Article

The Lack of Academic Social Interactions and Students' Learning Difficulties during COVID-19 Faculty Lockdowns in Croatia: The Mediating Role of the Perceived Sense of Life Disruption Caused by the Pandemic and the Adjustment to Online Studying

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Abstract: The emergence of the COVID-19 pandemic caused significant disruptions and changes to the educational process worldwide, and higher education institutions rapidly shifted from onsite to online education. This study aimed to explore the association between a perceived lack of academic social interactions in the online learning environment and learning and self-regulation difficulties experienced during online studying. More specifically, the mediating role of students' senses of life disruption caused by the pandemic and their general adjustment to online studying in the previously described association was explored. A total number of 464 university students from Croatia took part in an online questionnaire. The results revealed that students who perceive a greater lack of academic social interactions also report more learning and self-regulation difficulties during online studying. Further, the perceived lack of academic social interactions affects students' perceptions of life disruption caused by the pandemic and adjustment to online studying. Both of these mediators, in turn, affect the level of experienced learning and self-regulation difficulties. The obtained results can be helpful for introducing certain measures that could support students' learning and reduce the possibility of adverse effects of the pandemic.

Keywords: COVID-19 pandemic; university students; online education

1. Introduction

The COVID-19 pandemic that rapidly emerged at the beginning of 2020 affected various aspects of people's lives worldwide and led to the introduction of different measures primarily aimed at social distancing. One of these measures in many countries included complete lockdown of educational institutions, which represented a severe disruption of the educational process from pre-primary to tertiary education (United Nations 2020), and in March 2020 this measure was introduced in Croatia as well (Vlada Republike Hrvatske [Government of the Republic of Croatia] 2020). In a very short period, all teaching and learning activities in schools and universities have been transferred to an online learning environment. Although there are technology-related benefits of online learning, such as accessibility, affordability, and flexibility (Armstrong-Mensah et al. 2020; Dhawan 2020), this unexpected shift from onsite to online education required relatively fast (and, at the same time, unplanned) adjustment to the new situation, with different levels of preparedness among academic staff and students for the use of various online educational platforms and tools (Armstrong-Mensah et al. 2020; Filho et al. 2021). While schools in Croatia mostly opened in May 2020, higher education institutions remained online throughout the rest of the academic year 2019/2020, which was also predominantly the case in the subsequent academic year (2020/2021).

The growing number of studies interested in the effects of the pandemic reveals its impact on various aspects of life, e.g., economic aspects, usual daily routines and functioning, academic functioning, and physical and mental health (Babicka-Wirkus et al. 2021; Cao et al. 2020; Ihm et al. 2021; Son et al. 2020; Schiff et al. 2020). The psychological impact of the pandemic is especially in focus due to potential detrimental influences on children and youths' mental health (Schwartz et al. 2021), and experts in the field of mental health warn about the potential effects of the pandemic on stress-induced disorders (Horesh and Brown 2020). Within the context of higher education, studying experiences that are an essential part of students' everyday lives become directly influenced by the pandemic, including various challenges related to online education (Barrot et al. 2021). Although distance education is not a new form of education, the pandemic made it a dominant form for academic staff and students worldwide, and, according to Filho et al. (2021), both academic staff and students experience the impact of social isolation during a lockdown of higher education institutions. Since this situation has been present for almost two years, it could be considered a prolonged crisis with potential long-term effects.

