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# Social support, self-efficacy and academic satisfaction of university students during the COVID-19 lockdown

## *Apoyo social, autoeficacia y satisfacción académica de los estudiantes universitarios durante el confinamiento por COVID-19*

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**Abstract:** This work aimed to analyze the relationships between the students perceived institutional support, teachers' support, peers' support, and their academic satisfaction, mediated by their self-efficacy in information and communication technologies (ICT). Participants were 157 students who were studying from first to fourth year in different disciplines of the Valencia University. Structural equation models with latent factors were tested. A final model had satisfactory fit indices to the observed data. It is worth highlighting the strong direct effect of the teaching staff support on student' academic satisfaction, with less weight, although significant, being the effect of institutional support. In conclusion, teacher's figure is of paramount importance for student's academic satisfaction.

**Keywords:** Teacher support, peer support, institutional support, online teaching.

**Resumen:** Este trabajo tuvo como objetivo analizar las relaciones entre el apoyo institucional percibido por los estudiantes, el apoyo de los profesores, el apoyo de los compañeros y su satisfacción académica, mediada por su autoeficacia en las tecnologías de la información y la comunicación (TIC). Participaron 157 estudiantes que cursaban de primero a cuarto año en diferentes disciplinas de la Universidad de Valencia. Se probaron modelos de ecuaciones estructurales con factores latentes. El modelo final aportó índices de ajuste satisfactorios a los datos observados. Cabe destacar el fuerte efecto directo del apoyo del profesorado sobre la satisfacción académica de los estudiantes, mientras que tuvo menor peso, aunque también significativo, el efecto del apoyo institucional. En conclusión, la figura del docente es de suma importancia para la satisfacción académica de los estudiantes.

**Palabras clave:** Apoyo del profesorado, Apoyo de los compañeros, Apoyo institucional, Enseñanza online.

## INTRODUCTION

The exceptional situation caused by the COVID-19 pandemic affected people all over the world, changed the natural course of life, and had significant physical, psychological, and social effects (Ausín *et al.*, 2022; Danioni *et al.*, 2021). All areas of society's functioning changed, including education (Adeshola and Agoyi, 2022; González-García *et al.*, 2022). This phenomenon forced the lockdown of many populations in the world during the months of March to May 2020, causing educational practices to be developed digitally (e-learning education), compared to the face-to-face system mostly used previously (e.g., Belamghari, 2022; Benalcázar *et al.*, 2022; Fouche and Andrews, 2022; Martin *et al.*, 2022; Osmani, 2021; Şahin, 2021; Sharma *et al.*, 2020). This was an important challenge for the three main agents involved in the educational system: (a) for students, in terms of acquiring a greater command of information and communication technologies (ICT), applied to the context of teaching-learning; (b) for teachers, because not all of them had sufficient knowledge and mastery of the necessary tools to successfully carry out teaching in digital format; and (c) for institutions (universities), which were forced, in an accelerated manner, to provide resources, install platforms, and develop training activities for all members of the university community (Cleland *et al.*, 2020; Gantasala *et al.*, 2022; Heo *et al.*, 2021).

Research has highlighted the important role that student perceptions can play in the teaching-learning process, specifically in relation to support from teachers and peers (e.g., Gutiérrez *et al.*, 2021; Motz *et al.*, 2022; Mushtaque *et al.*, 2021). Another variable that has shown its relationship with academic functioning and student performance has been their feeling of self-efficacy (Adeshola and Agoyi, 2022; Joie-La Marle *et al.*, 2021). Given the situation created by the COVID-19 pandemic, it seems justified and useful to study the importance of student perceptions regarding the support received from their teachers, their classmates and their educational institution. Additionally, in order to better understand the dynamics of this process, it is necessary to know the degree of mastery or feeling of efficacy in the face of online teaching techniques and materials. Logically, the last step is to find out to what extent the students were satisfied with the e-learning educational experience and with their academic performance during COVID-19 pandemic.

