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TRANSITION IN LERNING DURING CRISIS

Student Transition from FTF to Online Learning: Perception & Experiences.

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INFO 430 RESEARCH PROJECT

Contents

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Warmest Regards

Deepak Gautam

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ABSTRACT

In this study, I examined how the adoption of complete online learning due to the COVID-19 pandemic impacted the student's learning experiences compared to the traditional face-to-face (FTF) learning model. These courses have the same characteristics, i.e., delivered by the same course instructor with the same course content & format. However, they differ only in terms of their delivery methods, FTF offered in 2019 before COVID-19 and completely online in 2020 after the COVID outbreak. Those course models were compared on course impressions such as engagement, value to career, overall evaluation, anxiety or frustrations, and preferences. Additionally, those variables were treated with the 15 scales Short assessment Big Five Inventory (BFI-S) instruments to understand what aspects of student personality influence how they perceive different learning and teaching models.

When comparing online and FTF, I found that students' openness was weaker in the FTF cohort than in the online cohort. On the other hand, it was found that those who scored higher on neuroticism were less engaged. However, it was found that students who score higher on neuroticism were more engaged in the FTF cohort than online cohorts. Notably, it was found that students who score higher on extraversion traits were less anxious or frustrated. However, it was found that students who score more on extraversion scores were more anxious in the FTF cohort than the online cohort. Interestingly, I found that extraversion was negatively associated with overall evaluation meaning students who score higher on extraversion rate lower overall evaluation for FTF courses when compared to online courses.

Student Transition from FTF to Online Learning: Students' Perceptions & Experiences

1.0 INTRODUCTION:

New forms of learning and teaching were developed and practised as higher education for many decades is naturally evolving. The integration of different technologies and digital communication media with various models of teaching and learning has become an integral part of education (Jinlei et al., 2012). It is evident that after the emergence of e-learning (Liaw, Huang, & Chen, 2007), online courses are not a new phenomenon or uncommon form of teaching and learning in higher education (Toven et al., 2015; Rhoads et al., 2015). In the rising trend of digital learning, online learning management systems and e-learning platforms are probably the two most well-known developments for learning and teaching supported via internet and web technology or happening in a purely online fashion. Developing courses that adequately leverage the affordances of technology takes time and has to be well planned. FTF, online, distance, and hybrid courses are commonly practised models of learning and teaching. In these models, students either physically attend/ present in a class at a particular location or virtually in predefined online platforms at their own pace and time.

After the spread of a highly contagious disease (Wang et al., 2020), i.e. SAES-CoV-2 Coronavirus (popularly called COVID-19) beyond the mainland of China across the globe, schools and universities were closed (UNESCO, 2020). Governments worldwide have imposed several restrictions such as social distancing, lockdowns, travel limitations, and closure of borders to curtail coronavirus spread. We witnessed new pedagogical challenges in teaching and learning after many institutions decided to cancel all FTF classes, including labs and other learning activities, in response to this public health emergency. Governments and educational institutions have to decide promptly to resume the disturbances caused by learning and teaching. Despite the government restrictions and closure of campuses and ban on FTF teaching and learning, UNESCO has announced that students' right to get an education should not be stopped (UNESCO, 2020). So, education institutions chose an alternative to going entirely online. Higher education institutions that were traditionally not delivering fully online classes were forced into rapidly doing so. Institutions faced challenges because transition in learning due to the global crisis never

happened. Universities have to close at the sudden and mandated fully online learning without any preparedness or proper tools/ equipment for learning and teaching.

The contribution of my analysis is twofold. In this paper, first, I report on an investigation into how the adoption of fully online learning in response to the COVID-19 pandemic impacts students' learning experience compared to previous year students (before COVID-19). Secondly, I also studied what aspects of student personality influence how they perceive different learning models and teaching in different years, i.e., 2019 and 2020.

