

Investigating Emotions as a Predictor of Academic Performance While Online-learning Due
to COVID-19

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March 2022.

Submission of Thesis and Dissertation

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

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Date: 13/03/22

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Acknowledgements

Firstly, I would like to thank my thesis supervisor Dr. Fearghal O'Brien for his guidance, time, support and knowledge that he provided me throughout the process of writing my thesis. Secondly, I would like to thank my lecturer Dr. Michelle Kelly who has also provided me with her guidance and knowledge during this challenging year. Additionally, I would like to thank everyone who participated in this study, it is greatly appreciated. Finally, I would like to thank my family, especially my mam who has supported and encouraged me throughout the year.

Abstract

Aims: The aims of the current study were to investigate if emotions such as depression, anxiety, and stress predicted third-level student's academic performance while online-learning due to COVID-19. Specifically, this study looked within an Irish context and looked at the academic year of 2019/2020. The current study also aimed to investigate if there are gender differences that exist within this relationship. **Methods:** A questionnaire was administered to the participants ($n=103$) through Google Forms which consisted of questions from the perceived academic performance scale (Verner & Vallerand, 2016) regarding their perceived academic performance, and the DASS-21 scale, which measures participants experiences with depression, anxiety, and stress symptoms. **Results:** Results demonstrated that academic performance was negatively correlated with depression, anxiety, and stress. Depression, anxiety, and stress explained 19.1% of the variance in academic performance, however, depression was the only statistically significant variable and was the strongest predictor of academic performance. Results also demonstrated that there was a gender difference in scores for depression and stress, with females reporting higher scores compared to males. **Conclusion:** Overall, findings has provided a greater understanding into the relationship between depression, anxiety, and stress and academic performance while online-learning due to COVID-19. Findings have also highlighted practical implications regarding student support services.

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Coronavirus, also known as COVID-19 was declared by the World Health Organisation (WHO) as a global pandemic after investigating its massive spread throughout the globe. The COVID-19 pandemic has affected the whole population in many ways. According to Karatas (2020) previous pandemics has had many societal, economical and psychological impacts on many individuals, and COVID-19 is no different. COVID-19 has forced individuals to change their daily lives and habits, such as terminating or reducing direct social contact with others, but also introducing new policies and laws such as social distancing, national lockdowns and quarantines (Sigala, 2020).

With the Irish government announcing the partial closure of society on March 27, this included the closure of the educational sector throughout Ireland. According to UNESCO (2017), they estimate that 264 million young people do not attend school, with the COVID-19 pandemic exacerbating this issue. As COVID-19 was spreading throughout the globe, this led to forced closures of colleges and universities for an indefinite period (Martinez, 2020). This resulted in students going from traditional face-to-face learning to a more modern approach to teaching. Although many academic institutions around the world were hesitant about this switch from face-to-face learning to online learning through the use of existing medias, according to Dhawan (2020) this change was a necessity.

The history of online learning

Traditionally non-formal education was education through e-learning, online learning, and distance learning. Distance education has been around for approximately two centuries (Spector et al., 2008), with online learning emerging in the beginning of the 1980's. Throughout these centuries substantial changes to learning methods and communication have emerged and developed. These substantial changes to distance education have been made due to the rapid development of technology (McBrien et al., 2009). Since the development of learning technology, researchers continue to debate and agree upon universal definitions

(Lowenthal & Wilson, 2010; Volery & Lord, 2000). Distant education is the most well-known term which describes the attempt to provide learning opportunities to students who are geographically distributed. Distant education is seen to involve an instructor such as a teacher or professor who is situated in a different location from the student, while delivering the education at distinct periods. Most researchers have defined online learning as providing learning experiences via the use of technology (Benson, 2002; Carliner, 2004). According to these researchers, online learning is a more up to date version of distance education which aims to enhance access to education through the use of technology. Online learning has been seen to make education more student-centred and focus, while also being more adaptable and innovative for students. If current COVID-19 trends continue, it appears that these modern teaching and learning approaches will progressively supplant the traditional face-to-face learning. As the COVID-19 pandemic is proving to be a difficult period for many, one of the major concerns is whether or not the online learning approach can offer third-level students with a high-quality education. Another major concern is whether online-learning has any psychological impact on third-level students as a result of being isolated from their other classmates.

