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Moving toward Digital Transformation by Force: Students' Preferences, Happiness, and Mental Health

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Abstract: The COVID-19 pandemic accelerated and, somehow, forced the process of digital transformation within the higher education sector. Due to the COVID-19 pandemic, online modes of course delivery have become the only available way of teaching in almost all parts of the world. We conducted a study in Mexico to know about students' preferences for these forced online class schedules, exams and assignments, and online teaching styles during this health crisis. Furthermore, this research sought to know about the impact of this forced digitalization on students' mental health and happiness. To conduct a conjoint analysis, we collected survey-based data from 219 undergraduate Mexican students. The most preferred attributes for students for online classes were "having a short online class (50 min)", "possibility to have 70% pre-exam assignments and 30% final exam", and "having a humorous professor in online classes". In terms of students' mental health, the prevalence of "moderate" anxiety and depression was 21.8%, and the prevalence of "severe" anxiety and depression was 14.9%. In terms of happiness, male students and students with shorter online classes per day felt a higher level of happiness.

Keywords: forced digitalization; COVID-19; conjoint analysis; students' preferences; online learning; mental health; Mexico



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1. Introduction

The process of digitalization in the higher education sectors started many years ago [1]; however, the outbreak of the COVID-19 pandemic accelerated this process significantly [2–4]. Mexico is one of the countries that continue to be worst-hit by COVID-19 [5,6]. Due to the unexpected COVID-19 pandemic, in March 2020, all universities and institutions in Mexico closed their campuses. Universities were forced to use online modes of course delivery in order to ensure the physical health of students, faculty, and staff alike [7]. The majority of recent research on online learning during the COVID-19 pandemic has been more focused on the advantages and disadvantages of this mode of course delivery [8–13]. For instance, [8], it was found that online courses impact negatively on students' confidence. However, students revealed that online learning's biggest benefit is the ease and quickness of information sharing for courses. In the same line of research, in ref. [11], it was found that unexpected changes due to the COVID-19 pandemic changed the academic education and lifestyles of students, which eventually increased their levels of anxiety and depression. On the other hand, a study on Indian students showed that they perceived online learning positively. Additionally, they found that more than half of the students think that online learning platforms were user-friendly and that the information necessary for online learning is easily accessible [10]. Despite the growing body of research about the benefits and disadvantages of online learning in recent months, we still have a limited understanding about student preferences for forced online classes during the COVID-19 pandemic [14]. The first research question of this study is to know what exactly students prefer within

these forced online class schedules, forced online exams and assignments, and forced online teaching styles, more or less, during this health crisis. Knowing student preferences for online classes is critical for meeting the educational needs of online learners [12].

The forced shift to online classes during the COVID-19 pandemic has had both positive and negative outcomes on students' mental and physical health and happiness. On the positive side, online classes have increased access to education, particularly for those who may not have been able to attend classes in person due to distance or other factors, and these classes have offered more flexibility in terms of scheduling and location, allowing students to attend classes from anywhere and at any time; lastly, this has helped to mitigate the spread of the COVID-19 virus by reducing the number of people in physical classrooms. On the negative side, the sudden shift to online learning has presented challenges for both students and teachers. Such a quick and unexpected crisis has not provided enough time for teachers and professors to make themselves well familiar with the required digital technologies [10,11,15]. When considering the inadequate training with digital technologies for forced online classes, the lack of ongoing communication with students to monitor their study habits, and the lack of parental support and aid, we should not expect that students have received an interesting and fruitful online education during COVID-19 [12]. Struggling with technology and adapting to new learning environments, loss of social interaction, isolation, and extended periods of online learning can lead to increased screen time, which can all have negative impacts on students' physical and mental health in the long-term [11–13]. Therefore, the second question of this research is to know how forcing students to attend online classes may impact their mental health and happiness.

It is well accepted that mental health issues and psychological problems have been raised among students and other groups of society during COVID-19 [16–21]. Furthermore, the unexpected COVID-19 crisis has significantly increased the level of uncertainty for decision makers in the higher education sector [22,23]. Converting the traditional learning style to online classes was among the most common responses to this health crisis. Our conjoint study contributes to the current literature by identifying and highlighting the relative importance of different aspects of online classes during the COVID-19 pandemic from the perspective of students. Our results will assist decision makers in higher education sectors to know about student demands for online classes. Knowing exactly what students want will help decision makers in higher education institutions to focus on relevant parameters and develop effective educational plans for students during the COVID-19 pandemic. Figuring out what students want in online classrooms can assist higher education decision makers to develop more effective online programs for the post-COVID-19 situation as well.

The main objective of online learning all across the world has been to prevent students from being infected by COVID-19. Our research also contributes to the mental health literature by providing empirical evidence on the levels of anxiety and depression prevalence among Mexican students during the COVID-19 pandemic. As an influential factor, forced online classes due to the COVID-19 pandemic have led to an increase in isolation and reduced social interactions for students [24], which can have a negative impact on their mental health. Students' mental health can affect their academic performance, motivation, and engagement in online classes. By understanding students' mental health status, teachers and universities can provide appropriate support and interventions to help students cope with depression and anxiety.

