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Variables affecting engagement in online learning

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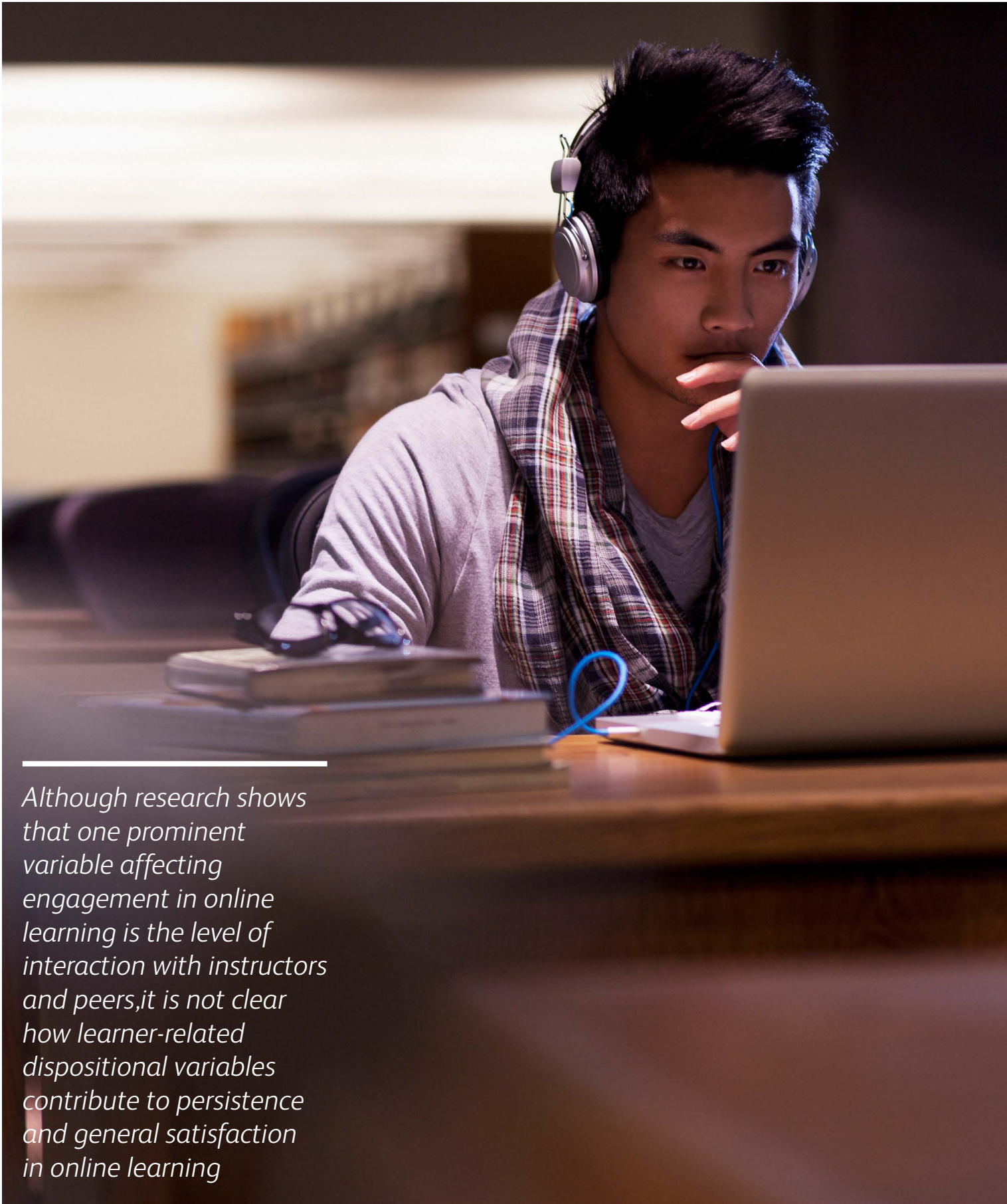# VARIABLES AFFECTING ENGAGEMENT IN ONLINE LEARNING

A study into locus of control, self-efficacy, general anxiety and COVID-19

Abstract:

Variables affecting online learning can be related to the individual or the situation. This study explored the contribution of both dispositional variables related to the learner and the situation, such as the COVID-19 pandemic and change of learning platform to engagement in online learning and the impact on general satisfaction. The findings support previous studies that investigated perceived self-efficacy and locus of control in online learning, and inform about the contribution of other variables such as anxiety and COVID-19 to constraining online learning. The findings can be used to inform online teaching methodologies and further highlight the importance of dispositional variables when considering the design of online teaching.