Mental health and academic performance of third-level students

For many individuals, their time in third-level education can be a difficult period in their lives and can be very emotionally and academically challenging (Saleem, 2013). During this period, a student may encounter demands and challenges, which may lead to physical, social and psychological issues (Rodgers, 2009). Due to these social and psychological changes, third-level students may be more sensitive to experiencing mental health issues (Benton et al., 2003; Eisenberg et al., 2007; Stanley & Manthorpe, 2001). There are several studies that have investigated the frequency of mental health issues among third-level students and results indicate that a significant percentage of third-level students around

the world experience mental health issues (Ovuga, Boardman & Wasserman, 2006; Nordin, Talib, & Yaacob, 2009; Verger et al., 2009). According to research (Hunt & Eisenberg, 2010), both the incidence and severity of third-level student's mental health issues are on the rise. Third-level students face issues such as mood disturbances, problematic behaviours, interpersonal difficulties and impairments to one self-concept (Grayson, 1989).

Stress, anxiety, and depression are common psychological symptoms third-level students face and they may have substantial detrimental effect on their academic performance (Tosevski, Milovancevic, & Gajic, 2010). Depression among third-level students is the most prevalent mental health issue (Lyubomirsky et al., 2003). Depression is a mental health disorder characterised by difficulties in emotional, social and occupational functioning (Sadock and Kaplan, 2007). As there is growing evidence to suggest that depression is prevalent among adolescence and the elderly (Winter et al., 2011; Lim et al., 2011; McKenzie et al., 2010), however depression among third-level students has received little attention throughout the years. According to research, the number of third-level students who report being depressed ranges from approximately 10% (Goebert et al., 2009), to 40% and 84% (Khan et al., 2006; Bayati et al., 2009). These findings may be as a result of factors such as evaluation methodologies (Weissman et al., 1996), the location of the college (Weissman et al., 1996) and socioeconomic parameters such as SES (Kaplan et al., 2008). Depression has been associated with poor academic (Hysenbegasi et al., 2005) and work (Harvey et al., 2011) performance. Although there are many protective factors such as socioeconomic status (Lowe et al., 2009) that may protect third-level students against depression, there are a various risk factors that might enhance a student's vulnerability to depression. Lifestyle changes that cause sleep and eating problems, financial difficulties, changes to family relationships and academic concerns (NIMH, 2003) are some factors that may enhance a student's vulnerability to depression. As COVID-19 has disrupted many third-level student's

college experiences by switching from traditional learning to online learning and it is clear that this transition may have caused a lifestyle change for many. Therefore, this lifestyle change and one's vulnerability to depression needs to be explored.

Recent research has identified the need to investigate student's mental health as there was a sudden switch to online learning during the pandemic. As mentioned previously, depression and stress among young individuals is common, especially among third-level students. This is a period where the young individuals go through a phase of identity building, and may be subjected to emotional, behavioural, academic and social challenges (Kaya et al., 2007). Stress can be defined as physiological or psychological response to a perceived stressor that can affect how an individual feels and acts (APA, 2019). This stress among third-level students can be seen as they are challenged with academic and social demands and are learning to form their own independent lives and relationships.

Yang et al. (2020) mentioned that due to the sudden outbreak of COVID-19, this has led to high levels of anxiety among individuals. Generalised anxiety can be defined as a common emotion felt by individuals that involves feelings of tension, worry, perceived challenges and concerned about individual situations (Spitzer et al., 2006). High general anxiety is associated with irritation, restlessness and distress. The current literature suggests that social isolation has resulted in a variety of psychological stressors such as fear of being infected with COVID-19 and boredom (Zolotov et al., 2020). Insufficient technology and social media use ultimately resulted in discontentment and worry amongst individuals during the social isolation period (Wang et al., 2020). However, a major concern among third-level students was their worry for their future employment opportunities, due to the loss of educational activities (Yang et al., 2020). Although anxiety (Spitzer et al., 2006) and stress have been seen to have a positive impact classroom engagement and academic achievement

(Naji et al., 2020), it is still unknown whether the stress and anxieties due to the COVID-19 pandemic had any academic impact on third level students.

Recent studies have investigated the emotional effects of COVID-19 on students using qualitative and quantitative methods (Son 2020; Aslan et al., 2020) Results of the study found that students have experienced an increase in anxiety, stress and depression.

Within a college population, females are more likely to report mental health difficulties when compared to males (McInyre et al., 2014). In terms of academic performance, females are often seen to outperform males (Dayioğlu & Türüt-Aşık, 2007; Khwaileh & Zaza, 2011; Balkis & Erdiñ, 2017). However, it is still unknown whether there are any existing gender differences in student's mental health quality and their academic performance during a global pandemic.

COVID-19 and the potential impact on third-level students

Because of these exceptional and unprecedented times, the potential effects of this global pandemic on student's academic performance and their well-being are still unknown (Baltà-Salvador, 2021). Dumford (2018) found that online learning does have some advantages such as flexibility and convenience. While this finding is critical to understanding an aspect of online learning, it is important to research student's academic performance during the COVID-19 pandemic. Although there are not many studies thus far investigating if the transition from traditional learning to online learning has any effect on student's academic performance, it is important to mention previous studies regarding the present study. Some studies have revealed that confinement during the COVID-19 outbreak had a positive impact on student's academic performance (Gonzalez et al., 2020; Realvásquez-Vargas et al., 2020). Similarly, Loton et al. (2020) demonstrated that online learning during the COVID-19 pandemic had a significant impact on student's academic performance.

