A. Certainty about the contents that the student must study. B. Certainty about the depth with which It has to cover the topics. C. Certainty about the getting information resources that It is necessary to use. D. Weekly planning of study time.

Another aspect of planning study time habits is to know the time that the students spend each week studying human anatomy. According to Figure 2, it is possible to see that 47 % of the OL generation spent more than 4 hours weekly studying human anatomy, whereas 68.2 % of the FF generation spent the same number of hours per week. Most of the student spent 2 to 4 hours per week in OL generation (35.7 %) in contrast with the FF generation in which most of the students (27.3 %) spent more than eight hours each week studying human anatomy, with significant differences between groups ($p < 0.0001$).

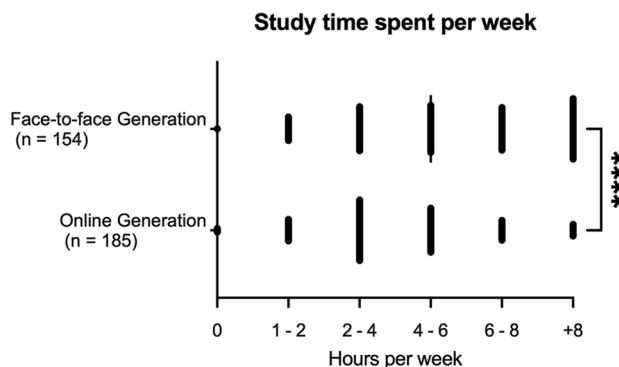


Fig. 2. Distribution of the sample according to the weekly time used by the students to study human anatomy.

The second focus point of this study was to know the student’s habits related to the resources used for getting information, which are resumed in Table II. In both groups, the most important resource was the Video Recorded Classes (90.8 % in OL, and 83.1 % in FF). In OL, the second resource most chosen was the Class Notes (72.4 %), followed by the Class Slides (65.9 %). In contrast, FF generation the second resource most used was Anatomy Atlas (82.5 %) and the third most chosen resource were Class Slides (80.5 %), at the same OL.

Table II. Frequency of resources used to obtain information.

Resources of getting information	Online Generation (n = 185)	Face-to-face Generation (n = 154)
Anatomy textbook	63.2 %	55.8 %
Anatomy atlas	62.2 %	82.5 %
Video recorded class	90.8 %	83.1 %
Class notes	72.4 %	72.7 %
YouTube videos	44.3 %	61.7 %
Apps on smartphone or tablet	28.6 %	50.0 %
App on computer	24.9 %	22.7 %
Class slides	65.9 %	80.5 %
Other	2.0 %	4.8 %

Table III. The rank of the most preferred resources for getting information.

Rank	Online Generation (n = 185)	Face-to-face Generation (n = 154)
1	Video recorded class	Video recorded class
2	Apps on smartphone or tablet	Anatomy atlas
3	Apps on computer	Class slides
4	Class notes	App on computer
5	Anatomy atlas	Anatomy textbook
6	Class slides	Apps on smartphone or tablet
7	Anatomy textbook	Class notes
8	YouTube videos	YouTube videos

The students were asked for ordering in a priority rank the resources of getting information used by them (Table III). For OL generation, the three priority resources were exclusively electronic: 1) Video Recorded Classes, 2) Apps on smartphone or tablets, and 3) Apps on laptop or computer. FF generation prioritized: 1) Video Recorded Classes, 2) Anatomy Atlas, and 3) Class Slides.

DISCUSSION

The objective of this study was to compare the autonomous study habits of two student generations that coursed the Human Anatomy subject in online and face-to-face modalities. Both groups received the semestral planning on the first session but the group's knowledge about the contents was different. It was possible stated that the students that received exclusively online classes had greater clarity about the contents and the depth that they should study them. It is possible that the online class conditions have facilitated the comprehension of the topics that must study in the Human Anatomy subject. This result was perhaps caused because the OL students were in closer contact with the digital resources than FF students, which caused the students used the delivered resources with greater efficiency. This outcome is supported by a similar study. In there, a virtual resource was included in the subject activities, and more than 80 % of the students had a high-level satisfaction to understand and organize the contents (Tiznado-Matzner *et al.*, 2020). In another study

carried out during the pandemic, students that received only online classes positively valued the freedom to plan their study time. They had all the material at their unrestricted disposal, however, they recognized with the recorded classes had more time to distract themselves (Goset-Poblete *et al.*, 2020). This specific point is supported by another study. The 72.24 % of the students stated that they found difficulties in time management during the pandemic with the classes delivered exclusively online (Khasawneh, 2021). It seems that lacking skills to plan the study time is a common problem in the students. In the current study, both groups have a similar level of planning study time item. Moreover, most of the answers were between 2 and 4 points of the questionnaire, showing a low level of planning in the sample studied.

