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RESEARCH ARTICLE

Satisfaction with Online-Teaching is Affected by COVID-Status for University Students

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Abstract:

Background:

Little is known about university students' views regarding online teaching, one year after COVID restrictions.

Objective:

The current study examined predictors of satisfaction with online teaching and differences in views and predictors between those exposed or not exposed to COVID.

Methods:

340 university students (144 males; 194 females; 2 nonbinary) completed an online survey. The mean age was 25 years, with 132 undergraduates and 208 postgraduates. Students completed the Online Teaching Satisfaction Questionnaire, Center for Epidemiologic Studies Depression Scale, Becks Anxiety Inventory, the Locus of Control Scale, the General Self-Efficacy Scale, and the Brief-COPE Questionnaire.

Results:

Levels of satisfaction with online teaching were reasonable, with about 60% of students satisfied, but satisfaction was not especially high. Students appreciated the efforts of staff but did not find online materials stimulating. Students exposed to COVID needed more external support to be satisfied with their online experience.

Conclusion:

The results indicate that additional support measures will need to be put into place for COVID-exposed students if current online teaching delivery is to continue. Such information may help further developments in online learning, especially if this form of delivery needs to be extended for any length of time.

Keywords: Online teaching, Student satisfaction, Coping strategies, COVID, E-workshops, Webinars.

1. INTRODUCTION

Coronavirus disease (COVID-19) was declared a pandemic by the World Health Organization on 12th March 2020. Owing to persistent infections and mortalities, most governments enforced strict public health measures to mitigate the spread of the disease. One commonly adopted infection control measure was encouraging individuals to avoid unnecessary contact with others and only leave home when necessary. As part of this strategy, universities shut down most face-to-face teaching and moved to online-delivery of learning. University students were encouraged to access learning through E-workshops, webinars, e-quizzes, and online classes [1].

University students are greatly exposed to internet [2]. Distanced learning [3] and e-learning [4] have also been used as alternatives to traditional classroom learning for a long time. On the other hand, most students and faculty were not prepared for the abrupt changes that came with this new mode of study, such as limited physical contact and having to learn from home [1, 5]. The potential impact on satisfaction with online teaching

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learning is a subject of some importance for higher education [6], and exploring factors that increase satisfaction has been the subject of research [1, 7, 8]. In part, examination of what contributes to satisfaction with online learning is important as this form of delivery has been found to undermine motivation to study [4, 9].

The goal of this study was to not only add to the literature on university students' satisfaction with online teaching [10] but also to get a better understanding of how psychological and physical well-being, particularly COVID exposure, is associated with this satisfaction. While some studies have identified factors associated with satisfaction and the intention to participate in online learning [10], including facilitative leadership, regulatory support and project team skills [6], and facilitators and inhibitors of the adoption of e-learning [8], few have explored the relationship of psychological and physical variables, especially COVID exposure, on satisfaction.

Some studies have shown that psychological wellbeing is positively associated with teaching satisfaction, for both students [7, 11] and staff [1]. As social contact can maintain such psychological wellbeing, especially in university students [12], it was thought that this might make online teaching particularly vulnerable to low satisfaction. Moreover, locus of control [13] and self-efficacy [14] have both been found to be associated with satisfaction with teaching but have not been investigated for students in terms of the current online development (see [1], for an investigation in the context of staff). Very few studies have investigated the effect of being exposed to COVID on online teaching and whether this has implications for the sort of support that universities need to offer, especially if this form of teaching is to continue. Finally, as stress has been found to impact satisfaction with online teaching [1], the effect of coping strategies as potential mediators in COVID-exposed and COVID-nonexposed students was explored. It might be expected that those exposed to COVID would need greater levels of emotional and social support, as has been seen in terms of other illnesses [15, 16].