An Irish context

The research and studies previously mentioned has been concentrated on other countries and populations, with little research being conducted on an Irish population in relation to COVID-19 and its' existing effects on students academically and psychologically. As there are many cultural differences existing between countries and populations, these results from previous studies cannot be generalisable to the Irish population.

Overall, this review of previous literature highlights the overview of COVID-19 and its impact on the educational sector all over the globe. This review also provides a brief account of the history of distance education and online learning, while noting that the sudden switch from traditional face-to-face learning to online learning was abrupt but it was a necessary transition. A lot of the research surrounding mental health and third-level students suggest that depression, anxiety and stress are common difficulties faced by many. A gap in the literature has been identified by the researcher, as to the researcher's knowledge, there is no existing literature surrounding if student's emotions while online learning during the COVID-19 has predicted student's academic performance.

Rationale

The rationale for the current study is that there is no existing literature surrounding if emotions while online learning during COVID-19 has predicted student's academic performance. The psychological variables surrounding the study will be measuring depression, stress and anxiety. This current study will investigate third-level students enrolled in an Irish university in order to address the gap in the literature mentioned above. Identifying if student's emotions during online learning due to the COVID-19 has predicted their academic performance, it may help future colleges and universities in identifying areas in which they can help support students if online learning is needed in the future. The current

research will also investigate the gender differences which may help identify potential groups that may be at risk.

Aims, questions and hypothesis

The aims of the current research is to investigate if stress, depression, and anxiety experienced by third-level students during online learning in the academic year of 2019/2020 predicted their perceived academic performance. The study also aims to investigate if there are any existing gender differences within this relationship.

For the current study, the research questions and hypotheses are the following:

RQ1: Is depression, anxiety, and stress related to student's academic performance while online-learning during the academic year of 2019/2020?

H1: Depression, anxiety, and stress will be related to student's academic performance while online-learning during the academic year of 2019/2020.

RQ2: Does the emotions stress, depression, and anxiety experienced by third-level students during online learning in the academic year of 2019/2020 predict their perceived academic performance?

H2: Stress, depression and anxiety experienced by third-level students during online learning in the academic year of 2019/2020 will predict their perceived academic performance.

RQ3: Is there a gender difference that exists within this relationship?

H3: There will be a gender difference that exist within this relationship.

Methods

Participants

The total number of participants for the current study is 103 participants, with 62 females and 41 males. Participants were aged between 19 and 48, with a mean age of 21.17 (SD= 3.39). All participants were enrolled in a third-level education in Ireland in the academic year of 2019/2020. Participants were recruited through convenience sampling through the researcher's personal social media accounts (Instagram and Snapchat). In line with NCI's ethical guidelines, participants were over the age of eighteen and provided informed consent after reading the provided information sheet (see appendix I) and consent form (see appendix II). Participants demographic information such as age, gender, and in which year where they enrolled in third-level education in the academic year of 2019/2020, was collected.

Measures

Demographic data

The demographic questionnaire was designed by the researcher. The demographic variables included gender, age, student status and in which year where they enrolled in third-level education in the academic year of 2019/2020.

Perceived academic performance

In order to measure individual's perceived academic performance, a questionnaire developed by Verner & Vallerand (2016) was used (see appendix III). The questionnaire consists of the following five questions; "I meet the official performance requirements expected out of a student", "I adequately complete assigned duties", "I fulfil responsibilities specified (e.g., study, homework, readings, papers) in the course outline", "I perform tasks that are expected of me" and "My performance is beyond demands". The items were rated on a 7-point Likert scale ranging from 1 "do not agree at all" to 7 "very strongly agree". The largest possible score to obtain using this scale is 35, whereas the lowest possible score to obtain is 5. In

previous research (Verner & Vallerand, 2016) the internal reliability was satisfactory, with an alpha level ranging from 0.83 in study one and 0.87 in study two. Within this current study, the internal reliability was reported at 0.86.

