



The Impact of COVID-19 on Teaching and Learning: The Case of ISEG

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Abstract

ISEG – Lisbon University switched from on-site to online classes on March 2020 at the middle of Summer semester 2019/2020 due to COVID-19 pandemic. Students' evaluation changed accordingly, which became a source of stress for teachers and students. In the Fall semester 2020/2021, ISEG adopted a blended system. Here we compare students' reactions and perceptions regarding these changes in the three scenarios on-site, synchronous online only and blended. We launched a survey to students enrolled in 2nd year of their degree on the Summer semester of 2019-20 and Fall semester of 2020-21. Our surveys are an adapted and reduced version of the one carried out by the European Students Union. We did reliability analysis to define constructs used to build indicators allowing us to quantify students' attitudes, contingency analysis and hypothesis testing. Sex, age and degree showed a robust association with students' reactions and perceptions, family socio-economic status variables not.

Keywords

COVID-19 pandemic, Higher Education, students' reactions and perceptions, reliability analysis, contingency analysis, Portugal

1. Introduction

The COVID-19 pandemic heavily affected the education system regardless of grade level.

All over the world, the main effect of the pandemic at the Higher Education (HE) level was to trigger a transition from on-site classes to online classes or a blended system where online and on-site classes coexist.

ISEG – School of Economics and Management of the Lisbon University- as all schools in the country, switched from on-site classes to online ones on March 2020 at the middle of the summer semester of 2019/2020. Teachers and students had to adapt to this huge change in teaching and learning methods in just a week. Online classes follow different types: synchronous classes or asynchronous video or audio classes.

Teachers had to change the way they are used to teach and learn to use digital platforms to give their classes. In synchronous classes or asynchronous video classes, teachers use Power-Point presentations often to support teaching.

Although most students have computers, internet connection problems and income shortage to provide for good computer gear and good internet network made it difficult for quite a number of students to follow online classes. Furthermore, despite teachers' great efforts to reinforce mentoring, the lack of face to face contact between teachers and students made teaching and learning a much greater challenge.

Students' evaluation also changed from on-site to online which was new to both teachers and students and a source of

stress for both.

In the fall semester 2020/2021, ISEG adopted a blended system. Theoretical lectures were synchronous online, but practical classes were a blend, with half of the students physically attending classes one week while the other half joining synchronous online classes and the other half doing the same in the following week. Students not physically in the class could join it online. Presence of students in face-to-face classes was not mandatory, so a large majority of students opted to attend online classes even in the week they could attend on-site ones. Sound and image were recorded in on-site classes so that students not in the class could access it online.

In this paper we compare students' reactions and perceptions regarding the move from on-site to online or blended education in the three scenarios on-site, synchronous online only and blended.

Our main research questions are:

- How did students feel about the changes above mentioned?
- What are students' perceptions about the way the changes affected their learning?
- What are students' perceptions about how the above mentioned changes affected their academic performance?
- Do individual and family background characteristics have any impact on students' reactions and perceptions within this pandemic situation?

We intended to analyze how did the above mentioned changes affect students' academic performance measured by their marks at the end of each of the semesters above mentioned but unfortunately, due to pandemic restrictions concerning ISEG services, we didn't manage to get the needed data for this analysis in time for this presentation. However, we plan to continue following this line of research and go deeper in the analysis as soon as we get the data.

2. Theoretical Framework

Numerous studies have been emerging since the summer semester of 2019/20 on the effects of the pandemic on HE students. Most of these studies concern practical cases, related to the situation experienced in a given institution or comparisons between HE institutions regarding changes in teaching methodologies due to the pandemic. Some of them provide a first overview on a large number of countries and are based on surveys directed at students on the assessment of the transition to online or mixed study (Aristovnik et al., 2020; Crawford et al., 2020; Li & Lalani, 2020; Vo et al., 2017).

Many of the studies are concerned with students' perceptions and expectations about online teaching in terms of intrinsic motivations. They seek to find out whether learning has become easier and more motivating, requires a larger work load and affected academic performance (Aucejo et al., 2020; Besser et al., 2020; Demuyakor, 2020). Another line of research investigates to what extent the transition to online education aggravates socio-economic inequalities among students (Aucejo et al., op cit).

Several studies emphasize the role played by teachers and tutors in extra-class hours, participation in debates and seminars, features that students consider most successful to develop their sense of belonging (Aristovnik et al., op. cit; Johnson et al., 2020).

Another set of studies is concerned with the possible social devaluation of online education compared to face-to-face. Such studies have identified expectations of greater difficulty in obtaining a future job, potentially lower wage levels, among others (Brammer & Clark, 2020; Demuyakor op. cit.).

The results showed a great level of heterogeneity in the perception of the positive and negative aspects of the transition to online education.

3. Data

Since we want to acknowledge differences in academic performance due to the changes in teaching and learning during the pandemic, we only deal with students enrolled in 2nd year of the undergraduate curriculum in academic years 2019/20 and 2020/21. We consider that those in the 1st year are still dealing with the struggle of adapting to Higher Education in 2019/2020 and most of those on the 3rd year graduated in 2019/20 and were not students in 2020/21.

We launched a survey to all students enrolled in 2nd year of their degree on the summer semester of 2019-20 and fall semester of 2020-21, in order to assess their perceptions, expectations and motivations towards the changes in teaching and evaluation methodology. Our survey is an adapted and reduced version of the one carried out by the European Students Union (ESU 2021).

Table 1 shows number of students who answered all the questions in the survey and those who answered just some of them, mainly those concerning self and family characterization.

Table 1. Population and sample dimensions

	Summer Semester 2019-20	%	Fall Semester 2020-21	%
Total	103	79%	167	99%
Answers	74	56%	92	54%
Complete Answers	35	27%	75	44%

From the survey we also got data on parents' school levels (Less or equal to Lower Secondary, Upper Secondary, Graduation or more), employment situation (both employed, at least one employed, one or both unemployed/inactive) and whether family or student's income allowed them to hardly, reasonably or easily/very easily face their expenses. All these variables are proxies for family socio-economic background.

4. Methodology

Data was collected from two surveys launched to students in 2nd year of their degree on the summer semester of 2019-20 and fall semester of 2020-21, in order to assess their perceptions, expectations and motivations towards the changes in teaching and evaluation methodology. Our survey is an adapted and reduced version of the one carried out by the European Students Union (ESU, 2021).

The survey has the following blocks of questions:

- self and family characterization
- perceptions about how the change affected teaching, learning and evaluation;
- perceptions about how the school and teachers helped, namely through mentoring;
- perceptions about family economic struggles concerning the needs for an online study;
- expectations regarding the impact on a future job from transition to online teaching.
- agreement with proposals of Government Measures to lighten pandemic impact on families and economy.

We start doing a Contingency Analysis based on Chi-Square statistics. We analyzed the level of satisfaction with different types of online (summer semester of 2019-20) and blended classes (fall semester of 2020-21) and correlated it with personal characteristics (sex, age, degree and curricular unit), family background characteristics (parents' school level, situation towards employment).

We performed similar analysis for the perception about workload weight, best way (video/audio call, email, text messages by Whats' App, Facebook, ...) to ask teachers questions about doubtful issues concerning learning subjects, level of satisfaction with teachers' help and tutorship due to the teaching changes, functioning of some school services such as library, Technical services, ICT, ...

Since we intend to analyze if attitudes from students changed from an academic environment of online classes, in the summer semester of 2019-20, to a blended one, in the fall semester of 2020-21, we first recode all the variables in the two data bases into two categories reflecting negative and positive attitudes and then did Z tests for differences in two proportions to all these new variables.

When we reject the equality of proportions in these tests, we did tests for null hypothesis that the proportion in the fall semester of 2020-21 was bigger than the proportion in the summer semester of 2019-20 meaning that dissatisfaction significantly grew from one semester to the next.

With data collected from the surveys we did reliability analysis to define the constructs in Table 2 based on Cronbach's Alpha values [Appendix 1 shows Cronbach's Alpha values: for all the constructs].

From these constructs we built a set of indicators that allow us to quantify students' attitudes in each of the last five blocks of questions above mentioned. These are standardized synthetic indexes, weighted averages of the factorial components. The weights are the "scores" of FAC with a single factor using a varimax rotation. The quality of FAC results were accessed from the values of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity.

