

Online or Face-to-Face Learning? College Students' Perceptions in the Aftermath of the COVID-19 Pandemic

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ABSTRACT

Online learning has been available for more than two decades, but it was not up until the COVID-19 pandemic that most educational institutions had to adopt it in early 2020. This major shift brought about a large number of complications for students; thus, most studies show that students prefer face-to-face learning over online education. Our study attempts to increase our understanding of the different nuances related to and about the effect of online learning during the COVID-19 pandemic on a particular group of higher-education students from a small regional campus. We conducted an online survey and collected data on students that had entered the university before 2020, to ensure that they had experienced both face-to-face and online learning. We collected students' sociodemographic data, their online learning conditions, perceived advantages and disadvantages of online compared to face-to-face learning, and general perceptions about their learning process. The results show that students faced some of the most typical difficulties identified in previous studies: a significant increase in class workload, poor quality of internet connection, and an increase in a sense of isolation and loneliness, among others. Yet despite these difficulties, students had an overall positive perception of online learning and the majority agreed that this learning modality should be maintained. This positive perception may be related to various difficulties faced during regular face-to-face learning, such as steep commuting costs and the emotional toll of becoming separated from the family.

Keywords: Costa Rica, Face-to-Face Learning, Higher Education, Online Learning, Regional Campus.

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I. INTRODUCTION

The COVID-19 pandemic has brought a series of new challenges at every level of the educational spectrum. Even though online learning has been available for more than two decades and also became a topic of academic discussion (McKenney & Reeves, 2012; Molnar *et al.*, 2019; Praechter & Maier, 2010; Salmon, 2013), it was up until this pandemic actually forced the overwhelming majority of educational institutions to adopt it. The technological tools available helped to make an abrupt transition in early 2020. Because of the implications and ramifications of this major shift, a wide range of studies have addressed different issues from informational technology and metacognitive response to affect and adaptability to new learning conditions for students during the first two years of the pandemic (Besser *et al.*, 2020; Dube, 2020; Ghimire, 2022; Mueller *et al.*, 2020; Mukuna & Aloka, 2020; Salas-Pilco *et al.*, 2022; Sandí-Ureña, 2020; Xhelili *et al.*, 2021). As almost all activities throughout most of the world had to be moved to online media, all these studies were also conducted online.

It was observed that the prevailing tendency of current literature is that students prefer face-to-face learning over online education (Besser *et al.*, 2020; Salas-Pilco *et al.*, 2022; Serhan, 2020). A study by Besser *et al.* (2020) revealed that students had a strong negative attitude towards online learning. In addition, Serhan (2020) mentions that during the first transitional semester to online teaching, students had a negative attitude towards technologies like Zoom. Almendingen *et al.* (2021) note that 75% of the students in Public Health Nutrition in Norway reported that their life had become more difficult, and 50% felt that learning outcomes would be harder to achieve due to the sudden shift to online education. The results from another study concluded that students had a preference for classroom over online learning (Xhelili *et al.*, 2021). Yet another research showed that chemistry students preferred face-to-face teaching over virtual learning, even though they had better grades with the latter (Sandí-Ureña, 2020). Considering this tendency, we decided to conduct a case study to test the hypothesis that our student population also favours face-to-face learning over online education.

This study was conducted at the University of Costa Rica's Golfito Campus (UCR Golfito). It is the newest and the smallest of all campuses with around 700 students within the university system. The majority of the student population comes from rural areas and small towns, some of them located as far as 3 hours by bus. According to the State of the Nation report, this region is the poorest of all 7 regions of the country with 26.5% of the population living under the poverty threshold in 2020 (Morales & Fernández 2022). The same report estimates that poverty might have increased up to 33.5% due to the COVID-19 pandemic. In this context, more than 90% of the student population at this UCR Golfito Campus receives some sort of scholarship, ranging from tuition waivers to full financial support for room and board, being the latter the vast majority.

This study attempts to generate an understanding of the different nuances related to and about the effect COVID-19 had on a particular group of higher-education students from a small regional campus. The target population was selected because it has a unique condition, as these students have had face-to-face learning prior to the pandemic, then online classes for two consecutive years, to finally hybrid or mixed learning experiences in 2022. Their affective, cognitive, and behavioural response to a sudden change to online learning may not be in par with those students from urban settings in other parts of the world. Yet, we expect it to be similar to that of students from other rural universities, like the case studied by Olawale *et al.* (2021) in two South African universities. Their findings revealed that both staff and students suffered from a psychosocial estrangement with regards to interpersonal relationships at all levels. With online education, the majority of respondents had to cope with family relationship challenges, while at the same time not being able to get any support from their institutions. We do expect that our mostly rural student population might have a similar affective response to, and thus a negative perception of, online learning. Whether this is the case or not, the results of our study may serve to support teachers and decision-making authorities about teaching methodologies and/or teaching policies. It has been widely studied that proper investment in tertiary education can help developing economies improve the standards and quality of life of its citizens (Altbach & Salmi, 2011). Thus, appropriate educational investments and choices of methodologies tend to have better results (Hanushek & Woessmann, 2012). This is especially important in small, rural campuses in the developing world where resources are limited.

II. METHODOLOGY

The University of Costa Rica's Golfito Campus is located in the southwestern region of the country, in the canton of Golfito. This campus originally started as a research project between the University of Costa Rica (UCR) and the University of Kansas (KU) in 1985. The idea was to take advantage of some coastal-front facilities surrounded by primary forests donated by the United Brands Banana Company. The project later turned into a regular teaching undertaking as the first 21 students enrolled in Business Informatics, in 2006.

Since then, the student population has grown to 671 students, enrolled in 11 different majors. Before the COVID-19 pandemic, face-to-face classes were the only method used for courses and other academic activities; however, during 2020 and 2021, classes and other academic activities were abruptly switched, entirely, to online.

Our target population are those students who, in 2020, had had at least one year of face-to-face learning and who were moved to online classes. The population considered includes students enrolled in the following majors: Business Informatics, English, Education, Ecotourism and Agricultural Economics. This study population includes approximately 250 students. We attempted to contact all students within this population through email and WhatsApp and asked them to fill the on-line questionnaire.