Given this, the current study used an online survey to explore UK university students' views regarding online teaching one year after the COVID restrictions were put in place. It examined whether there were any predictors of satisfaction with online teaching and any differences in those views and predictors between those exposed or not exposed to COVID. Such information may help further developments in online learning, especially if this form of delivery needs to be extended for any length of time or if educational institutions and authorities are considering long-term adoption of such a learning approach.

2. METHODS

2.1. Participants

The present study included students from six UK universities. The inclusion criteria were: consent to participate, be pursuing a university degree in the United Kingdom, and be above 18 years old. The exclusion criteria were: declining consent to participate, being below the age of 18, not being enrolled in a UK university, inability to adequately understand English, and inability to use the internet to complete questionnaires. Advertisements were sent through university emailing lists and social media posts, giving information about the study, and a unique Uniform Resource Locator (URL) for the survey was sent to potential participants to take part at their own convenience on their mobile phones or computers.

Initially, 467 participants accessed the survey information, and 340 students completed the survey (144 males; 194 females; 2 nonbinary). The mean age of the participants was 24.82 (SD $\pm$ 5.61; range = 18 – 52) years. There were 132 (39%) undergraduates, 208 (61%) postgraduate students, and 254 (75%) identified as British. Power calculations suggested that for 95% power, with a $p < .05$ criteria and medium effect size, 176 participants would be needed for a t-test test and 115 for a correlation. Ethical approval was given by the Research Ethics Committee of the Psychology Department.

2.2. Materials

Demographic datasheet captured the gender, age, nationality, and educational level. Their COVID-19 status was requested by asking if they, or a first-order relative (parent, sibling, spouse/partner), had been diagnosed with COVID.

Online Teaching Satisfaction Questionnaire (OTSQ [1]) comprises 13 questions assessing the level of satisfaction with online-teaching measures. Items are scored on a four-point Likert scale (1="very dissatisfied" to 4="very satisfied"). The total score is a sum of the 13 items, and ranges from 13 to 52, with higher scores indicating higher satisfaction with online teaching. The internal reliability of the scale (Cronbach's α) has been reported as .79 [1], and for the current sample, Cronbach's α was .81, indicating an acceptable internal consistency.

Center for Epidemiologic Studies Depression Scale (CES-D [17]) comprises 20 items regarding the experience of psychological symptoms of depression, such as loneliness, poor appetite, and changes in sleep patterns. Respondents are asked to evaluate every item on a four-point Likert scale (0 = "rarely" to 3 = "almost all the time"). The score ranges from 0 to 60, with higher scores indicating higher depressive symptoms. Internal reliability (Cronbach's α) of the scale has been reported as between .85 to .90 [17], and for the current sample its result was .75, which was considered acceptable.

Becks Anxiety Inventory (BAI [18]) comprises 21 items concerning anxiety. Each item is assessed on a three-point Likert scale (0 to 3), and the total score ranges from 0 to 63. Internal reliability (Cronbach's α) of the scale has been reported as .92 [18], and for the current sample, the result was .90, indicating an acceptable internal consistency.

Rosenberg Locus of Control Scale (LoC [19]) is a 17-item questionnaire measuring generalized expectancies for internal versus external control. Items are evaluated on a Likert scale ("strongly disagree" to "strongly agree"), with a range of 17–102 (low scores indicate internal control and high scores indicate external control). Internal reliability for the current sample was α = .64, but it had previously been reported as .86 [20].

General Self-Efficacy Scale (GSE [21]) is a 10-item scale

measuring optimistic self-beliefs to cope with a variety of difficult demands in life. Items are assessed on a four-point Likert scale ("not true at all" to "exactly true"). Total scores range between 10 and 40, and higher scores imply more self-efficacy. Cronbach's α of this scale has been reported as between .82 to .93 [21], and for the current sample the result was .90, which indicates an acceptable internal consistency.

