




## Differentiated effects of COVID-19 on university students

*Efectos diferenciados del COVID-19 en estudiantes universitarios*

*Efeitos diferenciados da COVID-19 em estudantes universitários*


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### KEYWORDS

COVID-19, differentiated effects, university students, perception.

**ABSTRACT.** The confinement due to the coronavirus had effects after implementing virtual education at all educational levels. To identify the students' perception about the teaching-learning conditions that prevailed during COVID-19, distinguishing those that allowed them to continue learning from those that did not work in the academic areas of higher education in health sciences. And economic-administrative, exploratory, descriptive and correlational research was carried out with students from the Universidad Veracruzana de México. The sample consisted of 665 non-probabilistic and non-random with a general population. It was inquired about the teacher's teaching activities, learning, academic interaction, digital knowledge, new understanding acquired, socio-emotional difficulties experienced and management strategies, and the technological resources and connectivity used. Among other results, it was found that students from the first semesters and women were the populations most likely to put metacognitive skills into practice.

### PALABRAS CLAVE

COVID-19, efectos diferenciados, estudiantes

**RESUMEN.** El confinamiento a causa del coronavirus tuvo efectos tras la implementación de la educación virtual en todos los niveles educativos. Con el fin de identificar la percepción de los estudiantes acerca de las condiciones de enseñanza-aprendizaje que prevalecieron durante el COVID-19, distinguiendo las que permitieron continuar con el aprendizaje de las que no en las áreas académicas de educación superior de ciencias de la salud y económico administrativa, se llevó a cabo una investigación de tipo exploratoria, descriptiva y correlacional con estudiantes de la

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universitarios,  
percepción.

Universidad Veracruzana de México. La muestra fue de 665 individuos elegidos de modo no probabilístico y no aleatorio con una población conocida. Se indagó acerca de las actividades de enseñanza del docente, de aprendizaje, de interacción académica, de saberes digitales, de los nuevos aprendizajes adquiridos, de las dificultades socio emocionales experimentadas y de las estrategias de su manejo y los recursos tecnológicos y conectividad utilizados. Entre otros resultados, se encontró que los estudiantes de los primeros semestres y las mujeres fueron las poblaciones más propensas a poner en práctica habilidades meta-cognitivas.

**PALAVRAS-CHAVE**

COVID-19, efeitos  
diferenciados, estudantes  
universitários,  
percepção.

**RESUMO.** O confinamento devido ao coronavírus teve efeitos após a implementação da educação virtual em todos os níveis de ensino. Com o objetivo de identificar a percepção dos alunos sobre as condições de ensino-aprendizagem que prevaleceram durante a COVID-19, distinguindo aquelas que lhes permitiram continuar aprendendo daquelas que não permitiram nas áreas acadêmicas do ensino superior em ciências da saúde e econômico-administrativa, foi realizada uma pesquisa exploratória, descritiva e correlacional com estudantes da Universidad Veracruzana de México. A amostra foi composta por 665 indivíduos escolhidos de forma não probabilística e não aleatória com população conhecida. Indagou-se sobre as atividades docentes do professor, aprendizagem, interação acadêmica, conhecimento digital, novos aprendizados adquiridos, dificuldades socioemocionais vivenciadas e estratégias de gestão e os recursos tecnológicos e conectividade utilizados. Entre outros resultados, verificou-se que os alunos dos primeiros semestres e as mulheres foram as populações mais propensas a colocar em prática as habilidades metacognitivas.

**1. INTRODUCTION**

The COVID-19 disease caused by the SARS-Cov-2 virus has had severe effects on practically all areas of life. Without a doubt, world education has suffered its impact, which caused the closure of educational establishments for 18 months throughout the planet during 2020 and 2021. The United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2020) estimated that more than 1.5 billion students suffered the effects. In Mexico, at the higher education level, close to five million students had to stay at home and receive classes through distance systems (Association of Universities and Institutions of Higher Education ANUIES, 2020).

The return to classrooms in person is beginning in Mexico and other countries (Dussel et al., 2020; Expósito & Marsollier, 2021; González, 2012; Kalman & Osorio, 2021). It is essential to value students' experiences during the pandemic in planning for that return. It is necessary to know its effect on moods, personal and family conditions, their perception of distance education, the learning achieved through this modality, the quality of the teaching received, and the strategies used to self-regulate their learning. Given that it is likely that hybrid educational models will be developed shortly that combine distance and face-to-face activities, it is convenient to take the pulse of the experience lived by students during this period of their academic life (Chavez et al., 2020; L. García, 2020; Guajardo, 2021; López et al., 2021; Rama, 2007).

These issues have been the subject of a significant number of recent studies. A simple search in Google Scholar using the descriptors COVID and university students indicates 33,400 documentary records. The total confinement of millions of students in the world and the brutal change from face-to-face teaching to emergency remote teaching in just a few days were factors that aroused the interest of the researchers. The preceding, due to its implications in the emotional state of the students and its impact on school achievement, as well as to identify elements to consider in the design of future educational models that take advantage of the lessons learned.



The objective of the present investigation is to know the students' perception of the academic areas of Health Sciences and Administrative Economics of the Veracruzana University of Mexico about the teaching-learning conditions that prevailed during COVID-19. This information is essential to primarily address the needs arising from the emotional impact of the pandemic on the well-being of students and contribute valuable elements for the design and operation of educational modalities that take advantage of the best of face-to-face teaching and distance education.

### Literature review

One of the aspects studied has been the emotional impact on university students generated by COVID-19. They report the application of a scale and a questionnaire to assess the level of stress experienced (González, 2012; Lozano et al., 2020; Robles & Rojas, 2015). The results indicate a decrease in motivation and academic performance with increased anxiety and family difficulties, especially for low-income students. Other studies have found similar results. Osorio and Prado conclude that almost half of the 80 students from a sample of students from the National Autonomous University of Mexico and the National Polytechnic Institute analyzed expressed affectations in their sleep habits, in smaller proportion irritability, as well as family difficulties and as a couple (Osorio & Prado, 2021). The conditions of confinement, lack of socialization, and the emergency remote teaching modality have had adverse effects on the emotional states of university students and their academic performance (Arras et al., 2020; López et al., 2021; Lovón & Cisneros, 2020; Ordoñez et al., 2020; Vivanco et al., 2020).