The instrument for data collection, a questionnaire, was designed with the Google Forms tool. In this questionnaire we wanted to identify some challenges and opportunities that were faced by the student population during online education as a result of the COVID-19 pandemic, specifically in 2020. A questionnaire, consisting of five sections, was prepared. The sections included questions pertaining to 1) demographic information, 2) conditions experienced during the pandemic, 3) advantages and 4) disadvantages of online classes, and 5) five closing questions related to general aspects of online classes. We include the original Spanish version of our instrument in the Supplementary Information.

The first set of questions was related to demographic data, including gender, age, major, year of enrolment, place of residence, with whom the student lived with in 2020, and number of credits enrolled per semester (in 2020). In addition, the questionnaire included other questions, such as the type of equipment (i.e., electronic devices) used, type and quality of internet connection, and whether students had an appropriate space to have the online lessons. The second set of questions was related to the advantages and disadvantages perceived during online classes. We created a list of advantages and disadvantages based on the methods and results of previous studies (e.g., Adedoyin & Soykan, 2020; Farrah & Hatem Al-Bakry, 2020; Ferri *et al.*, 2020; Liang & Chen, 2012). For this section of advantages and disadvantages, we used Likert-type scale questions containing five statements that ranged from complete disagreement (1) to complete agreement (5) with a specific condition being either an advantage or disadvantage to online classes. As advantages, we included statements pertaining to the flexibility of the location where they received classes, flexibility of schedule, reduction in commuting time and associated costs, safer environment, and about online classes providing new learning and evaluation tools (Supplementary Information). As disadvantages, we included statements that included an increase in the number of assignments, not having adequate equipment, inadequate internet connection, inadequate materials, and inadequate spaces for online classes. We also included other potential disadvantages such as a lack of experience of professors to impart online courses, poor communication with peers and teachers, little family support, negative effects on their emotional state, boredom, an increase in distractions, and a sense of isolation.

In both sections (advantages and disadvantages), we also included a space for students to write any other advantages or disadvantages that they identified as important for them.

Students were also asked about their perception of whether online learning is better than face-to-face on a scale of 1 to 5, 1 being that they learned less in online classes and 5 that they learned more. They were also asked about how they perceived their performance during online learning in a scale from 1 to 5; that is, whether they perceived that their grades decreased (1) or whether they increased (5) during online classes. Students were also asked about how they perceived their overall online learning experience, from very negative (rating of 1) to very positive (rating of 5). Finally, we asked students about future prospects for online learning. We allowed learners to select the percent of classes (0, 25, 50, 75 or 100%) that they would prefer to have online. We provided a space at the end for students to write about any relevant experiences during online classes.

We present results based on the frequency of responses to demographic data, conditions during online classes, and overall perception of their learning and academic

performance, in addition to their overall perception and preference for future online classes. To determine if there were significant differences in the distribution of responses to each one of our questions, we first created pie charts using the R package ggstatsplot with the function ggpiestats (Patil, 2021). This function creates a pie chart with results from a one-sample proportion test (chi-squared goodness of fit test), which is displayed on top of each chart. On the bottom of each pie chart, we also show results of the Bayesian analysis, including the natural log of the Bayes Factor (i.e., evidence in favour of null over alternative hypothesis).

We also tested the relationship between certain responses based on Chi-squared tests with the function ggbarstats. The responses that were paired include 1) internet type with internet quality, 2) internet type with a perception of poor internet connection as a potential disadvantage of online classes (in Likert-type scale), 3) percent of classes that students would prefer online within each major, and 4) gender with a perception of an increased sense of safety as a potential advantage of online classes (in Likert-type scale).