The variables that reflect dissatisfaction, disagreement, negative emotions and expectations, are recorded in a reverse way (1=5, 5=1) in order to make interpretation easy. Easiness comes from the fact that in the graphs the positive answers are up and the negative ones down. The results are invariant to this procedure.

We crossed these indices with individual and family background characteristics, to have an idea about the distribution of indexes by these variables in order to evaluate the determination of the attitudes by these characteristics.

Table 2. Constructs

Constructs	Variables
Satisfaction with asynchronous classes	Satisfaction with Video, Audio and Power-Point presentation classes
Satisfaction with classes organization and teaching support	Theoretical classes and student question sessions organization and Teacher support
Adaptation to changes in academic environment due to the pandemic	Easy adaptation, Easy knowledge apprehension, Easy identification of main difficulties
Ability to deal with computer use	Online information process, Digital platforms and , Digital Communications use, Digital content share, Software use
Emotions	Insecurity, Frustration, Anger, Anxiety
Availability of Computer Gear	Computer, Needed software, Head micros, Webcam, good Net
Personal concerns	Physical health, Mental health, Family and Friends, Leisure activities, Travel
Future Perspectives	Future education, Future professional career, Future self-income
agreement to Government Measures to lighten pandemic impact on families and economy	Child support, Needed families support, Tax pay deferral, Loan pay deferral, Free transport, House rent freeze

5. Results

Synchronous online classes are the preferred modality and for all types of online classes the satisfaction level is higher in the fall semester of 2020-21.

Table 3. Satisfaction with modality of online classes

SATISF + Very SATISF	%29 TERM 19-20	% 19 TERM 20-21
ONLINE Synchron	55,3%	65,2%
VIDEO Asynchron	48,8%	58,3%
AUDIO Asynchron	27,3%	28,6%
Power Point (sent)	53,7%	60,5%

The workload weight with online teaching is perceived as higher or much higher by female students, particularly in quantitative curricular units like Statistics II, while male ones perceived it as neither lower nor higher when compared to the period before pandemic.

In what concerns asking questions about doubtful issues concerning learning subjects, in the summer semester of 2019-20, most students, mainly older ones prefer email, especially in quantitative curricular units. In the fall semester of 2020-21, most students, mainly younger ones prefer to do it through online platforms, especially in curricular units like Statistics 2 and Microeconomics.

As to the easiness of identifying main difficulties and the perception that results were better than in the pre pandemic period, in the summer semester of 2019-20, they correlate with online synchronous classes positively for Management students and negatively for Economics ones. No statistical significant correlation was found for the fall semester of 2020-21 concerning these variables.

In what concerns teachers' help, tutorship and ISEG services' organization, level of satisfaction is correlated with age and sex with youngers and girls being more satisfied although the sex effect is only significant in the Fall semester of 2020-21.

Having been employed only displayed a statically significant correlation in the summer semester of 2019-20, being positively correlated with preference for audio asynchronous classes, using email for checking doubts with teachers, being highly satisfied with theoretical classes organization and negatively correlated with degree of knowledge apprehension and easiness to identify main difficulties. None of these or other variables showed significant correlation in the fall semester of 2020-21.

5.1 Z tests for differences in two proportions

Results of the Z tests for differences in two proportions are shown in appendix 2.

The Z tests didn't show significant differences between the two semesters for satisfaction with online synchronous classes or with video or Power-Point presentation asynchronous ones, adaptation to pandemic, ability to use computer programs, digital platforms and communication or share digital contents, availability of computer gear (computer, needed software, head micros, webcam or NET quality) or other conditions to study at home (quiet place, desk, printer, emotions (frustration, anger, anxiety or insecurity) and personal concerns (physical and mental health, family and friends, classes and evaluations, leisure activities, ...), future perspectives (education, professional career and income) and importance of all but one government support measures.

Differences were found for satisfaction with Theoretical classes and student question session's organization and teacher support as well as for satisfaction with Services and Students' Association support and importance of Government support measures towards needy families. For all these, dissatisfaction significantly grew from one semester to the next.

5.2 FAC Analysis

The FAC analysis quality measured by the KMO measure of sampling adequacy and the Bartlett's Sphericity test is reasonable to good for all components [Appendix 3].

The analysis of the results from crossing constructs by the individual and family background variables will be done for each construct.

5.2.1 Satisfaction with Asynchronous Classes

In both semesters, female students are dissatisfied with asynchronous classes while male ones are satisfied. Sex difference grew from summer semester of 2019-20 to fall semester of 2020-21.

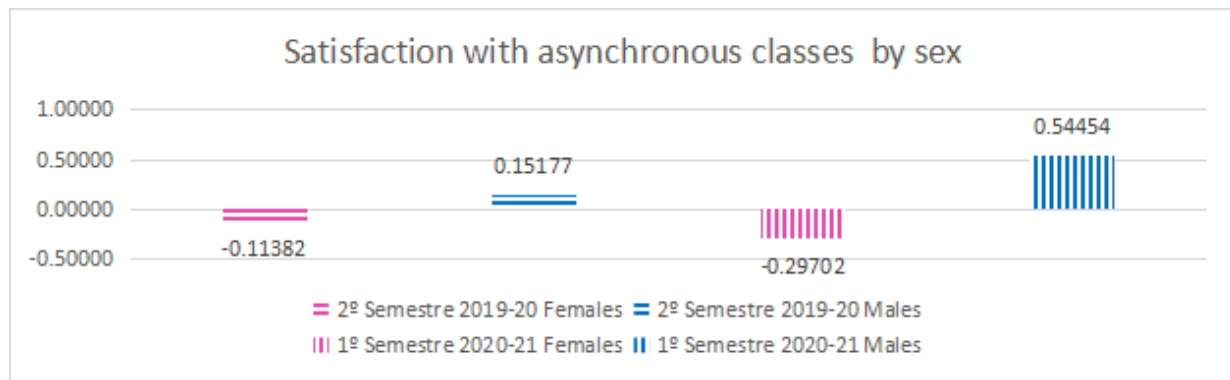


Figure 1. Satisfaction with asynchronous classes by sex.

A significant difference between younger and older students concerning satisfaction levels wasn't found.

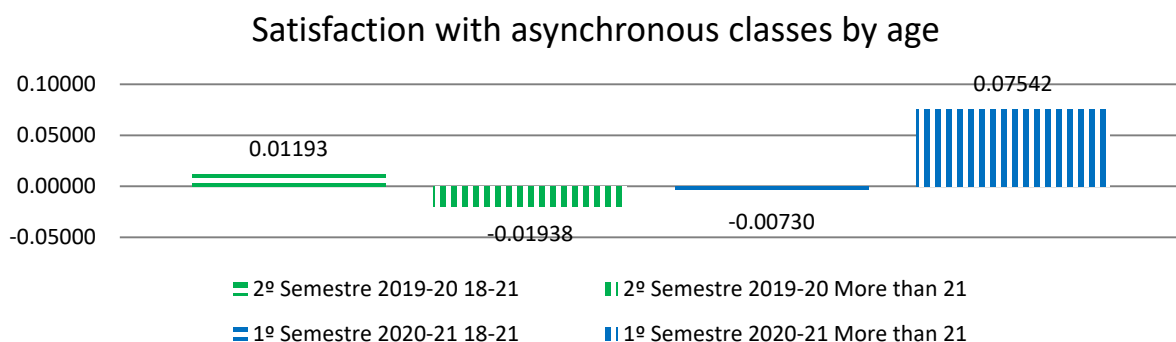


Figure 2. Satisfaction with asynchronous classes by age.

MAEG students are more dissatisfied than their colleagues following an Economics and Management degree mainly because they are students who attend classes more often than their peers and consider them more important in the process of acquiring knowledge.