Lastly, our paper contributes to the literature on individual well-being during COVID-19 [25] by identifying the groups of students who feel more happiness during this difficult time. According to our findings, male students and students with shorter online classes per day felt a higher level of happiness. Female students may face more challenges and obstacles than male students in online learning environments, such as difficulty accessing technology, feeling isolated, and juggling multiple responsibilities. For instance, female students are more likely to have caregiving responsibilities, such as caring for children or elderly family members. This can make it difficult for them to balance their academic responsibilities with their caregiving responsibilities. These challenges could

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potentially impact their overall well-being and satisfaction with the online learning experience. Some male students may feel a sense of responsibility to contribute to their family's income and take advantage of online classes to work part-time or full-time. They may feel more happiness because the flexibility offered by online classes can make it easier for them to balance their academic responsibilities with work obligations. It is worth knowing if having shorter online classes per day is another source of student happiness in forced online classes during the COVID-19 pandemic. By making online classes shorter, students may have more free time to pursue other interests or hobbies, feel less mentally exhausted after shorter class sessions, or simply enjoy the feeling of completing a task within a shorter period of time.

2. Literature Review

2.1. Digital Transformation in Higher Education

Digital transformation is a complex process of integrating different types of digital technologies into all areas of business, and as a result, it will fundamentally change business models and the way we create and deliver value to customers. All businesses can benefit from digitalization and digital transformation [26]. Using digital technologies in higher education started many years ago [27]. Digital technologies have transformed higher education in many ways, making it more accessible, efficient, and effective. According to literature reviews, having virtual classes; setting up online meetings and seminars; having hybrid classes and video lectures; using digital documents and books for student learning, online registration, online entrance exams, gamification, and online admission processes; and having a digital platform that facilitates the interaction between lecturers and students are good examples of digitalization and digital transformation within higher education [1,26]. Overall, digital technologies have revolutionized higher education by providing students with greater flexibility, access to knowledge, and collaboration opportunities. These tools are likely to continue to evolve and shape the future of higher education in exciting and innovative ways.

2.2. Student Preferences for Online Classes during COVID-19 Pandemic

Coronavirus has impacted countries around the world. The unexpected COVID-19 pandemic forced all universities in Mexico and other Latin American countries to stop their regular classes at the beginning of 2020. During crisis situations, private and public universities have struggled to return to normal. There is a growing body of research about student preferences for online classes during the COVID-19 pandemic. For instance, [8], the negative impact of online courses on students' confidence by using survey-based data from 356 community college students in the USA was found. Students revealed that online learning's biggest benefit is the ease and quickness of information sharing for courses and identified future possibilities of working with e-learning. However, it was also found that some students agreed that online learning did not support the design of new curricula or new teaching strategies, while others identified student collaboration and improved interactivity as the least positive attribute of online learning. A survey implemented through Google Forms to 307 agriculture students in India, including graduate, undergraduate, and postgraduate students, analyzed their learning preferences and preparedness before and during the pandemic [9].

Due to the physical and engaged nature of the learning process in this major, researchers posed questions that analyzed the students' interest levels and readiness to engage in forced online learning during lockdown periods. According to the results, 70% of students were ready to choose online courses to manage their curriculum and stay in school. The majority of students chose smartphones as their device for online learning and preferred recorded classes over online live classes with a final exam at the end of the school period [9]. An online survey conducted among 184 students from the National Capital Territory of Delhi, India, namely, Delhi University, Jamia Millia Islamia, and Guru Gobind Singh Indraprastha University, between June and August, revealed that students perceived

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online learning positively, as well as the new e-learning system. Additionally, it was found that more than half of the students think that online learning platforms are user-friendly and that the information necessary for online learning is easily accessible [10]. Another conjoint analysis investigated college students' mental health during the pandemic and lockdown periods in the US. It conducted a survey at an undisclosed, large university to assess students' mental health status. It found that the majority of participants had increased, self-perceived levels of anxiety and depression and that less than half had ways to cope with them considering the current circumstances. Additionally, the pandemic was perceived as a reason why their emotional health status changed, as well as the academic and lifestyle changes associated with the COVID-19 lockdown [11].

In this line of research, in ref. [28], different learning styles with the advantages and disadvantages of online learning were compared. The authors concluded that in online classes, students place the highest importance on applied technology characteristics and the student–administrator interaction, meaning that interactions between students and professors and the online platforms' characteristics generally play a big role in the learning experience of the students. It was also found that different learning styles and preferences go hand in hand with the e-learning process and the success the student has during it [28]. It is worth mentioning that by using survey data from 163 students in Mexico, in ref. [29], it was found that 83 percent of students expressed satisfaction with the transition from face-to-face to virtual modalities during the COVID-19 pandemic.