One factor that has influenced students' moods and learning is their perception of distance education, particularly online learning. Aguilera et al. reviewed data from 1,009 students from four countries (Aguilera et al., 2021). The factors analyzed included: attitude, affect, motivation, perception of behavioral control, and cognitive involvement. The predictive model used showed that online learning influences cognitive engagement. The role of self-efficacy as a moderator of mental concentration is highlighted. Hence the importance of promoting their development at the university level. To a certain extent and with all the proportion saved, the perception about online learning can be generalized to emergency remote teaching. The effects on mood and learning experienced by university students subjected to emergency remote teaching are also related to self-efficacy and self-regulation of learning. In another study, they analyzed the information of two groups of students, one with the students who gave up continuing one or more courses when they switched to the virtual modality and another with those who remained in all their subjects until the end of the 2020 cycle (Fernández et al., 2021; Gaeta, Gaeta, & Rodríguez, 2021; Robles & Rojas, 2015). The study results indicated that those who gave up their studies have low self-regulation skills and a lower feeling of perceived self-efficacy. Furthermore, Gaeta, Gaeta, & Rodríguez (2021) found in a sample of 1,290 Mexican university students, despite experiencing anxiety, boredom, and frustration during confinement, the primary emotions experienced were gratitude, joy, and hope. These emotions were positively related to self-regulated learning, while loneliness and disinterest were negatively related. Furthermore, the main strategies to deal with the situation focused on confronting and reassessing the situation. Finally, coping strategies mediate the relationship between emotions and self-regulated learning. Another study reported by León et al. (2014) confirms that the learning strategies used by students affect the goals of educational models.

COVID-19 has had differential effects between women and men. Other studies report the results of an investigation carried out on a sample of 12,518 university students. Women show a more significant impact of COVID-19 in the family and personal spheres. Therefore, coexistence, the economy, social life, recreational activity, studies, work, physical and mental health have been affected. Young female students are suffering more significant effects than males. Two groups of university students report greater differential affectations: young women studying for a degree and not having a partner, and males over 30 years of age, academics with a partner. The data shows that young women students, before the pandemic, already lived in a situation of greater vulnerability than male students Castañeda et al. (2021). The authors point out that the pandemic exacerbated such conditions, causing them to "experience the adverse effects of the crisis to a greater extent, which leads to greater risks of not being able to continue with their life plans, including their studies" (p.186).

The physical conditions in which the students had to carry out their academic activities also affected their learning. In the first place, access to the devices required to participate in remote activities such as laptops, PCs, or, as occurred in many cases, a smartphone was unequal, severely affecting the most vulnerable populations. Second, the Internet connection and speed. It is known that most Internet accesses are made through cell phones National Institute of Statistics, Geography, and Informatics (INEGI, 2021). Remote activities are limited if carried out on low-end equipment and slow connections. These conditions are added to the study space itself since there is some evidence of its effect on learning. In another study, they found that light intensity, temperature, and noise hurt the education of 206 university students (Realy et al., 2020).

Given the closure of schools, the immediate response was to resort to available technologies to contact students and academics and initiate emergency remote teaching (Hodges et al., 2020; Malo et al., 2020; Monasterio & Briceño, 2020; Portillo et al., 2020). The digital portals of the institutions served as a link with the university communities and were the way through which the resumption of classes, now in remote mode, was organized. Some institutions had experience providing distance and online education. These institutions had fewer problems in resuming teaching activities in the face of campus closures than those that did not. Therefore, the institutions were forced to resort to using available digital platforms that allowed teachers to teach their classes using proprietary resources such as *teams*, *google classroom*, *meet* y *zoom* (Fernández et al., 2021; Herrera et al., 2020). These platforms made it possible to re-establish communication with students in short periods and resume teaching activities somehow. As mentioned before, modalities that produce more, and we hope better use, digital technologies will likely be employed shortly. Therefore, it is essential to know the students' perspective on distance education. Hence the importance of assessing what they and their teachers did during emergency remote teaching, the sustained dynamics, their digital knowledge if they learned something new, the presence of emotional difficulties, and the technological resources available to them.

According to the results of a study on the opinion of university students about their experience in emergency remote teaching, the general view of the students was that the teachers used, for the most part, multimedia presentations or video tutorials (Pérez et al., 2020). It is about adapting to that medium what is usually carried out in face-to-face sessions. The limited mastery of teachers in using digital technologies to take advantage of the resources offered by the platforms that favor active, cooperative, and collaborative learning is underlined. On the other hand, the students expressed their dissatisfaction with distance education mainly because they considered the inverse relationship between dedication and learning results and the lack of interaction between students and teachers. This assessment coincides with what was reported by Gazca (2020) who investigated

the opinion of a sample of more than 954 students from the Universidad Veracruzana about emergency remote teaching. 46 percent expressed that they spent more time and effort in this modality than in the face-to-face.

In a different and positive perspective, Torres (2021) collected the opinion of 109 participants who indicated that teachers who promote learning to explain the topics, schedule practical activities, constantly give feedback, establish flexible tasks, and are available to students when required. For his part, Hesse (2017) found favorable effects of a hybrid modality on the achievement, involvement, learning, and perception of students at the elementary and high school levels through the review of 25 peer-reviewed articles published between 2008-2016. In addition, this review found that students report the development of additional skills related to self-control and metacognition.

As can be seen from the studies reviewed, the effects of the COVID-19 disease had an impact on different dimensions of the personal and academic life of the students related to the way they experienced emergency remote teaching. In addition, the effects of the coronavirus have been known to be more severe for women than for men. However, as Regueyra et al. (2021), it is necessary to deepen their study and investigate whether they were the same or different for students from other careers and school trajectories.

This research was carried out at the Universidad Veracruzana, founded in 1944, and autonomous in 1996. It is located in the state of Veracruz, situated on the Gulf of Mexico. It has five regional offices: Xalapa, Veracruz, Orizaba-Córdoba, Poza Rica-Tuxpan and Coatzacoalcos-Minatitlán, with a presence in 27 municipalities. Due to its enrollment, it is among the five largest state public universities of higher education in Mexico (López et al., 2021).

Its educational offer covers all areas of knowledge, organized into six groups: arts, biological-agricultural sciences, health sciences, economics-administration, humanities, and technology.