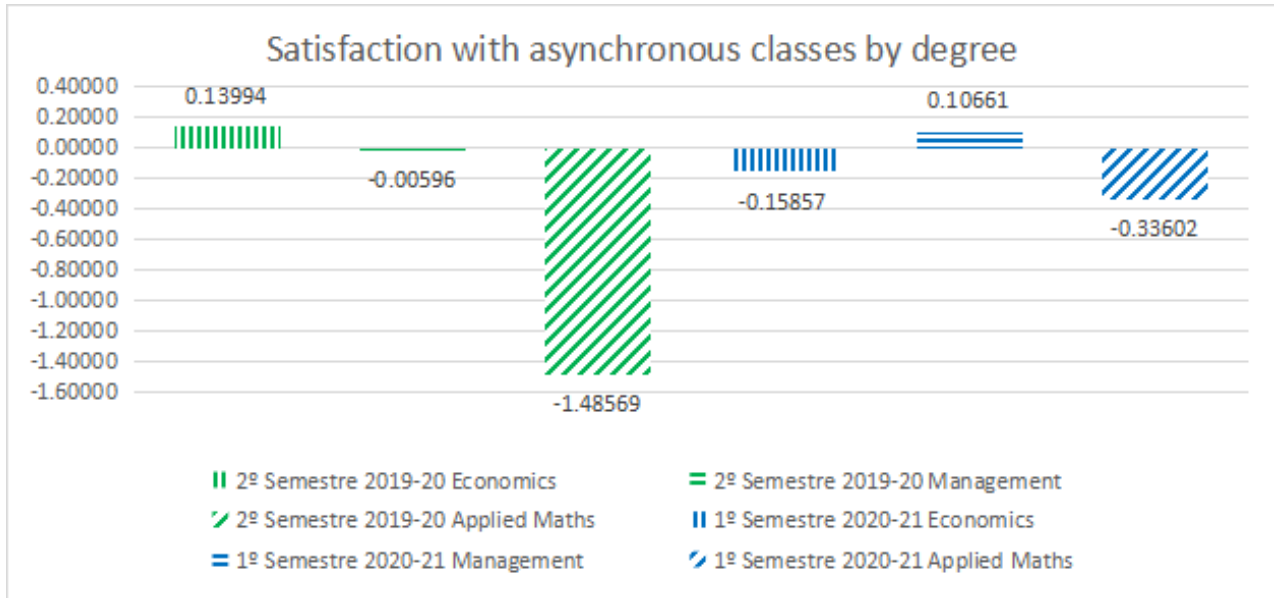


Figure 3. Satisfaction with asynchronous classes by degree.

Students whose parents are both unemployed like asynchronous classes more than those whose parents are both or one employed. Most probably because it is associated with lower costs since students can be at home and save rents, food and transport expenses.

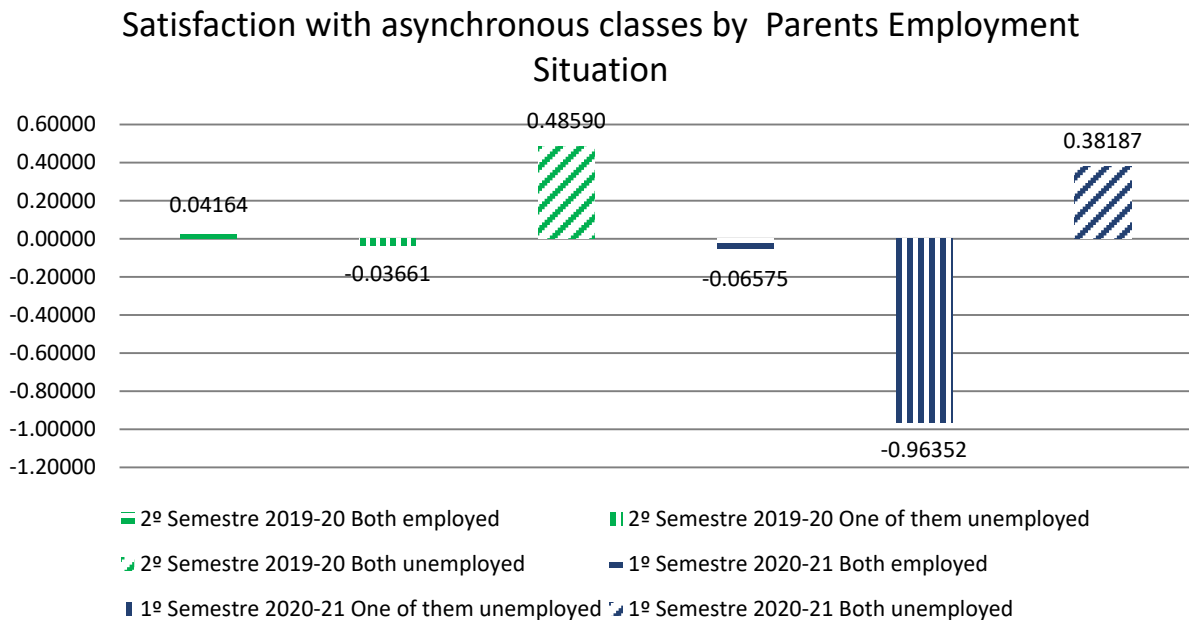


Figure 4. Satisfaction with asynchronous classes by Parents Employment Situation.

5.2.2 Satisfaction with Theoretical classes and Student question sessions Organization and Teacher Support

Female students are satisfied with teaching organization and support; their male colleagues don't, in both semesters.

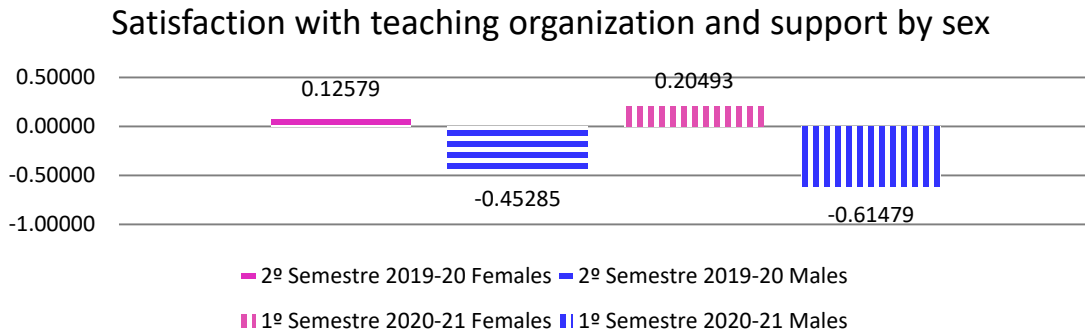


Figure 5. Satisfaction with teaching organization and support by sex.

Younger students are satisfied with teaching organization and support; their older colleagues don't in both semesters. The explanation is that older students are usually already in the labor market and so is not easy for them to take advantage of teachers' support online.

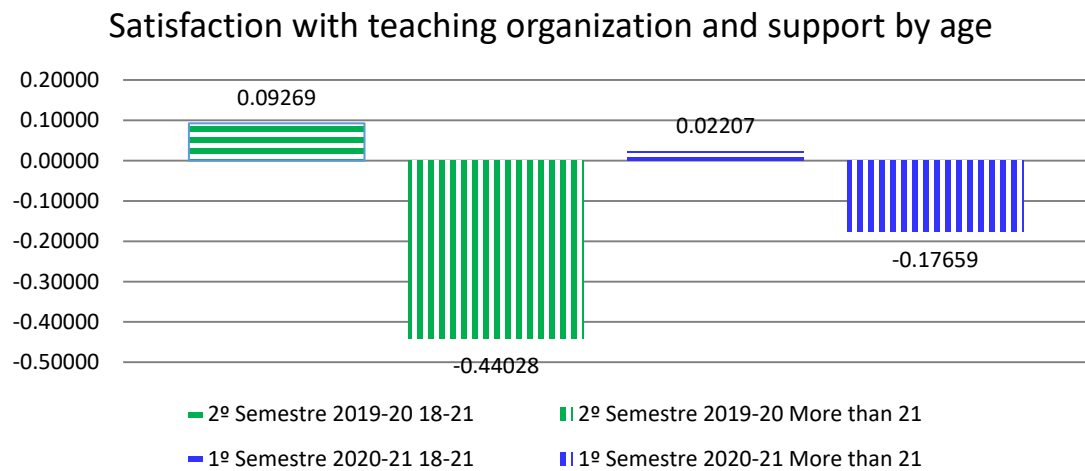


Figure 6. Satisfaction with teaching organization and support by sex.

Students following a MAEG degree contrary to their colleagues from other degrees are happy with Theoretical classes and Student question sessions Organization and Teacher Support. They enrolled higher education with high marks and are very motivated, focused and take advantage of all the support teachers give them.