Brief-COPE Questionnaire (B-COPE [22]) is a 28-item measure, assessing the ways individuals cope with a stressful life event. Each item is rated on a four-point Likert scale (1="I usually do nothing" to 4="I usually do exactly this"). This questionnaire consists of 14 subscales, and each one is composed of two items. Every subscale's total ranges from 2 to 8, with higher scores indicating more use of that strategy. Each subscale exceeds the Cronbach's α value regarded as minimally acceptable [23, 24]. For the purpose of this study, the Cognitive Planning, Emotional Support, and Action subscales were chosen.

2.3. Procedure

The survey link was made available on email and social media sites in order to recruit study participants. Upon clicking the URL, participants were directed to the questionnaire on Qualtrics, which began with a participant information sheet and an informed consent form. Participants who agreed to the consent form were then directed to the main survey. The completed data was collected and stored in an online database. Participants who declined to accept the consent were redirected to the end of the survey. The online questionnaire took approximately 20-25 minutes to complete.

3. RESULTS

Table **1** presents the mean (standard deviation) for each question in the satisfaction with online-teaching questionnaire (OTSQ), along with percentages of answers in each category. Means were above the mid-point, except for preference for online over classroom teaching, and recommendation for

online-teaching post-COVID. The overall mean for the OTSQ was 36.17 ($\pm$ 5.21; range = 18 – 51). COVID-exposure had a mean of 36.43 ($\pm$ 4.47), and no exposure to COVID had a mean of 36.03 ($\pm$ 5.57), $t(338)$ = .68, p> .40, d = .01. Males had a mean of 36.25 ($\pm$3.79), and females' mean was 36.11 ($\pm$6.09), $t(336)$ = .23, p> .80, d = .01. Undergraduates had a mean of 36.35 ($\pm$5.37), and postgraduates had a mean value36.06 ($\pm$ 5.11), $t(338)$ = .51, p> .60, d = .01. There was a small positive correlation between age and satisfaction, $r(340)$ = .216, p< .001.

Table **2** displays means (standard deviations) for predictor and mediator variables, as well as means for those who had, or who had not, been COVID-exposedSignificant positive relationships were observed between depression and anxiety, as well as depression and cognitive planning. Anxiety was negatively related to self-efficacy. External locus of control was positively related to action taking. Self-efficacy was positively related to all coping strategies, and cognitive planning and action taking were positively related to one another. There were no differences in these scores for COVID-exposed and COVID-nonexposed, except for their use of emotional support, which was higher in the COVID-exposed.

Table **3** shows the correlations between online-teaching and each of the variables, as well as the correlations for the COVID-exposed and COVID-nonexposed groups, and the z scores testing the difference between these correlations. Satisfaction with online-teaching was positively related to the use of cognitive planning and action taking strategies. Differences in the predictors of satisfaction with online-teaching for the COVID groups were found. The COVID-exposed group demonstrated a stronger relationship between external locus of control and satisfaction than the COVID-nonexposed group. The COVID-nonexposed group showed a stronger relationship between self-efficacy and online-teaching satisfaction. Moreover, this group exhibited stronger relationships between both using cognitive planning and action taking strategies and online satisfaction.

Table 1. Mean (standard deviation) for each question regarding satisfaction with online-teaching (OTSQ), along with the percentage of answers falling into each category of response.

Item	Mean (SD)	Very Satisfied	Quite Satisfied	Not Satisfied	Very Unsatisfied
General satisfaction	2.58 (.86)	14	40	34	11
Extent of help from school	2.89 (.59)	11	68	21	1
Adequate staff supportwhen needed	3.01 (.55)	14	75	9	8
Clear information of procedures	3.20 (.68)	33	54	10	2
Impression of online experience	2.99 (.67)	18	68	10	4
Stimulating online activities	2.66 (.69)	5	62	25	7
Preference of online to classroom teaching	2.32 (.55)	4	25	70	6
Recommend online-teaching post-COVID	2.49 (.71)	2	55	31	11
Adequate teaching material	3.15 (.68)	29	59	9	2
Adequate commitment required	2.52 (1.02)	28	9	50	12
Learned new content well with online-teaching	2.65 (.86)	14	49	25	11
Experience with online-teaching	2.56 (.83)	13	37	40	8
Communication with lecturers	3.15 (.60)	25	63	10	6

Table 2. Means (standard deviations) for the predictor and mediator variables, as well as the means for those who had, or who had not, been COVID-exposed, and the Pearson's correlations between the variables.