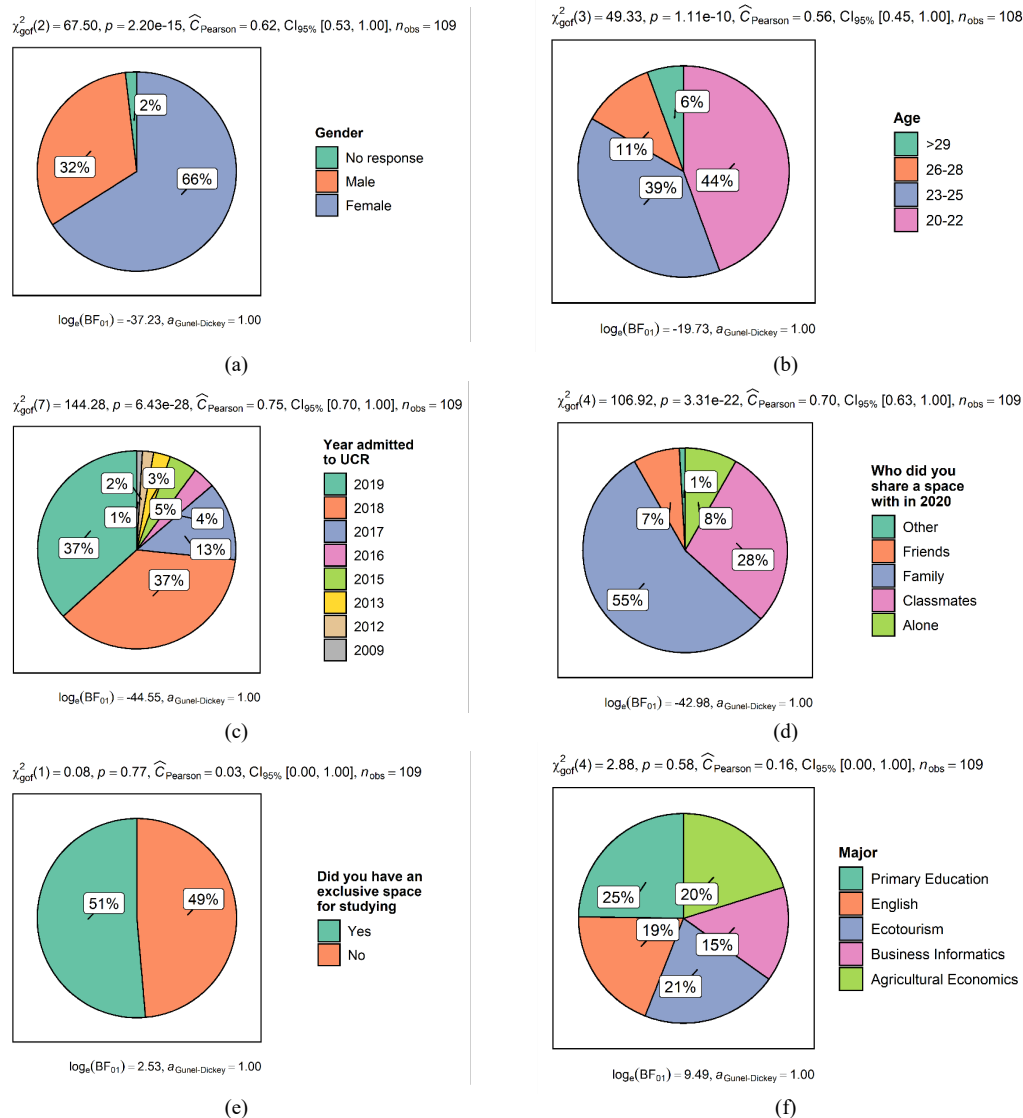


Fig. 1. Pie charts showing the distribution of responses for questions related to demographic data, including gender (a), age range (b), year of admission to the University of Costa Rica (c). We also include data on various conditions faced by students during the COVID-19 pandemic, such as the people that they lived with (d), and whether they had an exclusive space for studying (e). Finally, we show the distribution of students by major (F). Results on top of each chart are based on a chi-squared goodness of fit test; on the bottom we show results of the Bayesian analysis.

The ggbarstats function generates bar plots showing the result of the comparison of percentages within each category (top of each bar), and the results of the comparison of percentages among categories (based on a χ^2_{Pearson}) in addition to the effect size (V_{Cramer}) together with the confidence interval (top of each chart).

III. RESULTS

A. Sample Demographics

Responses were obtained from 109 students, of whom 72 were female, 35 were male, and 2 preferred not to answer (Fig. 1a). The age of most of the students interviewed ranged from 20 to 25 years old (Fig. 1b), and they were students admitted to the university mainly between the years 2017 to 2019 (Fig. 1c). The interviewed students mostly live in the Brunca region of Costa Rica. In relation to their housing situation during 2020, most students (56%) indicated that they lived in suburban areas; some considered their homes to be of rural origin (31%), while only a few (13%) considered that they lived in urban areas. Note that the latter is based on students' perception, not necessarily actual geographical reality. A high number of the students

lived with their family, although some also shared space with university classmates (Fig. 1d). A high percentage of the students also used spaces that were not exclusively used for studying (Fig. 1e). There was also an even distribution in the number of students who answered the questionnaire by major (Fig. 1f).

B. Equipment and Connectivity

About 85 % of the students sampled indicated that they had a computer for their academic work (Fig. 2a). Out of those, 83% said that such equipment belonged to them (Fig. 2b), and that this equipment was, for the most part, for their exclusive use and not shared (Fig. 2c). In addition, 85% of the population indicated that they had this equipment before the pandemic (Fig. 2d). The largest percentage of students (74%) had medium to good quality internet access (Fig. 2e); only 12% responded that their internet was of poor or very poor quality and only 6% responded that they had very good quality internet. DSL/Cable internet was used by the majority of students (53%; Fig. 2f), while around 20% of the sample reported having internet via fibre optics or using a mobile phone.