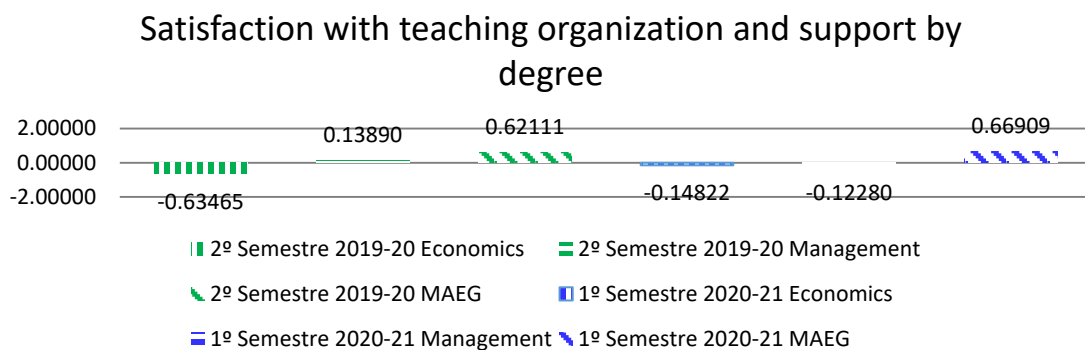


Figure 7. Satisfaction with teaching organization and support by sex.

In the 2019-20 summer semester, students from families or self who reasonably face their expenses are satisfied, unlike those who did so easily or very easily. This may be due to the fact that families with more sound finances are usually more literate and so are more demanding in their judgment about teaching organization and support. In fall semester of 2020-21 students and their families are neither satisfied nor dissatisfied irrespective of their income level. Because it is the 2nd semester under pandemic conditions, the school had time to organize itself better and the fact that it was switched to a blended system helped.

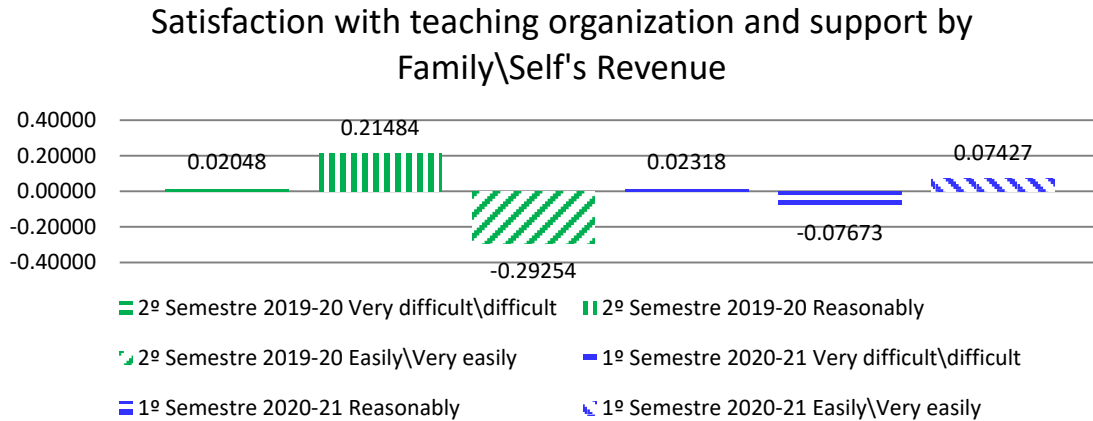


Figure 8. Satisfaction with teaching organization and support by sex.

5.2.3 Adaptation to pandemic changes in academic context

Female students lightly agree that they have well adapted to changes due to the pandemic. Male colleagues disagree in both semesters while in the fall semester of 2020-21 they seem to have fewer issues about their adaptation. This is understandable since the situation was not so new anymore and besides in the last semester classes have switched to a blended system.

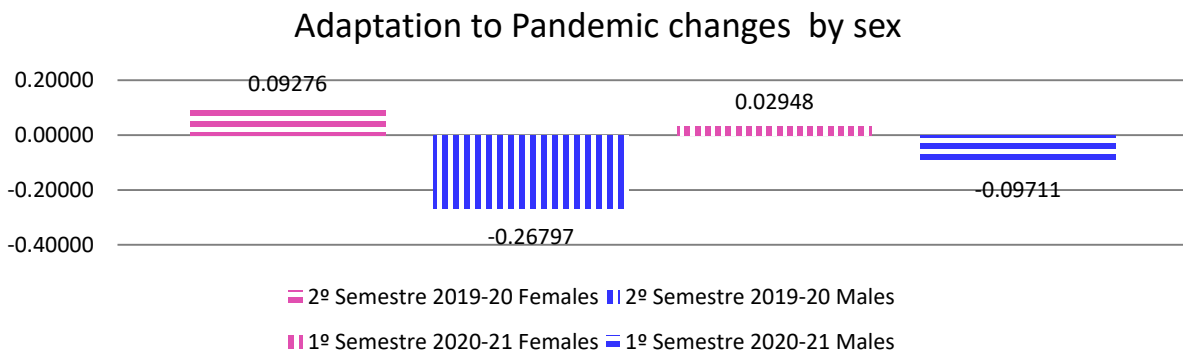


Figure 9. Adaptation to Pandemic changes by sex.

A significant difference between younger and older students concerning adaptation to pandemic changes wasn't found. Means are not significantly different from zero. In both semesters older students showed a light level of disagreement concerning their adaptation to pandemic changes.

Students in MAEG degree adapted better to changes due to the pandemic when compared to their colleagues who follow an Economics degree. Adaptation was difficult to students in a Management degree. This is true for both semesters.

Students from families where parents have a lower school level didn't adapt well to the changes due to the pandemic, their colleagues who belong to families where parents have middle or higher school level did. Most probably because the last ones have their parents' help, better conditions at home and also are, in general, better and more motivated students.

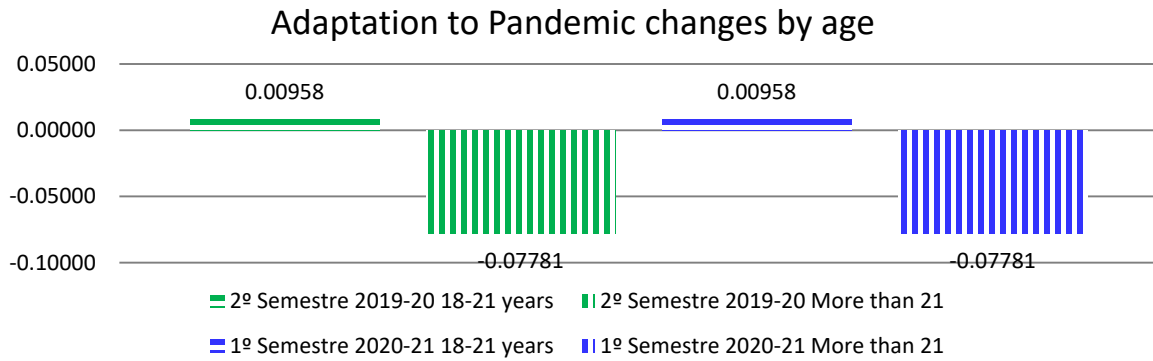


Figure 10. Adaptation to Pandemic changes by age.

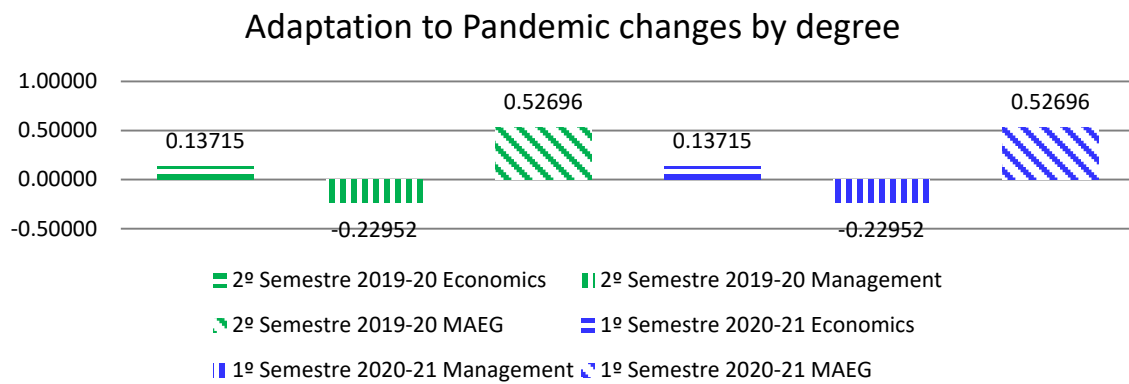


Figure 11. Adaptation to Pandemic changes by degree.