-	Mean (SD)	COVID-exposed	COVID-nonexp.	t(338)	Anxiety	Locus of Control	Self-efficacy	Cognitive Planning	Emotional Support	Action
Depression	23.52 (8.69)	23.07 (9.77)	23.77 (8.06)	.71	.473***	-.037	-.066	.132*	.095	.046
Anxiety	18.41 (12.71)	19.27 (12.67)	17.95 (12.78)	.91	-	-.002	-.188***	-.090	.056	-.014
Locus of Control	57.31 (8.82)	57.73 (8.41)	57.08 (9.01)	.65	-	-	.071	-.027	-.019	.141**
Self-efficacy	31.16 (5.35)	31.43 (4.94)	31.01 (5.57)	.69	-	-	-	.144**	.156**	.164**
Cognitive Planning	6.4 (1.36)	6.69 (1.32)	6.62 (1.39)	.49	-	-	-	-	.060	.381***
Emotional Support	5.28 (1.61)	5.63 (1.75)	5.08 (1.49)	3.05**	-	-	-	-	-	.076
Action	6.28 (1.44)	6.18 (1.34)	6.30 (1.50)	.71	-	-	-	-	-	-

*p< .05; **p< .01; ***p< .001

Table 3. Pearson's correlations between online-teaching and each of the variables, as well as the correlations for the COVID-exposed and COVID-nonexposed groups, and the z score testing the difference between these correlations.

-	Depression	Anxiety	Locus of Control	Self-efficacy	Cognitive Planning	Emotional Support	Action Taking
Satisfaction	-.013	-.030	.077	.098	.225***	.027	.113*
COVID-exposed	-.018	.019	.204*	-.024	-.034	-.010	-.016
COVID-nonexposed	-.009	-.054	.024	.184*	.331***	.038	.166*
Z	.079	.054	1.79*	1.77*	.329***	.42	1.76*

*p< .05; **p< .01; ***p< .001

The top panel of Fig. (**1**) shows that the relationship between locus of control and satisfaction with online-teaching was mediated by cognitive planning. Unstandardised effects were computed for 5,000 bootstrapped samples, and the 95% confidence interval was computed by determining the effects at the 2.5th and 97.5th percentiles for all relationships. The top panel of Fig. (**1**) reveals that the coefficient between locus of control and satisfaction was not statistically significant (.04; LL-UL: -.02:.11), the coefficient between cognitive planning and online-teaching was significant (.84; .41:1.28), but those between emotional support (.05; -.29:.39), action taking (.06; -.36:.47),and teaching satisfaction were not. Their effect of locus of control on teaching satisfaction was not mediated by cognitive planning (.03; -.02:.01), emotional support (.00; -.01:.01), or action taking (.00; -.01:.01).

The middle panel of Fig. (**1**) shows data for the COVID-exposed group, and reveals a direct relationship between locus of control and satisfaction with online-teaching, which was not mediated by coping strategies. The coefficient between locus of control and satisfaction was statistically significant (.11; .02:.22), but the coefficients between cognitive planning (-.01; -.02:.02), emotional support (.00; -.01:.01), action taking (-.01; -.03:.01), and teaching satisfaction were not significant.