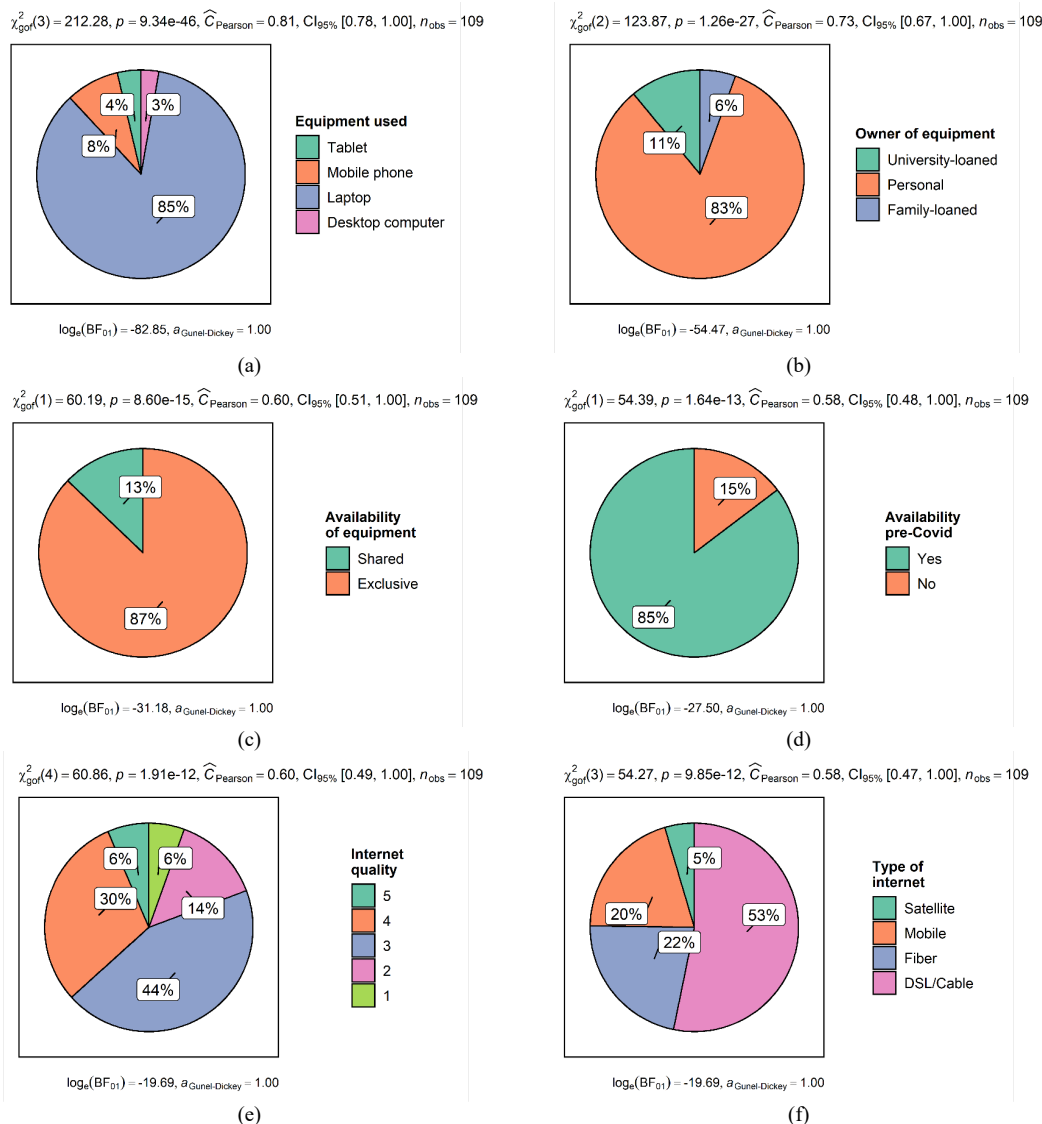


Fig. 2. Pie charts showing the distribution of responses for questions related to: a) the type of equipment used for accessing online classes; b) who was the owner of that equipment; c) how available it was; d) whether that equipment was available before the COVID-19 pandemic. We also show charts of: e) perceived internet quality (1: very poor, 5: excellent); f) the type of internet used. Results on top of each chart are based on a chi-squared goodness of fit test; on the bottom we show results of the Bayesian analysis.

TABLE I: STUDENTS' PERCEPTION OF THE IMPORTANCE OF PROPOSED ADVANTAGES AND DISADVANTAGES TO THEIR ONLINE LEARNING PROCESS DURING THE COVID-19 PANDEMIC

	Agricultural Economics	Business Informatics	Ecotourism	English	Primary Education	Overall
Advantages						
Site flexibility	4.05	4.38	4.17	4.10	4.19	4.17
Time flexibility	4.32	4.56	4.09	4.00	3.96	4.16
Pace of study	4.18	4.13	3.26	3.57	3.48	3.69
Reduced traveling costs	4.86	4.63	4.87	4.76	4.52	4.72
Time saving	4.82	4.88	4.83	4.67	4.56	4.73
Increased sense of safety	4.68	4.56	4.35	4.43	4.44	4.49
Novel learning tools	3.82	3.75	3.61	4.05	3.89	3.83
Novel evaluation tools	3.55	4.06	3.70	4.05	3.74	3.80
Disadvantages						
Increase in amount of work	4.27	3.94	4.43	3.95	4.44	4.24
Inadequate technology	3.59	2.63	3.09	3.43	3.41	3.27
Poor internet connection	3.64	3.44	4.00	3.86	3.85	3.78
Inadequate materials	3.73	3.25	3.22	3.33	3.52	3.42
Lack of suitable space	3.45	3.13	3.78	3.71	3.15	3.45
Noisy environment	3.73	3.31	3.78	3.38	3.26	3.50
Lack of experience of professors to impart online courses	3.64	3.19	3.83	3.14	3.56	3.50
No training in online tools	3.45	2.19	2.74	3.67	3.70	3.22
Poor communication with professors	3.77	2.50	3.48	3.43	3.74	3.45
Poor peer-to-peer communication	3.68	2.38	3.61	3.43	3.48	3.38
Lack of family support	2.45	2.25	2.17	2.67	2.74	2.48
Increased boredom	3.73	2.94	3.65	3.48	3.63	3.52
Increased sense of isolation	3.95	3.56	3.87	3.62	4.00	3.83
More distractions	3.91	3.56	4.00	3.81	3.85	3.84
Lack of self-organization skills	3.05	2.38	3.00	2.90	3.52	3.03
Negative impact on mood	3.91	2.88	3.91	3.33	3.89	3.64

Values are based on the Likert-type scale (1: highly disagree; 5: highly agree). Shaded cells: advantage or disadvantage chosen most frequently by students in that major; when no cell is marked, it means that there were three or more categories with similar scores.

C. Advantages of Online Classes

Regarding the advantages of online classes, Table I shows two types of results, on the one hand, highlighted with grey, the advantages that were most mentioned by the students, regardless of the level of importance. In this case we recognize it as the most frequent choice. We also show those advantages to which students assigned the highest level of importance (based on the Likert-type scale; 1: highly disagree, 5: highly agree). The latter are determined by the highest numerical value assigned by students enrolled in each major and overall; in this case, we indicate them as the most relevant advantages.

The advantage that was more frequent for the entire sample was site flexibility; the advantages that were considered the most relevant included the possibility of saving time and reducing transportation costs. Students of Agricultural Economics and Business Informatics mentioned most often the advantage of studying at their own pace. The advantages with greater relevance for Agricultural Economics included reduced commuting costs, time saving, and a sense of greater security. For Business Informatics, the two advantages recognized as the most relevant are time saving and reducing commuting costs. Ecotourism students most often recognized site flexibility as an important advantage but indicated that the most relevant are the reduction of commuting costs and time. English and Primary Education students most often indicated the advantage of reducing commuting costs.

In the case of Primary Education students, they also pointed out with high frequency the advantage of having a greater sense of security. The most relevant advantages for students in English and Primary Education were the reduction of commuting costs and time savings.

When asked about any other advantages they could identify from online classes, students often mentioned the possibility of staying in their own space, near their family members. Twenty-two students referred to advantages such as the possibility of being closer to their families, having family support, maintaining a better diet, taking advantage of the comfort offered by family housing and not being exposed to extreme weather conditions since they did not need to commute to the campus. They indicated that, thanks to the possibility of living with their families, they had more time for recreation and sports, which they associated with better mental health.