The contribution to the underlying foundation of my research project goes to the literature of Lang et al. (2011) and Keller, H., & Karau, S. J. (2013). Keller, H., & Karau, S. J. (2013), in their study on the importance of personality in students' perceptions of the online learning experience, found that Big Five personality traits were likely to influence the selection of the course modules. The existing research also studied what influences students' expectations and how their ability to achieve their expectations depends on different learning and teaching models, i.e., FTF and online. (Zhang, Q.,2020). Previous researchers have identified and focused on students' voices, perceptions, & experiences through their personality analysis (Yu-Yan et al., 2016) in predefined course models either online or FTF or flipped or hybrid models. But enforced fully online learning in response to a global health emergency or crisis that anyone has never experienced is yet not researched. This compulsory and untested enforced learning and training approach is the pure introduction of online long-term teaching and learning (Huang et al., 2020) without FTF learning at an unprecedented time (Burgess, S & Hans, S.S.,2020). These studies motivated me to analyze the opportunities for students to learn the use of an online platform during the COVID-19 and compare it with the FTF platform before COVID-19.

I conducted this research in a context where students have limited choices and are forced to learn entirely online. It is a unique scenario where students did their course FTF during the first few weeks of the trimester. The rest was fully online after the restrictions from the New Zealand government and university requirements. In this study, I have tried to identify the students' opinions regarding online and FTF learning and teaching platforms and how their personalities influence them. The research question guiding the research is based on students' experience, perceptions, and perspectives during their Online and/ FTF learning modules. My research project

was designed to directly explore how the adoption of fully online learning due to the COVID-19 pandemic impacted students' learning experience with different course impressions measures. Similarly, my research has intended to explore the influencing aspects of students' personalities to understand how they perceive different learning and teaching models.

1. How has the adoption of fully online learning due to the COVID-19 pandemic impacted students' learning experiences?

2. What aspects of student personality influence how they perceive different models of learning and teaching?

My analysis reveals that extraversion was negatively associated with an overall evaluation. That means students who score higher on extraversion rate lower overall evaluation for FTF courses when compared to online courses. On the other hand, it was found that those who scored higher on neuroticism were less engaged. However, it was found that students who score higher on neuroticism were more engaged in the FTF cohort than online cohorts. Additionally, while comparing online and FTF, it was noted that openness was found to be weaker in the FTF cohort than in the online cohort.

This work will provide universities with insight into how the adoption of fully online learning in response to the COVID-19 pandemic impacted students' learning experience and what aspects of student personality influence how they perceive different models of learning and teaching. It will help prepare for events in the future that may similarly disrupt university education.

2.0. LITERATURE REVIEW

In this research, I did a systematic literature review accessing the papers and research focused on face-to-face, online, blended, and virtual learning, among others. In addition, I focused on several pieces of previous literature from google scholar, academia, JSTOR, Springer, and materials from Victoria University Library for understanding the nature, characteristics, personality, perspectives, experiences as well as the performance of students in different course models, which is essential in this research.

Technology has enriched the learning and teaching experiences (L. Chen et al., 2015); Shu, H., & Gu, X., 2018); Gu, Cai, & Wang, 2014). Educators and researchers have argued that applying those