### *Theoretical framework*

Online learning or e-learning may be conceptualized as the learning experienced into the internet environment (either synchronous or asynchronous), where students do not physically but virtually interact with their instructors and fellow students (Bamoallem and Altarteer, 2022). From the very beginning of the first worldwide wave of COVID-19, online learning was no longer an option but a necessity. This online instruction comes with its own technological complexities and therefore instructors and learners had some resistences (Basilaia and Kvavadze, 2020; Belamghari, 2022; Faize and Nawaz, 2020). Several factors have been related in the literature as predictors of students' satisfaction with e-learning training: online interactions, online skills, teacher support, teacher feedback, technical support, computer efficiency, and e-learning engagement (e.g., Adeshola and Agoyi, 2022; Al-Fraihat *et al.*, 2020; Bawaneh, 2021; Kerzič, *et al.*, 2021; Sher, 2009).

The effects of learners' feedback and instructors' leadership on the learning process are positive (Faize and Nawaz, 2020). Faculty leadership may affect students' satisfaction through two paths: a) active interaction between the students and the faculty (also for e-learning); and b) student-peers interactions building a sense of community and support to counteract the feeling of isolation of the online sessions. The different sources of social support are determining factors for the well-being and academic performance of university students. Additionally, research in the context of institutional education has shown that students' self-perceptions play a critical role in student's academic performance and satisfaction (Wilhelm *et al.*, 2022). Hassan *et al.* (2021) found that online course satisfaction

was associated with factors such as computer competency, technology orientation and smooth delivery of course contents through online platforms. Quality of e-learning depended on service quality, an active role of the teacher during online education, and the technological quality of the system, while, on the other hand, students' digital competencies and online interactions with their peers and teachers were less important (Kerzič *et al.*, 2021).

#### *Institutional support*

Students' perceptions of technical support during distance education are important to students' e-learning education. The availability of technical support during distance education refers to students' judgment about access to adequate help in resolving technical issues during online education. In a study by Hassan *et al.* (2021), the positive academic self-perceptions, and perceptions of access to technical support appeared to be the most significant predictors of course satisfaction among university students taking virtual classes during the COVID-19 pandemic. Students need an easy platform with all contents and features integrated in order to finish their learning tasks on time and effectively in an e-learning environment (Adeshola and Agoyi, 2022). Students' satisfaction and performance with the e-learning process was linked to technical support from the university either through tutors or library resources (Kerzič *et al.*, 2021). These authors also found that students' satisfaction with e-learning was positively related with overall satisfaction with their education, and finally with academic performance.

#### *Peer support*

Because during the pandemic the students were confined to their homes, they were unable to interact with each other as they usually did in the face-to-face education modality. Therefore, interactions between students through social networks increased (Motz *et al.*, 2022). The interactions between the students and their teachers and among themselves promoted students' satisfaction with the e-learning system. Indeed, the online interactions are simply the number of times a determinate student communicates with peers from the course, his/her teachers or the administrative staff. With greater online interactions and social capital, students are more resilient (Al-Fraihat *et al.*, 2020). In the study by Motz *et al.* (2022) during a time of campus closure, the use of collaborative learning technologies was positively associated to academic performance. We have to keep in mind that in times of closure the online courses are the main connection between all the agents in the learning

community. The transition to online learning worldwide has been in many cases abrupt and due to emergency. As Sher (2009) has stated, student-instructor interaction and student-student interaction were found to be significant contributors of student learning and satisfaction.

Nevertheless, during the pandemic, in certain environments it has been especially difficult to create relationships between students. For example, Motz *et al.* (2022) argue that in Pakistan there is no good online education platform in higher learning institutions. Therefore, online classes have not proven to be powerful tools for engaging students, keeping their attention, and ensuring their concentration.

### *Teacher support*

Another important source of support is that offered by teachers, being the variable that best predicts school adjustment, understood as adapting to academic requirements (Gutiérrez *et al.*, 2021). The educational help supposes the continuous monitoring of the student's learning and the offer of support when necessary. During the pandemic, teachers exerted great efforts due to the unexpected increase in workload generated by the move to teaching online. Both the online teaching and the assessments involved a significant effort (Cleland *et al.*, 2020). Teachers are key actors to promote learning while changing how teaching is provided due to the pandemic. In general, the students had a very positive attitude towards their teachers and global learning under the very unpleasant and extraordinary circumstances of the pandemic. Mushtaque *et al.* (2021) estimated that during this hard time 75.2% of students declare having strong support from their teachers when extra help in their studies.