Previous studies emphasize the general role of quality social interactions for mental health (Nearchou et al. 2020) and the detrimental role of social isolation on both physical and mental health (Pietrabissa and Simpson 2020). On the other hand, studies also demonstrate the beneficial effects of academic social interactions on students' learning (Hurst et al. 2013; Okita 2012). Academic social interactions generally foster a sense of belonging, and, if the students lack the sense of belonging, they can be less motivated for academic assignments (Yeager et al. 2013). Recent studies indicate that students during the pandemic generally feel lonely (Labrague et al. 2021) and that the lack of face-to-face social interactions during the pandemic is not only associated with the sense of loneliness but can also be a significant source of students' stress (Dumitrache et al. 2021; Son et al. 2020; Živčić-Bećirević et al. 2021). The lack of social interactions can be experienced within various social contexts, including educational contexts, which poses the question of the potential effects of the lack of the usual academic interactions and social context cues on students' learning and adjustment to online studying. Namely, the lack of the usual face-to-face academic social interactions can contribute to the already-present sense of isolation generated by the other social distancing measures introduced during the pandemic. In a study conducted by Giusti et al. (2021), university students perceived the absence of direct face-to-face contact as the most notable disadvantage of distance education during the pandemic, followed by reduced interaction with teachers. It should be noted that this aspect of distance education and online studying has been of interest previously to the pandemic context as well. Pre-pandemic studies on distance education also emphasize students' needs to connect with other students and imply potential feelings of alienation related to virtual classrooms (Rovai and Wighting 2005), and, in Park and Bonk's (2007) study, students also expressed the need to connect to other students and to have a sense of social presence. According to Wallace (2003), social presence and enabling discussions with teachers and other students play important roles in students' satisfaction, learning, and performance in online classes. Muilenburg and Berge (2005) explored the potentials of online learning and obtained that the lack of social interactions is one of the crucial barriers for students' online learning experiences. In a study conducted by Boling et al. (2012), students reported feelings of disconnectedness with their colleagues, teachers, and course content in courses emphasizing individualized learning experiences and limited social interactions.

Muilenburg and Berge (2005) obtained that learning motivation is also one of the students' concerns regarding online learning. Difficulties related to the learning process in the online learning environment can be related to various factors, such as a sense of cognitive overload and perceived competence in the use of technology (Kim and Frick 2011). Within the context of the pandemic, students also needed to adjust to new studying conditions, which could be more or less demanding and challenging for some students. Several recent studies focused on the effects of the pandemic on students' learning indicate that, during the transition to online education, students reported increased workload

(Al-Kumaim et al. 2021; Aristovnik et al. 2020; Armstrong-Mensah et al. 2020) and academic burnout (de la Fuente et al. 2021). Further, students' adjustment and learning difficulties during online studying could be related to a lack of self-regulation and proneness to procrastination (Bao 2020; Hong et al. 2021). Giusti et al. (2021) also reported difficulties regarding learning and concentration during distance education among university students. An additional challenge for the learning process during online education could likely be the possibility that the studying experience became a rather lonely experience, lacking the usual academic interactions and networking (Elmer et al. 2020). This might be especially the case for asynchronous learning, which, compared to synchronous learning, lacks interactions and dynamics (Lobel et al. 2002) and can negatively affect student motivation and learning. Lack of students' engagement can further reflect on their poorer academic achievement (Garcia-Martinez et al. 2021). Various challenges related to the learning and self-regulation process in an online environment are not new issues, and studies conducted prior to the pandemic also reported certain difficulties in this manner. For example, in a study conducted by Pedrotti and Nistor (2019), a surprisingly small proportion of university students used various self-regulation strategies in an online learning environment related to time management and planning their learning during the semester. Furthermore, they were mostly focused on the period before the exams, manifesting the tendency to procrastinate. Having in mind the previously addressed challenges related to online education, it seems reasonable to assume that the pandemic and new studying circumstances that downsized the usual range of academic interactions could pose a challenge for a significant number of students and their adjustment to the unexpected shift from onsite to online education. Understanding these challenges and their underlying mechanisms can be of relevance from a broader perspective as well. Namely, the quality of educational experiences is associated with academic achievement, and positive experiences with the educational environment could reduce various risk factors for students' learning and ability to cope with challenges and stressors (Yu et al. 2017), which seems of special importance in the challenging times of the pandemic that affects students worldwide.