2.3. Students' Feeling of Happiness and Mental Health during COVID-19 Pandemic

A feeling of happiness is a positive emotion or feeling that is associated with experiences of pleasure, contentment, joy, and satisfaction [30,31]. It can be described as a warm, positive, and joyful feeling that often arises in response to positive life events such as success, love, or personal growth [32]. Happiness can also be experienced as a more general sense of well-being and satisfaction with life [33]. The feeling of happiness differs from one person to another even though they are in the same situation [34]. People may experience happiness in response to a variety of events or circumstances, such as achieving a goal, spending time with loved ones, or engaging in enjoyable activities. It is important to know about students' feelings of happiness because it is one of the main factors that has contributed to their academic success during the COVID-19 pandemic [35]. Some students may feel isolated and disconnected from their peers and instructors, which can negatively impact their happiness. Others may find it challenging to adapt to the virtual learning environment, leading to frustration and unhappiness. On the other hand, there are also some students who may have experienced a sense of convenience and flexibility in attending classes online. They may appreciate the ability to attend classes from the comfort of their own homes, avoid long commutes, and have more control over their schedules. Some students may have taken advantage of this flexibility and been involved in some part-time or full-time jobs.

Mental health refers to a person's overall psychological well-being [36,37]. Mental health encompasses a wide range of aspects, including emotions, thoughts, behaviors, and social functioning. Good mental health is characterized by stability, resilience, and the ability to manage stress and cope with life's challenges. Mental health conditions, such as depression and anxiety, in the long term, can impact a person's mental well-being and lead to significant distress, disruption to daily activities, and decreased quality of life. The COVID-19 pandemic has negatively impacted different groups of society, including students' mental health and well-being [18,38,39]. In this research, we focused on two types of mental health issues—the prevalence of depression and anxiety. Depression refers to a mental health condition that is characterized by persistent feelings of sadness, hopelessness, and a lack of interest in activities that were once enjoyed [40,41]. It is essential to recognize the signs and symptoms of depression among undergraduate students, as it can have a detrimental impact on students' psychosocial well-being and their academic performance [42,43]. Anxiety is another common mental health issue that is prevalent

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among many undergraduate students and increasing globally. Anxiety refers to having excessive worry or fear that is disproportionate to the situation at hand and can interfere with daily activities and social relationships [18,36].

3. Method

3.1. Context of the Study

About 13 months after the first COVID-19 case in Mexico, we conducted an online cross-sectional survey from 25 March to 12 April 2021 to know about student preferences for online classes during the COVID-19 pandemic in Mexico. We collected data from undergraduate students in UDLAP, a Mexican private university located in Puebla. In order to elicit maximum participation by students, a non-random "convenience" or "snowball" sampling technique was applied. In the introduction section of the online survey, we asked the respondents to share the link to the survey with any undergraduate students they know from their university. In order to reduce the social desirability bias, (1) all participants were guaranteed confidentiality, (2) they were ensured complete anonymity, and (3) we emphasized that there could be no right or wrong answers.

At the beginning of the study, the total number of infected cases in Mexico was 2,208,755, and at the end of the study, there were 2,280,213. At the beginning of the study, the total number of deaths in Mexico was 205,363, and at the end of the study, there were 209,338. According to the number of vaccinated people in Mexico, at the beginning of the study, the total number of COVID-19 vaccinations in Mexico was 526,412, and at the end of the study, there were 2,223,846.

3.2. The Survey Designs and Data Collection Process

The first part of our survey (Figure 1) included questions about the demographic characteristics of the undergraduate students [44]. The second part of the survey included the three main sections of conjoint analysis. In order to design the conjoint study items, first, we conducted a deep literature review to find out the major criteria for measuring students' preferences. Second, we conducted several interviews with program directors and program coordinators of five schools in UDLAP to know the exact structure of the programs, common class casuals, common class durations, starting class times, duration of break time between two lessons, rules and regulations for attending online classes, language of instruction, the number of days of having class per week, and restrictions. The first section of the conjoint analysis was about student preferences for class schedules. This included three attributes: class time, class duration, and the number of days of having class per week. Using the information acquired from the school's program directors and program coordinators, we offered students three options for class time: morning time (7 a.m. to 12 p.m.), afternoon time (12 p.m. to 6 p.m.), and nighttime (6 p.m. to 11:30 p.m.). Class duration had four options:, having 50 min online classes in each session, having 70 min classes in each session, having 100 min online classes in each session, and having 150 min online classes in each session. We provided the students three options for the number of days of having class per week:, having online classes 1-2 days per week, having online classes 3–4 days per week, and having online classes 5–6 days per week.

The second section of the conjoint analysis was about the students' preferences for teaching styles, which included four attributes: the language of instruction (English or Spanish), professors (camera on and off during online classes), students (camera on and off during online classes), and characteristics of professors (an easy-going professor, humorous professor, a professor who pays attention to individual students, and a strict professor) [45].