As Puljak *et al.* (2020) have stated, a number of factors influence the success of implementing any type of e-learning such as having timely feedback, delivering and recording online lectures, adapting instructions and materials to this situation, and helping the students in the problems they may have with the new learning environment. To achieve these factors, teachers play a key role, as Kerzic *et al.* (2021) pointed out. Similarly, the study by Naseer and Rafique (2021) revealed in a sample of undergraduates that teachers' academic support moderated the relationship between students' satisfaction with online learning and academic motivation. Indeed, the interaction with instructors is one of the most relevant determinants of student satisfaction. There is evidence that interactions with the teachers predicts both satisfaction but also actual performance (Kuo *et al.*, 2014). Nevertheless, there are also contradictory results. For example, Hamdan *et al.* (2021) found no association between the interactions with the instructor and students' satisfaction. Students reported

low levels of interactions of all kind. The study by Adeshola and Agoyi (2022) revealed that interaction with the teacher, peer collaboration, and community support were positively associated with engagement in their e-learning. This result reinforces the vital role the instructors have in the success of e-learning. A simple look at the many relevant interactions a teacher may have with their students during e-learning makes this last idea clear: feedback of their work, providing information and materials for learning, direct chat during the e-learning and the e-office hours, motivating the collaborative work with peers through virtual ways, etc.

### *Self-efficacy*

At the start of the pandemic, there was an urgent shift to online teaching at all academic levels. Online teaching was adopted, but with improvised measures (Cleland *et al.*, 2020). However, online university learning programs require students to be highly proficient in ICT, even if they are digital natives. Self-efficacy is a central element of social-cognitive theory and was originally defined as a person's belief in his or her ability to perform a specific task or behavior (Bandura, 1977). Self-efficacy has been considered as a personal adaptive resource. A high level of self-efficacy has been shown to contribute to performance at work, especially when tasks are novel, unpredictable, challenging, or stressful, as during the lockdown. General self-efficacy was positively correlated with all dimensions of adaptive performance at work during lockdown (Joie-La Marle *et al.*, 2021). When self-efficacy is applied to a particular area, such as computer self-efficacy or academic self-efficacy on e-learning refers to the belief that his or her computer skills are enough to handle successfully a broad range of computer-related tasks needed for academic tasks or to attain a specific academic goal (Adeshola and Agoyi, 2022).

Many studies have identified a positive relationship between self-efficacy to use technologies and online learning performance (e.g., Fu *et al.*, 2020; Heo *et al.*, 2021; Kim *et al.*, 2019; Wei and Chou, 2020). In general, the scientific literature supports the impact of self-efficacy in ICT on the academic performance of students who participate in online teaching courses and provides evidence that greater self-efficacy leads to better academic performance and greater student satisfaction. For example, Kim *et al.* (2019) showed that the perception of self-efficacy in the use of ICT and the commitment to learning activities are the best predictors of academic performance and the perception of learning of university students. Fu *et al.* (2020) found that academic self-efficacy and computer self-efficacy of students in online education programs have positive influences on student academic satisfaction. Heo *et al.* (2021) found that students' computer/Internet self-efficacy

improved the amount of online discussions as well as course satisfaction. In sum, Wei and Chou (2020) have claim how important technological self-efficacy for the current learning environments is.

Many studies support the relationship between self-efficacy and academic success or academic performance. However, there are some works, such as Hamdan *et al.* (2021), in which students reported low technology proficiency, although technology was an important predictor of their satisfaction with online teaching. For this reason, Hamdan et al (2021) point out that this is inconsistent with the results of Kuo *et al.* (2014), in whose work the students' scores on self-efficacy correlated positively with their academic satisfaction, despite the fact that self-efficacy did not show to be a predictor of academic satisfaction.