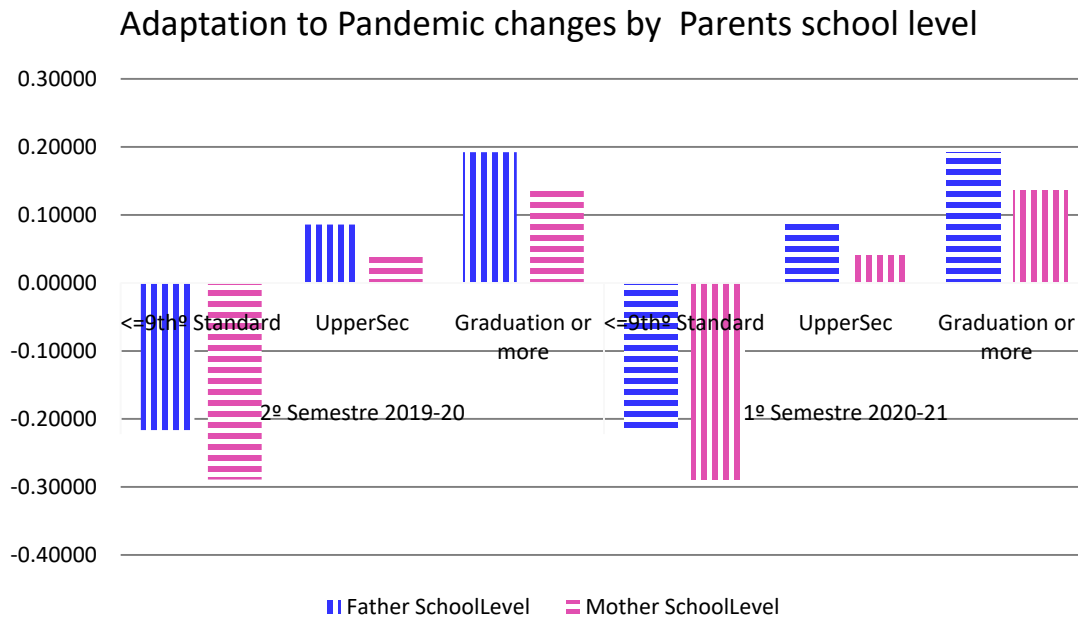


Figure 12. Adaptation to Pandemic changes by Parents school level.

5.2.4 Ability to deal with computer use

Females agree that they are at ease using computer to search and share contents, use digital platforms and other forms of digital communication as well as use software, males don't.

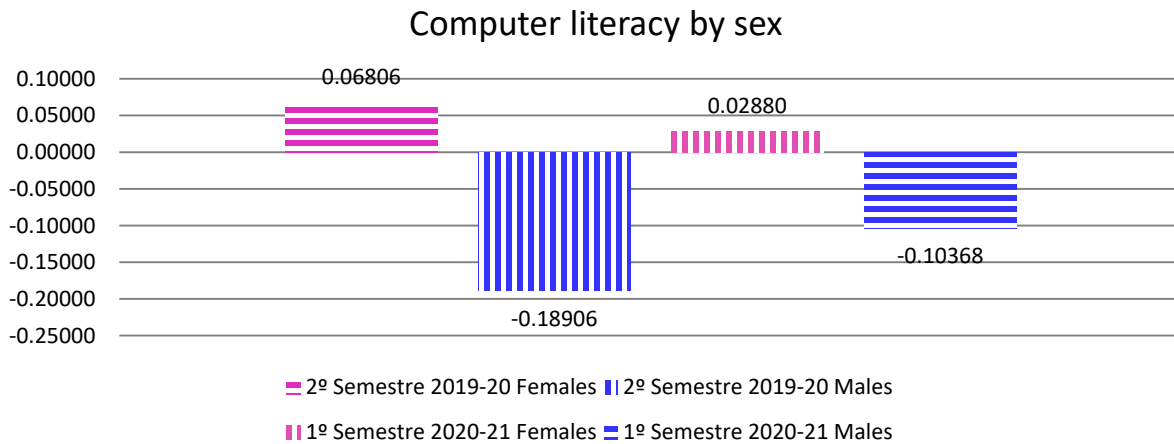


Figure 13. Computer literacy by sex.

Younger students agree that they are slightly at ease using computer to search and share contents, use digital platforms and other forms of digital communication as well as use software contrary to their older colleagues. Older students' value is smaller in the fall semester of 2020-21 compared with the summer semester of 2019-20, most probably because they had to learn how to deal with computer stuff during the previous semester.

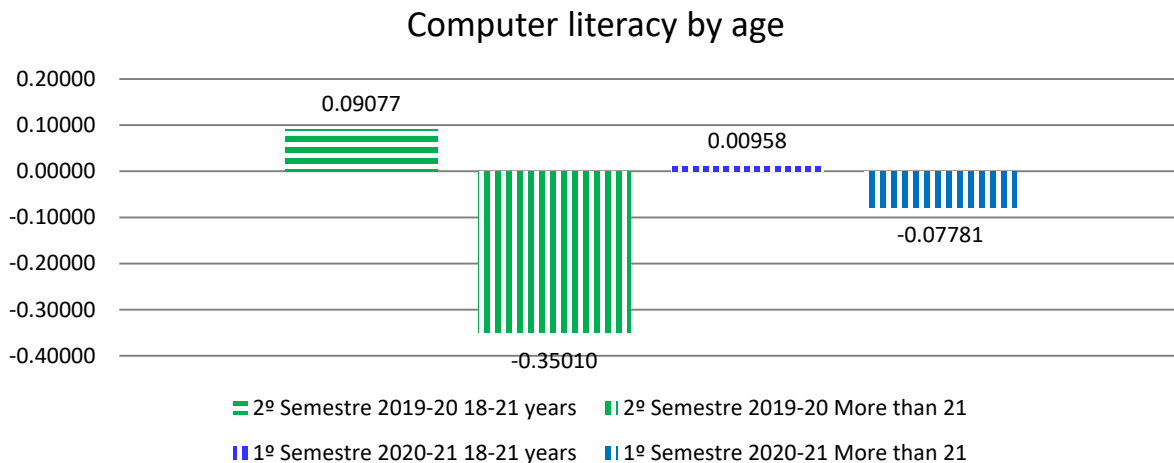


Figure 14. Computer literacy by age.

Students in Economics and MAEG programs are prone to master computer literacy; their colleagues who follow a Management one are not. MAEG students improve a lot their literacy which is a result of being more motivated and prone to learn.

5.2.5 Emotions

Females deal emotionally better with the changes due to the pandemic than males and from summer semester of 2019-20 to fall semester of 2020-21 the gap between females and males became wider.

Age differences in the way of dealing emotionally with the pandemic are quite large in the summer semester of 2019-20 but almost disappear in the 1st semester. Although it is still negative, older students managed to overcome their strong negative feelings.

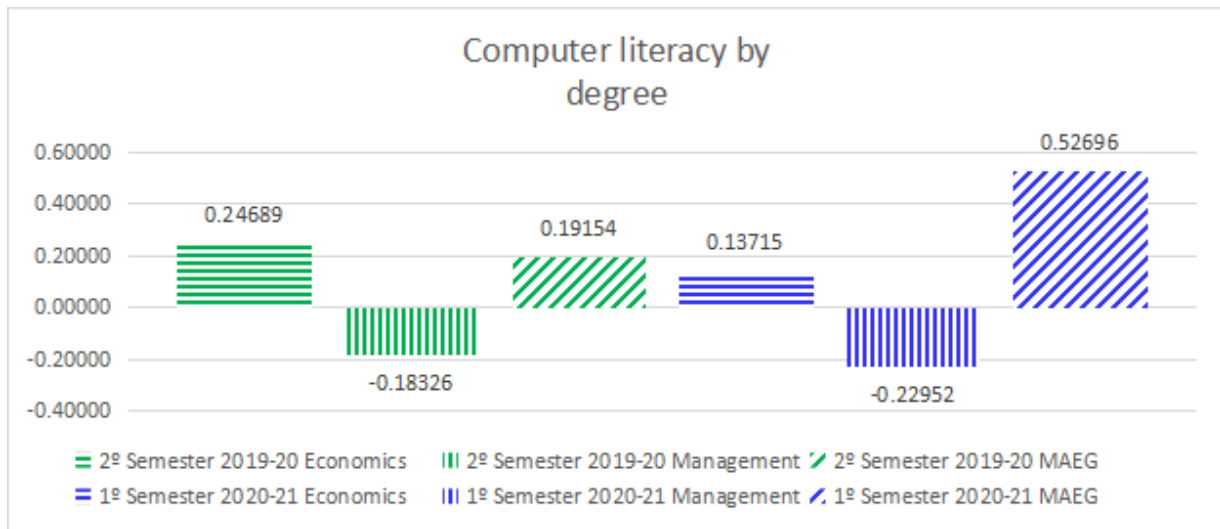


Figure 15. Computer literacy by degree.