The bottom panel of Fig. (**1**) shows data for the COVID-nonexposed group and reports no relationship between locus of control and satisfaction with online teaching. The coefficient between locus of control and satisfaction was not statistically significant (.01; -.07:.08), the coefficient between cognitive planning and online-teaching was significant (1.25; .70:1.81), but those between emotional support (-.02; -.49:.46), action taking (.17; -.34:.68), and teaching satisfaction were not. Locus

of control's effect on teaching satisfaction was not mediated by cognitive planning (.01; -.03:.04), emotional support (.00; -.01:.01), or action taking (.00; -.01:.02).

The top panel of Fig. (**2**) shows that the relationship between self-efficacy and satisfaction with online-teaching was mediated by cognitive planning. The coefficient between locus of control and satisfaction was not statistically significant (.06; -.04:.17), the one between cognitive planning and online-teaching was significant (.79; .36:1.22), but those between emotional support (.01; -.33:.36), action taking (.08; -.33:.49), and teaching satisfaction were not. A significant indirect effect of locus of control on teaching satisfaction was mediated by cognitive planning (.03; .01:.07). This effect was not mediated through emotional support (.01; -.02:.02) or action taking (.03; -.01:.02).

The middle panel of Fig. (**2**) shows data for the COVID-exposed group and reveals no relationship between self-efficacy and satisfaction with online-teaching and no mediation by coping strategies. The coefficient between self-efficacy and satisfaction was not statistically significant (-.03; -.21:.14), and neither were the coefficients between cognitive planning (-.12; -.81:.58), emotional support (-.02; -.49:.46), action taking (-.03; -.73:.66), and teaching satisfaction.
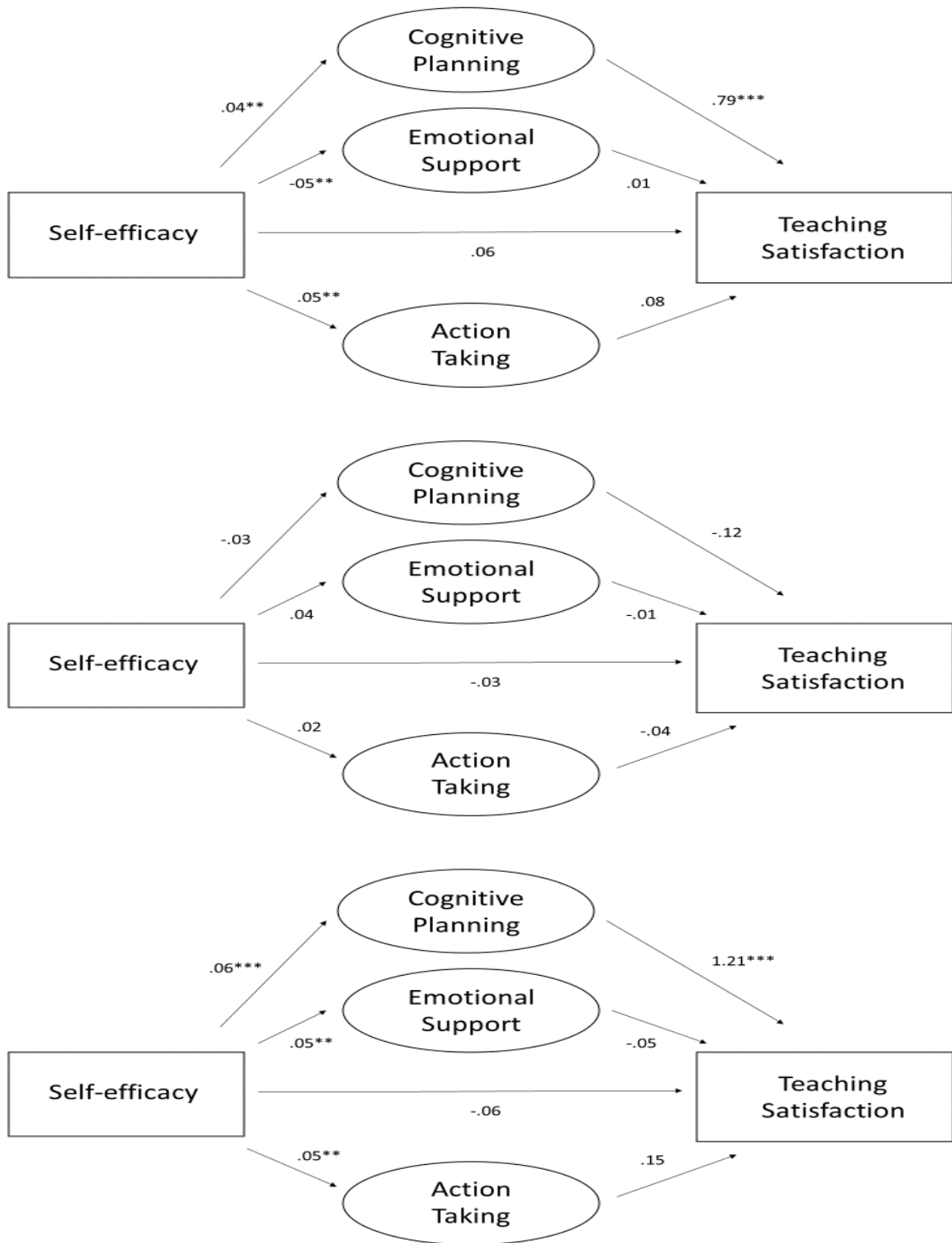
The bottom panel of Fig. (**2**) shows data for the COVID-nonexposed group and reveals no relationship between self-efficacy and satisfaction with online-teaching. The coefficient between self-efficacy and satisfaction was not statistically significant (.06; -.07:.20), the coefficient between cognitive planning and online-teaching was significant (1.21; .64:1.77). Coefficients between emotional support (-.05; -.53:.43), action taking (.15; -.36:.66), and teaching satisfaction were not