### *Academic satisfaction*

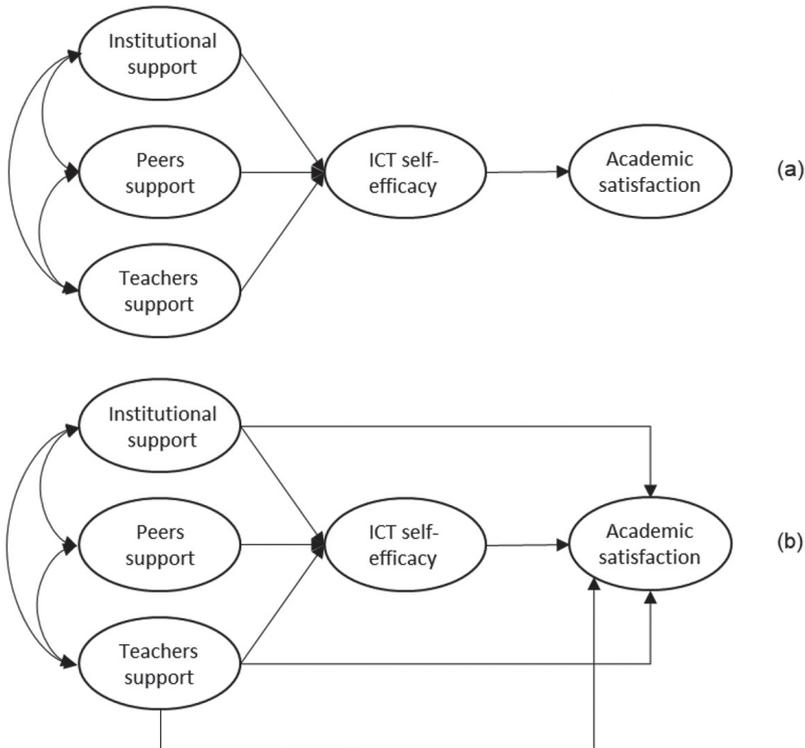
Academic satisfaction is a positive feeling on the learning process and the competence to achieve its goals, and the literature shows that students with positive perceptions on their academic competence better accomplish their academic tasks and consequently achieve better grades (Landrum, 2020). Other factors also play a role in the success of online courses such as frequent interactions, technological/computer self-efficacy, or self-regulation (Hamdan *et al.*, 2021). Hassan *et al.* (2021) found that the satisfaction with virtual learning was positively related with students' motivation towards their studies and their academic achievement. However, the level of satisfaction may vary across different degrees and contexts. Al Soub *et al.* (2021) analyzed a sample of chemistry students in Jordania during the pandemic and found that results indicated their satisfaction with using e-learning was high, while their satisfaction with the instruction and website improvements was moderate.

Many studies have analyzed satisfaction during COVID-19 pandemic. For example, Erden *et al.* (2021) showed that academic satisfaction and COVID-19 knowledge mediated the relation between social contact and well-being. Hassan *et al.* (2021) analyzed students learning in the context of the pandemic and found an association between academic satisfaction and subjective well-being. Academic satisfaction has also been associated with frequency and quality of social contact (Gopalan *et al.*, 2019). Computer self-efficacy and a user-friendly e-learning environment predicted directly and indirectly the satisfaction with the e-learning in a sample of Chinese university students (Jiang *et al.*, 2021). In the study by Kerzič *et al.* (2021), satisfaction with the e-learning strongly mediated the relationship between e-learning quality and students' performance.

*Present study*

The novelty of this study lies in the analysis of the importance of social support perceived by students in an anomalous academic situation, such as lockdown due to COVID-19, given the lack of coincidence in the results of previous studies. The aim of this work was to analyze the effect of the students' perceived support from teachers, classmates and educational institution, on the students' academic satisfaction, with self-efficacy in ICT as a mediator. Two alternative statistical models are proposed and tested, a fully mediational model (Figure 1a) and a partially mediated model (Figure 1b). The effects are supposed to be positive on ICT self-efficacy and on academic satisfaction.

**Figure 1. Hypothetical models of relationships between the variables studied: a) Fully mediated model; b) Partially mediated model**



## METHOD

### *Participants*

The participants were 157 students from the Valencia University who, during lockdown, had studied from the first to the fourth year of various academic degrees. Of them, 29 (18.5%) are men and 128 (81.5%) are women. The age ranges between 18 and 56 years, with  $M = 22.3$  and  $SD = 5.88$ . In terms of distribution by course, 26 were in the first during the lockdown due to COVID-19, 57 in the second, 37 in the third and 37 in the fourth course.