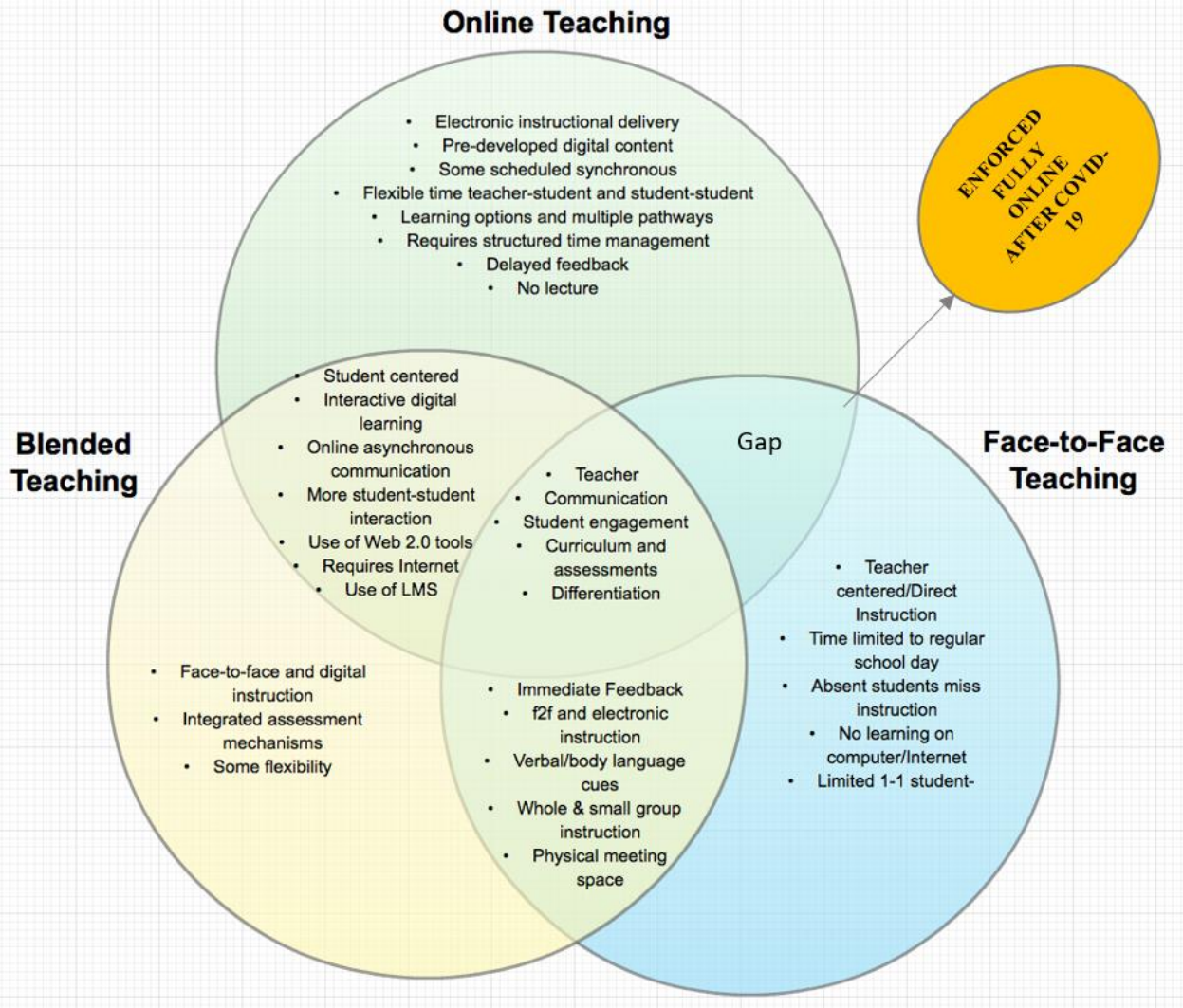
technologies in learning and teaching has brought a shift from a teaching to a learning paradigm (O'Bannon, 1997; Smolin and Lawless, 2003; Leu et al., 2004). Also, the integration of different technologies and digital communication media brought various models of learning and teaching (Jinlei et al., 2012) in the education sectors. The transition from FTF to online can enable more teaching and learning flexibility (Hussin, A, A., 2018), anytime. This was proven during this unexpected global health crisis where universities/ educational institutions have no other options. Even though universities have embraced online teaching and learning with different technologies before the COVID-19 pandemic, there is an ongoing debate about the quality and effectiveness of online courses compared with FTF (FTF) courses (Allen & Seaman, 2015; Hannafin, Hill, Oliver). Lack, K.A., (2013) mentioned that there is a scarcity of compelling quantitative evidence of the learning effectiveness of online courses over FTF courses. Additionally, it was found that students perceived course design as an affecting factor for success in an online learning experience (Song et al., 2004). Several research studies were conducted to explore and identify students' learning and satisfaction (Nguyen, 2015; Crawford-Ferre & Wiest, 2012) to improve learning and teaching processes (Song et al., 2004; Lim, Morris, & Kupritz, 2007) on online courses. But the current scenario of the rushed and enforced shift of fully online learning and teaching model is yet to be measured that has caused challenges for both faculties and students.