However, only students from the economic-administrative and health sciences areas were invited to participate in this research. Specifically, the Xalapa region and the Faculty of Accounting and Administration and the Faculty of Psychology (López et al., 2021), were selected, where the careers of Management and Business Administration, Administrative Computer Systems, Administration and Accounting participated, as well as of the psychology degree.

To investigate whether the effects of COVID-19 had a differentiated behavior among young people from these careers, an instrument was applied to 665 students enrolled in the February-July 2021 semester.

For this reason, the general objective of this research is to identify the students' perception of the teaching-learning conditions that prevailed during COVID-19 in the academic areas of Health Sciences and Administrative Economics to establish adequate mechanisms that improve remote teaching according to the differentiated profile.

## 2. METHOD AND MATERIALS

A mixed-type investigation was carried out with dominance of the quantitative approach, but without leaving aside the qualitative aspect to identify relevant elements of an exploratory, descriptive and correlational nature (Hernández et al., 2014).

## Instrument design

The questionnaire was designed based on references from the literature on the best teaching and learning practices and, in particular, those related to distance and online education (B. García et al., 2017; B. García & Pineda, 2012). The preceding considers it necessary to know if the teachers and students meet the appropriate conditions for their performance in the distance and online modality and identify the support they require to improve their practice. Therefore, the construction of the instrument ex profeso included 16 multiple-choice items on a Likert scale and open. The categories of analysis considered: census data, teacher teaching activities, learning activities, academic interaction, digital knowledge, new learning acquired, socio-emotional difficulties experienced, and management strategies and technological resources and connectivity.

## Instrument validity and reliability

To determine the validity and reliability of the instrument, Cronbach's Alpha method was applied, which allowed measuring the internal consistency of the scale (Robles & Rojas, 2015). The instrument's reliability obtained from a pilot survey of 30 students with 16 items yielded a Cronbach's Alpha value of .884, representing an excellent value (Darren & Mallery, 2003). Therefore, the instrument has a good consistency, it was valid and reliable, so it was applied.

## Population

The Faculty of Accounting and Administration belongs to the Economic-Administrative area, and within it are the careers of Administration, Accounting, Administrative Computer Systems, and Management and Business Administration. The number of students enrolled in the period February-July 2021 was 2667 students. In the case of Psychology, the number of students enrolled in that period was 693.

## Sample

The sampling applied to this research was non-probabilistic and non-random with a general population (Otzen & Manterola, 2017). Students who were pursuing an educational experience in February-July 2021 in the careers of Psychology, Accounting, Administration, Administrative Computer Systems, and Business Management and Administration were invited to participate in the study by email. The population of the careers belonging to the Economic-Administrative area was 2667 students. To carry out the calculation, a confidence level of 95% and a margin of error of 7.6% were considered, the participation of a sample of 458 students was obtained. On the other hand, the total number of Psychology students was 207, resulting in a full selection of 665 students.

Of 665 students surveyed, 20.5% of students belonged to Psychology and 68.9% to Administrative Computer Systems, Accounting, Administration and Management, and Business Management.



The age of the students surveyed by career was found mainly between 18-20 years and 21-23 years. In a smaller proportion, there were students 24 years and older. Regarding gender, greater participation of women was observed with 65.4%, only 1.2% affirmed a non-binary gender. The total population and sample are shown in Table 1.

**Table 1**

**Population and study sample**

Student population Faculty of Accounting and Administration Xalapa region		
Educational program	Population	Sample
Accountancy	857	138
Management	1056	153
Administrative Computer Systems	528	132
Business Management and Direction	236	35
Psychology	693	207
Total	3370	665

Source: self made

The data collection was carried out through a Google forms form, and later it was processed and analyzed, for which the SPSS software (Statistical Package for the Social Sciences) in its Version 24 was used.

### 3. RESULTS

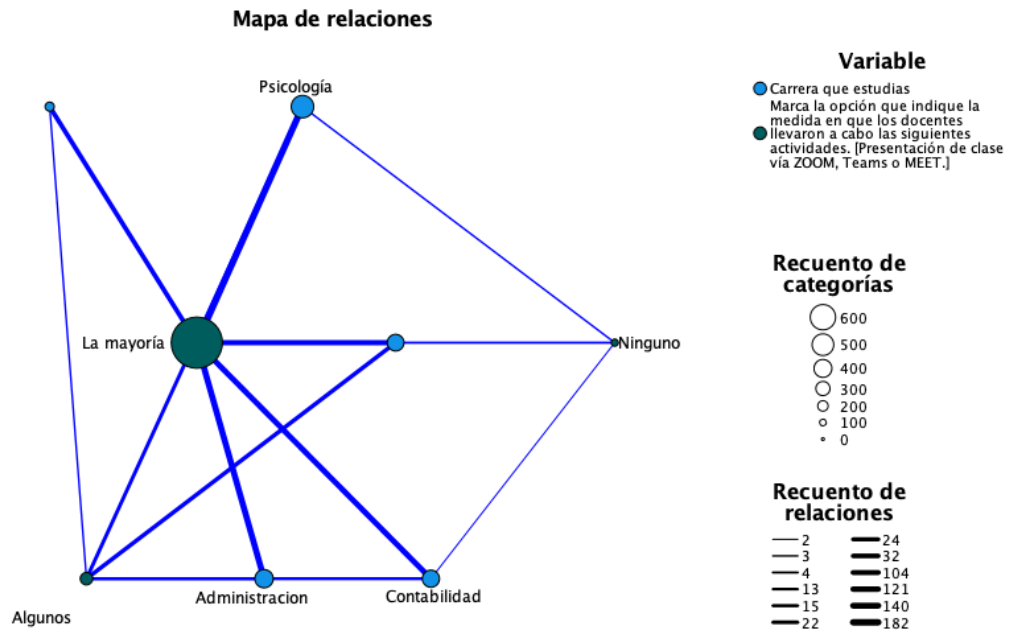
The profile of the students of each academic area is differentiated, so it is of interest to establish the relationships between the variables studied to identify the impact on the students and try to base recommendations for a hybrid return according to the particular needs. The main results analyzed by study category are presented below.