Another advantage mentioned by sixteen students has to do with the fact that online classes can favour better learning and use of pedagogical resources. They mentioned aspects such as the use of technological resources that strengthen the learning process and the possibility of watching class recordings, which allow them to constantly review class topics and understand complex subjects better. They considered that online classes provide greater access to external experts and other resources that could not be possible in a face-to-face scenario.

Six students also mentioned having experienced less stress during virtual classes in phrases such as "My emotional stability was much better" and "Individual and collective health are safeguarded".

D. Disadvantages of Online Classes

Students were also asked about disadvantages of online classes. From the list provided, students had to rate which ones they considered the most relevant. Table 1 shows, in grey, the disadvantages that were most frequently mentioned. The disadvantages to which students assigned the highest level of importance (based on the Likert-type scale; 1: highly disagree, 5: highly agree) are determined by the highest numerical value; again, we consider them as the most relevant disadvantages.

We see that, overall, the most mentioned disadvantage coincides with the most relevant, which was an increase in class workload. That same disadvantage was the most mentioned and the most relevant for students enrolled in Agricultural Economics, Ecotourism, and Primary Education majors. As for the major of Business Informatics, the disadvantage selected with the highest frequency was a bad internet connection, but the most relevant was precisely the increase in workload. The disadvantage that students see as less relevant was a lack of family support.

When asked about other disadvantages, twenty-one students referred to the workload, limited possibilities for socializing, difficulties in communicating with professors and other students, and exposure to the computer for long hours. They added that these situations generated a lot of stress and health problems, both mental and physical. Four students mentioned that having to take the courses at home sometimes caused conflicts with family members and difficulties in controlling noise and other interruptions. Four students mentioned connectivity difficulties as another major disadvantage in taking online courses. Finally, two students perceived as a disadvantage that the teachers did not make meaningful adjustments of course dynamics when switching to online classes.

E. General Opinions

When asked about the students' perception of whether online learning is better than face-to-face, the majority responded that the level of learning was similar (Fig. 3a). However, most students (79%) perceived that their grades improved with online classes (Fig. 3b). They were also asked about how they perceived their online learning experience, from very negative (rating of 1) to very positive (rating of 5). More than 90% of the students responded that online classes are equivalent (rating of 3) or better (ratings of 4 or 5) than face-to-face learning (Fig. 3c). Finally, when asked about future prospects for online learning (i.e., whether they would prefer none, some, or all of their classes to be online), the majority of students (89%) considered it as a good option for either some (25-75% of online classes; Fig. 3d) or all (100%) of their courses. Few students considered that online classes should not be an option in their college education. Towards the end of the survey, students were asked about any relevant opinions they had had as a result of online learning. Among the answers, five themes were identified, the most mentioned by the students being their study environment and the dynamics of the

classes. On the former subject, 12 students indicated experiencing excessive noise caused by their relatives, pets, neighbours, and others. They also mentioned having inadequate lighting conditions and insufficient or uncomfortable furniture. On the topic of lesson dynamics, students mentioned that professors were often intransigent, as they would not allow students to submit assignments late when they experienced poor or no internet connection or other difficulties beyond their control. Students also considered that the pedagogical tools were not adequate and that the dynamics of the courses were difficult due to little or inadequate communication between professors and students. They also referred to the limited experience some instructors had on online teaching. Eight students referred to the fact that the conditions of the places they had at their disposal for studying were not ideal, as they were constantly distracted by noise, family dynamics, and use of electronic devices, among others. Eight students also recognised the significant increase in the amount of work they were required in each course as relevant. On the other hand, ten students responded positively about the support of the university and instructors to adjust to the new conditions. They regarded positively the fact that they can save some money not having to commute to the campus every day and the possibility of having greater freedom to manage their time. One of the issues addressed by the students had to do with the efficacy of the learning process. Eight students mentioned that they learned less while taking online classes. There were comments such as "I think that any knowledge gained through online learning processes tends to be more easily forgotten," and another one mentioned that he/she "felt that [he/she] learned less online." Conversely, three students indicated that their learning was greater and more effective. Another issue related to learning had to do with academic performance. Four students mentioned that their academic performance (course grades) was higher than during face-to-face classes. One such student indicated that she/he was able to pass courses that she/he had repeatedly failed in face-to-face classes. One of the other topics acknowledged by the students is about the use of electronic devices, especially with regards to the problem of power outages that left them without internet connection. This became problematic when it took place in the middle of any type of evaluation, causing stressful situations. On the same token, two students included how they had difficulties related to equipment failures and a lack of understanding on how to establish a working connection to the university hub and participate in a synchronous online class. Health was another issue addressed by the students. In this sense, three students made references to physical health, including one who said that online classes made her/him more sedentary. Another indicated vision problems and one referred to having had alterations in blood pressure. The health issue most prevalent in the comments had to do with mental health. Eight students made comments along these lines, indicating having experienced depression, anxiety, and stress. Comments such as "My mental health was terrible", and "I suffered a lot of anxiety from not understanding the course and sometimes not having time to get all the assignments done on time, which led me to become depressed and seek help from drugs."