Present Study

Although the number of studies interested in various aspects of the transition to online studying is increasing, the incidence of the pandemic is still relatively new and has a broad potential for specific related issues that could be addressed and explored. Moreover, a better understanding of the factors that contribute to the quality of online studying experiences can have potential practical implications in planning measures to reduce the possibility of negative short-term and long-term effects on students' academic functioning and achievement. Hence, this study aimed to explore the association between a perceived lack of academic social interactions in the online learning environment and learning and self-regulation difficulties experienced during the online studying implemented during the pandemic at the higher education institutions. More specifically, the mediating role of students' senses of life disruption caused by the pandemic and their general adjustment to online studying in the previously described association was examined. Since the lack of usual interactions with peers and teachers in an online learning environment could be a potential source of stress for students (Chaturvedi et al. 2021) and affect their academic motivation (Marler et al. 2021; Yeager et al. 2013), it is generally hypothesized that a perceived lack of academic social interactions increases students' learning and self-regulation difficulties in the online learning environment. Further, in line with recent literature (Amir et al. 2020; Hong et al. 2021), which implies the importance of the overall pandemic's effects on university students, the mediating role of perceived level of life disruption caused by the pandemic was also explored. Since educational experiences are important for students' lives, it is hypothesized that the lack of academic social interactions affects students' levels of perceived life disruption caused by the pandemic and the general adjustment to online studying, which further affects the experienced level of learning and self-regulation difficulties. More precisely, students who experience a greater lack of usual academic interactions

are expected to perceive their lives as more disrupted and to be less adjusted to online studying, making them more prone to encounter learning and self-regulation difficulties during online studying.

2. Materials and Methods

2.1. Participants and Procedure

A total number of 464 students from different Croatian faculties participated in this study (M = 21.8 years, SD = 1.979), and 83% of participants were female. The data were collected via an online questionnaire in spring 2021 using snowball sampling. The questionnaire was constructed for the purposes of this study. The procedure was conducted according to the guidelines of the Declaration of Helsinki and in line with the ethical standards, rules, and guidelines issued by the Ethics committee of the Faculty of Teacher Education, University of Zagreb. Participants filled in questionnaires anonymously, and their participation in the study was on a voluntary basis. The purpose of the study was explained prior to the questionnaire, and, if students consented to participate, they proceeded to the questionnaire link. Furthermore, participants could withdraw from the study at any time if they decided to do so.

2.2. Measures

Five items were used to explore students' difficulties in learning and self-regulation processes during online studying (e.g., I have difficulties in constraining myself to fulfil my studying-related assignments). Students rated each item on a scale from 1 (completely disagree) to 5 (completely agree), and the total average score was used as an indicator of learning and self-regulation difficulties in an online learning environment. A higher average result indicates more learning and self-regulation difficulties, and Cronbach's alpha coefficient for this measure was 0.87. Factor structure was tested with EFA to test the construct validity of the scale. KMO measure of sampling adequacy for the scale was 0.85, and Bartlett's test of sphericity was significant (χ^2 (10) = 1150.79, p < 0.001). EFA indicated a one-factor structure with factor loadings ranging from 0.76 to 0.87 (factor loadings are displayed in Table S1).

Students also expressed their agreement on a five-point scale (1—completely disagree to 5—completely agree), with three items referring to perceived lack of usual academic social interactions with teachers and peers in online course delivery and associated feelings of social isolation (i.e., online education contributes to my feelings of social isolation). The total score on this measure was expressed as an average of these ratings, whereby a higher result indicates a greater lack of academic social interactions. Cronbach's alpha coefficient for this measure was 0.76. EFA demonstrated a single factor solution with factor loadings from 0.78 to 0.86 (factor loadings are displayed in Table S1). KMO measure of sampling adequacy for the scale was 0.68, and Bartlett's test of sphericity was significant (χ^2 (3) = 360.84, p < 0.001).

Perceived level of life disruption caused by the pandemic was rated on the scale from 1 (not at all disrupted) to 5 (severely disrupted) for several life domains (family, friendships, education, free time, health). The general level of perceived life disruption caused by the pandemic was expressed as an average of all items, whereby a higher score indicated a higher level of perceived life disruption. Cronbach's alpha coefficient for this measure was 0.73. KMO measure of sampling adequacy for the scale was 0.79, and Bartlett's test of sphericity was significant (χ^2 (10) = 460.62, p < 0.001), with loadings on a single factor ranging from 0.53 to 0.75 (factor loadings are displayed in Table S1).

Students' self-reported general adjustment to the online learning environment was explored by one item on which students rated their overall adjustment on a scale from 1 (very poor) to 5 (excellent).