Online education is commonly used to describe technology in all its forms, and is often referred to as 'e-learning', 'distance learning' or 'online learning'. Rosenberg (2000) defined online learning as delivering a course content to the end user through computers using internet technology. The positive impact of the online learning has been reported in a meta-analytic review, and is mostly due to its flexibility and convenience (Allen *et al.*, 2002). However, Rovai and Barnum (2003) reported that online courses may be impersonal and misdirected due to inappropriate levels of interaction. This has been reported to constitute an obstacle among online learners who have no face-to-face interaction with peers or instructors throughout the coursework. The level of persistence among distant and online learners has also been shown to be different to traditional universities. For example, Tat-Sheung and Wong (2018) studied the factors affecting persistence among distant and online learners and found that students who perceived themselves academically weak considered stopping their studies at some point, while high-level students did not. Some of the recommendation made by authors to increase persistence included appointing mentors for distance learning students to support them in managing their time and to help them develop a sense of belonging. Croxton (2014) further confirmed in a literature review that student-instructor interaction appears to be the primary variable determining student satisfaction and persistence among online learners. Although research shows that one prominent variable affecting engagement in online learning is the level of interaction with instructors and peers, it is not clear how learner-related dispositional variables contribute to persistence and general satisfaction in online learning. These variables include locus of control, perceived self-efficacy as characteristics of the learner and general learner satisfaction as a learning variable.

Locus of control (LOC) refers to individual perceptions about whether they have control over the outcomes of events in their lives. Rotter (1966) defined internal locus of control (ILOC) as the belief in oneself, that one can control future outcome of events in one's life, while external locus of control (ELOC) is the belief that one has no control of outcomes of the events in their lives. Since individuals with ILOC believe that they have control over events in their lives, they tend to be more achievement-oriented, be active information and knowledge seekers, and this dispositional variable has been shown to be one of the key factors determining academic performance (Abdalla *et al.*, 2019). ILOC has also been shown to be a strong determinant of engagement and persistence in distance learning (Joo *et al.*, 2013). Suretha and Stanz (2004) compared the LOC of traditional face-to-face and online learners of Business Sciences course and found no difference in the locus of control of both learner groups. This could be due to LOC being a dispositional variable that is part of the person rather than a behavioural characteristic that changes with situation, such as different learning platforms. Rotter (1966) described LOC as a personality trait, referring to a person's stable beliefs of personal efficacy. Thus, individuals with high ILOC are expected to be generally more achievement-oriented. Cascio, Botta and Anzaldi (2013) further showed that online learning degrees are influenced by the combined effect of both ILOC and external motivation, such as continuing education credits. Fazey and Fazey (2001) postulated that independent learners attribute success or failure to themselves and therefore perceive themselves as in control of the outcome in an educational context. ILOC have been found to be closely linked with self-efficacy. This was another variable investigated in this study. Bandura (1977) defined self-efficacy as the belief in oneself and in one's own capabilities to perform actions or achieve set goals. Self-efficacy has been revealed as an important factor associated with learning,

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as it affects the level of effort, achievement and engagement in both traditional and technology-assisted learning (An *et al.*, 2020). High self-efficacy and ILOC are assumed to be associated with some of the most important variables in online learning, where students are required to be more autonomous and teachers have less involvement (Joo *et al.*, 2013).

Learner satisfaction is another important factor that determines learning engagement. Therefore, the main aim of the study is to explore the possible determinants of general satisfaction and engagement in online learning. A further aim is to explore the extent to which self-efficacy moderates (strengthens) the effects of ILOC on general satisfaction. Although these variables are important for learning, only some have been examined previously or they were assessed in different contexts such as blended or face-to-face learning. Furthermore, previous studies mostly looked at the direct relationships between these variables. The current study aimed to further understand the extent to which these factors moderate the effect on general learner satisfaction, which is an important factor affecting persistence. Moderation is a way of assessing whether a third variable influences the strength or direction of the relationship between two variables (Baron and Kenny, 1986).