Aragon et al. mentioned that even students have different styles of learning preferences, it showed that online learning could be as effective as FTF learning (2002, p.243). However, the impact of the crisis is yet to be studied from various spectrums. Moreover, students raised the problems or difficulties experienced in online learning that emerged due to the universities' physical services (Chen et al., 2020). Correspondingly, Mullen revealed in a study that frustration & attrition started to emerge in asynchronous online learning raised the conflict in participants about the need for timing. Such learning does not accommodate interaction at the time of urgency (2020). Furthermore, research has shown that students face difficulties in social interactions (such as making friends, proper communications in asynchronous courses than in FTF courses (Jorgensen, D., 2003, Helms 2014).

Studies have shown that online or remote learning students are not disadvantaged when it comes to learning outcomes. A recent study examining several aspects of effectiveness found that online courses are as effective as or more effective than FTF (FTF) courses (Smith, K. D. (2020). Whilst research has compared different models of teaching and learning (e.g. Lim et al., 2007). Previous

research on flipped classroom pedagogy highlighted the benefits of improved communication (Ferreri and O'Connor, 2013) and higher student engagement (McLaughlin et al., 2014; Hu et al., 2015; Jamaludin and Osman, 2014). Smith, K. D. (2020) noted that students reported a preference for the hybrid learning model, despite modestly lower levels of learning. Furthermore, the learning outcomes of online students are comparable to and sometimes even better than those of students enrolled in traditional FTF courses (Biner et al., 1994). If there is no empirical evidence for shortcomings in terms of learning outcomes but why have there been elevated criticisms on online and flipped courses by students on self-learning-and-teaching approach (Ferreri and O'Connor, 2013; Wilson, P., 2013) and raised voices that such courses' benefits are for only certain types of learners (Wilson, P., 2013).

The learning experiences before the COVID-19 pandemic were well-planned and are profoundly distinct from those online courses offered in response to a crisis or disaster. Likewise, several studies have studied student's intentions, perceptions, and experiences either on FTF or online or blended or flipped approaches only. Even disaster researchers examined the impact of natural disasters, such as fires, floods, hurricanes, and tornadoes (noted from Lemons, H., 1957); Picou, J. S., & Marshall, B. K., 2007; Daphne et al., 2010) but not in the scenario which is unprecedented and unique. Nevertheless, the current shift to online learning after the COVID-19 outbreak is far from ideal; hurried, mandatory, often with minimal training, equipment, and synchronization. Henceforth, educational institutions, researchers, and academicians should understand that courses before and after the pandemic/emergency are different. Take into consideration while evaluating the differences between them.



Figure[1] 1. Source: Wanger, K. D. (2012).Online vs. Blended vs. FTF Venn Diagram.

The transition has been shown in the current issue of the pandemic in the whole world, in which the transition from FTF learning into online learning has shown the most significant effect on the lives of students and teachers. The sudden transition of FTF learning into online mode has affected students' learning process, resulting in lagging due to loss in their studying process.

Several studies have compared students' intention to take further online and FTF courses. Researchers have investigated student's studying intention to centre attention on numerous aspects, including students' characteristics, learning motivation and capability, course experiences, and

[1] Figure shows the research gap.

learning systems. Different research confirmed student's expectations of online courses, their course satisfaction, and attitudinal factors were related to their continuous intention to learn online (for instance: Basak and Calisir 2015; Al-Fuqaha, A., 2015; Mouakket, S., & Bettayeb, A. M., 2015; and Tarhini et al.,2015). Pérez Cereijo (2006), amongst other researchers, expressed that students' perceptions of online learning predict success. Notably, researchers quoted that the students' performance increases when a fit exists between a student's abilities and the learning and teaching method (see. Gardner, 1983; Sternberg, Torff, & Grigorenko,1998). Academic motivation would be higher when the students' personality-influenced cognitive and interaction preferences are matched with the academic environment (Komarraju and Karau, 2005; Keller, H., & S.J. Karau research & S.J. Karau, 2013)., and their motivation will incline them towards their course preferences from their academic environment. Keller, H., & S.J. Karau research and S.J. Karau (2013) pointed out that students would have more favourable impressions of online courses when their personality is well-matched to the learning environment.