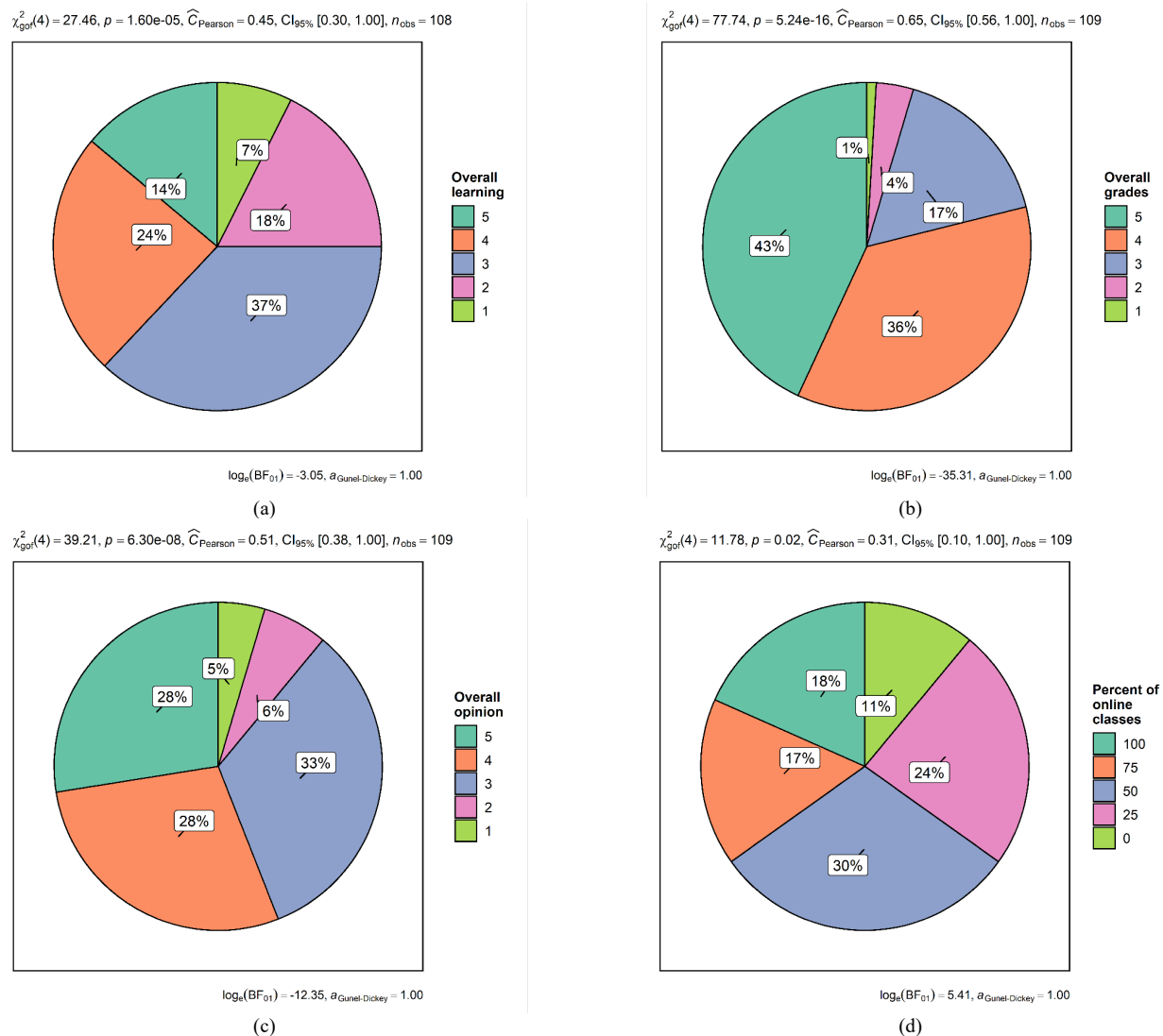


Fig. 3. Pie charts showing the distribution of responses for questions related to the students' general opinion about online classes during the COVID-19 pandemic. Specifically, we show: a) how students perceive their learning experience during online classes (1: learned less during online classes, 5: learned more during online classes); b) whether their grades changed (1: lower grades during online classes, 5: higher grades during online classes). We also show: c) students' overall opinion of their online learning experience (1: very negative, 5: very positive); d) what percentage of their courses would they prefer to have online, from now on. Results on top of each chart are based on chi-squared goodness of fit test; on the bottom, we show results of the Bayesian analysis.

The last issue had to do with their attitude towards online learning in relation to their major. Out of nine students, three indicated that they miss the face-to-face classes and have an aversive attitude toward online learning. Another student said that virtual learning is only useful for some courses. Contrary to the opinion of these four students, five indicated that they found online classes to be a good experience as it offers them greater flexibility and greater autonomy in their learning process.

F. Interactions Between Data

To further understand our population, we decided to test the relationship between responses to various categories. For example, we wanted to determine how different types of internet services influenced students' perception of their quality (Fig. 4A). We found that 36% of the students who perceived their internet as being extremely poor are those who have mobile internet. For satellite internet, students believed this to be of intermediate quality (80%) and above, though not excellent. However, 63% of people who have a fibre internet connection rated it as a better quality. Regarding the type of internet and whether students perceive

a poor internet connection to be an important disadvantage for online classes (Likert-type scale: 1 highly disagree, 5 highly agree; Fig. 4B), we found that students that used mobile internet highly agreed on this being a significant disadvantage. We found that responses on whether online courses should continue to be offered in the future varied by major (Fig. 4C). For example, students in Ecotourism would not want 100% of their classes to be online; they would prefer only some (25 or 50%).

For students in Business Informatics, we found that they would prefer to have at least some online courses, as none responded that they would prefer 0% online courses. The distribution of preferences in other majors (Fig. 4C) is fairly similar to the distribution of responses for the overall population (Fig. 3d). We also compared how male and female students rated an increased sense of safety as being an important advantage of online classes (Likert-type scale: 1 highly disagree, 5 highly agree; Fig. 4D). We found that a large portion of female students (92%) agreed with this advantage compared to male students.