In addition to these variables, current life events such as possible COVID-19-related anxiety, as well as trait anxiety, are other factors that can affect the satisfaction and engagement of the learner. COVID-19 has been identified as a new strain of a deadly virus discovered in 2019, which can cause individuals to experience symptoms varying from common cold to more severe respiratory problems and can result in death (WHO, 2020). Although some of the above mentioned variables such as LOC and motivation have been assessed in previous studies (Joo et al., 2013), it is not clear how these variables interact with trait and state anxiety, to affect engagement and general satisfaction. Furthermore, it is not clear how a change in learning platforms or delivery impacts on individual online learning. This is important to establish, as many learners all over the world who enrolled in traditional face-to-face courses had to move to online learning platforms at the beginning of their courses due to the COVID-19 pandemic in March 2020. Some
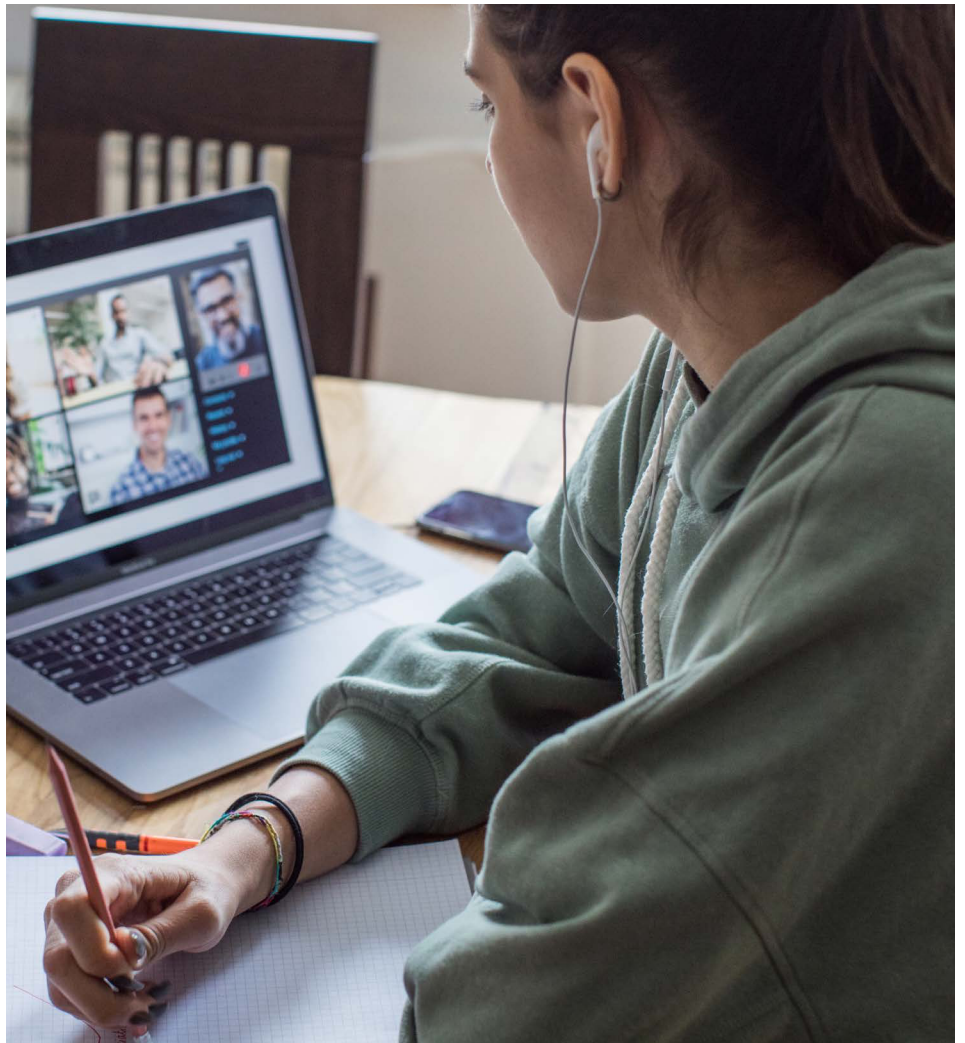
research has been conducted recently to understand the impact of this transition on learner achievements. For example, a qualitative research conducted in a South African university found this transition to be a hindrance, with students reporting not being able to realise the full potential of online learning, yet still being expected to submit assessments using these platforms (Mpungose, 2020). On the other hand, Rad et al. (2021) found that dental students and instructors reported both positive and negative effects of moving to online learning, with positives being more flexibility, autonomy, efficiency and convenience for both learners and instructors, and negatives being limited scope for interaction and learner engagement, as well as a lack of practical sessions. Moreover, Shah *et al.* (2021) did not find any direct influence of online learning on student engagement during the pandemic. However, mediational analysis revealed an indirect effect of online learning on student engagement through psychological factors, such that engagement depended on the extent to which students perceived their psychological needs as satisfied/not satisfied. Another recent research project also showed that individuals who were infected with COVID-19 experience psychological