#### I. Teaching activities of the teacher

During the virtual classes, it was of great importance to identify the relationship between the career and some activities carried out by the teachers. In Figure 1, a relationship map is presented. It is determined that the jobs where the majority of the students indicated that the teachers mainly carried out work activities such as presentation of classes, sessions via *zoom*, *teams* or *meet* were Psychology, Administration and Accounting. On the other hand, the Administrative Computer Systems and Business Management and Administration courses did not appear because they had a lower incidence.

Figure 1

Map of relations between career and activities



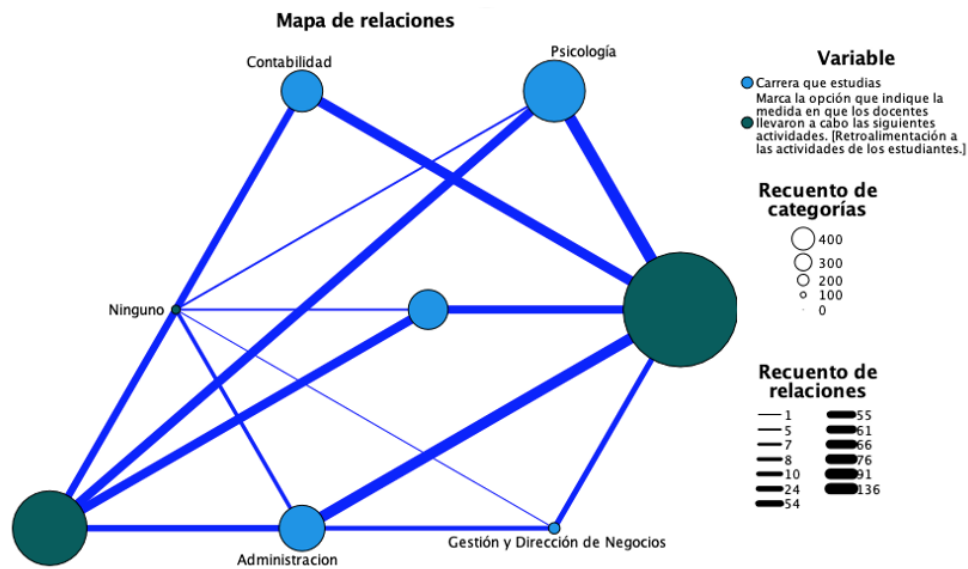
Source: self made

Regarding the feedback of the activities by the teachers, it was identified that the students mentioned that the careers of Psychology, Administration and Accounting are where they received the most feedback from their teachers (see Figure 2).

Figure 2

Map of relationships between career and feedback from teachers





Source: self made

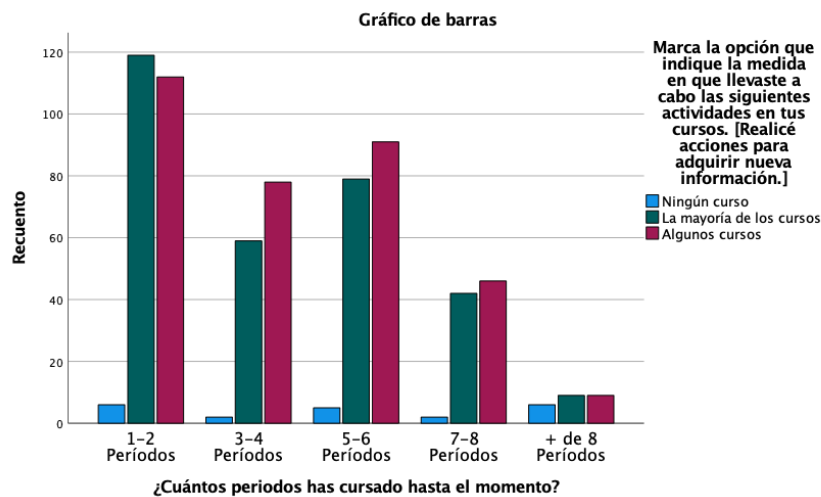
## II. Learning activities

The category of learning activities that the students declared is of great relevance for this study. The most important relationships found are described below:

It was identified that the students who were studying between the first and second periods were the ones who mostly carried out actions to acquire new information, as shown in Figure 3.

**Figure 3**

Activities carried out to acquire more knowledge by period.

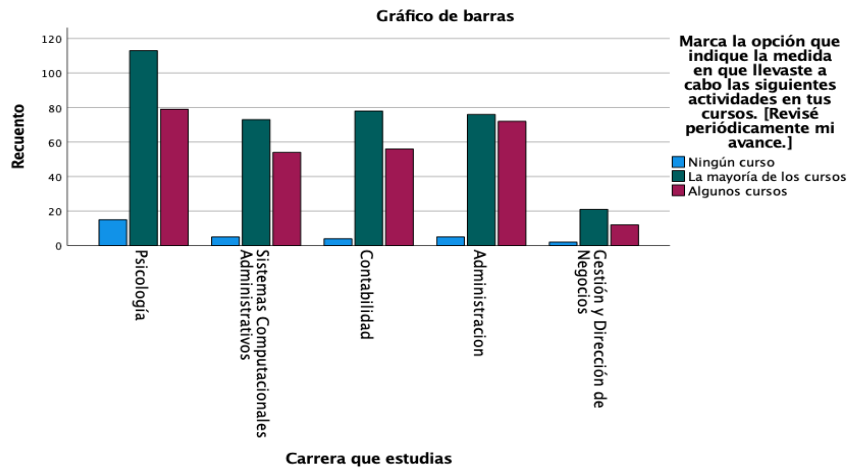


Source: self made

In this same sense, the female gender was the one who carried out the most activities.

Proportionally to the degree of participation of the students of the different careers, it is identified that they periodically reviewed their progress. This is observed in figure 4. The Psychology students were the ones who reported regularly reviewing their progress in the courses the most.

