



ISSN 1030-9616  
Volume 00 Number 00 2018

Accounting Research  
Journal



**Impact of COVID-19 on undergraduate business students: A longitudinal study on academic motivation, engagement, and attachment to university**

Journal:	<i>Accounting Research Journal</i>
Manuscript ID	ARJ-09-2020-0286.R2
Manuscript Type:	Article
Keywords:	COVID-19, higher education, motivation, engagement, attachment to university

SCHOLARONE™  
Manuscripts

## Impact of COVID-19 on undergraduate business students: A longitudinal study on academic motivation, engagement, and attachment to university

**Originality:** The COVID-19 pandemic imposed a rapid transition to online instruction in education institutions worldwide. However, it remains unclear to date how students' engagement, motivation and attachment to the university were negatively affected by the first COVID-19 outbreak. **Purpose:** This longitudinal study aims to explore whether the COVID-related circumstances hindered these academic-related variables. **Design:** We surveyed two groups of undergraduate business students (42% male) who completed the questionnaires at the beginning and at the end of the semester. One group of students attended only face-to-face classes in the 2018/2019 academic year ( $n = 126$ ) and the other group transitioned to online classes due to the COVID-19 outbreak in the 2019/2020 academic year ( $n = 99$ ). **Findings:** Our findings show no statistically significant group differences between the pre- and post-test in students' intrinsic and extrinsic motivation, feelings of attachment to the university, and engagement dimensions of absorption, and vigour. Nevertheless, a moderate negative effect was found in the dedication engagement dimension. **Practical implications:** We discuss the main results in terms of some practices that may contribute towards attenuating the effects of future emerging pandemics in the higher education setting.

Keywords: COVID-19, higher education, motivation, engagement, attachment

## Introduction

The high infection rates of the SARS-COV-2 strained all aspects of society, including higher education. During the first COVID-19 outbreak, national governments imposed strict home confinement measures in order to thwart the spread of the virus and 85% of education institutions in Europe replaced the face-to-face classroom with online teaching (Marinoni *et al.*, 2020). This transition involved new challenges, but its impact on academic outcomes remains unclear, especially when considering the sudden nature of the imposed measures. In the current study, we explore the effects of COVID-related circumstances on students' motivation, engagement, and attachment to the university using a longitudinal design.

A large body of research has shown that students' motivation relates to both engagement and attachment to university. Motivation is an important antecedent of engagement (Reeve, 2012), while relatedness (i.e., attachment to the university) is considered one critical psychological need to foster students' intrinsic motivation and academic engagement (Freeman *et al.*, 2007; Ryan and Deci, 2017; Shernoff, 2013; Strange and Banning, 2001). Moreover, prior studies have shown that motivation, engagement, and attachment are predictors of academic achievement (e.g., Archambault *et al.*, 2009; Ryan and Deci, 2017; Lai, 2011; Lazowski and Hulleman, 2016; Lane *et al.*, 2015; Shernoff, 2013; Lam *et al.*, 2012; Padilla *et al.*, 2013), making important to monitor the effects of the educational solutions that were conceived during the initial stages of the COVID-19 pandemic on these academic variables.

The Self-Determination theory (Ryan and Deci, 2017) states that the satisfaction of psychological needs for autonomy, competence, and relatedness are crucial aspects of academic motivation and the COVID-related circumstances may have hampered the fulfilment of those needs. Students experience autonomy when there is a sense of psychological freedom and perceived choice over one's behaviours and experiences in

1  
2  
3 learning activities. Competence is jeopardized when learning tasks are too challenging  
4 since the student needs to perceive mastery in one's interactions with the environment.  
5  
6 Additionally, relatedness refers to the need of establishing close emotional bonds with  
7  
8 other people and of being a significant member of social groups. Students fulfil these  
9  
10 psychological needs and become intrinsically motivated when teachers and peers create  
11  
12 an authentic, warm, and supportive environment. At the other end of the motivation  
13  
14 spectrum, the concept of amotivation describes those students who do not perceive any  
15  
16 causal links between their actions and academic outcomes. In this sense, amotivation  
17  
18 is usually accompanied by feelings of incompetence and lack of control over  
19  
20 one's behaviours. When it comes to online classes, students display higher levels  
21  
22 of motivation compared to on-campus students, mainly due to students' perceptions of  
23  
24 autonomy in their choice of course delivery (Rovai *et al.*, 2007; Shroff and Vogel,  
25  
26 2009; Wighting *et al.*, 2008; Kim and Frick, 2011). However, in the context of COVID-  
27  
28 19, students did not voluntarily choose to engage in online classes. Instead, they were  
29  
30 constrained by external circumstances. This lack of control over choice may have strained  
31  
32 students' sense of competence and autonomy with negative implications for  
33  
34 motivation. A cross-country study showed indeed a decrease in academic motivation of  
35  
36 Portuguese and Italian school-aged children during the home confinement period  
37  
38 (Zaccoletti *et al.*, 2020).  
39  
40  
41  
42  
43  
44  
45  
46