symptoms to a greater extent than those who were not infected, and that having ELOC related to reporting greater symptoms (Sugirvinsdottir *et al.*, 2020). However, it is not clear whether those who report greater symptoms had prior mental health problems. Furthermore, it is not fully clear how moving learning platforms from face-to-face to online had an effect on engagement of all learners enrolled on different courses and the extent to which dispositional variables such as locus of control, prior chronic anxiety and COVID-19-related anxieties affected learner engagement and general satisfaction with their course.

In an attempt to address these questions, factors that were examined additionally were general anxiety and COVID-19-related anxieties and their impact on academic performance and general satisfaction. The study aimed to determine whether the academic performance of learners with prior chronic anxiety is affected to a greater extent by an unexpected life event such as COVID-19 pandemic, and whether learners believed that this had an effect on their performance to a significantly greater extent than those with no reported general anxiety. The study more specifically aimed to address the following questions:

The study aimed to determine whether the academic performance of learners with prior chronic anxiety is affected to a greater extent by an unexpected life event such as COVID-19 pandemic, and whether learners believed that this had an effect on their performance to a significantly greater extent than those with no reported general anxiety

a) Are there correlations between internal locus of control and self-efficacy?
b) Does self-efficacy moderate the effect of internal locus of control on general satisfaction?
c) Is there a difference in reported academic performance related to COVID-19 anxieties among learners with high and low general anxiety disorder?
d) Do learners with high-level general anxiety report a higher negative effect of moving from face-to-face to an online learning platform, compared to learners with low-level general anxiety disorder?

Method
Participants

The participants were undergraduate and postgraduate students studying different courses at the University of West London. All students in the study were initially enrolled for traditional face-to-face courses before moving to online education in March 2020. The sample consisted of 57 participants, with 48 females (M = 23.29 years of age, SD = 5.80) and 9 males (M = 26.88 years of age, SD = 12.83). The participants were a minimum 18 years of age and maximum 59 years, and were required to provide informed consent prior to participation. All measures, consent and debrief forms were uploaded on the online survey platform Qualtrics. A link was posted on research platforms within the university and emailed to students through the 'Psychology Learning Community' research page. The data was extracted from Qualtrics to SPSS for analysis upon completion of the data collection. Ethical approval for this study was obtained from the University of West London, Ethics Panel.

Measures

Internal, Powerful Others and Chance Scale (Levenson, 1981): The scale consists of three subscales, 'Powerful Others' which measures the extent to which an individual believes outcomes of events in their lives are due to powerful individuals. Example items include, 'Getting what I want depends on pleasing those people above me'. The second subscale, 'Chance' includes items assessing whether an individual believes events in their lives are outside their control, and includes items such as 'Often there is no chance of protecting my personal interest from bad luck'. The last subscale, 'Internal locus of control' consists of items that assesses whether an individual believes that they have control of events and outcomes in their lives and include items such as 'My life is determined by my own actions'. The items are assessed on a six-point Likert Scale on a continuum from 'Strongly Disagree' to 'Strongly Agree'.