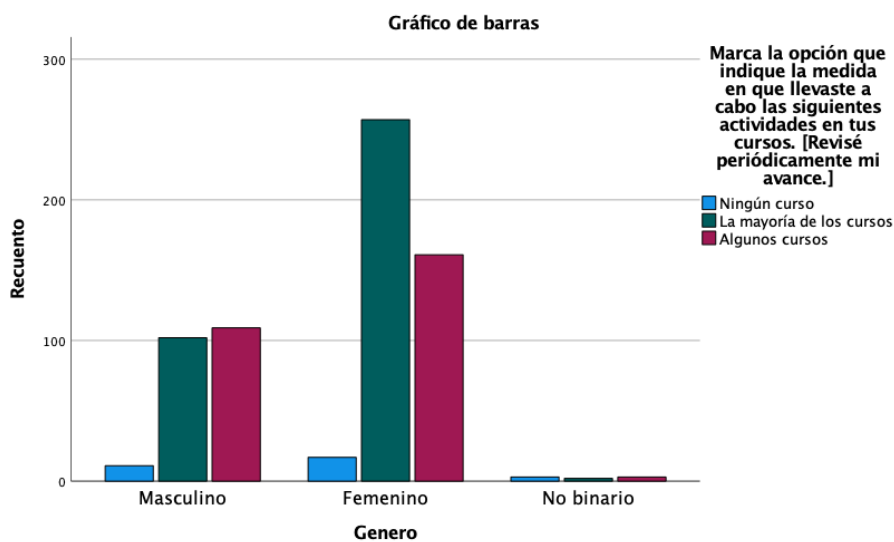
**Figure 4**  
Correlation of activities carried out and race



Source: self made

On the other hand, it stands out that women were the ones who most regularly reviewed their progress (see Figure 5).

**Figure 5**  
Correlation of activities carried out and gender



Source: self made

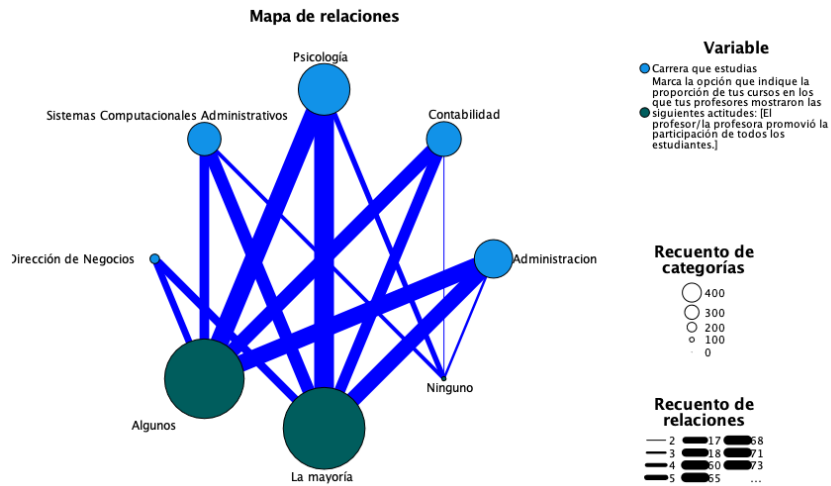
By correlating age with the activities carried out, it was identified that the youngest students, those who entered during the confinement, were the ones who were more aware of their progress periodically.

### III. Academic interaction

In increasing order, in the Psychology career, followed by Administration and Accounting, most teachers promoted student participation, as shown in Figure 6.

Figure 6

Map of relationships between career and teacher participation

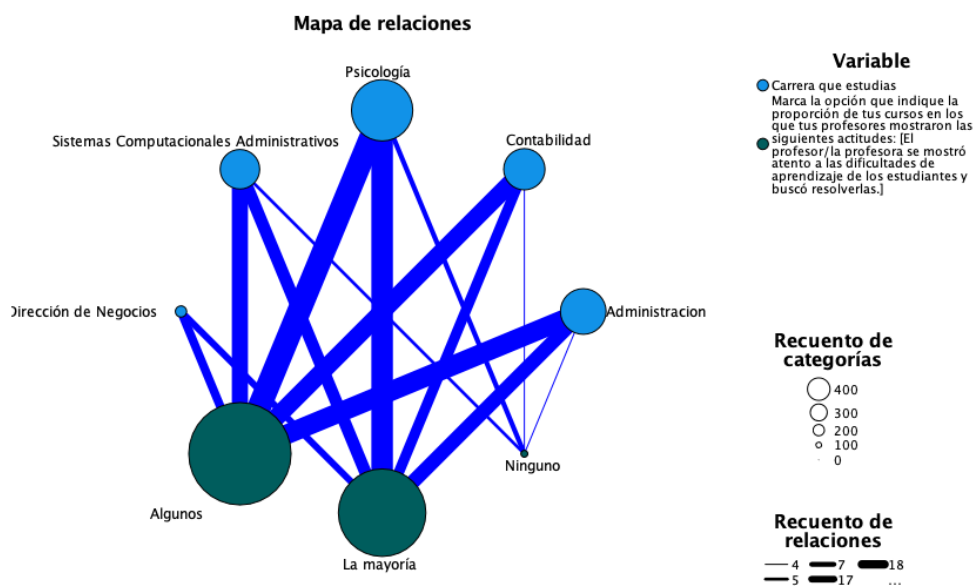


Source: self made

On the other hand, Figure 7 shows that the Psychology and Administration majors were also the majors where respectful, tolerant relationships were generated. The students identified that the professors were attentive to their learning difficulties, looking for solutions.

Figure 7

Map of relationships between career and attention to learning difficulties

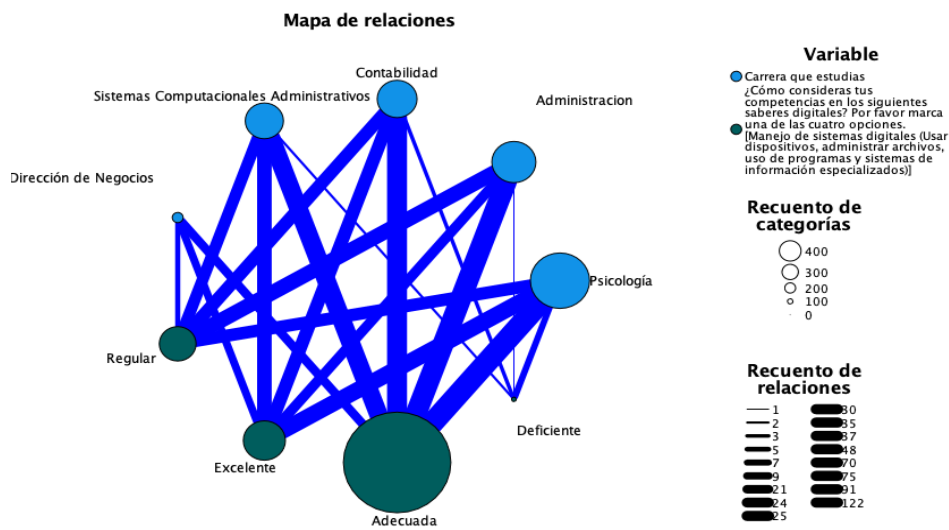


#### IV. Digital knowledge

A fact of great interest is that in the five careers studied. Most students consider that they have good use of devices, file management, programs, and specialized information systems. Therefore, the students' digital skills have helped them face virtual classes by facilitating the use of various technological tools (see Figure 8).