47 Regarding engagement, it is more of a state rather than a stable individual  
48  
49 attribute, being also heavily influenced by contextual factors such as policies of  
50  
51 educational institutions and interactions with peers (Sinclair *et al.*, 2003). This means  
52  
53 that the contextual changes in the educational settings due to the COVID-19 outbreak are  
54  
55 likely to affect students' engagement. The literature describes several factors that  
56  
57 influence one's engagement (Mahatmya *et al.*, 2012; Shernoff, 2013; Reeve, 2012) that  
58  
59  
60

1  
2  
3 may apply to COVID-19 exceptional circumstances. For example, anxiety is a natural  
4 phenomenon during disease outbreaks, considering the uncertainty around the illness  
5 outcomes and the number of deaths increasing exponentially (Pasion *et al.*, 2020). The  
6 effects of task-withdrawing emotions such as anxiety may undermine the emotional  
7 dimension of engagement (e.g., concentration, effort, and self-regulation to pursue  
8 sophisticated learning strategies) (Mahatmya *et al.* 2012; Shernoff, 2013; Reeve, 2012).  
9 The extent to which students proactively enrich their learning experiences, rather than  
10 passively receiving them, is another relevant dimension of behavioural engagement that  
11 may reduce in online settings. Taking into consideration the complex determinants of  
12 engagement, oversimplified attempts to implement online courses may have negative  
13 implications for engagement, particularly in the context of a pandemic which requires  
14 rapid curricula rearrangements (Czerkawski and Lyman, 2016).  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29

30  
31 Finally, the social isolation imposed by COVID-19 may  
32 have weakened attachment to the university. Previous findings indicate that  
33 students enrolled in online courses exhibit lower levels of attachment relative  
34 to classroom students, which is explained by the higher feelings of isolation, the lack of  
35 physical presence and participation that online students report (Lane *et al.*, 2015). It is  
36 also acknowledged that the sense of physical proximity allows for the emergence of  
37 incentives which are critical to motivating learning in online teaching settings (Tu, 2000).  
38 For instance, communication styles, computer literacy skills, language skills, and  
39 paralanguage skills have a great influence on the ability to create an apparent physical  
40 proximity. Building on these findings, attachment to the university is considered a critical  
41 concept to provide effective guidance on online teaching contexts since it is likely to  
42 constitute a promising means for maintaining one's connection to the university in times  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 of social distance and for mitigating the negative consequences that are expected to be  
4  
5 found in motivation and engagement.  
6

7  
8 From the reviewed literature, the first COVID-19 outbreak may have hampered  
9  
10 students' motivation, engagement, and attachment to the university due to the rapid  
11  
12 transition to online teaching in overwhelming circumstances. To test this hypothesis, we  
13  
14 surveyed two groups of first-year business students (classes of 2018 and 2019) about  
15  
16 their academic motivation, engagement, and attachment to the university. The class of  
17  
18 2018 attended only face-to-face classes while the class of 2019 transferred to online  
19  
20 classes due to the COVID-19 outbreak. This is a longitudinal study with a pre- and post-  
21  
22 test design, in which all participants completed the questionnaires (academic motivation,  
23  
24 engagement, and attachment to the university) at the beginning and at the end of the  
25  
26 semester. In the next sections we will analyse the collected data and discuss the main  
27  
28 results.  
29  
30  
31  
32  
33

## 34 **Methods**

### 35 **Sample and Procedures**

36  
37 We conducted this study in a Portuguese university, with a total 900 students in  
38  
39 Management and Economics bachelor's degrees. Our school monitors changes in several  
40  
41 academic-related engagement variables in first-year students and this brought  
42  
43 interesting possibilities in terms of allowing for exploring differences in students'  
44  
45 motivation, engagement, and attachment to the university during the first COVID-19  
46  
47 outbreak.  
48  
49  
50  
51

52  
53 Two groups of first-year students (2018 and 2019 classes) took part in this study.  
54  
55 Data were collected for both groups at two time points: at the students' welcome week  
56  
57 before classes start (T1; September 2018 and 2019) and at the end of the first academic  
58  
59 year (T2; May 2018 and 2019). Due to the COVID-19 outbreak, our school  
60

officially ceased classroom teaching on 11 March 2020, after 4 weeks of normal on-campus activity. This means that almost 70% (10 weeks) of the second semester of the 2019/2020 academic year took place on online platforms. As such, whilst the class of 2018 had a typical first-year experience at the university (thus acting as the control, on-campus group) the class of 2019 experienced the challenges imposed by the pandemic (i.e., online-COVID group).

The final sample included 225 undergraduate business students (42% male), aged between 17 and 26 years old ( $M = 18.37$ ,  $SD = 0.99$ ), that completed both waves of the study. Drop-out rates from T1 to T2 were 30% in the on-campus group ( $n = 126$ ) and 27% in the online-COVID group ( $n = 99$ ). Table 1 describes participants' sociodemographic characteristics, which were not significantly different between groups. Participation was always voluntary and anonymous, and all respondents gave informed consent.

Table 1.

Participants' sociodemographic characteristics, per group.