The third section of the conjoint analysis was about students' preferences for exams and assignments. This included three attributes: students' preferences for cooperation with other students, students' preferences for the method of assessment, and students' preferences for flexibility for pre-exam assignments. The students' preferences for cooperation with other students included three options: preferring a 100% individual-based assignment, preferring a 100% group-based assignment, and preferring a 50% individual-based

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assignment and a 50% group assignment. The method of assessment included four options: preferring 100% pre-exam assignments, preferring 70% pre-exam assignments and 30% final exams, preferring 30% pre-exam assignments and 70% final exams, and preferring 100% final exams. The flexibility for pre-exam assignments had two options: preferring a clear deadline for pre-exam assignments and preferring a flexible deadline for pre-exam assignments.

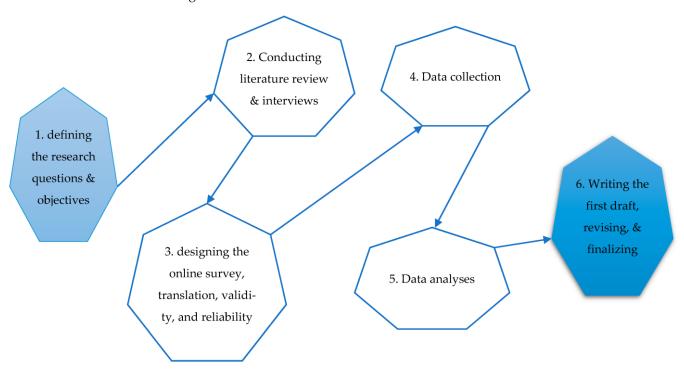


Figure 1. The methodological process in this research. Source: Researcher's own work.

The last part of our online survey included questions about the mental health and feelings of happiness of students during the COVID-19 pandemic. In doing so, we used the Patient Health Questionnaire-4 (well-known as PHQ-4), which was developed by the authors of [46,47] to measure students' anxiety and depression (Likert scale, 0-3). We asked the respondents: "Over the last two weeks, how often have you been bothered by the following problems? (1) Feeling nervous, anxious, or on edge; (2) not being able to stop or control worrying; (3) feeling down, depressed, or hopeless; and (4) having little interest or pleasure in doing things." The total score of anxiety and depression were determined by summing the values all of four items. The respondents were considered "normal" if their scores were between 0 and 2; "mild" if their scores were between 3 and 5, "moderate" if their scores were between 6 and 8, and, finally, "severe" if their scores were between 9 and 12. We checked the composite reliabilities, analogous to Cronbach's alpha values, for these two measurement scales, and both were above the recommended minimum of 0.70. The Cronbach's alpha values for anxiety and depression measurement scales were 0.86 and 0.91, respectively. The level of feeling happiness was measured by a single item, which was developed by the author of [30]. We asked the students: "Do you feel happy in general?" on an 11-point scale (0 very unhappy to 10 very happy).

The demographical questions, conjoint measurement items, and mental health and happiness questions were written in English. The survey was then translated into Spanish by two native Spanish-speaking students. Two other students checked the quality of the translation process. The survey was pre-tested by five undergraduate students before the final distribution. We used social media (Instagram, Telegram, WhatsApp, Facebook, and email) to reach out to the respondents. The final data came from five UDLAP schools, which included business and economics, social sciences, arts and humanities, sciences, and engineering.

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4. Results

Among the 219 participants, 67.9% were female; most (96%) were aged between 18 and 22. As shown in Figure 2, in terms of religion, 62.6% were catholic and 4.1% were Christian, and it was surprising to see that 33.3% did not follow any religion. There are most probably several possible reasons as to why many of the students prefer not to follow a religion; some possible factors are growing secularism, increased exposure to diverse perspectives, desire for personal autonomy, or seeing religion as an outdated or irrelevant institution that does not provide practical solutions to the different types of problems and issues they face daily. It is important to note that the decision to follow or not follow a religion is a personal one, and each individual's experience is unique, and it is important to respect and support their choices.

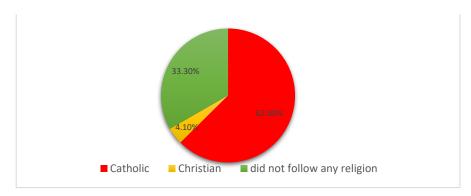


Figure 2. Distribution of respondents in terms of religion.

As can be seen in Figure 3, in terms of the program of study, 39.3% were from business and economics schools, 18.3% were from social science schools, 16.9% were from science schools, 16% were from engineering schools, and 9.6% were from art and humanities schools.

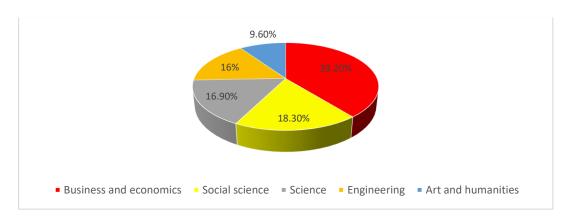


Figure 3. Distribution of participants in terms of educational programs.