The virtual outbreak of online education has prompted questions about the quality of the learning in isolation and students' frustration. Furthermore, it came up with the questions raising for the impact of online learning on learner results is getting investigated (McInnerney, J. M., & Roberts, T. S., 2004). It was found that online students were self-disciplined and more independent (McInnerney, J. M., & Roberts, T. S., 2004). Thiele (2003) claims that online students learned to trust their judgment and dig deeper into the content than FTF courses. In studying students' frustration and isolation, McInnerney & Roberts(2004) and Daugherty & Funke (1998) reveal that online learning often leads to frustrations with a lack of social interaction with peers and educators. However, contemporary research by Daugherty and Funke (1998) indicates that the issue of isolation is 'an important criterion for student satisfaction' in an online course. Daugherty and Funke gave another perspective that isolation can influence a student's attitude to learn self in online courses because there is a physical separation between student and teacher (1998). Teachers may improve that isolation; however, it might be completely impossible to eradicate that isolation (Daugherty and Funke, 1998). Henceforth students start to learn on their own when they could not reach their instructors at the time of need (Daugherty & Funke, 1998). One research mentioned that those students who may not have developed appropriate strategies for self-regulation might find that online courses do not meet their expectations and may subsequently have much higher

rates of attrition than FTF courses (MacMahon & Oliver, 2001; Phipps & Merisotis, 1999; Merisotis, J. P., & Phipps, R. A., 1999).

In contrast to previous views, Pérez Cereijo et al., (2001, p.37;) and Kuong, H. C. (2009) disproved the view of Daugherty & Funke and expressed that isolation can be a problem with web-based learning. These findings are verified on an exploratory case study of students' perceptions of online graduate education. The case study found that participants who expressed extreme frustration with isolation and technical problems or inexperienced computer users and never attended online courses were extroverts, visual learners, or more likely inclined towards FTF based courses (Pérez Cereijo et al., 2001; Kuong, H. C., 2009). Furthermore, Shu, H., & Gu, X., finding the differences between online and FTF students–group interactions in a blended learning course, found a significant difference between online and FTF learning and teaching (2018). When there is interaction & sharing of ideas between teachers and students, it promotes cognitive change and builds a strong cohesion (Shu, H., & Gu, X ., 2018). Alternatively, different researchers noted that social context and flexibility of learning models should be considered besides isolation. Besides these personalities, academic performance influences the course selections for students.

Personality, personal preferences, academic performance, and engagement (academic and social) are the most important factors in education, either online or hybrid. (for example, Daugherty and Funke, 1998; Komarraju and Karau, 2005; Keller, H., & S.J. Karau research & S.J. Karau, 2013; Pérez Cereijo et al., 2001; Kuong, H. C., 2009, Summers et al., 2005; Soffer, T., & Nachmias, R., 2018)) or FTF education (for example, Soffer, T., & Nachmias, R., 2018; Irani, Telg, Scherler, & Harrington, 2003; Kanuka & Nocente, 2003; Kim & Schniederjans, 2004; Rovai, A. P., 2003; Schniederjans & Kim, 2005; Harrington, R., & Loffredo, D.A., 2010; MacGregor, C.J., 2002; Pocius 1991; Biner et al., 1995; Daugherty and Funke, 1998). Academic engagement generally focuses on behaviours directly related to the learning process; for instance, the time spent on task or participation in organized learning activities, whereas social engagement focuses on interactions of students' either with teachers or their colleagues (Finn et al., 2003). Both academic and social engagement have shown consistent correlations with academic performance (McDermott & Beitman, 1984; Finn et al., 1995; Matks, H., 2000; Finn et al., 2003). Besides the students' participation in academic activities, the role of the teacher is essential in learning either FTF, online, or blended. Blake (2011) & Dikkers (2015) researched the effectiveness of blended

learning from different perspectives over traditional instruction modes to influence online learning on face-to-face learning.