	<b>On-campus</b>	<b>online-COVID</b>	<b>Group differences</b>
Gender	40% male 56% female	44% male 44% female	$\chi^2(1, n = 208) = 1.42, p = .261$
Age ( $M, SD$ )	18.36(1.11)	18.39(0.84)	$t(196) = 0.16, p = .873$
Course year	86% first-year	88% first-year	$\chi^2(1, n = 198) = 0.15, p = .999$
Course	13% Economics 75% Management	13% Economics 76% Management	$\chi^2(1, n = 198) = 0.01, p = .999$
High school background	37% public 59% private	42% public 47% private	$\chi^2(1, n = 208) = 1.84, p = .202$
High school GPA	16.66(0.91)	16.80(1.04)	$t(201) = 1.02, p = .309$

1			
2			
3	First-year	university	13.66(1.56)
4			13.51(1.56)
5			$t(186) = 0.63, p = .533$
6	GPA		

---

## Measures

Students' motivation towards college was assessed using the Academic Motivation Scale (Vallerand *et al.*, 1992). Participants rated their agreement with 28 statements ( $1 = \text{not at all}$ ,  $7 = \text{exactly}$ ) regarding reasons why they want to attend college. These reasons are aggregated into seven dimensions (4 items each) that represent the dimensions proposed by the Self-Determination Theory: Amotivation; Extrinsic motivation – external regulation, introjected, and identified; and Intrinsic motivation – to experience stimulation, toward accomplishment, and to know.

The Utrecht Work Engagement Scale (Schaufeli *et al.*, 2002) was adapted to assess students' engagement. Participants rated how often ( $0 = \text{never}$ ,  $6 = \text{every day}$ ) each of the statements related to their experience as a university student on three dimensions: vigour, dedication, and absorption.

Attachment was evaluated through the University Attachment Scale (France *et al.*, 2010). Participants evaluated how accurate ( $1 = \text{not at all accurate}$ ,  $5 = \text{extremely accurate}$ ) each of the nine statements applied to themselves, considering two main dimensions: attachment to the group and to the members of that group.

More details on the measures and their psychometric properties (internal consistency and confirmatory factorial analysis) are provided in Supplementary Material (<https://osf.io/z82sm/>).

## Results

A between-subjects multivariate analysis of variance (MANOVA) was performed to analyse for statistically significant differences between T1 and T2. The subscales of



Attachment, Motivation, and Engagement were included as dependent variables to correct for the expected shared variance between scale dimensions. Groups (online-COVID and On-campus) were included as the between-subjects factor and allowed to explore univariate group mean differences in the variables of interest. Bonferroni adjustments were calculated to adjusting for Type I errors in multiple T-Test comparisons. Table 2 presents the descriptive statistics for all variables.

There was no multivariate effect of Group on Attachment,  $F < 1$ . The univariate analysis revealed no significant group differences on both Member,  $p = .854$ , and Group dimensions of attachment,  $p = .999$  (Figure 1-A).

A non-significant Group factor for Motivation was also found,  $F < 1$ , across all the dimensions (all  $ps > .280$ ) (Figure 1-B).

A significant multivariate effect of Group emerged in Engagement from T1 to T2,  $F(3, 221) = 12.9$ ,  $V = .149$ ,  $\eta_p^2 = .149$ ,  $p < .001$ . The post-hoc analysis showed that group differences were observed in Dedication,  $p < .001$ ,  $d = 0.72$ , but not in Vigour,  $p = .135$ , nor Absorption,  $p = .651$ . The group of students that had online classes due to the COVID-19 circumstances exhibited a greater reduction in dedication compared to the group that had on-campus classes in the previous year (Figure 1-C).

Table 2.

Mean (M) and standard deviations (SD) for Time 1 (T1), Time 2 (T2) for the Online-COVID and On-campus Groups.

	Online-COVID group				On-campus group			
	T1		T2		T1		T2	
	M	SD	M	SD	M	SD	M	SD
<b>MOTIVATION</b>								
Amotivation	7.52	5.37	7.63	5.07	8.67	6.21	7.17	4.93
IM: to know	22.93	3.27	21.88	4.06	22.94	4.25	22.25	4.65

IM: to accomplish	21.02	4.11	20.09	4.75	20.81	5.35	19.85	5.04
IM: stimulation	18.96	4.94	17.57	5.13	19.50	5.25	17.51	5.53
EM: identification	24.40	2.87	24.00	3.80	24.03	3.87	23.98	3.99
EM: introjected	20.02	5.36	19.33	5.79	19.94	6.26	19.19	6.28
EM: regulation	23.65	3.82	23.22	4.17	23.43	4.30	23.48	4.13
<b>ATTACHMENT</b>								
Group	20.18	3.39	21.46	4.02	20.00	3.50	21.19	3.73
Member	7.50	1.94	8.68	1.85	7.04	2.26	8.49	1.93
<b>ENGAGEMENT</b>								
Vigor	14.97	3.27	13.52	3.68	16.82	3.03	14.31	3.65
Dedication	13.70	3.44	12.65	3.83	17.62	2.72	13.72	3.93
Absorption	14.70	2.96	14.51	2.99	15.94	3.25	15.09	3.12

*Note:* IM – Intrinsic Motivation; EM – Extrinsic Motivation

[insert Figure 1 about here]

## Discussion

Higher education institutions faced complex challenges with the uncertainty brought by the first COVID-19 outbreak. Universities worldwide had to deal with a context of mounting pressure to act and were forced to rearrange their operations towards online solutions requiring substantial alterations in the short-term. However, to date, it remains unclear how these exceptional circumstances affected important educational outcomes of undergraduate students. For this purpose, we will first discuss the results of this study. Then, the lack of significant differences in motivation, engagement, and attachment to the university when comparing online and face-to-face