As can be found in Figure 4, in terms of duration of online classes per day, about 6.5% of students had an average of 1–2 h of online class per day, 33.5% had an average of 3–4 h of online class per day, 38.1% had an average of 5–6 h of online class per day, and 21.9% of them had an average of more than 7 h of online class per day. It is worth mentioning that reducing the number of classes or hours of instruction per day can help to prevent student burnout and allow for more flexibility in their schedules.

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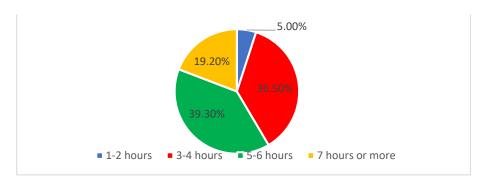


Figure 4. Distribution of participants in terms of duration of online classes per day.

Among the 219 respondents, 26 students had had a positive coronavirus test in the prior 15 months (11.9%). Despite having minimum social interaction due to having online classes, the rate of infected students by COVID-19 was slightly high. About 43% of the respondents reported that at least one of their family members had had a positive coronavirus test since the beginning of the pandemic. As shown in Figure 5, only 39.7% reported that they were enjoying the online courses overall, and 83.6% of respondents preferred to have physical (in-person) classes for the following semester. It is not surprising that about 72% of them believed that their learning process had worsened since starting with online courses. The forced transition to online classes during the COVID-19 pandemic has been challenging for students and has led to a number of issues that may have negatively impacted the learning process. Among the several possible reasons, we can refer to the lack of a fixed schedule or routine at the beginning of online classes; slow internet; incompatible devices; software glitches; reduced interaction and engagement with peers and instructors; and distractions from home, such as family members, roommates, or pets, all of which can disrupt the learning process for students.

Overall, do you enjoy online courses? Yes or no.

Would you like to continue with online courses in the future (the following semester)? Yes or no.

Do you believe that your learning process has worsened since starting with online courses? Yes or no.

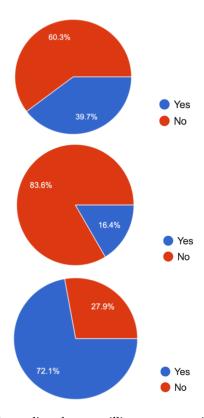


Figure 5. Distribution of respondents in terms of enjoying online classes, willingness to continue with online courses in the following semester, and quality of learning process in online classes.

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We asked the respondents what kinds of devices they used for their online classes. As shown in Figure 6, the majority of them were using laptops for connecting to online classes. The respondents had the possibility to choose more than one device.

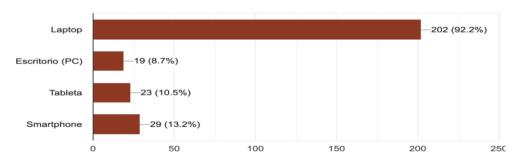


Figure 6. Distribution of respondents in terms of using electronic devices for connecting to online classes.

Lastly, we checked the mental health of students (anxiety and depression) during the COVID-19 pandemic. Our results indicate that among the 219 undergraduate students, about 20.9% of them were normal, 42.4% of them were mild, 21.8% of them were moderate, and the rest of the students (14.9%) were severe in terms of anxiety and depression.

We used SPPS software for conducting the conjoint analysis. As can be seen in Table 1, the first part of the conjoint analysis was about student preferences for online class schedules. This included three main attributes: students' preferences for online class time, students' preferences for online class duration, and, lastly, students' preferences for the number of days they want to have online classes per week. As shown in Table 1, we offered our respondents three options for online class time: having an online class in the morning, having an online class in the afternoon, and having an online class in the nighttime. As can be seen in Table 1, class duration had four options: having 50 min online classes, having 70 min classes, having 100 min online classes, and having 150 min online classes. Finally, we provided the students three options for the number of days of having classes per week: having online classes 1–2 days per week, having online classes 3–4 days per week, and having online classes 5–6 days per week.

| | | Utility Estimate | Std. Error |
|----------------------|------------------------|-------------------------|------------|
| | Morning time classes | 0.334 | 0.440 |
| Class time | Afternoon time classes | 0.551 | 0.722 |
| | Nighttime classes | -0.885 | 0.613 |
| Class duration | 50 min | 1.084 | 0.495 |
| | 75 min | 0.238 | 0.653 |
| | 100 min | 0.196 | 0.825 |
| | 150 min | -1.519 | 0.803 |
| No. of days per week | 1–2 days | 0.474 | 0.440 |
| | 3–4 days | 0.599 | 0.816 |
| | 5–6 days | -1.073 | 0.722 |
| (Constant) | | 5.078 | 0.444 |

In the first step, an orthogonal design using SPSS software was conducted, and it generated 16 cards randomly. Due to using an online survey (we did not have face-to-face access to respondents), we decided to reduce the number of cards to 10 cards only. In this regard, the authors of [48] believe that most respondents would have difficulty ranking a set of combinations consisting of a lot of stimuli, and we had to reduce the number of stimuli combinations (cards) to a manageable size [44]. The Pearson's R correlation coefficients

were 0.95 (Kendall's tau: 0809), indicating that the conjoint measurement had excellent reliability in the current research.