Figure 8

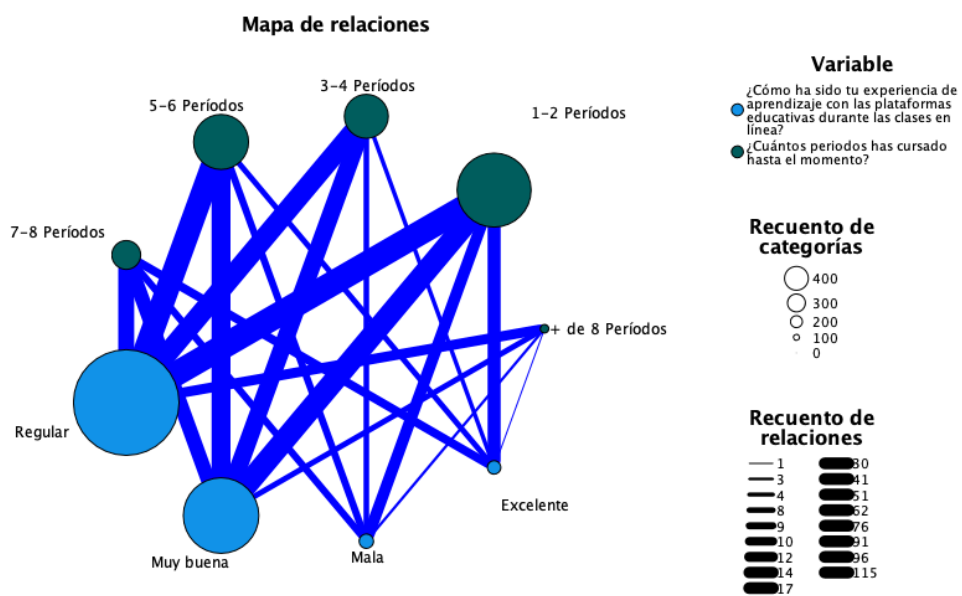
Map of relationships between device use, file management, program use, and specialized information systems.



When inquiring about the learning experience with educational platforms during online classes, most students indicated that their experience was regular, which suggests that there is still a lot of work to improve in the use and management of platforms. This is observed in Figure 9.

Figure 9

Map of relationships between educational platforms and periods studied.

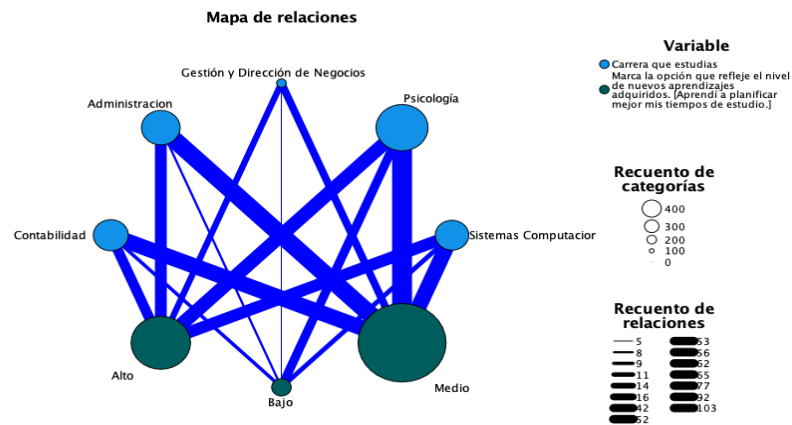


## V. New learning acquired

Regarding planning the time dedicated to studying, it was mostly identified that the students reported an average level. Therefore, not designing study time is recognized as a repercussion of students facing virtual teaching (see Figure 10).

Figure 10

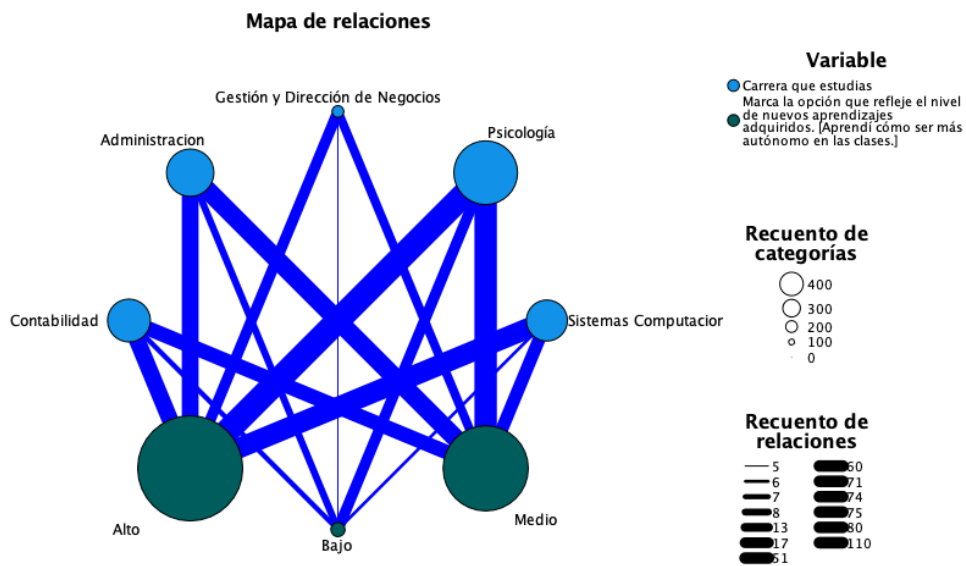
Map of relations between career and study time planning



On the other hand, in figure 11, it is identified that students of the Psychology and Computer Systems careers stood out for being more autonomous in their classes.