significant. The effect of locus of control on teaching satisfaction was mediated by cognitive planning (.07; .02:.15), but not by emotional support (.00; -.04:.03) or action taking (.01; -.02:.04).
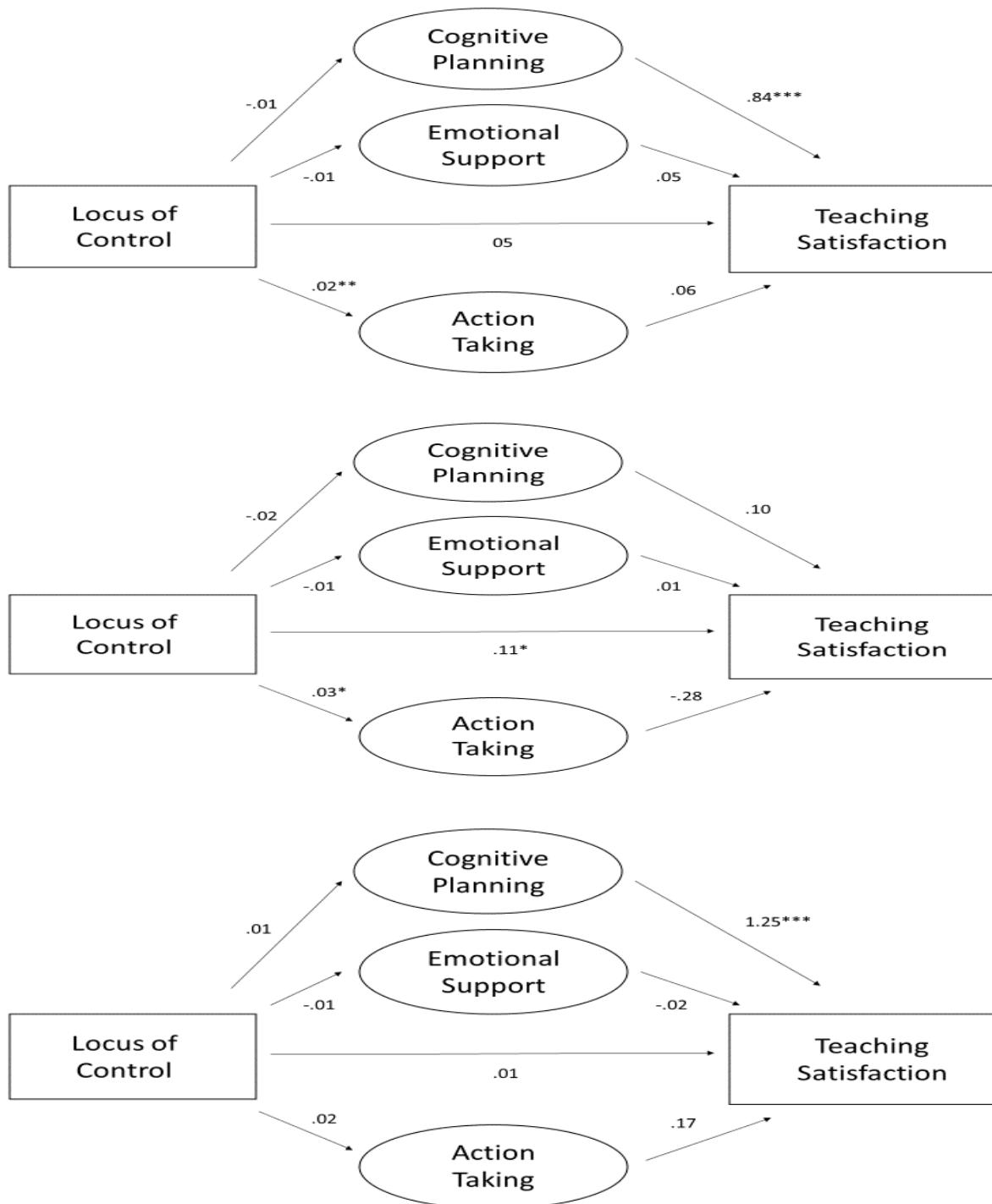
Fig. (1). Relationship between locus of control and satisfaction with online-teaching: Top panel = whole sample. Middle panel = COVID-exposed students. Bottom panel = COVID-nonexposed students.