Depression, anxiety, and stress

Depression (e.g., loss of self-esteem), anxiety (e.g., fear of a negative event) and stress (e.g., having a constant state of over arousal) was measured using the DASS-21 scale (Lovibond & Lovibond, 1995) (see appendix IV). This self-reporting questionnaire consists of twenty-one questions (seven questions for each category) and was measured on a 4-point Likert scale ranging from 0 “did not apply to me at all” to 3 “applied to me very much or most of the time”. In order to calculate a score for each subgroup, each 7-item scale was multiplied by two in order to calculate comparable scores to DASS-42. The maximum score for each subscale is 21 and the minimum score is 0. Items included “I found it hard to wind down”, “I was worried about situations in which I might panic and make a fool of myself” and “I couldn’t seem to experience any positive feeling at all”. In order to measure the participants emotional distress in depression, anxiety and stress while online-learning, participants were asked to rate how many of each item applied to them in the academic year of 2019/2020. The higher the score a participant received indicates high levels of depression, anxiety or stress. Several studies have reported DASS-21 as being a valid construct in order to measure depression, anxiety and stress (Henry & Crawford, 2005; Ng et al., 2007; Asghari, Saed & Dibajnia, 2008; Le et al., 2017). Within this study, the reported Cronbach’s alpha was 0.92.

Design

As the current research will investigate the relationships between the variables at a single time point, a cross-sectional design was used for the current research, which investigated three hypotheses. A quantitative approach was used as a questionnaire was used

to collect the data. SPSS was used to analyse and interpret the data. Standard multiple regression was used to investigate the first research question. The predictor variables (PV) is depression, anxiety and stress. The criterion variable (CV) is perceived academic stress. An independent t-test was used for the second research question. The independent variable is gender, and the dependent variable is depression, anxiety, stress, and perceived academic stress.

Procedure

Participants were recruited through various online platforms. Data was collected through Google Forms, which displayed the questionnaire for the current study. The questionnaire was shared on the researcher's personal Instagram and Snapchat accounts which provided potential participants with a link to the questionnaire, which could be shared by participants. After participants decided to click the link, they were directed to the information sheet (see appendix I). The information sheet provided participants with information regarding the nature of the study, what participation will involve and highlighted the potential risks and benefits to the participant. Participants were provided with a consent form (see appendix II) which required them to tick the consent box if they consent to participation. One consent box highlighted that they were over the age of 18 and another one confirmed that they were a third-level student in the academic year of 2019/2020. The questionnaire consists of three sections. The first section consists of demographic questions which were relevant to the research questions. The second section consists of the perceived academic performance scale, which measures the student's perceived academic performance and participants were asked to refer to the academic year of 2019/2020. The third section presented participants with the DASS-21 scale which measures depression, anxiety and stress. Students were asked to refer to the academic year of 2019/2020. Once participants completed and submitted the self-reported questionnaire, participants were presented with a

debriefing sheet which thanked them for their participation, reminded them of the nature of the study and were given relevant support lines if they encountered potential distress from participation (see appendix V). Participation took approximately five minutes and were not offered breaks. However, participants could complete the questionnaire in their own time.

Data was transferred to excel to ensure no data was missing and then was transferred to IBM SPSS statistics for analysis of the data.

Ethical consideration

Data collection by the researcher adhered to the ethical considerations and guidelines by the National College of Ireland. Ethical approval was granted by the ethics committee in NCI. Participants were provided with the information with the nature of the study and highlighted the potential risks associated with the study in the information sheet. The information sheet also highlighted their rights as participants. Participants provided informed consent through the consent form. The debriefing sheet provided at the completion of the questionnaire provided participants with the support helplines if they experienced distress while participating in the current study.

Results

Descriptive Statistics

The sample for the current study consisted of 103 participants ($n=103$), consisting of 62 females (60.2%) and 41 males (39.8%). Frequencies for gender are reported in table 1. Descriptive statistics were performed for variables including age, total depression scores, total anxiety scores, total stress scores and total academic performance scores. Means (M), Standard Deviation (SD) and the Range (R) were obtained and reported in table 2.

Table 1

Descriptive statistics for gender

Variable	Frequency	Valid %
Gender		
Males	41	39.8
Females	62	60.2

Table 2

Descriptive statistics for age, depression, anxiety, stress and academic performance.

	<i>M</i> [95% CI]	<i>SD</i>	Range
Age	21.17 [20.51-21.84]	3.40	19-48
Depression	12.13 [10.98-13.27]	5.85	0-24
Anxiety	8.73 [7.68-9.77]	5.30	1-22
Stress	12.02 [10.98-13.06]	5.32	2-24
Academic performance	22.63 [21.33-23.93]	6.66	5-35

Inferential statistics

Standard multiple regression analysis was performed in order to determine if the variables depression, anxiety and stress predicted academic performance. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The correlation between the predictor variables (depression, anxiety and stress) and the criterion variable (academic performance) were examined. The three predictor variables were significantly correlated with the criterion variable with $r = -.12$ (anxiety), to $r = -.15$ (anxiety) and $r = -.37$ (depression). Correlation between the independent variables were assessed with r values ranging from $r = .67$ to $r = .77$. Tests for multicollinearity indicated that Tolerance and VIF values were in an acceptable range and therefore these results indicate there was no violation of the assumption of multicollinearity. The three predictor variables explained 19.1% of the variance in academic performance, $F(3, 98) = 7.7$, $p < .001$. Depression was found to be statistically significant and was the strongest predictor of academic performance ($\beta = -.67$, $p < .001$) (see table 3 for full details).