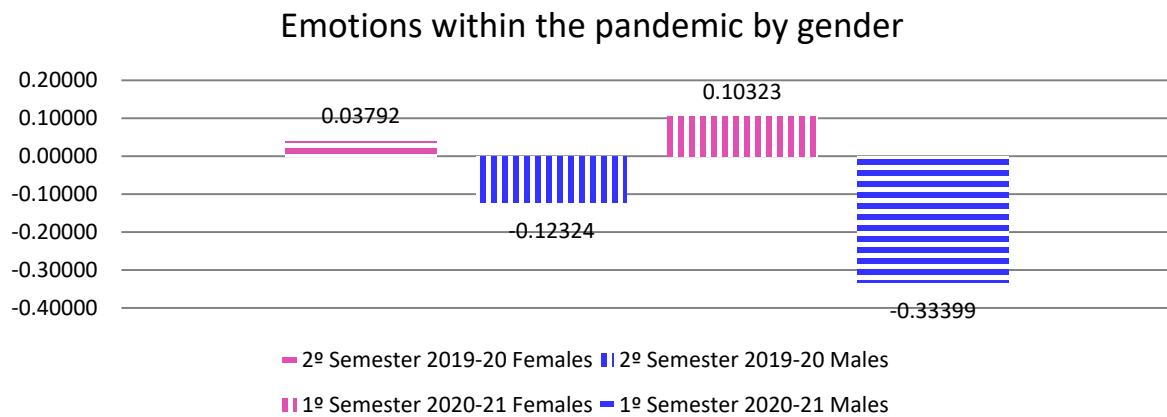


Figure 16. Emotions within the pandemic by sex.

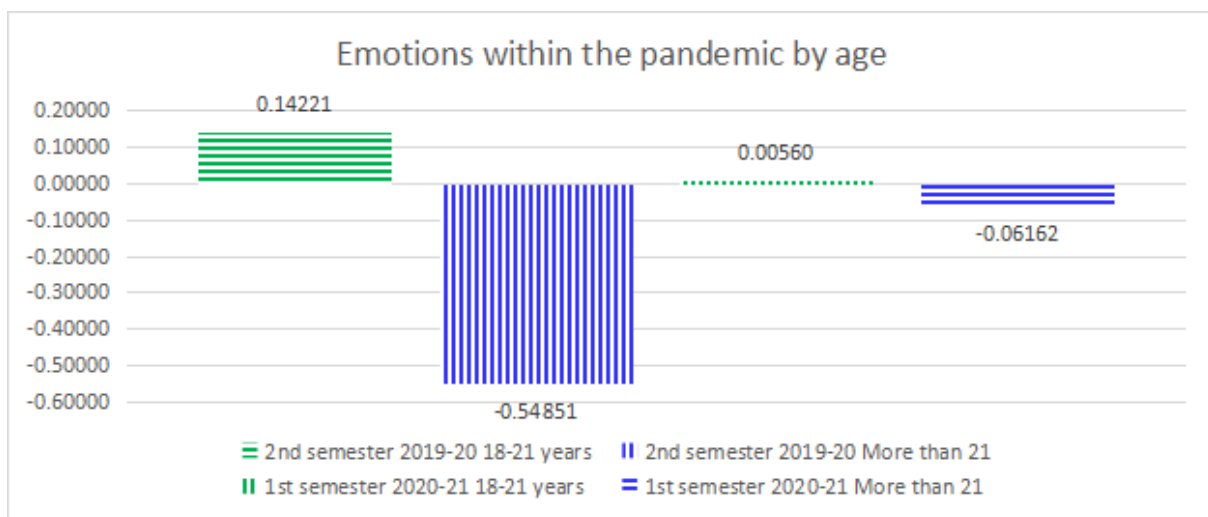


Figure 17. Emotions within the pandemic by age.

Students following an Economic Degree seem to be emotionally the more fragile showing strong negative feelings that tend to be less negative in the fall semester of 2020-21. Those following a MAEG Degree showed positive feelings in a quite high level which reflect the characteristics of these students already mentioned.

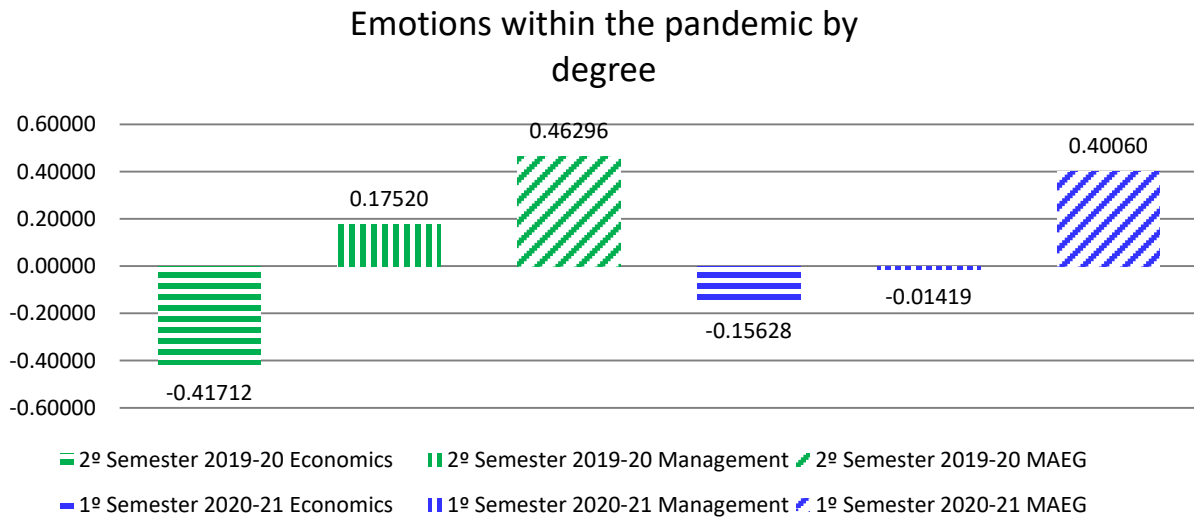


Figure 18. Emotions within the pandemic by degree.

5.2.6 Availability of computer gear

Females are better in what concerns computer gear availability than males which can be related to the fact that they are more at ease dealing with such stuff.

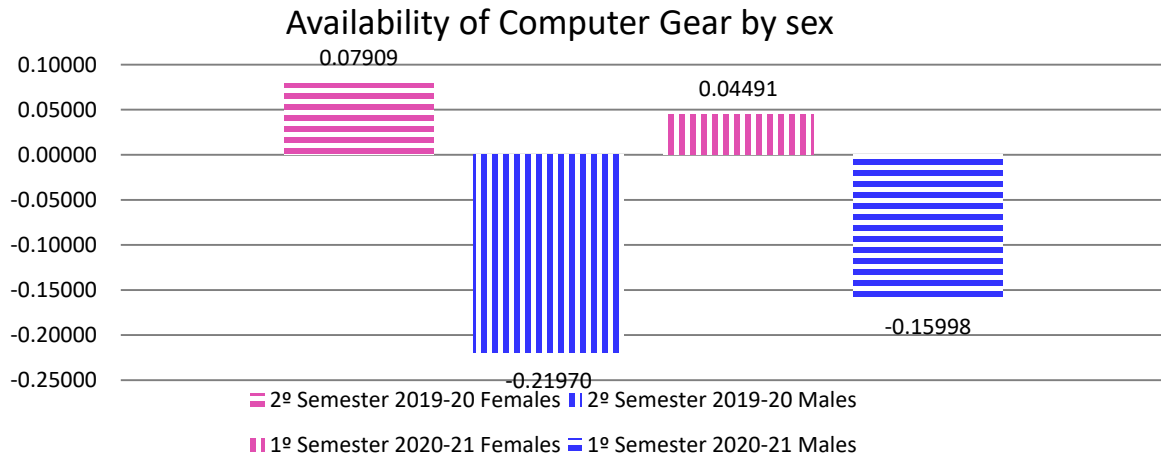


Figure 19. Availability of Computer Gear by sex.