### *Instruments*

All the instruments that used in this study are uni-dimensional, they are worded in relation to the period of lockdown by COVID-19 between March and May 2020, and they were applied to the students in the months of September to December, at the beginning of the 2020-21 academic year. In all cases, the response options were on a scale with 5 anchors, from (1) "Totally disagree", to (5) "Totally agree". Once the information provided by the participants was collected, Confirmatory Factor Analysis (CFAs) were estimated to check the fit of the different uni-dimensional structures. Next, the reliability (internal consistency) of each of the instruments was calculated using Cronbach's alpha coefficient.

*Institutional support.* A 5-item questionnaire about the support that the University, in general, and the staff, in particular, provided to students during the lockdown due to COVID-19. It is inspired by the Service Quality Scale by Urbach *et al.* (2010). An example item is: "The staff of the Valencia University attended me in a personalized way when I had problems with any function of Moodle or the virtual classroom". CFA's fit was:  $\chi^2(5) = 12.619$ ,  $p = .027$ , RMSEA = .099 [.030 - .168]; CFI = .999; SRMR = .014. This questionnaire obtained an alpha of .909 in the studied sample.

*Teacher support.* A 9-item questionnaire about the support that teachers provided to students during lockdown, based on the Professor Support Scale by Moleiro and Ruiz (2005). Example of items: "The teacher responded accurately to the questions that were asked". The CFA of this scale provided the following fit indices:  $\chi^2(27) = 129.83$ ,  $p < .001$ , RMSEA = .156 [.129 - .183]; CFI = .975; SRMR = .036. The alpha coefficient showed a value of .937.

*Peer support.* A 14-item questionnaire on the support that one or more colleagues gave the student during lockdown. It is an adaptation of the Student Academic Support Scale by Mazer and Thompson (2011). The instrument is headed

by the expression, “During the lockdown from March to May 2020, a classmate: “Helped me complete an assignment”, “Helped me increase my confidence at the Faculty”, etc. The CFA of this scale had these fit indices:  $\chi^2(77) = 621.14$ ,  $p < .001$ , RMSEA = .212 [.197 - .228]; CFI = .940; SRMR = .097. Reliability was  $\alpha = .941$ .

*ICT self-efficacy.* A questionnaire with 7 items on the perception that the students had in relation to the use and mastery of ICT during the period of lockdown by COVID-19. It is inspired by the ITC Self-Efficacy Scale by Kim *et al.* (2019). An example of item is “I was confident in myself when using the functions of on-line learning”. A CFA had the following indices of fit to the data:  $\chi^2(14) = 179.33$ ,  $p < .001$ , RMSEA = .274 [.239 - .311]; CFI = .942; SRMR = .065. The internal consistency of this questionnaire was .894.

*Academic satisfaction.* To measure the satisfaction of the students with the academic situation and with their performance during the lockdown period, 16 items were used that deal with how the students felt regarding the educational environment, the enjoyment of the classes, or the learning experience on line. It is based on the Academic Satisfaction Scale by Lent *et al.* (2007), and the User Perceived Satisfaction Scale by Urbach *et al.* (2010). Some examples of items are: “I enjoyed the classes most of the time”, or “I am satisfied with the results obtained at the end of the 2019-20 academic year”. The fit indices of the CFA model were:  $\chi^2(104) = 450.07$   $p < .001$ , RMSEA = .146 [.132 - .160]; CFI = .917; SRMR = .079. Finally, the alpha was .869.

### *Procedure*

The data collection took place in the period from September to December 2020. With the scales described, an anonymized questionnaire was prepared on the Google Forms platform with its corresponding link, which was placed in the virtual classroom (Moodle) of the collaborating teachers of the different subjects. This link gave access first to the explanation of the research purpose and the confidential treatment of the data. Once the explicit conditions were read and accepted, the participants were able to complete the questionnaire. This research has been developed in compliance with the APA guidelines on human research and approved by the Research Ethics Committee of the Valencia University.