Table 3

Multiple regression model for predicting perceived academic performance scores.

Variable	R ²	B	SE	β	<i>t</i>	<i>p</i>
Model	.191***					
Depression		-.76	.17	-.67	-4.53	.001
Anxiety		.13	.18	.10	.73	.46
Stress		.36	.21	.29	1.7	.08

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

An independent samples t-test was conducted to compare levels of depression, anxiety, stress and academic performance between males and females. There was a significant difference in scores for depression, with males ($M= 9.59$, $SD= 4.45$) scoring significantly lower than females ($M=13.80$, $SD= 6.09$; $t(99.94)= 4.06$, $p= .004$, two-tailed). The magnitude of the differences in the means (mean difference= 4.22, 95% CI: 2.16 to 6.28) was moderate (eta squared= .99). There was a significant difference in scores for stress, with males ($M= 9.80$ $SD= 3.78$) scoring significantly lower than females ($M=13.48$, $SD= 5.70$; $t(101)= 3.94$, $p= .003$, two-tailed). The magnitude of the differences in the means (mean difference= 3.68, 95% CI: 1.83 to 5.53) was moderate (eta squared= .99). There was no significant difference in the means between males ($M= 8.08$ $SD= 4.16$) and females ($M=9.15$, $SD= 5.92$; $t(99.20)= 1.07$, $p= .29$, two-tailed) for anxiety. The magnitude of the differences in the means (mean difference= 1.07, 95% CI: -.91 to 3.05) was small (eta squared= .01). There was no significant difference in the means between males ($M= 23.54$ $SD= 5.82$) and females ($M= 22.03$, $SD= 7.15$; $t(96.62)= -1.17$, $p= .26$, two-tailed) for academic performance. The magnitude of the differences in the means (mean difference= -1.50, 95% CI: -4.05 to 1.05) was moderate (eta squared= .99).

Discussion

The aim of the current study was to investigate if emotions, specifically depression, anxiety, and stress predicted academic performance while online-learning in the academic year of 2019/2020. The current study explored this relationship within a sample of third-level students who were enrolled in an Irish university. The current study also investigated if any gender differences existed within this relationship.

Due to COVID-19 introducing new laws and measures, the introduction of online-learning during the academic year of 2019/2020 has led to many unknowns. Due to these uncertainties, recent research has highlighted the need to investigate student's mental health as there was a sudden switch from traditional face-to-face learning to online-learning. Prior research has found that depression, stress, and anxiety are common psychological emotions third-level students experience which may have an impact on their academic performance throughout their college experience (Tosevski, Milovancevic, & Gajic, 2010). With regard to gender differences, prior research has suggested that females are more likely to report higher levels of depression, anxiety, and stress compared to males, with female college students more likely to report poorer mental health quality in comparison to males (Soysa & Wilcomb, 2015). Three hypotheses were developed as a result of this research in order to address the aims of the current study.

As H1 was formulated from previous research, results showed that depression, anxiety and stress were correlated with the academic performance, which was investigated through a standard multiple regression analysis. Through this regression analysis, the three predictor variables explained 19.1% of the variance in academic performance. Results of this multiple regression showed that depression, anxiety and stress are negatively correlated with academic performance. This finding is consistent with prior research (Deroma, Leach, & Leverett, 2009; Elias, Ping, & Abdullah, 2011; Sohail, 2013; Mihăilescu et al., 2016; Oketch-

Oboth & Josiah, 2018; Frazier et al., 2019). The prior studies mentioned have investigated depression, anxiety, and stress and academic performance during a time period before COVID-19 and majority of studies have found a negative correlation between the variables. Unsurprisingly, the researcher has found results consistent with these findings during a period where COVID-19 was first introduced. COVID-19 has seen many negative consequences and implications on one's physical and mental health. As mentioned previously, COVID-19 has introduced new policies and laws such as quarantines, which has led to social isolation and distance from others. Since the global COVID-19 pandemic, researchers have seen an increase in depression, anxiety and stress (Ahmed et al., 2020; Cao et al.m 2020; Dubey et al., 2020; Ma et al., 2020; Salari et al., 2020; Wang et al.m 2020). Thus, these negative mental health issues which students may have faced has negatively impacted their academic performance.