Differences by age are not significant in the Summer semester of 2019-20 but became quite large in the Fall semester of 2020-21, most probably due to the fact that a large share of older students are already in the labor market and so have better economic conditions to buy the needed computer gear.

5.2.7 Personal concerns

Personal concerns related with Physical health, Mental health, Family and Friends, Leisure activities, Travel occupied the thoughts of males more often than the females' ones, in the Summer semester of 2019-20, when females are concentrated in dealing with their emotions in the better way but in the following semester the positions reversed mainly because males got depressed.

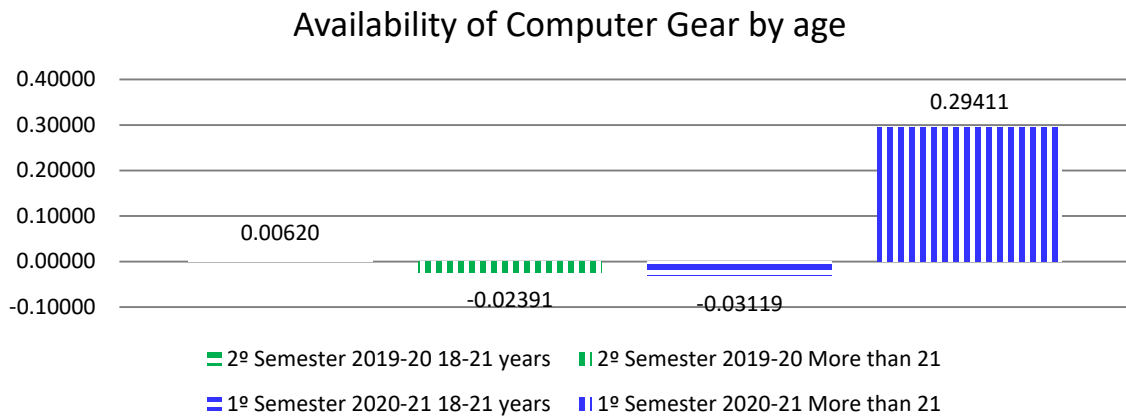


Figure 20. Availability of Computer Gear by age.

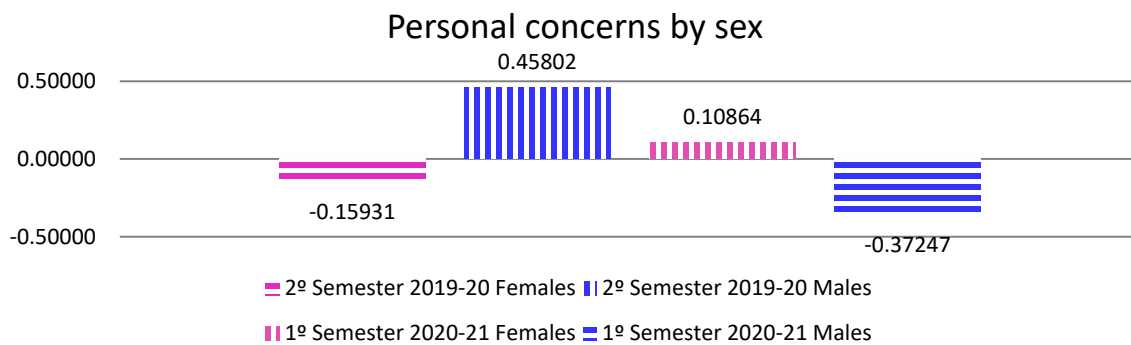


Figure 21. Personal concerns by sex.

An analysis by age showed that younger students don't give these issues special attention. Their values are not significantly different from zero in both semesters. On the contrary, these issues occupied the thoughts of their older colleagues often in the fall semester of 2020-21. Because they are more conscious about the importance of Physical health, Family and Friends or Leisure activities for keeping mental health mainly in a pandemic context where there were severe restrictions concerning all these matters.

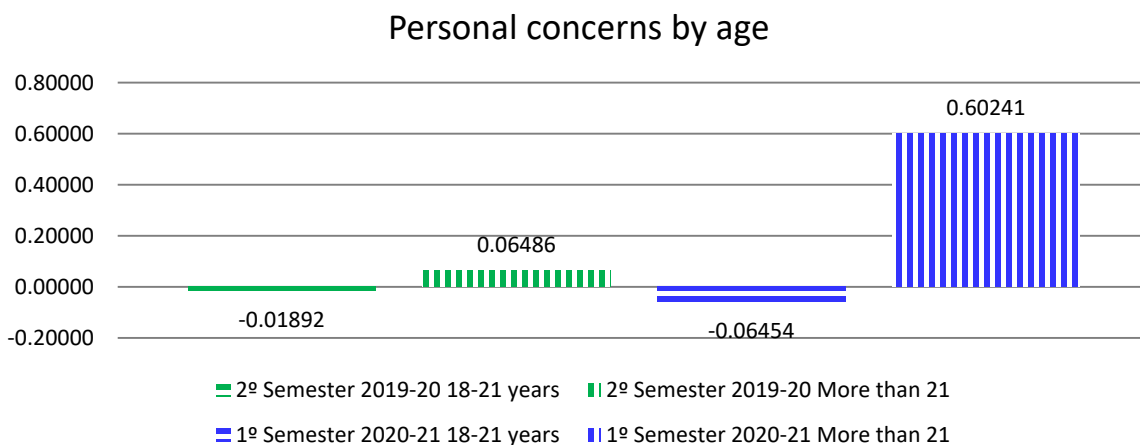


Figure 22. Personal concerns by age.

MAEG students are so focused in their studies that only very rarely think about such personal concerns mainly in a situation where they have to adjust to all the changes in teaching and learning. However in the fall semester of 2020-21 they give such issues a little more attention because they are already more at ease with the changes. Also the long period of absence of relationships with family and friends or the possibility of carrying out recreational activities may have begun to weigh on them.

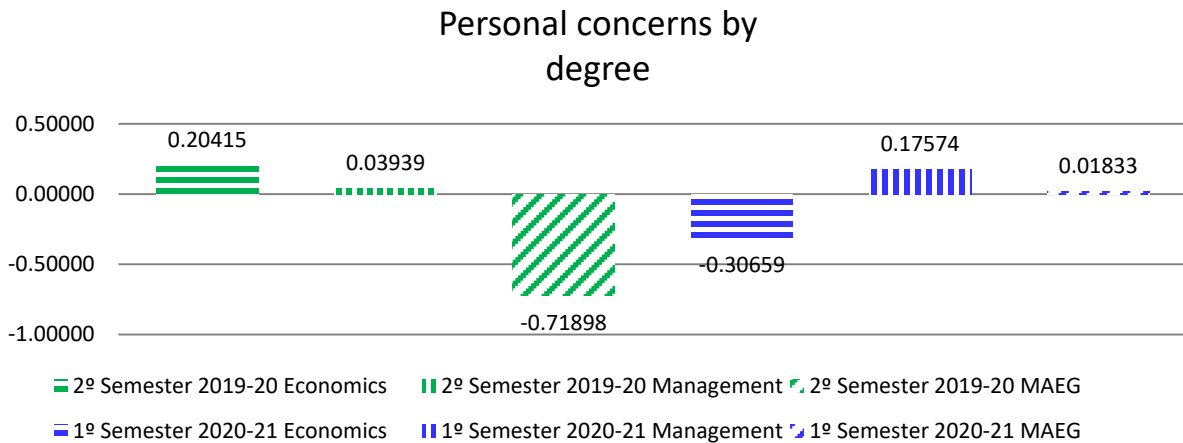


Figure 23. Personal concerns by degree.

5.2.8 Future Perspectives

Females seldom think about their future perspectives, while males think of them often. A likely explanation is that females concentrate more on the present than on the future contrary to their male colleagues.