As shown in Table 1, for the Mexican undergraduate students, our findings indicate that, for the class time attribute levels, "afternoon time classes" were most preferable (0.551), and "nighttime classes" were less preferable (-0.885). For the class duration attribute level, having "50 min" of online classes was preferred over "70 min" and "100 min" of online classes, with the least preference given to having "150 min" of online classes. For the number of days of having class per week attribute level, having online classes 3–4 days per week was preferred over having online classes 1–2 days per week, with the least preference given to having online classes 5–6 days per week.

As shown in Figure 7, among these three attributes, online class duration with an importance value of 37.180 was preferred over online class time with an importance value of 34.604, with the least preference given to the number of days of having online classes per week with an importance value of 28.216.

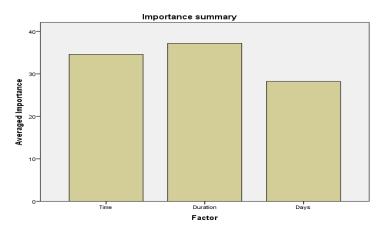


Figure 7. The averaged importance score of three attributes.

As shown in Table 2, the second part of the conjoint analysis was about student preferences for online classes teaching style. This includes four main attributes: the language of instruction (English or Spanish), professors (camera on and off during online classes), students (camera on and off during online classes), and characteristics of professors (an easy-going professor, humorous professor, a professor who pays attention to individual students, and a strict professor). In the first step, we conducted orthogonal design using SPSS software, and it generated eight cards. The Pearson's R correlation coefficients were 0.991 (Kendall's tau: 1.000), indicating that the conjoint measurement had excellent reliability in the current research.

| Table 2. Student preferences for online class teaching sty | Table 2. Student | preferences i | for online | class | teaching styl |
|---|------------------|---------------|------------|-------|---------------|
|---|------------------|---------------|------------|-------|---------------|

| | | Utility Estimate | Std. Error |
|-------------------|---------------------------------------|-------------------------|------------|
| Language | English | -0.406 | 0.169 |
| | Spanish | 0.406 | 0.169 |
| Professor camera | On | 0.409 | 0.169 |
| | Off | -0.409 | 0.169 |
| Student camera | On | -0.370 | 0.169 |
| | Off | 0.370 | 0.169 |
| Professor quality | Easy-going | 0.672 | 0.292 |
| | Humorous | 0.693 | 0.292 |
| | Pays attention to individual students | 0.435 | 0.292 |
| | Strict | -1.800 | 0.292 |
| (Constant) | | 4.500 | 0.169 |

As shown in Table 2, for the Mexican undergraduate students, our findings indicate that, for the language of instructions attribute level, "having classes in full Spanish" was most preferable (0.406) and "having classes in full English" was least preferable (-0.406). For the students' preferences for professors' video camera status during online classes attribute level, "turning on video cameras of professors" was most preferable (0.409) and "turning off video cameras of professors" was least preferable (-0.409). For the students' preferences for their own video camera status during online classes attribute level, "turning off video cameras" was most preferable (-0.370) and "turning on video cameras" was least preferable (0.370). In the characteristics of professors' attribute level, having a "humorous professor" (0.693) during online classes was preferred over having "an easy-going professor" (0.672) and "a professor who pays attention to individual students" (0.435) during online classes, with the least preference given to the having "a strict professor" (-1.800) during online classes.

As we can see in Table 3, among these four attributes, professor characteristics with an importance value of 48.610 was preferred over the language of instruction, with an importance value of 21.209, and students' video cameras being on during online classes, with an importance value of 15.366. As shown in Table 3, the least preference was given to the professors' video camera being on during online classes, with an importance value of 14.815.

Table 3. Importance values for teaching style attributes.

| Attributes | Averaged Importance Score | | |
|---------------------------|---------------------------|--|--|
| Language | 21.209 | | |
| Professor camera (on/off) | 14.815 | | |
| Student camera (on/off) | 15.366 | | |
| Professor characteristics | 48.610 | | |

As can be seen in Table 4, the last section of the conjoint analysis was about student preferences for online exams and assignments. This includes three attributes: students' preferences for cooperation with other students, students' preferences for method of assessment, and students' preferences for flexibility for pre-exam assignments. In the first step, we conducted orthogonal design using SPSS software, and this generated 16 cards. Following [48], we decided to reduce the number of cards to 10 cards. The Pearson's R correlation coefficients were 0.914 (Kendall's tau: 0629), indicating that the conjoint measurement had acceptable reliability in the current research.