The results from this research have been mixed but generally supported a significant relationship between personality and performance. For example, Schniederjans & Kim (2005) found a significant relationship between performance and each Big Five dimension except extraversion. Lee and Lee (2006) noted a relationship between personality and interaction in a web-based threaded discussion. Moreover, a consistent relationship with personality traits was found by Butler & Pinto-Zip (2005/2006). Biner et al. (1995) reported that the global factor of the anxiety of online and FTF students is different. However, MacGregor, C.J., disproved the claim with different findings that both FTF and online cohorts were similar to the global factor of anxiety (2002). Online students seemed to have different personality characteristics than FTF. The primary differences were in the seriousness, shyness, apprehension, and inflexibility of the online students compared to those who meet FTF. Harrington, R., & Loffredo, D.A, amongst others, reports that most students who preferred online classes were found to be introverts whilst FTF were extraverts (2010). The preferences for online courses were indicated by some factors such as convenience, enjoyment of computer technology and a desire for innovation (Harrington, R., & Loffredo, D.A., 2010), accommodating and self-controlling than those in FTF classes (MacGregor, C. J. 2002). Their study noted that the students who preferred FTF courses reported that they were influenced by the class structure appealing to their need to learn through listening and their desire to better gauge the emotional reactions of others in the class (Harrington, R., & Loffredo, D.A., 2010). Interestingly, Harris, M. L., & Gibson, S. G., 2006) found that older students, women, and those working full time were more likely to prefer online/ distance courses. Additionally, it was highlighted that students who had taken most of those courses in the past and women expressed their preferences for distance education over FTF courses (Harris, M. L., & Gibson, S. G., 2006).

3.0. METHODS AND RESEARCH DATA

A quantitative research methodology for this study was chosen because quantitative methods have an important role in discovering the fundamental dimensions of personality. The post-positive method was used to evaluate perspectives & experiences and compare students' personalities for their learning modalities. It is based on a prediction in which the data has been applied in specific research, and it should be chosen based on research questions. The post-positivism approach is

referred to as methodological pluralism (Morris et al., 2009), which balances both a positivist and interpretivist approach that focuses on researching the issues in the context of involving experiences of the majority and announcing the results of what the majority says is acceptable (Wildemuth, B.M., 1993; Fischer. F., 1998). Positivism approaches a term used to evaluate the approach of the research of a community that depends primarily on technical proof like statistics and experiments. The research approach applied is believed to help gain data and knowledge regarding the online learning benefits for the students during the COVID-19 and FTF learning before COVID-19 from multiple dimensions, i.e., through course impressions and personality.

3.1. Participants

The participants in this research are from undergraduate-level courses, i.e., QUAN 102 introduction for statistics course Trimester 1 2019 and Trimester 1 2020. A convenience sampling method was applied to collect the data from the participants, which means the sample participants were readily available from that course for this research. Then an email was sent to the participants from the course coordinator with the Informed Consent form to participate in a voluntary survey (Appendix 1, 2, 3,4) that included a description of my research study, research procedures, associated risks and benefits, and in case of risk the solution offered was also mentioned. Students were given full control to complete the survey or exit the survey when they feel uncomfortable. Survey data were collected from 41 students from Trimester 1 2019 and 26 students from Trimester 1 2020. Both cohorts studied the same course taught by the same professor with contents and materials at Victoria University of Wellington, New Zealand.

In T1 2019, the lectures and the tutorials were only FTF and taught before the COVID-19 pandemic. However, only tests were done on the tutorials, FTF, but in Blackboard, so "online". Whereas in T1 2020, there was an FTF class for the first few weeks, and the rest was completely online, but the synchronous ones were attended by a tiny fraction (out of 400 or so). The lecture attendance was optional initially in both cases when there was an FTF stream and stream with no lectures. Similarly, the pre-recordings were watched by a small portion of the class. Tutorials were online but not attended. Tests were again "online" but done by students in their own time and space in 2020.