As a second outcome, it found that the students that received face-to-face classes spent a great number of study hours than the generation that received only online classes. The most of the OL students spent between 2 and 4 hours per week such as another study developed in India (Biswas & Biswas, 2021). If we consider that during the pandemic the students spent more time in front of the screens it is possible to understand this result. There is evidence of high anxiety levels in students during the pandemic (Wang *et al.*, 2021), which could be the cause of the results shown by OL group. We believe necessary to consider this result in the online class design since there are studies that have warned about this issue (Martinez *et al.*, 2022).

The third result of this study was the students that received only online classes preferred electronic resources to obtain information. The video recorded class was most preferred resource for both groups. The learning effect of this resource has been studied with positive results in student's satisfaction (Goset-Poblete *et al.*, 2020). One of the reasons was that the students have the possibility to plain their study time freely. The same conclusions have been determined for the other online learning technologies, such as iPad applications (Chakraborty & Cooperstein, 2018), 3D anatomy software (Zibis *et al.*, 2021) and a mixed technologic platform (Liu *et al.*, 2021) with academic performance improving. However, several authors have recommended to use these resources accompanied with active learning tools to ensure the achievement of learning objectives

(Iwanaga *et al.*, 2021; Bernal-García *et al.*, 2022). They warn that the app using did not allow to replace the face-to-face activities (Martinez *et al.*, 2022). This warning already has been mentioned and oriented toward the role that the cadaveric dissections has in the current learning environment that the human anatomy is developing (Ooi & Ooi, 2020; Bond & Franchi, 2021). In this study was interesting to find that the traditional resources (such as textbooks and class notes) were not in the head of the list. This fact supports the idea that the new student generations give greater value to the digital than the traditional resources of getting information. This phenomenon has already been described by another study (Tiznado-Matzner *et al.*, 2020). We need to work on improving the effectiveness of our teaching methodologies in order to get that the students learn human anatomy, even we need to use social network (Roa, 2021).

CONCLUSIONS

During the COVID-19 pandemic, the students that received only online classes were able to plain their study time in a better way than those were in face-to-face classes. However, they spent less time to study the topics. In addition, it was possible to determine that students prefer digital resources (video classes recorded and apps in smartphone or computer) over traditional resources such as textbook and anatomy atlas. It proposes to consider these results in the Human Anatomy subjects design, in virtual or face-to-face mode.

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RESUMEN: Durante 2020 y 2021, la asignatura de anatomía fue desarrollada exclusivamente en modalidad online. En 2022 se retomaron las clases presenciales. El objetivo de este estudio fue comparar los hábitos de estudio autónomo de dos generaciones de estudiantes de anatomía. Dos grupos de estudiantes completaron un cuestionario online: Generación Online (OL) (n=185) y Generación Presencial (FF) (n=154). La principal diferencia entre ellos fue que OL recibió clases exclusivamente en modalidad

online y FF exclusivamente presencial. La mayoría de los sujetos de OL tuvieron mayor claridad acerca de los contenidos (71,9 %) y la profundidad con que debían estudiarlos (50,8 %) en contraste con FF (58,4 %, p = 0,0124 and 24,7 %, p < 0,0001, respectivamente). En OL, el 47 % empleó más de 4 horas semanales de estudio, mientras en FF fue el 68,2 % (p<0.0001). En ambos grupos, el recurso más importante empleado fue la clase grabada (90,8 % en OL y 83,1 % en FF). Para OL la prioridad en el uso de los recursos de estudio fueron 1) Videoclase grabada, 2) Aplicación en teléfono o tablet y 3) Aplicación en computador. Para FF el orden de prioridad fue 1) Videoclase grabada, 2) Atlas de Anatomía y 3) Diapositivas de clases. Durante la pandemia de COVID-19, los estudiantes que recibieron exclusivamente clases online planearon su tiempo de estudio de mejor manera que quienes tuvieron clases presenciales y emplearon menos tiempo de estudio. Además, fue posible determinar que los estudiantes prefieren recursos de información digital (Videoclase Grabada y aplicaciones para teléfono celular o computador) por sobre los recursos tradicionales tales como texto y atlas de anatomía. Se propone considerar estos resultados en el diseño de los programas de asignatura de Anatomía Humana, a impartir en modalidad online o presencial.

PALABRAS CLAVE: Anatomía; Educación Online; Hábitos de Estudio; Pandemia; COVID-19.

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