Table 4. Student preferences for online exams and assignments.

| | | Utility Estimate | Std. Error |
|--------------------------------------|---|-------------------------|------------|
| T 1 | 100% individual-based assignment | 0.619 | 0.367 |
| Task cooperation with other students | 100% group-based assignment | -0.798 | 0.516 |
| | 50% individual-based and 50% group-based assignment | 0.180 | 0.447 |
| Method of assessment | 100% pre-exam assignment | -0.694 | 0.446 |
| | 70% pre-exam assignment and 30% final exam | 1.859 | 0.550 |
| | 30% pre-exam assignment and 70% final exam | -0.444 | 0.465 |
| | 100% final exam | -0.721 | 0.519 |
| Flexibility for pre-exam | Clear deadline | -0.170 | 0.275 |
| assignment | Flexible deadline | 0.170 | 0.275 |
| (Constant) | | 5.410 | 0.283 |

As shown in Table 4, for the Mexican undergraduate students, our findings indicate that for the students' preferences for task cooperation with other students attribute level, "preferring to have 100% individual-based assignment" was most preferable (0.619) and

"preferring to have 100% group-based assignment" was least preferable (-0.789). For the students' preferences for evaluation criteria attribute level, "preferring to have 70% pre-exam assignments and 30% final exam" was most preferable (1.859) and "preferring to have 30% pre-exam assignments and 70% final exam" was least preferable (-0.721). Lastly, for the students' preferences for flexibility for pre-exam assignment attribute level, "preferring to have a flexible deadline for pre-exam assignment" was preferable (0.170) and "preferring to have a clear deadline for pre-exam assignment" was least preferable (-0.170).

Table 5 represents the averaged importance score for these three attributes. As shown in this table, among these three attributes, the method of assessment with an importance value of 54.208 was preferred over the task cooperation with other students, with an importance value of 33.490, and the least preference was given to flexibility for pre-exam assignment, with an importance value of 12.302.

Table 5. Importance values for exams and assignments attributes.

| Attributes | Averaged Importance Score |
|--------------------------------------|---------------------------|
| Task cooperation with other students | 33.490 |
| Method of assessment | 54.208 |
| Flexibility for pre-exam assignment | 12.302 |

As shown in Table 6, the results of least square regression with a statistical significance of p < 0.05 show that students who are female feel a lower level of happiness than male students ($\beta = 0.645$, p = 0.05, 95% CI 0.102 to 1.205). Lastly, longer online classes per day (in terms of hours) was negatively associated with students' feelings of happiness ($\beta = -0.375$, p = 0.05, 95% CI -0.699 to -0.0807).

Table 6. Outcome variable: feelings of happiness.

| | 95% Confidence Interval | | | | | |
|-------------------------------------|-------------------------|----------------|----------------|------------------|--------------|----------------|
| Predictor | Estimate | SE | Lower | Upper | t | р |
| Intercept ^a Gender: | 7.228 | 0.454 | 6.334 | 8.1218 | 15.94 | <0.001 |
| Male–female Hours per day | $0.654 \\ -0.375$ | 0.280 0.149 | 0.102 -0.669 | 1.2053 -0.0807 | 2.34 -2.51 | 0.020 0.013 |

^a Represents reference level.

5. Discussion

A conjoint analysis allows the researchers to estimate the relative importance of different characteristics of attributes [49] and provides a useful set of information for decisionmaking processes [22,50]. In this regard, in ref. [51], it is believed that conjoint analysis helps researchers to find out about student preferences for teaching style and teaching quality. To estimate the relative importance of different characteristics of online classes during the COVID-19 pandemic, we conducted a conjoint analysis among undergraduate students in Mexico. In terms of online class schedules, the results reveal that Mexican undergraduate students mostly prefer to have online classes in the afternoon time (12 p.m. to 6 p.m.), they prefer to have shorter classes (having 50 min online classes), and they prefer to have online classes not more than 3-4 days per week. Afternoon time online classes can be more flexible for students who may have other responsibilities during the day, such as work or caregiving. Furthermore, among these three attributes, the highest preference was given to online class duration, and the least preference was given to the number of days of having online classes per week. With shorter online classes, students are less likely to become fatigued or lose interest, leading to better concentration and more effective learning. However, we should keep in mind that with shorter online classes, there may be

limited time for students to engage in discussions, complete team-based assignments, or ask questions, which can be detrimental to their learning.

In terms of student preferences for teaching style, the results indicate that Mexican undergraduate students mostly prefer to have online classes in only Spanish (having classes in only English was least preferable), they prefer to have professors' video cameras on during online classes (professors' video cameras off was least preferable), they prefer to have their own video camera off during online classes (students' video cameras on was least preferable), and they prefer to have humorous professors during online classes (having a strict professor was least preferable). Humor can make the class more engaging and enjoyable, leading to increased participation and interest from students. Most importantly, the COVID-19 pandemic has caused stress and anxiety for many students [25], and a humorous professor can help ease tension and make the learning environment more relaxed. Furthermore, we found that, among these four attributes, professor characteristics (having humorous professors rather than having a strict professor) were preferred over the other three attributes (the language of instruction and students' and professors' video cameras on/off during online classes). However, it is important for the humor to be used in a way that enhances rather than detracts from the learning experience. By knowing that having a strict professor was least preferable for Mexican students, a good balance between humor and seriousness can create a positive and engaging online learning environment for all students. It is worth mentioning that our results are in line with [52], which found that the majority of students prefer to keep video cameras off during online classes. Students may prefer to turn off their own video camera during online classes for privacy (feeling uncomfortable having their personal space on display for their classmates and professors to see), distraction (concerned about distractions that could come from their own surroundings, such as family members or pets in the background), or technical reasons (having technical issues with their video cameras or internet connections, which can lead to poor quality video or audio). On the other hand, they prefer to have their professor's camera on for better connection (seeing the professor's face and body language), engagement (seeing the professor's reactions to their questions and comments), and trust (seeing the instructor's professionalism and engagement with the class).