3.2. Data Collection Approach

In my research, the data collection method is the primary method where I collected through the survey. The survey questions were created similar to the original paper of Steven J. Karau (2013) and added modified some questions and created course impressions for both settings, i.e., online and FTF, as shown in table no.1[2]. Similarly, a short Big Five personality inventory, i.e., 15-item BFI-S instruments, was used (Lang et al., 2011) to measure the personality traits depicted in Table 2[3].

3.2. Ethical Consideration

In my research project, participants were from the vulnerable population, i.e., students. Due to COVID-19, their studies have been disrupted or shifted from FTF to online, which might have caused stress or difficulties. And in the survey, some personality-related questions might have triggered distress or made students' worried about their responses for each course module when asked participants to recall upsetting events they faced during the COVID-19 pandemic. This may cause them distress (e.g. when they performed exceptionally bad). I took all the necessary precautions to manage this situation[4] (I explicitly mentioned in the information sheet and surveys). I carefully anonymized the data. Students were not named and also not reported at an individual level (unidentifiable). Instead, only statistically aggregate results were produced.

Open-ended questions were not used for this research. Any forms of personal identifications, email addresses, or personal questions that were not used could retrace any information about the participants or recruited participants. Before submitting their responses, they were able to save them as a PDF and review their responses. After the submission, they were unable to change their responses. Also, the researchers cannot identify whether the person took part in the research, or subsequently identify people who took part (e.g., by recognizing them in different settings by their appearance or being able to identify them retrospectively by their appearance, or because of the distinctiveness of the information they were asked to provide. In any publications, I have not mentioned which specific course my study was investigating so that students cannot infer it was the particular class they were enrolled in.

[2] Appendix 3 & 4 represents survey questionnaires used for FTF and online cohorts.

[3] In appendix 3 & 4, Questions from Q. 4.1 to Q 4.15 represent BFIS inventory.

[4] Appendix 1 section mentions what precaution was taken to manage those situations.

3.3. Variables

To measure the perceptions and experiences of students from different cohorts, I utilized course impressions (FTFCI and OCI) and 15- Big Five Inventory Items (BFI-S) from previous research.

3.3.1. FTF Course Impression (FTFCI) and Online Course Impressions (OCI)

Previous research has developed and utilized online course impression (OCI) instruments to measure perceptions and experience toward online courses from various sets of questions. Course impressions measured engagement, value to career, overall evaluation, preferences for online courses, and anxiety or frustration for online students only (Keller, H., & Karau, S. J. (2013). I utilized the same OCI instruments with some modifications to measure the perceptions and experiences of students from the online cohort. However, due to the lack of such instruments to measure FTF course impressions (FFTCI), I created something similar for FTF Cohort with the foundation of OCI instruments from Keller, H., & S.J. Karau research (2013).

In both course impressions, there are five constructs. **Engagement** and **value to career** were used to measure the positive aspects of those courses, explaining motivation, progress, and other aspects. Likewise, overall evaluation and preference constructs were used to explore the feeling, experiences, and preferences. On the other hand, **anxiety or frustration** constructs were used to measure the negative impressions of FTF and online courses. And also exploring the feeling and preferences (overall evaluation and preferences for course modules) as variables to measure perceptions and experiences about the selected course modalities (Keller, H., & S.J. Karau research). Likewise, short assessments of 15-item Big Five Inventory (BFI-S) instruments from Lang et al. (2011) were used to measure Big Five Personality traits.