The second hypothesis (H2) stated that depression, anxiety, and stress will predict academic performance of the students during the academic year of 2019/2020. Results of multiple regression analysis showed that only depression was found to be statistically significant and was the strongest predictor of academic performance in third-level students. This current finding is consistent with previous studies, who have also found that depression significantly predicted academic performance (Khanam & Bukhari, 2015). Similarly, Giusti et al. (2021) investigated the impact of distance education on mental health, social cognition, and memory ability in university students during the COVID-19 lockdown and to identify any predictors of academic performance. Researchers also found a negative correlation between depression and distance education, with depression being one of the strongest predictors of academic performance. In contrast, Bolatov et al. (2021) found that online-learning due to COVID-19 improved mental health among medical students. Interestingly however, the most common depression and anxiety symptoms were among the students who

reported a decrease in their academic performance. It is clear from the research to date that depression, even experienced during a pandemic, has negative effects on university student's academic performance. However surprisingly in the current study, the researcher did not find that stress and anxiety predicted academic performance. These findings may be due to the fact that online-learning has seen a certain decrease in stress and anxiety due to a number of reasons: the motivation and development of self-education, the reduction of costs such as transport, meals, and accommodation (Bolotov et al., 2021). The ability to balance education with personal and family life was seen to also reduce anxiety and stress during online-learning. In support of this, Cao et al. (2020) found that living with parents during COVID-19 was a protective factor against anxiety.

The third hypothesis (H3) stated that there will be a gender difference in scores when reporting depression, anxiety, stress and academic performance. Gender differences were investigated in the context of differences in depression, anxiety, stress, and academic performance scores. This hypothesis was moderately supported, with results from the t-test demonstrating statistically difference in depression and stress scores between males and females. For both emotions, males reported lower depression and stress scores compared to females. This suggests that females have a tendency to report and experience depression and stress compared to males. This finding supports previous research which have found that females are more likely to report depression (Piccinelli & Wilkinson, 2000; Bromet et al., 2011; Schuch et al., 2014; Kim et al., 2015; Wilson et al., 2018) and stress (Matud, 2004; Backović et al., 2012; Anbumalar et al., 2017; Prowse et al., 2021). However, findings to suggest there is no gender differences in anxiety is surprising and is in contrast to previous studies (Zalta & Chambless, 2012; Tsukamoto et al., 2021). The current study's findings may be due to the fact that many previous studies have investigated specific anxiety disorders, such as post-traumatic stress disorder (PTSD) (Roberts et al., 2011), panic disorder (Bernstein

et al., 2006) and social anxiety disorder (Grant, Hasin & Blanco, 2005). Results of the t-test also indicated that there were no gender differences in academic performance. Majority of previous findings have found that females often outperform males in their academic performance (Sheard, 2009; Deepak, et al., 2011; Khwaileh & Zaza, 2011). Based on the above findings, hypotheses 1 can be accepted, while hypotheses 2 and 3 are partly rejected.

The result from current study has many practical implications. The current study highlights that while online-learning during the academic year of 2019/2020, academic performance is negatively correlated with emotions such as depression, anxiety, and stress. It also highlighted that depression was seen to predict student's academic performance and gender differences were also highlighted.

As mentioned previously, the Irish government made the announcement to close schools and universities in order to help stop the spread of the disease. With this decision, online-learning for students came into effect. For many, online-learning for students was a new and an unusual experience (Hamaideh et al., 2021). In a previous study conducted by Hamaideh & Hamdan Mansour (2014), researchers found that online-learning led individuals to lack the psychological ability to maintain their psychological and academic requirements, experience high levels of academic stress (Shehadeh et al., 2020) and be susceptible to psychological disruptions (Hamdan-Mansour et al., 2018). As a result, online-learning has led to an increase in depression, anxiety, and stress among university students. Depression, anxiety, and stress are still common among students even if quarantine is lifted (Woon et al., 2020). One particular approach to help students with their mental distress, is to increase the presence of online support and helplines. Online helplines for students can be a method to overcome the barrier for transmission of COVID-19 and uncertainties of lockdowns and quarantines. Students have also identified barriers for seeking psychological treatment. These include lack of time, inconvenience and stigma surrounding psychological help (Lannin et al.,

2016). If colleges and universities offer online support programs for their students, this may help with these challenges and barriers for students as online support may be more cost-effective, can be used at any time and provides anonymity. Numerous meta-analyses have found that online support is as effective in the treatment of mental health issues compared to face-to-face therapy (Andersson et al., 2014; Carlbring et al., 2018). As there is increasing demands for mental health services, colleges and universities should offer online support for their students. The Royal College of Psychiatrists in the United Kingdom has encouraged colleges and universities to improve the accessibility of online support and therapies for students (Royal College of Psychiatrists, 2011). Since 2006, Australia has been following an e-mental health program for their citizens (Meurk et al., 2016). If colleges and universities are unable to provide online support for their students, it should be made aware to their students of existing helplines for seeking psychological health such as 'MyMind' which is an online counselling service for individuals who are directly affected by COVID-19. As mentioned previously, student's psychological well-being is correlated with their academic performance and satisfaction. Thus, college and universities offering online support services may help improve their academic performance.