Online classes and online exams are a way to protect students' physical health during COVID-19 [14]. In terms of student preferences for online exams and assignments, our finding reveals that Mexican undergraduate students mostly prefer to have 100% individualbased assignments (preferring to have 100% group-based assignments was least preferable), they prefer to have 70% pre-exam assignments and 30% final exams (preferring to have 30% pre-exam assignments and 70% final exams was least preferable), and they prefer to have a flexible deadline for pre-exam assignments (preferring to have a clear deadline for pre-exam assignments was least preferable). Among these three attributes, the method of assessment was preferred over task cooperation with other students, and the least preference was given to flexibility for pre-exam assignments. In this line of research, by using survey data from 307 agriculture students in India, in [9], it was found that 70% of students were ready to choose online courses to manage their curriculum. The majority of students preferred recorded classes over online live classes with a final exam at the end of the school period [9]. According to our findings, students may prefer to have 100% individual-based assignments during online classes for reasons such as time flexibility, personal accountability, avoiding group conflicts, personalization, and reduced stress. However, it is important for instructors to balance individual-based assignments with group projects, as group work can also provide valuable skills and experiences for students.

There is a growing body of literature about the mental health issues of people during COVID-19 [16–18,53,54]. Contributing to this line of research, it was found that a large percentage of Mexican students (36.7%) have suffered from moderate to severe anxiety and depression during COVID-19. Similar to the findings of [8], which found that college students have suffered from mental health issues during the COVID-19 pandemic. Due to COVID-19, they missed face-to-face interactions with their classmates and professors

in classes, group-based activities, meetings, and in-person tutoring sessions. Universities and institutions in Mexico should ensure professors and administrative workers are well prepared to address mental health issues that arise during the COVID-19 crisis to ensure they can perfectly meet their students' needs.

Lastly, our results show that male students and students with shorter online classes per day felt a higher level of happiness. By having online classes, male students may feel more flexibility in their schedules and academic pursuits and more of a possibility to have a part-time or full-time job, thus contributing to the family income, which can lead to a greater sense of happiness and fulfillment. Another possible explanation for these results is in-person classes can sometimes create social pressure for male students to conform to gender roles and expectations. Online classes may provide a more private and less intimidating environment wherein male students feel more comfortable expressing themselves and being themselves.

It seems that students with shorter online classes per day have more free time to engage in other activities that bring them happiness and fulfillment. This can lead to a higher overall level of happiness and satisfaction. Having shorter online classes per day may give students a sense of control over their personal and life schedules and academic workload, which can increase their sense of autonomy and well-being. Overall, understanding the factors that contribute to student happiness during online classes can help educators create a more positive and supportive learning environment. However, by making online classes shorter, we should keep in mind that we should not sacrifice the quality of teaching and learning over the happiness of the students.

6. Conclusions and Implications of the Study

The findings of this study afford three important implications based on students' preferences, happiness, and mental health. This study presents significant support for an improved design and more online learning research. First, the practice of online learning requires significant teacher—student interactions. To comprehend students' needs, preferences, and learning progress, educators should provide efficient communication channels, such as discussion boards, individual reviews, emails, and polls [43]. Secondly, to keep students interested in online classrooms, instructors should have improved pedagogical abilities and design more dynamic lessons. With online learning, a healthy and enjoyable home-schooling atmosphere is essential [44]. Parents should offer their children reassuring institutes, reliable internet connection, and enough space for learning, computer self-efficacy, isolation, and independent skills. Thirdly, schools ought to learn more about how students feel about their ability to live and learn in a positive academic setting. In order to comprehend students' experiences in school, teachers might interact with them frequently. In order to actually create happy schools for people, process, and place considerations, the government may consider spending more on educational research [45].

Overall, while the COVID-19 pandemic has certainly presented challenges for students in online learning, it is important to recognize that the experience of happiness and mental health is complex and multifaceted and can be influenced by a wide range of individual, educational, and contextual factors.

7. Limitation of the Study

Our research paper, in the context of Mexico, suffers from some limitations. First, due to the COVID-19 pandemic, we could not reach a large sample size, and our results come from only 219 students' responses. Collecting data from only undergraduate students is another limitation of our study sample. We recommend in the future that researchers use a larger sample and include both undergraduate and graduate students. Due to not having face-to-face access to the population of the study, we were unable to use a random sampling method. We used a snowball sampling method, and this sampling method does not give all students an equal chance to be selected as the final sample. Therefore, the representativeness of the sample is not guaranteed in this study.

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