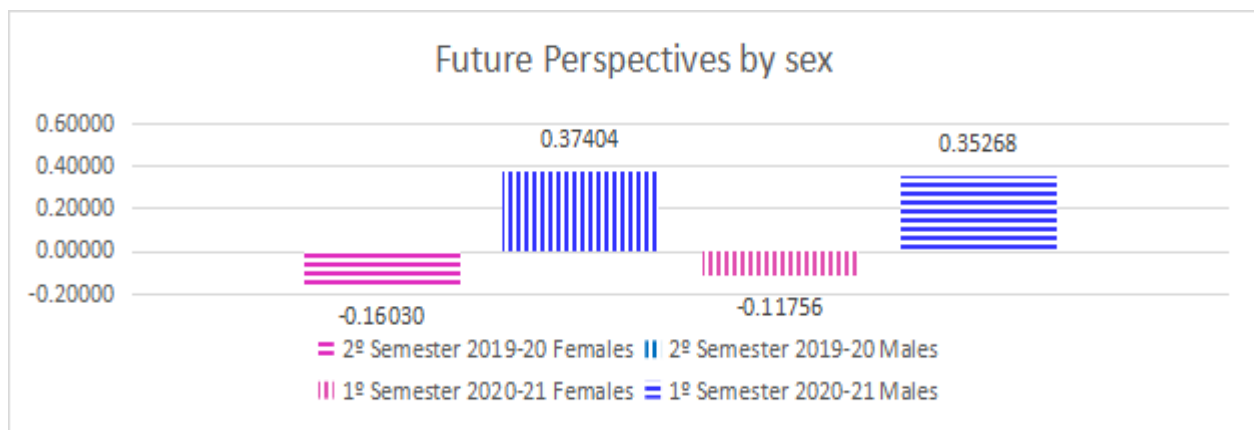


Figure 24. Future Perspectives by sex.

Because younger students usually see themselves still far from the labor market they seldom think about their future perspectives. On the contrary, older students feel themselves at the edge of the labor market and so, issues like employment, wages, and professional career are the ones that they think a lot. In the fall semester of 2020-21 these students think less often about such issues, most probably because their physical, mental and emotional health became the main concerns.

6. Conclusions

Sex, age and degree are the main variables for which we found robust associations with students' reactions and perceptions regarding the move from on-site to online or blended education. Associations with variables representing family socio-economic background like parents' school levels, employment situation or family/self income are seldom found.

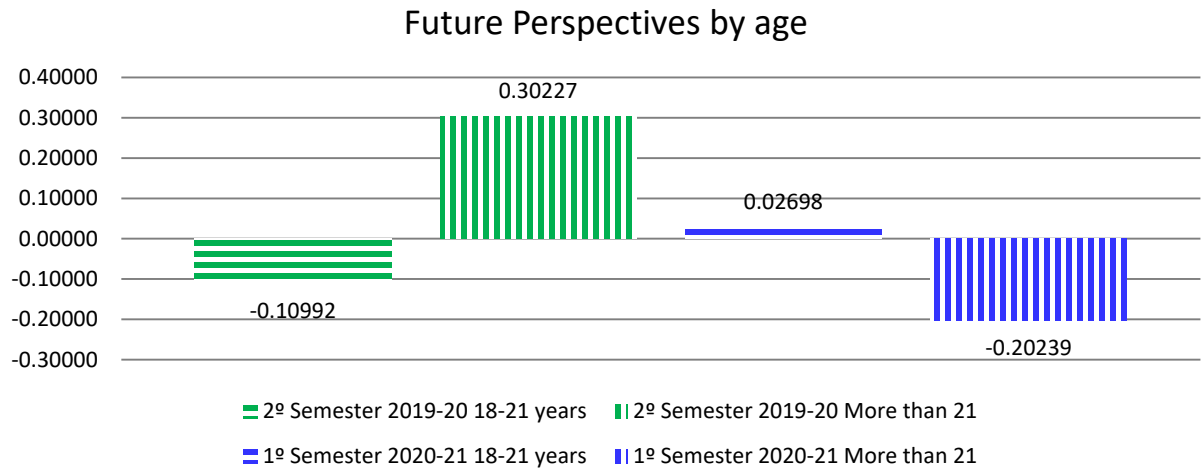


Figure 25. Future Perspectives by age.

The contingency analysis showed that:

- workload weight with online teaching compared to the period before pandemic is perceived as higher or much higher by female students and neither lower nor higher by male ones;
- in the Summer semester of 2019-20, most students, mainly older ones prefer to ask their teachers about doubtful issues by email while in the following semester they prefer, mainly younger ones to do it through online platforms;
- in both semesters, parents' school levels revealed to be positively correlated with good study conditions at home, namely good internet network, availability of a webcam and other study resources like books. Mother' school level is also positively correlated with a good adaptation to online classes in the Summer semester of 2019-20;
- level of satisfaction with teachers' help, tutorship and ISEG services' organization, is correlated with age and sex with youngers and girls being more satisfied

The Z tests, for differences in the proportions in each of the two semesters analyzed, only showed significant differences between them for satisfaction with Theoretical classes and student question sessions organization and teacher support as well as for satisfaction with Services and Students' Association support and importance of Government support measures towards needed families. For all these, dissatisfaction significantly grew from one semester to the next.

When we cross the weighted averages of the factorial components with individual characteristics we found that:

- Female students are dissatisfied with asynchronous classes, satisfied with teaching organization and support, lightly agree that they have well adapted to changes due to the pandemic, agree that they have a high level of computer literacy and deal emotionally well with the changes due to the pandemic while males have opposite feelings, in both semesters. However, in the Fall semester of 2020-21 males seem to have less issues about their adaptation which is expected since the situation was not new anymore and classes have switched to a blended system but still, males negative emotions grew increasing the gap between females and males;
- Personal concerns related with Physical health, Mental health, Family and Friends, Leisure activities, Travel as well as Future Perspectives occupied the thoughts of males more often than the females' ones in the Summer semester of 2019-20 which may be explained by the fact that females are concentrated on the present, dealing with their emotions in a better way, rather than on future. In the following semester the positions reversed mainly because males got depressed;
- A significant difference between younger and older students concerning satisfaction levels, adaptation to pandemic changes wasn't found;
- Younger students are satisfied with teaching organization and support but not the older ones most probably because they are usually already in the labor market and so is not easy for them to take advantage of teachers' support online;
- Younger students showed a higher level of computer literacy than their older colleagues. Their disagreement level is smaller in the Fall semester of 2020-21 because they had to learn how to deal with computer stuff during the

- previous semester;
- Age differences in the way of dealing emotionally with the pandemic are quite large in the summer semester of 2019-20 but almost disappear in the 1st semester. Although still negatives, older students managed to overcome their strong negative feelings;
 - Differences in availability of computer gear by age are not significant in the summer semester of 2019-20 but became quite large in the fall semester of 2020-21, most probably due to the fact that a large share of older students are already in the labor market and so have better economic conditions to buy the needed computer gear;
 - Younger students don't give personal concerns or future perspectives special attention while they occupied the thoughts of their older colleagues often in the fall semester of 2020-21. A plausible explanation could be that these are more conscious about the importance of Physical health, Family and Friends or Leisure activities for keeping mental health mainly in a pandemic context where there were severe restrictions concerning all these matters and being in the edge of the labor market, issues like employment, wages, professional career are important;
 - MAEG students' reactions and perceptions are quite different from their colleagues following an Economics or Management degree. They are more dissatisfied with online classes, happy with Theoretical classes and Student Management sessions Organization and Teacher Support, adapted better to changes due to the pandemic, master computer literacy, showed positive feelings in a quite high level, seldom think about anything but their studies. MAEG students enter HE with very high marks, attend classes more often and consider them more important in the process of acquiring knowledge, are very motivated, focused, competitive and take advantage of all the support teachers give them. Characteristics that gave them better conditions to deal well with the pandemic changes in teaching and learning and explain why they react so differently from their colleagues.

Regarding the family socio-economic background we found that:

- Students whose parents are both unemployed like asynchronous classes more than those whose parents are both or one employed. Most probably because it is associated with lower costs since students can be at home and save rents, food and transport expenses;
- In the summer semester of 2019-20, students from families which face their expenses reasonably are satisfied contrary to those who did it easily or very easily. This may be due to the fact that families with more sound finances are usually more literate and so are more demanding in their judgment about teaching organization and support. In Fall semester of 2020-21 students and their families are neither satisfied nor dissatisfied irrespective of their income level;
- Students from families where parents have a lower school level didn't adapt well to the changes due to the pandemic while their colleagues who belong to families where parents have a middle or higher school level did. Knowing that school level is, in general, well associated with a wealthy economic and finance situation these parents could provide their children with better conditions at home, help them in their studies which turn them into better and more motivated students.

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