Self-efficacy (Pintrich and Degroot, 1990)

The self-efficacy measure used in this study was adopted from the Motivational Strategies for Learning Questionnaire. Nine items covering self-efficacy were used. Example items include 'I am certain I can understand the ideas taught in this course' and 'I expect to do very well in this class'. Items are assessed on seven-point Likert Scale with 1-Not at all true for me, to 7-Very true for me. Individual scores are calculated by summing the scores, with high scores indicating high self-efficacy.

General satisfaction Survey (Strachota, 2003)

The General Satisfaction Survey is a six-item subscale adopted from Student Satisfaction survey. This subscale is used to assess overall satisfaction from technology-mediated courses. Example items include 'I feel that online courses are as effective as face-to-face courses' and ' I would recommend this course to others'. The scale items included a four-point Likert scale of 1-Strongly disagree, 2-Disagree, 3-Agree, and 4-Strongly agree.
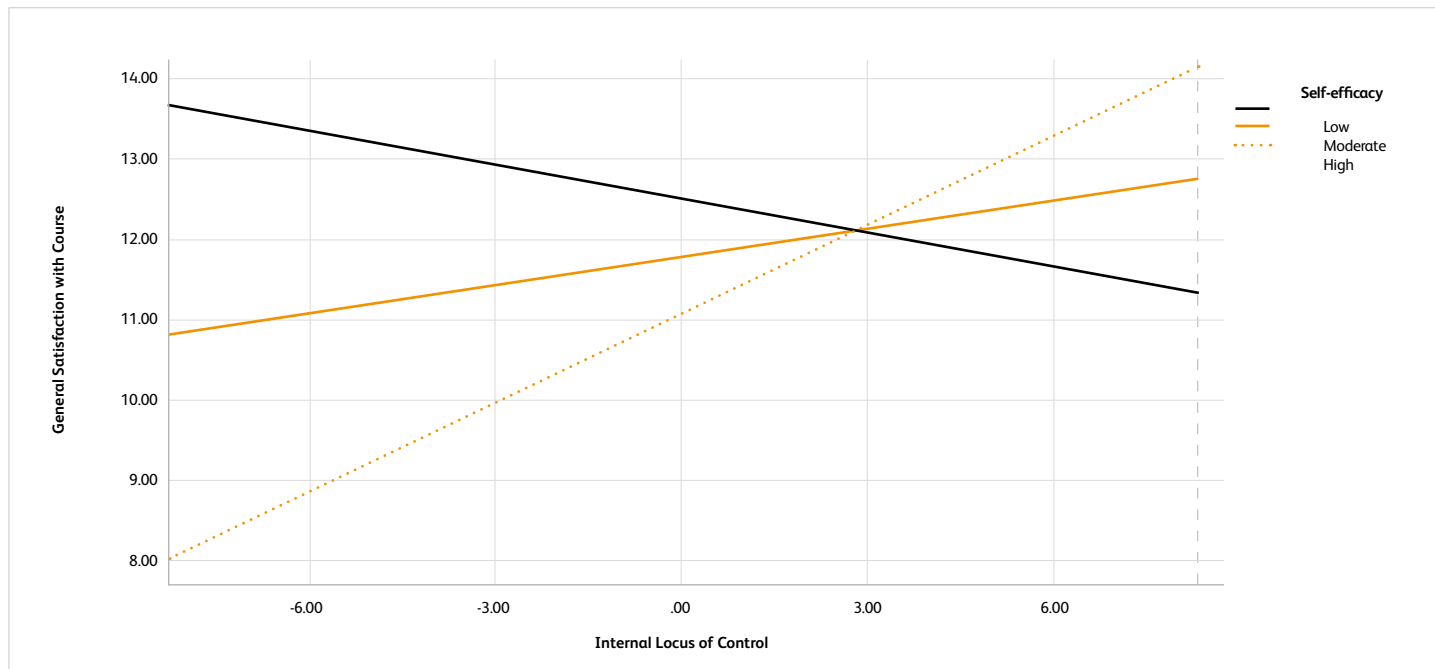
FIGURE 1 Graph depicting the relationship between internal locus of control and general satisfaction with course at low (-1 SD), moderate (mean) and high (+1 SD) levels of self-efficacy