1  
2  
3 students opened an avenue to analyse some practical implications. Namely to what extent  
4  
5 have the measures the university took to deal with this unprecedented pandemic context  
6  
7 may have helped prevent decrease in students' motivation, engagement, and attachment  
8  
9 to the university.  
10

11  
12 Our results reveal that the group of students who were forced to move to online  
13  
14 learning due to the COVID-19 outbreak did not show differences in academic motivation  
15  
16 and attachment to the university from T1 to T2, compared to the group that attended only  
17  
18 face-to-face classes in the previous academic year. This contrasts with previous studies  
19  
20 (e.g., Zaccoletti *et al.*, 2020), since the lack of physical presence, low participation, and  
21  
22 feelings of isolation would be expected to compromise attachment to the university in  
23  
24 online students (Lane *et al.*, 2015; Zaccoletti *et al.*, 2020). Moreover, the lack of control  
25  
26 over choice and the reduced sense of competence and autonomy to pursue goal-oriented  
27  
28 learning strategies resulting from changing from face-to-face classes to online classes  
29  
30 were expected to decrease academic motivation (Kim and Frick, 2011). However, in our  
31  
32 sample, online students were able to maintain their motivation and attachment, indicating  
33  
34 that students' motivation to learn in an online environment interacts with the perceptions  
35  
36 of physical proximity and social presence (Tu, 2000).  
37  
38  
39  
40  
41

42 The only negative affect found in our results from the transfer from face-to-face  
43  
44 to online learning was observed in the dedication dimension of engagement. The online  
45  
46 students were able to maintain their energy towards academic tasks (i.e., vigour) and to  
47  
48 remain immersed in them (i.e., absorption), but their involvement decreased (i.e.,  
49  
50 dedication). Some prior studies argue that engagement is state-dependent on contextual  
51  
52 changes, such as those resulting from the COVID-19 context (Sinclair *et al.*, 2003;  
53  
54 Czerkawski, and Lyman, 2016; Mahatmya *et al.*, 2012; Reeve, 2012; Shernoff, 2013).  
55  
56 The pressure of reorganizing and adapting to a new format of classes in a short period of  
57  
58  
59  
60

1  
2  
3 time, and the lack of experience in online learning, could have increased anxiety and  
4 reduced proactive involvement which could, in turn, have undermined engagement. In  
5 fact, a survey conducted during the initial stages of COVID-19 in our country revealed  
6 that anxiety levels were particularly high among individuals in the same age range of our  
7 sample (Pasion *et al.*, 2020).  
8  
9  
10  
11  
12

13  
14 In summary, our findings suggest that the changes imposed by the first COVID-  
15 19 outbreak did not compromise students' academic motivation, attachment to the  
16 university, absorption, and vigour, despite a moderate negative effect in dedication ( $d =$   
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

### **Implications for practice**

Self-Determination Theory relies on the assumption that the satisfaction of basic psychological needs is critical to the educational process (Ryan and Deci 2017). The threatening circumstances brought by the first COVID-19 outbreak highlights the importance of practices to safeguard not only students' health, but also their psychological needs for competence, autonomy, and relatedness. Importantly, the fulfilment of these psychological needs interacts with their motivation, engagement, and attachment to the university. Therefore, there is a need for systematizing educational practices that may guide decisions on teaching and learning in future pandemics.

#### ***Need for competence***

Competence requires the ability to effectively interact with the environment (Ryan and Deci 2017). The existence of protective and structured environments, together with mechanisms for obtaining continuous feedback and knowledge of results are key to fulfil the need for competence and, subsequently, motivation and engagement (Shroff and Vogel 2009; Ryan and Deci 2017).

1  
2  
3 At a first moment, the ideal conditions for learning and experiencing competence  
4 during a pandemic may be highly dependent on a protective context, safeguarding health  
5 issues and guaranteeing equal opportunities in the access of technology for all  
6 stakeholders. There also other challenges and difficulties. For example, the lack of  
7 previous significant learning experiences in online platforms for both students and  
8 teachers and the needs of international students who might want to return to their home  
9 countries in different time zones. Our school attempted to create this supportive  
10 environment by offering to buy or to borrow technological equipment (e.g., tablets and  
11 computers), by creating training sessions for the use of online platforms before classes  
12 start again, and by recording live classes for students to attend and view at their own pace  
13 (Panther *et al.* 2012).  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27