Fig. (2). Relationship between self-efficacy and satisfaction with online-teaching: Top panel = whole sample. Middle panel = COVID-exposed students. Bottom panel = COVID-nonexposed students.

4. DISCUSSION

The current study explored university students' views regarding online-teaching and examined the predictors of satisfaction with online-teaching. This research also aimed at searching for possible differences in views and predictors between those who had been exposed or not exposed to COVID-19. As a result, the study found that satisfaction with online-teaching was reasonable for university students but not actually high. In other words, students appreciated the university staff's efforts, but did not find online materials particularly stimulating. The ones who had been exposed to COVID-19 reported to need more external support in order to be satisfied with their online experience.

In general, students were moderately satisfied with their online-teaching experience, although this could not be described as a strongly held view. In this finding, the current study corroborates other explorations of these views for students [7] and staff [1], as well as patients experiencing online forms of consultation in health settings [15]. University students were most satisfied with the efforts made by the university staff to support them, but their satisfaction was reduced by unstimulating online learning materials. In general, students were ambivalent about the prospects of continuing with online-teaching after the end of COVID restrictions (see also [7]). Regarding satisfaction with online-teaching, no difference was found between those who were or were not COVID-exposed, neither between genders nor between undergraduates and postgraduates. A slight positive relationship between satisfaction and age was discovered, suggesting that older students preferred this method of learning. This was possibly due to older students being better able to manage other commitments [5]. Younger students may be more susceptible to the motivational impact of face-to-face contact [4, 11] and may become more shaped by lack of opportunities to engage in typical social activities at university [12, 25]. While students do not reject online teaching as an acceptable medium, the format in which the materials are given appears to be a key factor affecting satisfaction levels [11, 26].