In order to address the gender differences in depression and stress among college students, it is crucial for third-level institutions to become aware of these differences. Once made aware, colleges and universities should implement programs that recognise the gender differences and provide more appropriate counselling to females and males in their college years in an attempt to enhance their psychological well-being. There is evidence to suggest that addressing gender concerns into interventions improves the individual's health outcomes (Boerder et al., 2004). In order to address the gender differences in females reporting depression and stress when compared to males, colleges should offer clubs and organisations for females to join, in an attempt to improve their mental distress. Research has shown that

individuals who join a club or organisation has been positively correlated with psychosocial development and improvement with interpersonal relationships (Foubert & Urbanski, 2006).

Strengths and limitations

The current study serves as a solid starting point for further research. Firstly, to the researcher's knowledge, this is the first study investigating depression, anxiety, stress, perceived academic performance and gender differences during COVID-19 in the academic year of 2019/2020 in an Irish context. Secondly, as this study investigates the academic year of 2019/2020, it gains an insight into the first initial impact of COVID-19 on student's mental well-being and academic performance.

A number of limitations exist within the current study. The current study is based on self-reported measures. Although there are many advantages of self-reported measures such as anonymity and motivation to report from participants (Paulhus & Vazire, 2007), many participants may have felt embarrassed and may have been denying the truth about their mental health and academic performance due to COVID-19. Self-report measures can lead to self-favouring bias and self-enhancement. Previous studies investigating academic performance and COVID-19 measured participants academic performance by gaining student's test and exam scores, which therefore avoids self-favouring bias and self-enhancements from participants.

Another limitation in the current study is that it is a cross-sectional design. Although a cross-sectional can allow researchers to gain an insight into a specific topic at a certain time-point, causality cannot be obtained. Future research should focus on a longitudinal design, gaining a better understanding and knowledge on the effects of online-learning on student's mental well-being during COVID-19.

Lastly, another limitation that exists within the current study is the lack of probability

sampling. The current study used convenience sampling in order to recruit participants. This has a number of limitations such as the lack of ability to generalise the results to the population as a whole. There is a possibility that population was underrepresented in this study, as there was only 103 participants. Future research to use sampling methods such as stratified random sampling which can allow them to avoid sampling bias that may exist.

Conclusion

Overall, the current study has gained an insight into the relationship between depression, anxiety, stress and academic performance while online-learning due to COVID-19 during the academic year of 2019/2020. There is growing evidence to suggest that depression, anxiety, and stress are negatively correlated to academic performance, even during a global pandemic. Results of the current study has also provided additional support for the growing research investigating COVID-19 and college students. Future studies should use an alternative measure in order to investigate student's academic performance such as obtaining test and exam scores of the students. Future research should also use a longitudinal design and looking at online-learning and lockdown throughout the pandemic would be beneficial in order to gain causality of the relationship between the numerous variables. As the effects of COVID-19 is constantly changing and affecting students and their education, it is crucial to research this variable and its' negative effects on student's mental health and well-being.

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Appendices

Appendix I

Participant Information Sheet

You are being invited to take part in a research study. Before deciding whether to take part, please take the time to read this document, which explains why the research is being done and what it would involve for you.

What is this study about?

I am currently a final year student in the BA in psychology programme at National College of Ireland. As part of our degree we must carry out an independent research project. The overall aims of the study is to investigate if online learning as a result to COVID-19 has any academic and emotional effects on Irish students. The project will be supervised by Dr. Fearghal O'Brien, who is a lecturer at the National College of Ireland.

What will taking part in the study involve?

If you decide to take part in this research, you will be asked to complete an online questionnaire. This questionnaire will involve asking you questions relating to your academic performance during COVID-19. It will also involve asking questions about your emotions and well-being during the COVID-19 lockdown.

Who can take part?

You can take part in the study if you are aged over 18 and are enrolled in an Irish university. In order to measure the effects of online learning on your academic performance during the COVID-19 lockdown, you must have been a third-level student in the academic year of 2019/2020.

Do I have to take part?

Participation in this research is completely voluntary. If you do decide to take part, you can withdraw from participation at any time by closing your browser on your device or by completely turning off your device. Once you have submitted your questionnaire, it will not be possible to withdraw your data from the study, as the questionnaire is anonymous and individual responses cannot be identified.

What are the possible risks and benefits?