28 At a second moment, and besides creating a protective and supportive  
29 environment, it is important to build a structured, predictable environment. Students need  
30 to have clear and realistic expectations about learning activities and outcomes to  
31 formulate achievable goals and pursue sophisticated self-regulatory learning strategies  
32 (Shroff and Vogel 2009; Ryan and Deci 2017). As such, it might be essential to help  
33 students and staff to recreate a predictable learning process amid a  
34 chaotic pandemic world. The faculty can play an important role in building this structured  
35 context by accelerating negotiations with the university management to clarify the  
36 university's response to the pandemic. When the decision is taken, then definitive  
37 changes are possible, and uncertainty is reduced. Here, communication strategies may be  
38 critical as decisions should be communicated in time, clearly, and effectively. For  
39 example, in our School, all students' questions regarding COVID-19 to different  
40 members of the board, staff, and professors were redirected to one assigned person.  
41 Furthermore, the first email to students regarding the COVID situation was to  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 communicate the definitive decision to move all activities online until the end of the  
4 semester. These two strategies not only assured the consistency of the information given  
5 to students but also provided a clear learning structure in times of high uncertainty. Thus,  
6 rather than defining measures for short periods of time, that could imply further changes  
7 or revaluations of adopted decisions, it may be better to define early on the conditions  
8 for the semester, thereby providing a stable and predictable environment for students to  
9 develop adequate self-regulatory learning strategies and to remain motivated and  
10 engaged. In structured contexts students and teaching staff are more able to foresee and  
11 anticipate the long-term and, thus, this reduces the ambiguity about the future and  
12 increases the sense of control and competence to deal with all the ongoing challenges.  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

26 Teaching staff may also benefit from the clear decisions and communications  
27 strategies in terms of changes to the academic calendar, online teaching pedagogies, and  
28 changes to assessments and evaluations. These features create a common approach for  
29 teachers to develop possible solutions for learning practices. One of the first measures  
30 taken by our school was to meet each course coordinator to discuss changes in course  
31 delivery. As a result, one week after the decision to suspend teaching activities, the school  
32 announced to students that classes were ready to begin and sent the new (definitive)  
33 calendar for the entire semester. This further contributed to build a predictable  
34 environment for students.  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46

47 Finally, another concern to increase the need for competence relies on the  
48 continuous knowledge of results and timely feedback (Shroff and Vogel 2009; Ryan and  
49 Deci, 2017). A recursive results-feedback system is inherently dependent on the need of  
50 autonomy and practices focused on making students and teaching staff agents of the  
51 educational process.  
52  
53  
54  
55  
56  
57

### 58 *Need for autonomy*

59  
60

1  
2  
3 Within a structure capable of reducing uncertainty, students and teaching staff can  
4 be more effective stakeholders in the process of improving online teaching practices.  
5 Self-determination, autonomy, motivation, and engagement are boosted by the sense  
6 of agency, the perceived opportunities for choice, and the perceived control of one's  
7 actions (Shroff and Vogel, 2009; Ryan and Deci, 2017). By contrast, amotivation  
8 encompasses perceptions of incompetence, and the difficulty in establishing causal links  
9 between actions and academic outcomes. As a result, how individuals experience control  
10 over outcomes is affected by how individuals perceive themselves as autonomous (Shroff  
11 and Vogel, 2009). This is crucial for the effective operation of the educational  
12 transaction by restoring the belief that students can be held accountable for what they  
13 do. In self-determining contexts, options are provided to students, they are encouraged  
14 to initiate actions and to participate in the learning process. Therefore, the existence of  
15 practices encouraging students and active voices in the learning process may foster the  
16 sense of agency, motivation, and engagement.

17  
18  
19 One way to achieve this is by opening communication channels with student  
20 representatives. This will guarantee a direct link to the mounting concerns of  
21 students, allowing timely action. This may work together within a recursive results-  
22 feedback system, in which students provide some guidance on their first online  
23 experiences. For example, online surveys are a useful tool to collect students' feedback on  
24 the new online learning practices. These results may then be shared among course  
25 coordinators and used to inform future decisions on learning practices. At our school, the  
26 first feedback was collected after a week and a half of online teaching. Teaching staff  
27 were eager to receive continuous feedback and have knowledge of results, and  
28 consequently the student representatives continued to provide feedback at various points  
29 during the semester.  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 Teaching staff can be further encouraged to be autonomous and to make their own  
4 decisions regarding how to deliver online course content and how to design online course  
5 evaluations. Ultimately, these practices make educational stakeholders aware of the main  
6 results of the students' feedback, as well as their emergent needs. They also allow  
7 stakeholders to play an active role in the process of defining new solutions to online  
8 learning. This involvement of students and teaching staff in the educational practice is  
9 also likely to affect the third key psychological need: relatedness (Ryan and Deci, 2017).

### 20 *Need for relatedness*

21 Motivation and engagement are more likely to flourish when social and  
22 interpersonal experiences contribute to one's feeling of connectedness to a group (Shroff  
23 and Vogel, 2009). As a close attribute of attachment to university (Freeman *et al.*, 2007;  
24 Shernoff, 2013), relatedness is thought to be influenced by environments of genuine  
25 caring, mutual respect, safety, and a sense of affiliation or belongingness to whom one feels  
26 connected (Ryan and Deci, 2017), as well as by the active participation in social  
27 groups (Lane *et al.*, 2015). The existence of a supportive environment, together with the  
28 participation of students and teachers in the educational process to face an external threat,  
29 may enhance the bond between stakeholders and increase group cohesion and  
30 relatedness.  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43

44 Furthermore, the decision of maintaining the structure as similar as possible to  
45 face-to-face teaching might be challenging, but it allows group assignments and events at  
46 the school level to continue (e.g., free online conferences, debates, and round table  
47 discussion). These kept students connected to their school and their peers in times of  
48 home confinement and social distancing while promoting a sense of "normality" and  
49 unchanged levels of human interaction. In our school, some courses in the study plan  
50 follow a Project-Based Learning strategy with a strong focus on teamwork and  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