Figure 11

Map of relations between career and autonomy in classes



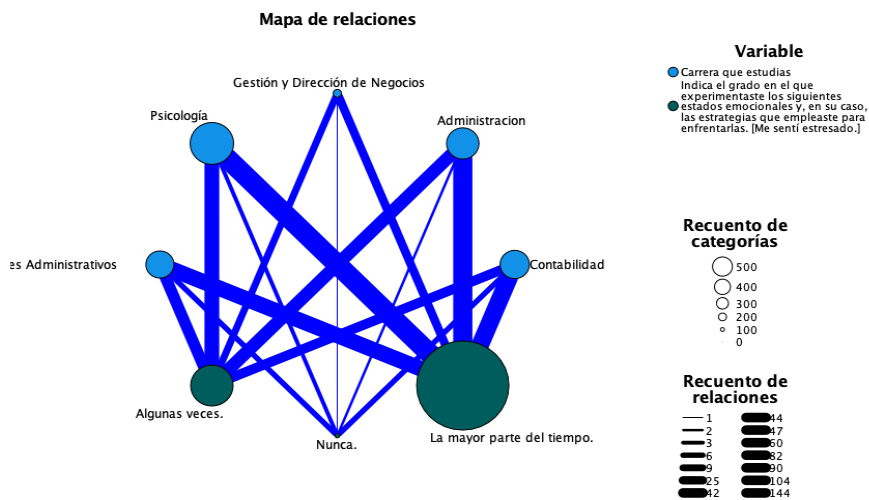
Source: self made

## VI. Experienced socio-emotional difficulties and coping strategies

Regarding the socio-emotional state, students from all careers reported feeling stressed most of the time, and this can be seen in Figure 12.

**Figure 12**

Map of relationships between career and emotional states

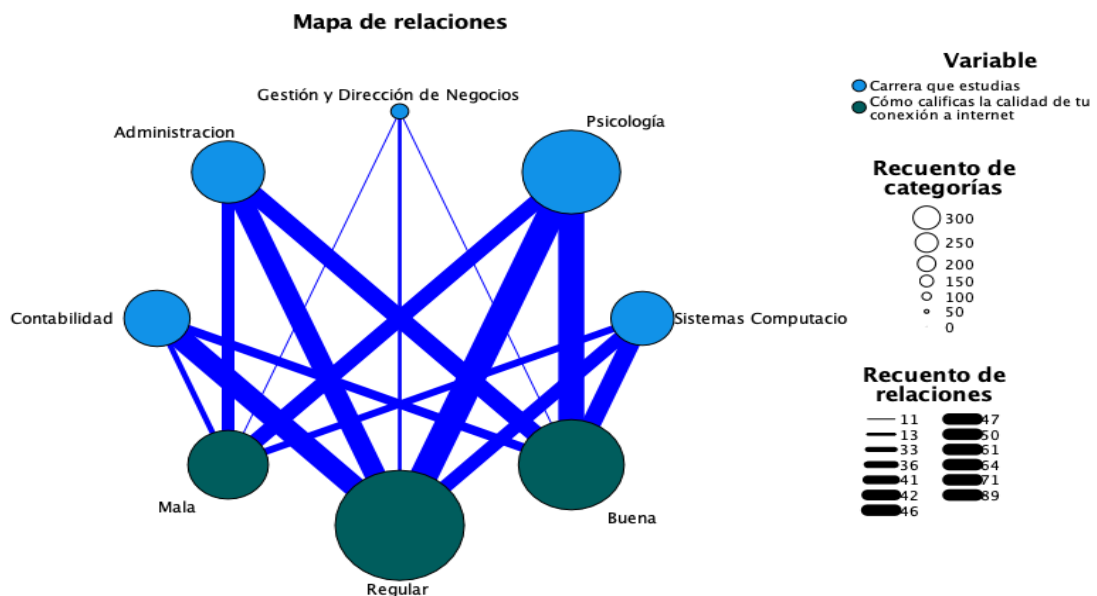


## VII. Technological resources and connectivity

Finally, most of the students reported a regular internet connection quality. Some Psychology and Accounting students indicated having a bad internet connection, which is recognized as one of the main problems in the development of the classes. Virtual as it is an indispensable technological resource (see Figure 13).

**Figure 13**

Map of relationships between career and internet connection



Source: self made

#### 4. DISCUSSION

This study confirms the findings of previous research by pointing out that the COVID-19 pandemic negatively and differentially affected students of different genders, careers, and school trajectories. As pointed out by Castañeda et al. (2021), women have been the most affected. Women show more significant effects in everything, primarily mental and physical health. Young students are suffering more powerful consequences than males. The participating students reported that the teachers replicated the face-to-face practices to a digital format through available videoconference platforms, where streaming systems prevailed (Sánchez et al., 2020). The teachers showed limited technological appropriation by making scarce use of available digital tools to enrich the dynamics and learning activities of the students. This result confirms what was suggested by Lara and Cabero (2021), who report that 43.8% of teachers surveyed say low or regular digital knowledge. It was shown in this study that teachers also have limited digital learning, as do many of the students who, in addition, had insufficient access to adequate devices to participate in remote activities and, especially, to their access to a robust connection and stable internet. This fact is similar to what was found in studies carried out in other latitudes. Regueyra et al. (2021) report that 95% of a total of 974 students faced Internet connectivity problems.

Despite making a notable effort to conduct their remote teaching in the best way, according to the evidence obtained, teachers do not meet the knowledge and skills required for distance education. In the framework of future scenarios of hybrid teaching and learning models, teachers must build capacities for planning, monitoring, and evaluating knowledge in these new environments (B. García et al., 2017). Something notable was the insufficient feedback provided by the teachers to the student's activities. Aspect identified in the distance education literature as essential (B. García & Pineda, 2012). In particular, it was determined that the students of the International Business and Administrative Computer Systems careers were the ones who reported limited feedback from their teachers. In contrast, the Administration, Accounting, and Psychology students received adequate feedback.

For their part, the students reported, for the most part, that their teachers promoted their participation in the courses and established relationships of tolerance and respect, especially in psychology, administration, and accounting careers. These results are consistent with those reported by Molina et al. (2021) who indicated that most of their teachers responded to their concerns promptly, provided continuous feedback, were efficient in mediating learning, motivated them to achieve their academic goals and met their guidance needs in complementary aspects.