The individuals exposedto COVID did not differ greatly from those who had not been exposed in terms of the aforementioned psychological variables. Higher levels of anxiety were found in the COVID-exposed group, but this result was not statistically significant, and no differences were noted in terms of levels of depression, locus of control, or self-efficacy. These results appear in contrast with previous findings concerning older individuals who have been exposed to COVID and tend to show greater levels of depression [1, 27]. This indicate that depression may result from a curtailing of the ability to engage in usual activities and employment, which may not be a great issue for students. Those who had been exposed to COVID employed greater levels of seeming emotional support as a coping strategy for stressful situations. Seeking emotional support after or during illness is a common coping strategy according to existing literature [15, 28], and the present result replicates previous findings regarding coping with COVID [16, 29].

Some differences were found in the way the psychological variables predicted online-teaching satisfaction between those who have been COVID-exposed and those who have not. For the latter, satisfaction with online-teaching was related to greater self-efficacy and more cognitive planning and action taking coping strategies. For those who had been COVID-exposed, satisfaction was related to having an external locus of control. This pattern is in line with the above mentioned findings, which report that the ones who have not been COVID-exposed appear to rely on more internal-based and active strategies (self-efficacy, cognitive planning), whereas those who have been COVID-exposed seem to count more on external supports and have a greater external locus of control. These findings again mirror what is known previously about the psychological responses from serious illnesses [15, 16, 28]. They also suggest that satisfaction with online-teaching can be influenced by different factors depending on the COVID-status of the student. This may mean that if the pandemic persists, institutions will need to ensure that adequate external support is provided to COVID-exposed students, in order to increase their satisfaction with online-teaching and to bolster their ability to engage with academic materials.

The impact of coping strategies on these relationships was also moderated by COVID-exposure. In terms of locus of control, high external control was not mediated by any coping strategy for those who had been COVID-exposed, but it was helped by action taking strategies. Whereas, for those with no COVID-exposure, cognitive planning mediated this relationship. Moreover, increased cognitive planning mediated between self-efficacy and satisfaction in this group. On the contrary, neither self-efficacy directly nor mediations by any coping strategy help for the COVID-exposed group. These data suggest that students who have been COVID-exposed may find it difficult to get satisfaction from online-teaching until their self-efficacy is fostered by promoting any particular coping strategy. Once again, these data suggest that the COVID-exposed participants may need higher levels of support to engage with their online courses. Of course, this may apply to face-to-face teaching methods as well.

CONCLUSION, FUTURE SCOPE OF RESEARCH, AND LIMITATIONS OF THE STUDY

In summary, the current study found that levels of satisfaction with online-teaching were reasonable in university students, but they were not especially high. Although students appreciated the efforts of university staff, the current sample did not find online materials particularly stimulating. The ways in which satisfaction with online-teaching was influenced differed between COVID-exposed subjects or not exposed participants. Specifically, the ones who have been exposed to COVID appear to need more external support to be satisfied with their online experience.

The main limitation of this study is related to its design. Because of its cross-sectional nature, caution is needed in interpreting the results as reflecting causal relationships [30]. For example, students exposed to COVID reported needing more assistance, but this could be due either to this exposure or to these students needing more assistance prior to COVID exposure. However, as the psychological variables (anxiety, depression, locus of control, self-efficacy) did not differ

between the groups, it is difficult to see which factor may have prompted the COVID-exposed group to require more assistance in general, other than their COVID exposure. Nevertheless, this remains a possibility that needs to be explored in future research.

ETHICS APPROVAL AND CONSENT TO PARTI-CIPATE

The application has been reviewed and approved by the Department of Psychology Ethics Committee, Swansea University, UK. Re: 4910.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (Institutional), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The data sets used during the current study can be provided from the corresponding author [R.T], upon reasonable request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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