Due to the nature of the questionnaire and topics such as how a global pandemic might impact your well-being, it is possible that you may feel minor distress while taking part in the questionnaire. If this does occur, you have the right to withdraw from the study and exit the questionnaire until the point of submission of your answers. A debriefing form will be provided at the end of the questionnaire containing contact information for relevant support services. There will be no direct benefits to you for taking part in this research. However, the information gathered can make an important contribution to understand the impact of COVID-19 on student's well-being and academic performance.

Will taking part be confidential and what will happen to my data?

The questionnaire is anonymous and it will not be possible to identify a participant based on their responses to the questionnaire. Only the researcher and their supervisor will have access to the data. All data gathered from the study will be stored by the researcher in a password protected file and kept, as NCI policy, for a period of five years before being destroyed.

What will happen to the results of the study?

The results of this study will be presented in my final dissertation, which will be submitted to the National College of Ireland. The results of the project may be presented at conferences and/or submitted to an academic journal for publication.

Who should you contact for further information?

If you have any questions or queries please contact the researcher, Nham Thi Connaughton or their supervisor, Dr. Fearghal O'Brien, on the following email:

Researcher: x19309856@student.ncirl.ie

Supervisor: Fearghal.O'Brien@ncirl.ie

Appendix II

By ticking the "Yes" box, I confirm that I have read the information and understand the terms of this study, I am 18 years of age or above, and I give consent to participating in this study

☐ Yes

By ticking the "Yes" box, I confirm that I was a student in the academic year of 2019/2020, and I give consent to participating in this study

☐ Yes

Appendix III

Perceived academic performance scale

Below, please rate your academic performance during the 2019/2020 COVID-19 lockdown.

The scale is measured on a 7-point Likert scale ranging from 1 (do not agree at all) to 7 (very strongly agree).

1. I met the official performance requirements expected as a student.
2. I adequately completed assigned duties.
3. I fulfilled responsibilities specified (e.g., study, homework, readings, papers) in the course outlined.
4. I performed tasks that were expected of me.
5. My performance was beyond demands.

Appendix IV**DASS-21 questionnaire**

Below, please complete the DASS21 questionnaire which measures depression, anxiety and stress. Please read each statement and tick a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the months of confinement during the 2019/2020 lockdown.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree or a good part of time
- 3 Applied to me very much or most of the time

Question 1:

I found it hard to wind down

Question 2:

I was aware of dryness of my mouth

Question 3:

I couldn't seem to experience any positive feeling at all

Question 4:

I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)

Question 5:

I found it difficult to work up the initiative to do things

Question 6:

I tended to over-react to situations

Question 7:

I experienced trembling (e.g. in the hands)

Question 8:

I felt that I was using a lot of nervous energy

Question 9:

I was worried about situations in which I might panic and make a fool of myself

Question 10:

I felt that I had nothing to look forward to

Question 11:

I found myself getting agitated

Question 12:

I found it difficult to relax

Question 13:

I felt down-hearted and blue

Question 14:

I was intolerant of anything that kept me from getting on with what I was doing

Question 15:

I felt I was close to panic

Question 16:

I was unable to become enthusiastic about anything

Question 17:

I felt I wasn't worth much as a person

Question 18:

I felt that I was rather touchy

Question 19:

I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)

Question 20:

I felt scared without any good reason

Question 21:

I felt that life was meaningless

Appendix V

Debriefing sheet

Many thanks for your participation in this research study. This study was conducted in order to gain insight if COVID-19 had an impact on third-level students, academically and emotionally. Specifically, the aim of the study is to see if students' emotions such as depression, anxiety and stress, during the COVID-19 lockdown had an effect of students' academic performance. Again, I greatly appreciate your contribution to this study. Please, if you know anyone who may be interested in participating in this study and who fit the criteria, you can share the link to this study.

If you have any questions or queries about this study, please contact the researcher, Nham Thi Connaughton at x19309856@student.ncirl.ie or their supervisor, Dr. Fearghal O'Brien at Fearghal.O'Brien@ncirl.ie.

If you feel that you have been negatively affected by taking part in this study, the following contacts may be useful:

Mental Health Ireland can be contacted if you have any mental health queries.

Their contact information is: Phone number: 012841166

Email: info@mentalhealthireland.ie

Website: mentalhealthireland.ie.

Samaritans - Samaritans provide emotional support to anyone in distress or struggling to cope.

Their contact information is: jo@samaritans.ie,

Phone number: 116123,

or Visit their website: Samaritans Ireland.

Text 50808- this is a free 24/7 text service, providing individuals with many services including a calming chat or to support people going through mental health or an emotional crisis.

TEXT HELLO to 50808 or

Visit their website: www.text50808.ie