The students of the first semesters, the women of the Psychology career, reported greater use of metacognitive strategies and self-regulation of their learning. This result is similar to that reported by Fernández et al. (2021), who found that university students in the first semesters obtained the highest scores on a scale of metacognitive abilities. This competence is essential to students to promote independent learning throughout life, as established in the sustainable development goal number four of the 2030 agenda for sustainable development of the General Assembly of the United Nations.

Most of the analyzed careers students reported having developed digital knowledge regarding the use of devices, file management, and specialized programs and information systems. These competencies are essential for



taking advantage of information and communication technologies in learning, as Benavides et al. (2021) also found a high self-perception of the level of digital literacy in a group of university students.

Unlike the results obtained by the students participating in this study, whose opinion about the emergency remote teaching experience was regular, Villafuerte (2021) reports the results of a satisfaction survey of a population of 4,489 students from 22 university careers. In addition, the students participating in this study believed that the institution offered a good quality organization and instrumentation of the distance education offer. The reasons for these differences are related to the availability of adequate devices, a stable and robust connection to the Internet, and the sociodemographic characteristics of the students who participated in our study, many of whom come from low-income population segments.

The students participating in this study, especially those studying psychology and computer systems, reported having achieved greater autonomy and better organization of their time in carrying out learning activities. On the contrary, those who studied accounting, business management, and administration reported lower levels of autonomy and skills to use their time. This information is consistent with that observed by López et al. (2021), who says that less than two-thirds of the surveyed population developed their autonomy to take control of their learning.

As has happened around the world, the COVID pandemic has had adverse effects on the well-being of students. In our study, the participants reported affectations in their emotional states experienced stress and difficulties in their interpersonal relationships. This fact was also written by González (2012), who analyzed the responses of students from a public university in southern Mexico to a questionnaire on the perception of academic stress, in which a decrease in motivation and academic performance and an increase in anxiety and family problems, especially for low-income students.

Students state that teachers require more and better training to conduct teaching experiences to promote active learning. This becomes evident when reporting that, in most cases, the teachers repeated the structure and content of face-to-face classes transmitted through videoconferencing technologies. Current technological tools offer ample opportunities to promote active and collaborative learning. However, it must be recognized that technologies by themselves do not achieve any significant change if they lack pedagogical support for the design of learning activities and the evaluation of desired learning. Therefore, it is imperative to deepen the study on how to better take advantage of the potential of hybrid education that integrates the best practices of face-to-face teaching and technology measurement. New research will contribute to elucidating strategies that contribute to the development of integrated and flexible teaching modalities such as those proposed by (L. García, 2020).

This study sheds light on the inequalities that have worsened due to the pandemic. Low-income population segments have been most affected due to insufficient access to technological devices and solid and stable Internet connections. Higher education institutions and governments must ensure that these populations meet these conditions. The pandemic is forcing institutions to reflect on the way teaching is conducted. The presence significant by itself now can take advantage of information and communication technologies to expand and improve learning opportunities. Attention to the most vulnerable populations cannot wait if education is inclusive and of good quality.

The isolation and confinement of the students produced unfavorable effects on their emotional well-being and the quality of their interpersonal relationships. Never like now is it essential that the tutoring offered in institutions be a vehicle to promote better environments of tolerance and respect and ways of channeling specialized psychological care services. Teachers have also experienced stress and burnout due to the amount of work required in emergency remote teaching for the preparation of distance classes, feedback, and evaluation of tasks and needed work. The excessive use of digital media such as WhatsApp and Facebook have also been factors that have contributed to causing negative moods in teachers.

The development of metacognitive skills was demonstrated in psychology and computer systems careers but not in the other jobs analyzed. This result is a warning sign to consider the importance of promoting resilience among students and the skills required for the best organization and distribution of their time and to monitor their progress in the construction of disciplinary knowledge and intervene in the cases necessary to achieve those purposes.

Research on the transition from face-to-face models to other inclusive and flexible ones represents a fertile and necessary field of study that improves current educational systems.

## 5. CONCLUSIONS

This research allows us to approach the perception that students have about emergency remote teaching. In particular and in attention to the study's objectives, the perception of students of different gender, semester and university career was analyzed about the following dimensions: teacher's teaching, learning activities, academic interaction, digital knowledge, new learning acquired, social difficulties. In addition, experienced emotional and management strategies and technological resources and connectivity were used. As a result, evidence is presented that accounts for the differentiated effects of emergency remote teaching between men and women and between the semesters and careers studied in the dimensions examined.

The widespread use of digital video conferencing platforms denotes an absence of the necessary elements to satisfy distance education, including planning, instructional design, continuous feedback, and authentic means of evaluation of the learning achieved. In most cases, the students reported that their teachers promoted tolerant and respectful relationships, being the careers of Accounting, International Business, and Administrative Computer Systems. However, the students indicated a lower assessment of this dimension. On the other hand, Psychology, Accounting, and Administration students reported, to a greater extent, that their teachers were attentive to their difficulties and sought to solve them.

The psychology and computational systems students reported the development of time planning skills and the use of metacognitive strategies. As detailed in the results of this research, all students said having felt stress and adverse socio-emotional effects due to isolation and confinement. The students of all the careers analyzed reported having adequate digital knowledge. Regarding their experience in emergency remote teaching, they generally considered it fair. Very few evaluated it as excellent. Emergency remote teaching promoted students

to improve the way they plan their time. The students of the Psychology and Administrative Computer Systems careers reported having acquired greater autonomy in the development of their classes. Most students write an acceptable quality of their internet connection. Some Psychology and Accounting students report having a poor relation to this service.

In the future, studies are needed that investigate the best ways to conduct teaching in inclusive and flexible modalities. Likewise, research is required to analyze different forms of technological appropriation of teachers and students. Another critical area of study is the analysis of students' metacognitive skills due to their importance for permanent education throughout life.

**Conflicto de intereses / Competing interests:**

Los autores declaran que no incurren en conflictos de intereses.

**Rol de los autores / Authors Roles:**

Ricardo Mercado: conceptualización, curación de datos, análisis formal, adquisición de fondos, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & edición.

Alma Otero: conceptualización, análisis formal, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & edición.

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