### *Data analysis*

SPSS was used for descriptive statistics, mean comparisons and alpha’s coefficients calculations. The MPlus 8.7 program from Muthén and Muthén (1998-2017) was

used to estimate CFAs and structural models. For CFA and structural models, overall fit was assessed with the chi-square, CFI, RMSEA and SRMR indexes. The criteria for good fit was a CFI above .90 (better fit above .95) and RMSEA and SRMR below .08 (Marsh *et al.*, 2004). For the structural models, item parceling (aggregation of items) was employed. Parceling was made with adjacent items. This has been proved to have several advantages (González-García, Martinent, and Nicolas, 2022; Martinent *et al.*, 2019; Matsunaga, 2008): stabilize parameter estimates; improves model fit; and it works very well when sample sizes are small and items unidimensional within each latent variable, which is our particular case.

## RESULTS

### *Descriptive statistics and mean comparisons*

Descriptive statistics of the variables under study are presented in Table 1.

**Table 1. Descriptive statistics, including means, standard deviations (SD), asymmetries (As) and kurtosis (K), and correlations among the variables in the model**

VARIABLE	MEAN	SD	AS	K	IS	PS	TS	SE	AS
<i>Institutional support (IS)</i>	2.64	0.95	0.35	0.01	1				
<i>Peers support (PS)</i>	3.83	0.96	-1.20	1.39	.03	1			
<i>Teachers support (TS)</i>	3.07	0.95	0.06	-0.49	.37**	.07	1		
<i>Self-efficacy (SE)</i>	4.05	0.78	-0.82	0.83	.36**	.24**	.31**	1	
<i>Academic satisfaction (AS)</i>	2.84	0.74	0.01	-0.43	.40**	.14	.68**	.34**	1

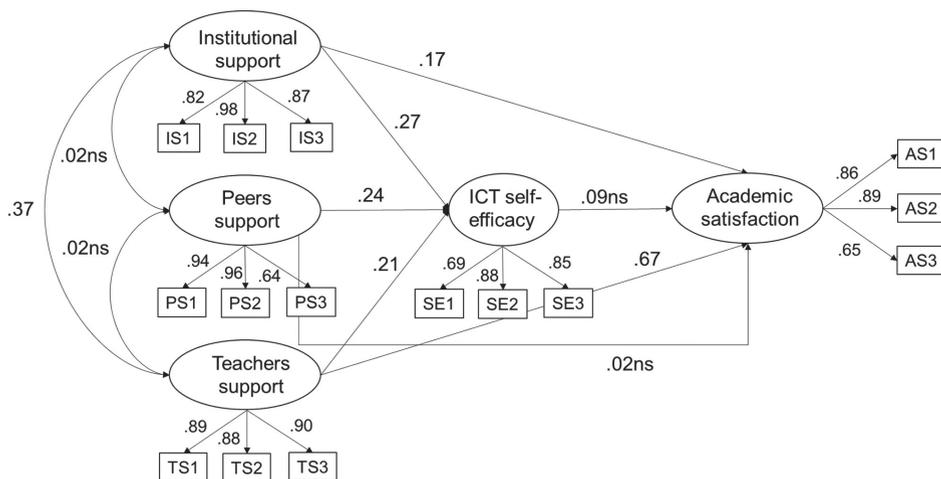
A repeated-measures ANOVA on all variables under study was statistically significant and large ( $F(3.23, 504.81) = 107.436, p < .001, \eta^2 = .408$ ). This result points out that there are mean differences among the variables. Post-hoc tests with Sidak's correction showed that all means were different, with the exceptions of peers' support and self-efficacy, which were the largest means, and institutional support and satisfaction, which were the lowest means (Table 1).