SPSS 25 (IBM Corp., Armonk, NY, USA, 2017) and PROCESS Macro for SPSS (Hayes 2018) were used for data analyses.

3. Results

Descriptive statistics for the examined variables, as well as their correlations, are displayed in Table 1. The average values reveal that students encounter a moderate level of learning and self-regulation difficulties during online studying, and they mostly agree that they experience a lack of social interactions in the online learning environment. Further, students perceive a relatively low level of life disruption caused by the pandemic, and they see themselves as relatively adjusted to the online learning environment.

Table 1. Means, standard deviations, and correlations between explored variables.

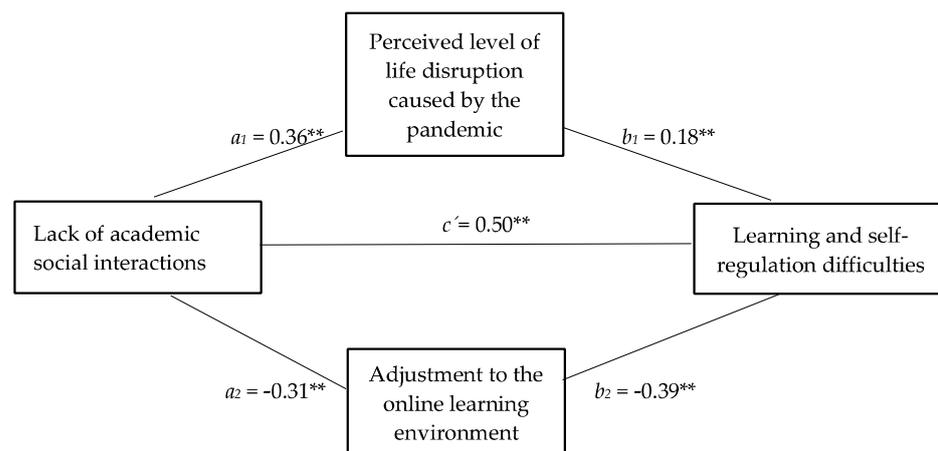|	M	SD	1.	2.	3.	4.
1. Learning and self-regulation difficulties during online studying	3.37	1.059	-	0.47 **	−0.59 **	0.61 **
2. Perceived level of life disruption caused by the pandemic	2.44	0.823		-	−0.36 **	0.36 **
3. Adjustment to the online learning environment	3.72	1.028			-	−0.30 **
4. Perceived lack of social interactions in an online learning environment	3.98	0.918				-

Note: ** = $p < 0.001$.

The results of the parallel mediation of the association between a perceived lack of social interactions and learning and self-regulation difficulties in the online learning environment are displayed in Table 2, and the model is displayed in Figure 1.

Table 2. Regression coefficients, standard errors, and confidence intervals for the direct and indirect effects of a perceived lack of social interactions on learning and self-regulation difficulties during online studying in the parallel mediation model (mediators: perceived level of life disruption caused by the pandemic and the adjustment to the online learning environment).

	B	t	SE	LLCI	ULCI
Total effect	0.709 **	16.682 **	0.043	0.6255	0.7926
Direct effect	0.495	12.893 **	0.038	0.4195	0.5704
Indirect effects					
Perceived level of life disruption	0.074 **		0.020	0.0377	0.1159
Adjustment to the online learning environment	0.140 **		0.025	0.0948	0.1908

Note: ** = $p < 0.001$.

The obtained results indicated that the perceived lack of academic social interactions caused by the pandemic has both direct and indirect effects on difficulties related to learning and self-regulation in an online learning environment. Results generally indicate that students who perceive a greater lack of academic social interactions also experience more learning and self-regulation difficulties during online studying. Furthermore, the indirect effects of the lack of social interactions through both mediators were significant. More specifically, students' perceptions of the lack of academic social interactions positively affect their perceived life disruption, and their perceived life disruption enhances their learning and self-regulation difficulties during online studying. On the other hand, students' general adjustment to the online learning environment also mediates the association between the perceived lack of social interactions and learning and self-regulation difficulties during online education. Hence, students who perceive a greater lack of academic social interactions also report a poorer overall adjustment to online studying and further encounter more learning and self-regulation difficulties in the online learning environment.