1  
2  
3 communication skills (Oliveira and Guimarães, 2010). These courses kept their initial  
4 planned activities, in which group assignments and interactions among students were  
5 carried out in an online format. Moreover, students' perceptions of apparent physical  
6 proximity are relevant for the motivation to learn (Tu, 2000), and the pandemic context  
7 may have enhanced students' degree of acceptance of teachers' efforts in that respect.  
8  
9

### 14 **Limitations, contributes, and future directions**

15  
16 The small sample size and the inclusion of business students may limit the  
17 generalization of these findings to other courses or student groups of other age ranges  
18 (Zaccoletti *et al.*, 2020). Nevertheless, our sample represents approximately 30% of the  
19 students enrolled in the first year of our Management and Economics bachelor's degrees.  
20 At a broad level, the value of this study's contribution may also be compromised due to  
21 the specificities of the school and university management's decisions to the pandemic.  
22 Additional studies are needed to assess wider samples of students and to monitor  
23 institutional/national policies for a better understanding of the effects of COVID-19 on  
24 the academic-related variables under analysis. Moreover, the results from the first  
25 outbreak in the pandemic may be different from subsequent outbreaks.  
26  
27

28  
29 The inclusion of other measures (e.g. achievement) would be important to further  
30 complement the main findings. However, the data was collected in the final session of  
31 the semester before students' final exams. This assured higher participation in the study  
32 as well as the fulfilment of the ethical requirements to anonymize data. Future studies  
33 should consider this variable and include teachers' reports regarding students' motivation,  
34 engagement, and attachment.  
35  
36  
37  
38  
39

40  
41 Finally, the data was collected only at the beginning and at the end of the academic  
42 year. This means that one group had the opportunity to experience only face-to-face  
43 classes, whereas the second group experienced both face-to-face and online classes due  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 to the COVID-19 outbreak However, due to the unprecedented circumstances of this  
4  
5 pandemic, our priorities focused on rearranging the academic environment. As a result,  
6  
7 we were unable to collect data now that our teaching moved online, and consequently  
8  
9 we were unable to control the variations in students' motivation, engagement, and  
10  
11 attachment to the university.  
12  
13

14  
15 Despite these limitations, the longitudinal design of this study allowed us to  
16  
17 compare important academic-related variables that were expected to be affected by the  
18  
19 COVID-imposed circumstances. This design further reduced the impact of recall bias,  
20  
21 especially when events are highly complex and dynamic as the first COVID-19 outbreak.  
22  
23

24  
25 Taken together, our results show no significant differences in intrinsic and  
26  
27 extrinsic motivation, feelings of attachment to the university, and engagement  
28  
29 dimensions of absorption, and vigour in business students during the first COVID-19  
30  
31 outbreak in Portugal. These results compelled us to discuss the practices that can be put  
32  
33 in place to maintain students' motivation, engagement, and attachment to the university  
34  
35 in unprecedented times.  
36  
37  
38  
39

40  
41 Conflicts of interest. No potential competing interest was reported by the authors.  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## References

- 1  
2  
3  
4  
5 Archambault, I., Janosz, M., Morizot, J. and Pagani, L. (2009), "Adolescent behavioral,  
6  
7 affective, and cognitive engagement in school: Relationship to dropout", *Journal*  
8  
9 *of School Health*, Vol. 79 No. 9, pp. 408-415.  
10  
11  
12 Czerkawski, B. C. and Lyman, E. W. (2016), "An instructional design framework for  
13  
14 fostering student engagement in online learning environments", *TechTrends*, Vol.  
15  
16 60 No. 6, pp. 532-539.  
17  
18  
19 France, M. K., Finney, S. J. and Swerdzewski, P. (2010), "Students' group and member  
20  
21 attachment to their university: A construct validity study of the University  
22  
23 Attachment Scale", *Educational and Psychological Measurement*, Vol. 70 No. 3,  
24  
25 pp. 440-458.  
26  
27  
28 Freeman, T. M., Anderman, L. H. and Jensen, J. M. (2007), "Sense of belonging in college  
29  
30 freshmen at the classroom and campus levels", *Journal of Experimental*  
31  
32 *Education*, Vol. 75, pp. 203-220.  
33  
34  
35 Kim, K. J. and Frick, T. W. (2011), "Changes in Student Motivation During Online  
36  
37 Learning", *Journal of Educational Computing Research*, Vol. 44 No. 1, pp. 1-23.  
38  
39  
40 Lai, E. R. (2011), "Motivation: A literature review research report", *Pearson Research*  
41  
42 *Report*, available at:  
43  
44 [http://images.pearsonassessments.com/images/tmrs/Motivation\\_Review\\_final.pdf](http://images.pearsonassessments.com/images/tmrs/Motivation_Review_final.pdf)  
45  
46 [f](#) (accessed 20 July 2020).  
47  
48  
49 Lam, S., Wong, B. P. H., Yang, H. and Lui, Y. (2012), Understanding student engagement  
50  
51 with a contextual model, In *Handbook of research on student engagement*, edited  
52  
53 by Christenson, S. L. and Reschly, A. L. and Wylie, C., 403-419. London:  
54  
55 Springer Science+Business Media.  
56  
57  
58  
59  
60