### *Structural Models*

Two a priori structural models were estimated (Figure 1). The fully mediated model had not a good fit to the data:  $\chi^2(84) = 210.7, p < .001, RMSEA = .098 [.082 - 0.115]$ ; CFI = .917; SRMR = .147. On the contrary, fit of the partially mediated model was satisfactory:  $\chi^2(81) = 123.94, p = .001, RMSEA = .058 [.036 - 0.78]$ ;

CFI = .972; SRMR = .082. The results obtained (Figure 2) show that the predictive value of self-efficacy in the use of ICT does not turn out to be such a determining factor for academic satisfaction as expected, with a non-significant relationship ( $b = .094, p > .05$ ). However, there is a high and direct effect of the teachers' support on the students' academic satisfaction ( $b = .668$ ). There is also a direct influence, although to a lesser degree, between institutional support and academic satisfaction ( $b = .176$ ). Additionally, institutional support and teachers' support were positively and significantly correlated ( $r = .367$ ), while peers support was uncorrelated with the other two sources of support. Overall the indirect effects of support on academic satisfaction were not statistically significant.

**Figure 2. Standardized solution for the structural equation model with partial mediation**



## DISCUSSION

In this study, we investigated the students' perceived support from educational institution, teachers and peers at Valencia University and its relation to their satisfaction with the online teaching and the academic performance during COVID-19 lockdown, considering their self-efficacy in ITC as a mediator of these relationships.

Our results show that the three sources of students perceived social support (institutional, peers, teachers) are significantly related to the students' feeling

of efficacy in ICT (information and communication technologies), accounting for 23.3% of the variance in this variable. This result coincides with that obtained in previous studies such as the one by Adeshola and Agoyi (2022), Kerzic *et al.* (2021), Hassan *et al.* (2021) and Motz *et al.* (2022). In all these works, the importance of social support from some of the aforementioned sources (institutional, teachers, peers) on self-confidence and the feeling of efficacy in the use of ICTs is highlighted. Our results also support this importance of support on ICT self-efficacy.

The predictive capacity of self-efficacy in ICT on academic satisfaction has not been supported by our data, since the relationship found has not been statistically significant. There are many researches that refer positive relationships between students' self-efficacy in ICT and satisfaction with the e-learning system and with academic performance (e.g., Fu *et al.*, 2020; Heo *et al.*, 2021; Wei and Chou, 2020). However, in this study, self-efficacy in ICT has not shown predictive capacity on academic satisfaction, once the sources of support (institution, peers and teachers) are considered in the model. This result seems somewhat contradictory, given that the students have shown a high value in self-efficacy with ICT. Something similar was found in the work by Kuo *et al.* (2014), in which self-efficacy was not predictive of school satisfaction, despite the fact that students' self-efficacy correlated positively with their academic satisfaction.

Based on the specialized literature, we assumed that the first hypothetical model proposed would be fulfilled, in which the different sources of social support are proposed as predictors of self-efficacy in ICT and, in turn, on academic satisfaction, that is, the model of full mediation. However, we have seen that this has not been fulfilled. By testing a second hypothetical model, with partial mediation, we found that institutional support and teacher support have a great direct effect on academic satisfaction. As shown in the results, the predictors in the model are able to explain 62.8% of the variance in academic satisfaction. These results coincide with those obtained in other studies such as the one by Hamdan *et al.* (2021) in which they found that the significant predictors of students' satisfaction with online education were self-regulated learning, learner-content interaction, learner-learner interaction and the number of e-learning theoretical courses. Another study that offers similar results, although with nuances, is that by Kerzic *et al.* (2021). In this research, the quality of e-learning depended mostly on the administrative support through tutors and libraries, the active role and feedback of teachers during on-line teaching, and in general on the quality of the system. They also found that digital competence by the students and their interactions with their peers during the learning process were less important, although statistically significant.