General Anxiety Disorder Scale (GAD) (Spitzer *et al.*, 2006)

General anxiety disorder scale (GAD-7) aims to assess the frequency of worry the person has been experiencing in the last two weeks. It includes items such as 'Trouble relaxing', 'Feeling nervous, anxious or on edge'. The items are scored on a four-point Likert scale with '0-Not at all' and '3-Nearly every day'. An overall score of '8' or above is considered as indicating probable anxiety disorder. This scale was used to understand whether individuals with chronic anxiety showed significantly more COVID-19-related anxiety (state anxiety), compared to those without pre-existing anxiety symptoms, and whether this significantly affected engagement with online learning.

Results

COVID-19, Online Learning, General Anxiety disorder, Self-efficacy and Locus of control

General satisfaction with the course did not correlate with self-efficacy, GAD or internal locus of control. However, self-efficacy yielded significant negative correlations with GAD (r= -.26, p<.05) and significant positive correlations with internal locus of control (r=.45, p<.001). The reported engagement in online learning, as measured by the number of sessions attended, did not show significant correlation with general satisfaction.

Moderating effects of self-efficacy between ILOC and General Satisfaction

The moderation analyses showed a significant effect of self-efficacy in the relationship between ILOC and general satisfaction with the course. There were no significant main effects of ILOC or self-efficacy on general satisfaction. However, self-efficacy was a significant moderator of the relationship between ILOC and general satisfaction ($R2$=.09, $\Delta R2$=.08, p=.03). In other words, ILOC is a stronger predictor of general satisfaction for students with high levels of self-efficacy.

Furthermore, a one-way between-subjects ANOVA comparing the level of general satisfaction for students who reported either negative, positive or no change in their performance following a transition from face-to-face to online platform, revealed that students who believed their performance was affected negatively as a result of moving from face-to-face to online learning platform, reported significantly less general satisfaction with their course (M=11.10, SD=4.39), compared to those who reported a positive effect (M=15.36, SD=6.60) or no change to their performance (M=14.77, SD=4.79), F (2, 56) =4.28, p=.019. The post-hoc analyses revealed that those learners who reported a negative effect on their performance as a result of a change in learning platform also reported the highest levels of general anxiety (M=20.89, SD=7.10), compared to those who reported no change to their performance (M=14.88, SD=4.13), p =.02, suggesting that general anxiety is an important variable affecting academic performance. The one-way ANOVA also showed that those learners who reported that their performance was negatively affected as a result of COVID-19-related anxieties were the learners who reported the highest general anxiety (M=20.93, SD=6.66), compared to those who reported no effect of COVID-19-related anxiety on their performance (M=11.66, SD = 4.33), F (1,56)=16.00, p<.001. This result further confirms that learners with chronic general anxiety were more vulnerable to situation-related anxiety and may find it difficult to adjust to changes in learning platforms.

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We found that there was a significant negative correlation between self-efficacy and general anxiety, suggesting that high general anxiety may have a negative effect on a learner's perceived self-efficacy

important psychological variable that can affect both engagement in online learning and general learner satisfaction. General anxiety was included to assess the extent to which learners with chronic anxiety experienced COVID-19-related anxieties and the ways in which this impacted on their engagement in learning and general satisfaction. The analyses confirmed that there was a significant difference in the general anxiety of learners who reported that their performance was affected by COVID-19-related anxieties and those who did not report differences in their performance related to COVID-19. In other words, learners who scored high on the general anxiety scale reported negative effects of COVID-19 on their engagement in online learning. Moreover, learners who reported a negative impact on performance as a result of moving from traditional face-to-face to online learning reported low general satisfaction, and those learners who reported low satisfaction also reported significantly higher general anxiety, compared to learners who reported no change to their performance as a result of a change in learning platform. This result is in line with Shah *et al.* (2021) where psychological factors were shown to indirectly determine the influence of online learning on student engagement during the pandemic.