Figure 1. Multiple mediation analyses of the effect of a perceived lack of academic social interaction on learning and self-regulation difficulties during online studying for the two mediators: perceived level of life disruption caused by the pandemic and the adjustment to the online learning environment (standardized coefficients). Note: ** = $p < 0.001$.

4. Discussion

The present study explored the association between a perceived lack of academic social interactions in the online learning environment and students' learning and self-regulation difficulties during online studying, including the mediating role of students' senses of life disruption caused by the pandemic and their general adjustment to online studying. The obtained results confirmed the starting hypotheses and demonstrated that students who lack the usual academic interactions more, at the same time, experience more learning and self-regulation difficulties in an online learning environment. This association is in line with previous studies, which imply that social interaction in the academic context can be of relevance for students' learning and motivation, both in the pre-pandemic time and during the pandemic (e.g., Boling et al. 2012; Hafiz 2017; Hurst et al. 2013; Marler et al. 2021; Yeager et al. 2013). It is possible that, in this unexpected transition to online studying, the previously demonstrated beneficial effects of social interactions on students' learning in the literature (Hurst et al. 2013) are absent or significantly reduced. Recent studies that focused on pandemic-related effects on students' lives and different aspects of their academic functioning also emphasize that a lack of social interactions in an academic context (and generally) is a possible source of students' stress and can affect their everyday life functioning, including academic functioning and worrying about their academic assignments (e.g., Chaturvedi et al. 2021; Schiff et al. 2020), and the results obtained in this study also support these findings.

Keeping in mind that educational experiences are an important part of students' lives, this study also explored the mediating roles of students' general sense of life disruption caused by the pandemic and their overall adjustment to online studying in the association between the lack of academic social interactions and learning and self-regulation difficulties. In line with the hypotheses, both of these mediators had significant effects on this association. Students who experience a greater lack of academic interactions also perceive their lives as being more disrupted due to the pandemic, which aligns with several recent studies that imply the detrimental effects of social isolation on students' lives and well-being (e.g., Liu et al. 2021a; Lukács 2021). A higher level of perceived life disruption is further positively associated with experienced learning and self-regulation difficulties during online studying. Finally, students who experience a greater lack of academic social isolation are also generally less adjusted to transition to online studying, and poorer adjustment negatively affects their learning and self-regulation in an online environment. Previous studies have also reported that adaptation difficulties and pandemic-related worries could

reflect on learning and concentration during online education (Giusti et al. 2021), which can be supported by the results of this study.

The obtained results add to the current base of knowledge on the possible adverse effects of academic social isolation in an online educational environment. As previously mentioned, this issue was already discussed in the literature before the pandemic (e.g., Muilenburg and Berge 2005; Yeager et al. 2013), but it seems that nowadays it has become even more prominent since changes in the organization of educational processes during the pandemic concern a much larger number of students worldwide. In addition, the pandemic's negative effects are often discussed in the literature from the perspective of students' well-being (e.g., Cao et al. 2020; Liu et al. 2021a; Pietrabissa and Simpson 2020), which is understandable. Namely, considering the ages of students, it should be noted that social interactions in that period of life, i.e., in emerging adulthood, are an important part of the identity formation process (McNamara Barry et al. 2009), and that this period of life is characterized by the process of exploration of potential life directions and possibilities (Arnett 2000). Social interactions play a significant role in these processes from adolescence, and satisfying and quality relationships contribute to psychological well-being and mental health (Ragelienė 2016). According to Clair et al. (2021), the youngest adults have experienced a greater lack of social isolation during the pandemic than other adults, whereby the perception of social isolation is also associated with well-being. Similarly, Rodriguez-Besteiro et al. (2021) also point out that university students are one of the most affected groups by the pandemic since they are exposed to delays in academic activities and concerns regarding the economic situation. Therefore, in the times of the pandemic, reduced social interactions can also be related to generally poorer adjustment to this adverse situation, especially for the younger students who, according to Babicka-Wirkus et al. (2021), demonstrate more difficulties in coping with pandemic-induced stress. The same authors obtained that seeking emotional support is among the dominant coping strategies with stress during the pandemic. However, it should be noted that the options of seeking emotional support are, due to social distancing measures, also somewhat reduced and less available than unusual, which could further reflect on students' increased senses of loneliness. In addition, a significant increase in the time spent in front of a computer screen during online education (Al-Kumaim et al. 2021) can also contribute to these feelings of loneliness and undermine students' mental and physical health.