Academic satisfaction is a variable that has always been of interest as a result of the educational process. During the period of lockdown due to COVID-19, the results have been very diverse and sometimes contradictory. Many studies explored the level of satisfaction with online teaching during the COVID-19 pandemic in various contexts and found a high level of satisfaction with online teaching (Choe *et al.*, 2019; Fatani, 2020). Some studies have concluded that students felt satisfied with the online educational procedure and with the performance obtained (e.g., Almusharraf and Khahro, 2020; Faize and Nawaz, 2020; Kerzić *et al.*, 2021; Naseer and Rafique, 2021). For example, Almusharraf and Khahro (2020) revealed that all the participants were greatly satisfied with online learning tools and platforms. Their study also showed that students were satisfied with the support provided by staff during the COVID-19 crisis. However, other researchers such as Hamdan *et al.* (2021), found that the mean score of students' satisfaction was low in a sample of Jordanian university students. Hashemi (2021) revealed that COVID-19 had negatively affected the academic performance of Afghan students and the students were highly dissatisfied with online teaching during this critical moment. Hassan *et al.* (2021) found that scores on negative academic self-perceptions were significantly higher in comparison to positive academic self-perceptions, and that positive academic self-perceptions appeared as the most significant predictor of course satisfaction. Wilhelm *et al.* (2022) studied a sample of undergraduate students and found that, despite the fact that students reported a 20% increase in their grades, simultaneously they also reported low learning, less engagement to the educational process, and that they were not satisfied with the quality of teaching during the period of lockdown compared to face-to-face classes received before the COVID-19 pandemic. This result may be due to the particular subject analysed, anatomy, a discipline that is more difficult to study with e-learning than with a face-to-face system, in laboratories and practice rooms. The findings of the study by Sharma *et al.* (2020) indicated that the majority of their respondents are dissatisfied with online learning platforms. Similarly, Dinh and Nguyen (2020) showed that online teaching and learning had a lower satisfaction level than face-to-face teaching.

### *Practical implications*

The results of this work have come to highlight the important role played by the social support of teachers for the students' academic satisfaction and performance. This has always been important, and it is even more so in crisis situations such as the one generated by COVID-19. These findings imply that higher education

institutions must invest more in the provision of timely and adequate technical support during e-learning educational system. It must be recognized that, during the COVID-19 lockdown, the response given by educational institutions was quick, but it is still insufficient if we want a complete adaptation of the education system to the modern world.

The rapid transition to e-learning in many academic institutions may imply that some of the potential benefits and advantages of this type of learning have not been fulfilled (Mottz *et al.*, 2022). This fact may be due for a lack of time from both teachers and students to adapt activities to the new environment as well as the number of new stressors introduced as a consequence of this rapid institutional change.

From this work, it is necessary to continue advancing in the elaboration of protocols to prevent situations of academic uncertainty, so that the efforts of teachers (and students) adjust to a rational work model, where the evaluation of the students is not an anecdotal event. In addition, it is important to train university teachers in the management of virtual learning platforms and other relevant applications for teaching, and in the application of didactic methodologies to develop a motivating and participatory teaching in virtual environments. This training would serve to improve the teaching offer even in situations of full attendance.

### *Limitations*

The scope of the conclusions of this work is limited by the sample size. The recommendations in prevention of the COVID-19 pandemic by the Valencia University determined the non-use of paper forms and the restriction of access to the classrooms of teachers and students. This made difficult to collect information and only online sampling could be carried out in the manner specified in the procedure.

Another limitation may be the hypothetical model tested. The model tested in this work is not the only possible one. Thus, for example, Adeshola and Agoyi (2022) consider that e-learning engagement is a determinant of academic benefits and learning persistence. Other authors such as Hashemi (2021) have used students' academic performance as a predictor of their satisfaction with online teaching. Although in this work we have used the students' academic satisfaction as a variable to predict, it could also be pertinent to use other variables, in line with works such as those by Rossi *et al.* (2021) or Erden *et al.* (2021) that have considered important to predict the students' psychological wellbeing. Finally, yet another limitation is the exclusive use of self-reported measures.

## CONCLUSIONS

Among the conclusions, it is worth highlighting the strong direct effect of the perception of support from teachers on the students' academic satisfaction. With less weight, it is also relevant the direct effect of students perceived institutional support on satisfaction. The feeling of self-efficacy in information and communication technologies (ICT) showed a low effect, despite what we assumed. All this reinforces the relevant role of the teaching staff, regardless of the personal level and the resources with the student believes he/she has.

Many studies have been carried out because of the special situation of lockout due to COVID-19, and the results found in each of them have been very diverse, as we have been referring to in the theoretical framework of this work. We have also explained that the reasons for these various results have been multiple, highlighting, among others, the economic situation of each country, the degree of digital technification and the capacity of institutions to react to a situation as unforeseen as COVID-19, the training of university staff and the response of students to a new learning modality, the e-learning.

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