Another aim of the study was to explore the extent to which self-efficacy moderates the effect of ILOC on general satisfaction. The findings confirmed that self-efficacy strengthened the effects of internal locus of control on general satisfaction. Although previous studies confirmed the direct relationships between self-efficacy and ILOC (Abdalla, Abdelal and Soon, 2019) and general satisfaction (An *et al.*, 2020), the way in which self-efficacy effects this relationship was not researched. The findings confirm the previous literature showing the effects of ILOC on general satisfaction, and further shows that this relationship is strengthened through self-efficacy, suggesting that learners who believe that they are in control of the events in their lives are generally more satisfied with their course, and this effect is stronger for those with high self-efficacy. These results can be used to inform course designs and delivery. Supporting students in judging themselves positively may improve their perception of self as academically efficient, which in turn may improve motivation and engagement in learning and general satisfaction. This was also supported by previous studies (Sagone and De Caroli, 2014). In further support of the current findings, Joo *et al.* (2013) showed that supporting learners to succeed may reduce the attrition rate. However, in contrast to previous findings, internal locus of control and self-efficacy did not predict persistence in Joo et al. This shows that persistence and satisfaction may be influenced by different factors. Lastly, age, gender and level of study was not found to predict general satisfaction in this study. This finding is in line with previous studies. Cole and Shelley (2014) measured the level of satisfaction in online learning and also found no statistically significant differences in the level of satisfaction based on gender, age, or level of study. Furthermore, partially online courses were rated as somewhat more satisfactory than fully online courses in that study.

Discussion

The study aimed to explore the extent to which different variables such as self-efficacy, LOC, general anxiety and COVID-19 affected engagement in online learning and overall general satisfaction of the learners. Firstly, we found that there were significant positive correlations between internal locus of control (ILOC) and self-efficacy. This is in line with previous findings such as Joo, Lim and Kim (2013). Learners with high levels of ILOC were also found to have high perceived self-efficacy. In support of the current findings, Sagone and De Caroli (2014) also found that the more learners perceived themselves as academically efficient, the more they expressed a positive representation of self-concept, and the more likely they were to perceive themselves as in control of everyday life circumstances. Furthermore, we found that there was a significant negative correlation between self-efficacy and general anxiety, suggesting that high general anxiety may have a negative effect on a learner's perceived self-efficacy. General anxiety is a variable that has not been previously researched in relation to self-efficacy and LOC in the context of online education. This is an

Overall, the current study revealed that the ILOC and self-efficacy has important effect on general satisfaction with the course. Furthermore, learners with anxiety may be more vulnerable to the negative effects of situational changes such as the COVID-19 pandemic. Adapting to other changes such as moving learning platforms from face-to-face to online may be more difficult for learners with high general anxiety and they may require additional support.

Lastly, the current findings should be considered in terms of limitations of the study. For example, there were only nine male participants in the study and the data was collected from one university in London. Also, students were originally enrolled for traditional face-to-face courses and had to move to an online platform and adapt to online learning due to the COVID-19 pandemic. Although this was considered by assessing the impact of a change in learning platform on perceived academic performance and, studies with fully online learning yielded similar results about self-efficacy and ILOC on general satisfaction, the findings may have been different if the study had been conducted in a fully online university. Furthermore, including grades for the assessment of engagement and a measure of persistence would have provided a more comprehensive view of the findings. Following up learners who participated in the study to see if they continued their enrolment would provide a more in-depth understanding of satisfaction and engagement.

In conclusion, the findings could be used to inform instructors about the importance of dispositional variables such as ILOC, self-efficacy and anxiety levels of the learner on general satisfaction. The findings can also lead to designing more effective strategies that focus on personalised support to help learner achievement. Support can include more constructive feedback to increase motivation, perceived self-efficacy and control of the learner, which can lead improvements in engagement and general satisfaction.

Lastly, considering that learners with general anxiety are more vulnerable to changes in the situation such as moving the learning platform, and the COVID-19 pandemic, these students may require further emotional and academic support to increase self-efficacy and therefore general satisfaction. Thus, this empirical study contributes to the knowledge base related to developing online learning and informs about psychological variables which affect learning and satisfaction. The findings may encourage policy-makers in higher education to consider learner's psychological needs within distance and blended learning.

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