Besides providing additional insight into some specific aspects of students' learning in an online environment during the COVID-19 pandemic, the results obtained in this study could be helpful for introducing certain measures aimed to support students in their adjustment to online studying. This primarily refers to students who are more sensitive to the lack of social interactions, whereby faculty management and staff could invest additional efforts to introduce more interactive tools in the educational process and student networking. Additional efforts could also be invested in teaching students how to better manage and organize their time for academic assignments in these specific circumstances. Further, raising the quality of online education can also modify students' perception of online studying, and, according to Giusti et al. (2021), recognition of online education's advantages is one of the protective factors for university students' academic performances during online studying. The vital role of teachers in this process should also be recognized. Namely, the teaching process during online education can also be one of the sources of stress for university students (de la Fuente et al. 2021), as well as the lack of teachers' motivation for online teaching (Ilieva et al. 2021). According to Armstrong-Mensah et al. (2020), students have also expressed the need for more engaging teaching, caring for students' needs, and a more balanced workload during online education. Thus, certain teaching-related factors should also be included as determinants of the online education's quality and academic interactions in further similar studies, as well as personal protective factors that could contribute to a better adjustment to online studying and reduce difficulties related to students' learning and academic functioning during these still unpredictable times of the pandemic.

5. Limitations of the Study

Limitations of this study regarding the representativeness of the sample and the generalizability of the results should also be acknowledged and taken into consideration. Since the data were collected via an online questionnaire and using the snowball method, the self-selection sampling bias is present. Further, although the questionnaire was anonymous and no identification data were collected, it is possible that some potential participants still had some privacy concerns and were reluctant to participate. It is also plausible that students might be somewhat fatigued by various online activities and the time spent in front of the screen during online studying and thus less willing to additionally engage and participate in online studies. Furthermore, the sample is gender-imbalanced, i.e., the participants in this study are predominantly females, which is also a reason for caution regarding the generalizability of the results. Namely, there are certain indicators in similar pandemic-related literature that the explored constructs could differ regarding students' genders, although some disparities regarding previous findings imply the need for further exploration. For example, recent studies indicate that females are generally more worried about the pandemic and express related stress symptoms more often than males (Liu et al. 2020; Rodriguez-Besteiro et al. 2021), including academic-related stress (de la Fuente et al. 2021). However, in a study conducted by Liu et al. (2020), male students had higher social isolation scores than female students, while an association between perceived loneliness and mental health was obtained for female students only, implying that the subjective feeling of loneliness could be a more significant risk factor than social isolation for female students. Further, recent studies indicate certain gender differences regarding self-regulated learning during distance education. For example, Liu et al. (2021b) obtained that female students were better at self-regulation of their learning in an online environment, and, according to Hsiao (2021), male students might be more passive in distance learning. Previous studies also imply that female students are generally more engaged in online teaching and learning and demonstrate a higher level of self-regulation and task-persistence when managing difficulties related to online studying (de la Fuente et al. 2021). In addition, female students are more likely to use various online tools to seek help from their teachers during online education and engage in more interactions with teachers (Song and Li 2020), which could also be related to their perceived social isolation during online studying. On the other hand, Tang et al. (2021) did not obtain gender differences in learning motivation, readiness, or self-efficacy during online learning, while Giusti et al. (2021) obtained that female students are more at risk of poor performance during online education. Hence, additional studies with gender-balanced samples could provide a clearer insight into the potential role of gender in the association between the lack of academic social interactions and students' learning. In addition, these studies could also further explore possible mediators of this association and contribute to a better understanding of the learning process and coping with various academic challenges of online studying that many young people are facing during these unprecedented times of the pandemic.

Conflicts of Interest: The author declares no conflict of interest.

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