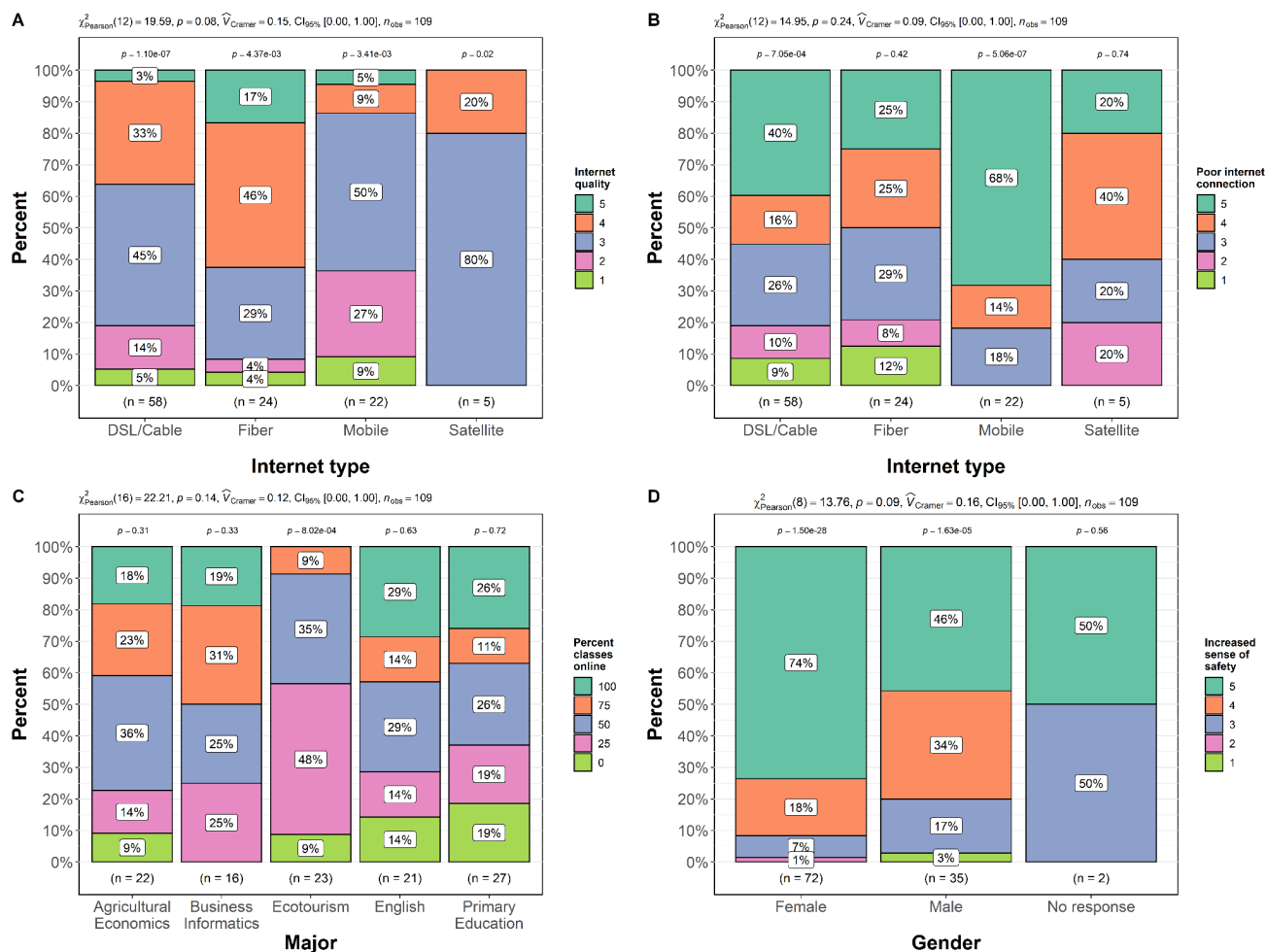


Fig. 4. Bar charts showing: A) how students with different internet types perceived their internet quality (1: very poor, 5: excellent); B) internet type with a perception of poor internet connection as a potential disadvantage of online classes (in Likert type). We also show: C) the percent of classes that students would prefer online within each major. Finally, we present: D) results of gender with a perception of an increased sense of safety as a potential advantage of online classes (in Likert-type scale). The result of the comparison of percentages within each category are shown on top of each bar, and the results of the comparison of percentages among categories (based on a χ^2_{Pearson}) in addition to the effect size (V_{Cramer}) together with the confidence interval are shown on top of each chart.

IV. DISCUSSION

In this study, we expected college students from the University of Costa Rica in Golfito to evaluate their online learning experience during the COVID-19 pandemic poorly, compared to face-to-face learning. Previous studies show that students often have a negative perception of online learning as they face multiple, and, often insurmountable, difficulties (Besser *et al.*, 2020; Praechter & Maier, 2010), including an unreliable internet connection, lack of necessary electronic devices, lack of human interactions with teachers and other students, little support from parents, and no suitable spaces for studying (Almendingen *et al.*, 2021; Ferri *et al.*, 2020; Zhang *et al.*, 2020). Our results show that students in our sample also faced some of the most typical difficulties identified in previous studies: a significant increase in class workload and poor internet quality (Barrot *et al.*, 2021; Maatuk *et al.*, 2022; Muflih *et al.*, 2021). Since having a stable internet connection is vital for online classes and school-related activities, this is a critical disadvantage, as other studies have found (Agung & Surtikanti, 2020). The difficulty of access to materials, equipment, and adequate spaces for virtual learning was also mentioned as a drawback. It should be taken into account that most of the population included in our sample comes from rural communities and from low-income families, so it

is not surprising that they experienced the latter difficulties as they often may not be able to purchase adequate equipment and materials, and homes often do not have sufficient space to accommodate a dedicated study room, problems that have been detected in previous studies (Adedoyin & Soykan, 2020). Another important disadvantage mentioned was an increase in the students' sense of isolation and loneliness, which has often been identified as the most relevant cost of online learning experiences (Barrot *et al.*, 2021; Besser *et al.*, 2020; Copeland *et al.*, 2021).

Despite the evidence from various studies showing students' poor perception of online classes, and the multiple difficulties faced by our study population, students in our sample seemed to have an overall positive perception of online learning. For example, most students responded that online classes are an equivalent or better option than face-to-face learning. Students also did not perceive a deterioration of their learning process during online courses. A similar trend was observed in a study of Polish medical students (Bączek *et al.*, 2021), as this population did not see a change in its learning process when comparing face-to-face and online learning. Students in our sample also indicated that their grades improved during online courses, a factor that could play a major role in their overall positive perception

of online learning (Karadag, 2021). In fact, a few students mentioned that during online classes they were able to pass required classes they had constantly failed, and one even highlighted the fact that her/his grade point average increased so significantly that he/she was granted the recognition of academic excellence. With the above we can see that online learning is favourably rated, and most students would like to keep at least some online courses.