- 1  
2  
3 Lane, F. C., Martin, G.L. and Henson, R.K. (2015), "A multidimensional comparison of  
4 traditional, transfer, and online students' university attachment", *Journal of*  
5 *College Student Development*, Vol. 56 No. 7, pp. 746-751.  
6  
7  
8  
9
- 10 Lazowski, R. A. and Hulleman, C. S. (2016), "Motivation Interventions in Education: A  
11 Meta-Analytic Review", *Review of Educational Research*, Vol. 86 No. 2, pp. 602-  
12 640.  
13  
14  
15  
16
- 17 Mahatmya, D., Lohman, B. J., Matjasko, J. L. and Farb, A. F., (2012), "Engagement  
18 across developmental periods", In *Handbook of research on student engagement*,  
19 Christenson, S. L., Reschly, A. L. and Wylie, C (Eds)., pp. 45–63. London:  
20 Springer Science+Business Media.  
21  
22  
23  
24  
25
- 26 Marinoni, G., Land, H. V. and Jensen, T. (2020), "The impact of COVID-19 on higher  
27 education around the world", available at: [https://www.iau-](https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf)  
28 [aiu.net/IMG/pdf/iau\\_covid19\\_and\\_he\\_survey\\_report\\_final\\_may\\_2020.pdf](https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf)  
29  
30  
31  
32  
33 (accessed 20 July 2020).  
34
- 35 Maunder, R. E. (2018), "Students' peer relationships and their contribution to university  
36 adjustment: The need to belong in the university community", *Journal of Further*  
37 *and Higher Education*, Vol. 42 No. 6, pp. 756-768.  
38  
39  
40  
41
- 42 Oliveira, E. D. and Castro Guimarães, I. (2010), "'Employability" through curriculum  
43 innovation and skills development: a Portuguese case study", *Higher Education*  
44 *Management and Policy*, Vol. 22 No. 2, pp. 1-20.  
45  
46  
47  
48
- 49 Padilla-Walker, L. M., Day, R. D., Dyer, W. J. and Black, B. C. (2013), "'Keep on  
50 keeping on, even when it's hard!" Predictors and outcomes of adolescent  
51 persistence", *The Journal of Early Adolescence*, Vol. 33 No. 4, pp. 433–457.  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 Panther, B. C., Wright, W. and Mosse, J. A. (2012), "Providing a flexible learning  
4 environment: Are on-line lectures the answer?", *International Journal of*  
5  
6 *Innovation in Science and Mathematics Education*, Vol. 20 No. 1, pp. 71–82.  
7  
8  
9
- 10 Pasion, R., Paiva, O. T., Fernandes, C. and Barbosa, F. (2020), "The AGE effect on  
11  
12 protective behaviors during the COVID-19 outbreak: sociodemographic,  
13  
14 perceptions and psychological accounts", *Frontiers in Psychology*, Vol. 11, p.  
15  
16 2785.  
17  
18
- 19 Reeve, J. (2012), "A self-determination theory perspective on student engagement", In  
20  
21 *Handbook of research on student engagement*, S. L Christenson, A. L Reschly,  
22  
23 and C. Wylie (Eds.), pp. 149–172. London: Springer Science+Business Media.  
24  
25
- 26 Rovai, A. P., Ponton, M., Wighting, M. and Baker, J. (2007), "A comparative analysis of  
27  
28 student motivation in traditional classroom and e-learning courses", *International*  
29  
30 *Journal on E-Learning*, Vol. 6 No. 3, pp. 413-432.  
31  
32
- 33 Ryan, R. M. and Deci, E. L. (2017), *Self-determination theory: Basic psychological needs*  
34  
35 *in motivation, development, and wellness*, New York: Guilford Press.  
36  
37
- 38 Schaufeli, W. B., Salanova, M., González-Romá, V., and Bakker, A. B. (2002), "The  
39  
40 measurement of engagement and burnout: a two sample confirmatory factor  
41  
42 analytic approach", *Journal of Happiness Studies: An Interdisciplinary Forum on*  
43  
44 *Subjective Well-Being*, Vol. 3 No. 1, pp. 71–92.  
45  
46
- 47 Schunk, D. H. and Pintrich, P. R. (2002), *Motivation in education: theory, research, and*  
48  
49 *applications*, 2nd ed. Merrill.  
50  
51
- 52 Shernoff, D. J. (2013), *Optimal learning environments to promote student engagement*,  
53  
54 New York, NY: Springer.  
55
- 56 Shroff, R. H. and Vogel, D. R. (2009), "Assessing the factors deemed to support  
57  
58 individual student intrinsic motivation in technology supported online and face-  
59  
60

1  
2  
3 to-face discussions", *Journal of Information Technology Education*, Vol. 8, pp.  
4  
5 59-85.  
6

7 Sinclair, M. F., Christenson, S. L., Lehr, C. A. and Anderson, A. R. (2003), "Facilitating  
8  
9 Student Engagement: Lessons Learned from Check and Connect Longitudinal  
10  
11 Studies", *California School Psychologist*, Vol. 8, pp. 29–41.  
12  
13