Students in our sample very consistently considered an increase in the amount of workload to be the greatest disadvantage of online learning. Despite this being the most relevant drawback identified, only one study to date has addressed this issue during the sudden and widespread migration of universities to online learning during the COVID-19 pandemic. A study by Therisa Beena and Sony (2022) measured student workload by estimating mental, physical, and temporal demand. They discovered that students found online learning frustrating in part due to a significant increase in temporal demands. An increase in workload is associated with high levels of stress and even poor performance (Corrales *et al.*, 2020), so a careful assessment of whether this increase in workload was in fact common during the pandemic, and how this may have influenced a widespread negative perception of online classes, is certainly warranted.

When balancing the advantages and disadvantages perceived by students in our sample during online classes, we see some important trends; these trends may help us explain why students in the UCR Golfito Campus are more amenable to online classes compared to other populations. For example, it seems that being able to choose the location from where to attend classes is a highly relevant advantage. In fact, other relevant and frequently selected advantages may be associated with site flexibility, including reduced transportation costs, time saving, and even an increased sense of safety. The latter appears particularly relevant to women. Students provided additional clues to understand why they generally perceived online classes more positively, including the possibility of staying with their families and an overall improvement in healthy habits, such as increased sleep time, time to exercise, and the quality and quantity of meals.

Broadly speaking, students in the UCR Golfito Campus face two distinct living conditions associated with attendance during face-to-face classes. The first condition concerns those students that still live with their parents or family group; typically, their residence is located far away from campus and must therefore use public transportation for commuting. Public transportation in the region typically offers highly spaced schedules; in some cases, only 2 services per day, which means that students may spend several hours commuting to and from the university. The second condition pertains to students whose homes are so far away that they decide to find a residence near campus; interestingly, they tend to visit their families during the weekends. These two conditions show the importance that students place on their relationship with their families, which is typical of students from Latin America (Fulgini *et al.*, 1999; Kiang & Fulgini, 2009). It is not a surprise, then, that our students, who had already lived at least a year either spending a substantial number of hours commuting each day

to attend classes or being far away from their families, had a positive perception of online classes, and that some of their chosen major advantages were associated with site flexibility and reduced traveling costs. Interestingly, previous studies show that a lack of family support is an important cost of online classes (Ferri *et al.*, 2020), yet our students consistently disagreed with this disadvantage, providing further support to the idea that spending time with the family unit was highly relevant for establishing a positive perception of online classes (Fathoni & Retnawati, 2021).

An important issue that our study identified, but which we could not expand on, was that many students, mostly women, perceived a greater sense of safety as an important advantage of online learning. We do not know whether feeling unsafe during face-to-face classes has to do with potential dangers in the process of commuting, living near campus, or feeling unsafe around other students or professors. However, it is widely known that women at all levels of academia, from undergraduate students to faculty, commonly report safety concerns which are often related to sexual assault and harassment (Cortina *et al.*, 1998; Trawalter *et al.*, 2022). This issue should be addressed with utmost urgency. Feeling unsafe can deteriorate the learning process and create opportunity gaps that need to be eliminated so that universities can become truly inclusive (Trawalter *et al.*, 2022). The possibilities presented by online learning in improving students' safety seem to provide important arguments in favour of this learning modality.

We analysed some of our results by major and found some differences in preferences on whether students would like to continue with online classes or not. For students of Business Informatics, returning to face-to-face classes in all courses is not considered as a preferred option. In contrast, no student of Ecological Tourism recommends that 100% of the courses should be online. Students from other majors did not show significant differences in their position, since the answers were somewhat equally distributed among all the options presented. The observed differences in opinions for the two majors, Business Informatics and Ecotourism, may be related to the fact that in the latter field trips are an important component of this major; for the former, their coursework is predictably reliant on electronic and online resources, so most activities could still be conducted online without a deterioration of their learning experience.

These differences in opinions of the online learning experience expressed by students enrolled in different majors has, to the best of our knowledge, not been addressed in previous studies. However, the topic needs to be studied further if universities wish to continue exploring the option of implementing online learning in the future.

While we believe our results to be representative of our study population, as the trends to responses were fairly similar, the fact that many students in each major were unable to respond to our questionnaire precludes us from thoroughly understanding the experiences of a large portion of the population during online learning. Also, a better understanding of the teachers' perspectives, challenges, and opportunities during online classes, which are lacking in this study, would allow us to make better decisions in the future.

Many of the same difficulties faced by students were shared by professors during the pandemic: problems of connectivity, increased workload, equipment and spaces, organization, flexibility and feeling isolated (Adedoyin & Soykan, 2020; Ferri *et al.*, 2020; Mukuna & Aloka, 2020). Therefore, providing better conditions to professors, as well as students, would allow the entire academic community to thrive during online classes.

In conclusion, our study shows that, unlike what other studies have found, students in the University of Costa Rica's Golfito Campus considered online learning as a potentially useful method. For example, all respondents stated that they would accept both online and face-to-face modalities. From these results we then recommend that, for universities that serve a similar population, a percentage of online courses be retained. However, before deciding to enforce this modality, it is extremely necessary to assess which courses and majors would benefit the most from online classes, in addition to having a better understanding of demographic and socioeconomic aspects that may affect the online learning process. Likewise, it is essential to consider the way class contents are approached during online learning, implementing methodologies that guarantee a better understanding without a significant increase in class workload. In this same line, it is necessary to carefully address the topic of grades by asking: are students passing online classes because they understand the topic better or because evaluations are not ideally suited to this learning modality? Either way, the need to develop proper evaluation tools is one that has been addressed in multiple studies (Biggs, 1992; Guskey, 1994; Malouff & Thorsteinsson, 2016; Rothstein *et al.*, 2008; Sadler, 2005); now we must address this issue in light of widespread integration of online learning in university settings. Although the option of maintaining online classes is considered highly viable and even desirable by many, it can be clearly concluded that online classes, due to the COVID-19 pandemic, meant a challenging personal and academic struggle for a large number of students and professors. Universities must continue working not only on the goal of promoting academic excellence but on increasing the well-being of professors and students alike while adopting novel learning approaches.

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