14 Strange, C. C. and Banning, J. (2001), *Educating by design: Creating educational*  
15  
16 *environments that work*, San Francisco: Jossey Bass.  
17  
18

19 Tu, C. H. (2000), "On-line learning migration: From social learning theory to social  
20  
21 presence theory in a CMC environment", *Journal of Network and Computer*  
22  
23 *Applications*, Vol. 23 No. 1, pp. 27–37.  
24  
25

26 Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senecal, C. and Vallieres,  
27  
28 E. F. (1992), "The Academic Motivation Scale: A measure of intrinsic, extrinsic,  
29  
30 and amotivation in education", *Educational and Psychological Measurement*,  
31  
32 Vol. 52 No. 4, pp. 1003–1017.  
33  
34

35 Wighting, M. J., Liu, J. and Rovai, A. P. (2008), "Distinguishing sense of community and  
36  
37 motivation characteristics between online and traditional college students",  
38  
39 *Quarterly Review of Distance Education*, Vol. 9 No. 3, pp. 285-295.  
40  
41

42 Zaccoletti, S., Camacho, A., Correia, N., Aguiar, C., Mason, L., Alves, R. A. and Daniel,  
43  
44 J. R. (2020), "Parents' perceptions of student academic motivation during the  
45  
46 COVID-19 lockdown: A cross-country comparison", working paper.  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 Figure 1. Attachment, Motivation, and Engagement differences from time 1 (T1) to time  
4  
5 2 (T2) in the Online-COVID (green) and On-campus groups (orange). *Note:* A) Differences  
6  
7 from time 1 to time 2 in Attachment; B) Differences from time 1 to time 2 in Motivation (IM = Internal  
8  
9 Motivation, EM = External Motivation); B) Differences from time 1 to time 2 in Engagement (\* significant  
10  
11 effects in dedication).  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

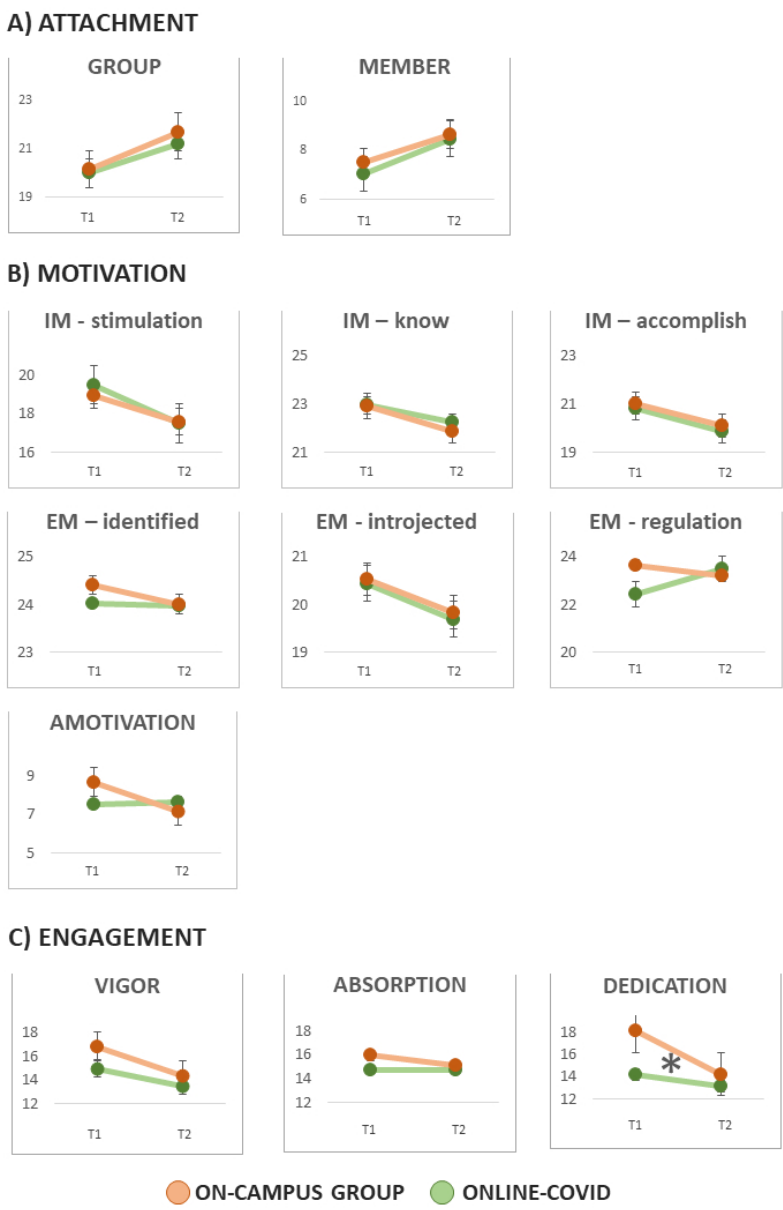


Figure 1. Attachment, Motivation, and Engagement differences from time 1 (T1) to time 2 (T2) in the Online-COVID (green) and On-campus groups (orange).

190x275mm (96 x 96 DPI)