3.3.2. 15-Short Big Five Inventory (BFI-S)

Students' personality characteristics were measured using the short version of the German Big Five Inventory (Gerlitz & Schupp, 2005) developed by Lang et al. (2001, 2011). The BFI dimension represents a powerful means/tool (Brust et al., 2016) to analyse inter-individual differences in personality dimensions (Lang et al., 2011). BFI is part of the International Personality Item Pool (IPIP5), widely accepted and utilized as a source of various personality scales. The shorter version

[5] *International Personality Item Pool (IPIP) can be accessed through* *http://ipip.ori.org/*

of BFI-S has just 15 items but have good psychometric properties (Törnroos et al., 2019) that delivers a quick and rough (Lang et al., 2011) but a robust and reliable estimation of personality traits across survey methods except telephone interviewing (Lang et al. 2011; Jokela et al., 2013). The BIF inventory with high numbers of items is more time-consuming while conducting a survey. To remove this hassle, short inventories were developed, which can be easily applied in surveys. Hence, shorter versions of BFI were emerged (Gosling et al. 2003; Gerlitz and Schupp 2005, p204). Under proven ease of administration, usefulness, and widespread application (Goldberg L. R, 1992; Goldberg et al., 2006; Lang et al. (, 2011) of those short versions of BFI-S, I have also used them in this study.

BFI measures the five dimensions of personality such as Openness to experience (O), Conscientiousness(C), Extraversion (E), Agreeableness(A), and Neuroticism (N). Using those personality constructs/ variables, I explored students' personality traits from both cohorts and compared them across the course impressions. These five dimensions were often termed as OCEAN models, as shown in figure 2.

- Openness to experience (O) refers to individual differences in the propensity for originality, creativity, and the acceptance of new ideas (Brust et al. 2016 p.602)
- Conscientiousness (C) refers to individual differences in self-control, task orientation, and rule-abiding (Taylor et al. 2010, a3-21- a3-22).
- Extraversion (E) refers to individual differences in sociability, gregariousness, level of activity, and the experience of positive emotions (Brust et al. 2016 p.602).
- Agreeableness (A) refers to individuals' differences in altruistic behavior, trust, warmth, and kindness (Brust et al. 2016 p.602)
- Neuroticism (N) or emotional stability refers to individual differences in the susceptibility to distress and the experience of negative emotions such as anxiety, anger, and depression (Brust et al. 2016 p.602).

Figure 2. OCEAN Model, Brust et al. 2016 p.602; Taylor et al. 2010, 13-21-a3-22

4.0. RESULTS

The primary purpose of this study was to understand the perceptions and experiences of students from different years, i.e. T1 2019 and T2 2020. Participants' perceptions and experiences were evaluated from the course impressions and their personality traits. The result of this quantitative

study is based on surveys from those two cohorts. I created five constructs for course impressions and five for BFI-S for both cohorts for the data analysis purpose. The construct variables for course impressions are engagement, value to career, overall evaluation, anxiety/ frustration, and preference for each course model. Similarly, for BFI-S, like an OCEAN model, constructs variables are created (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) are in Tables 1 and 2 in detail.

Then for general analysis, I calculated descriptive statistics with item mean and item standard deviation, shown in table no 1 and 2, respectively. To identify which elements of BFI traits were most strongly related to each of the 5-course impressions, I conducted stepwise multiple regression on R studio version 4.2.0. I used BFI traits as a predictor and treated each of the 5-course impressions as dependent variables. The significance predictors from each regression model are shown in tables 3, 4, and 5. Neither gender nor place of study has any significant influence on these results.

To establish trustworthiness/reliability, i.e. internal consistency of each construct and subscales of course impressions and BFI-S, Cronbach alpha was calculated. Cronbach alpha (Cronbach, L. J., 1951) measures reliability, especially internal consistency reliability/ trustworthiness or item interrelatedness, of a scale or a test (for example, in my research survey questionnaire). Cronbach alpha was calculated to measure and evaluate how well each item in a scale correlated with the sum of the remaining items (Streiner DL & Norman GR., 1989). This measures the consistency among the individual items on a scale and helped determine whether the research truly measured what it was intended to measure and measured the truthfulness of the research results (Kothari 2012).

Descriptive Statistics

Tables 1 and 2 show the mean and standard deviations of each item and alpha values for each of the five subscales for course impressions and the Big Five Inventory.

Table 1: FTFCI & OCI

Cohort/ Year	**FTF**		**Online**	
Scales, alpha, coefficients, and items	**Item Mean**	**Item SD**	**Item mean**	**Item SD**

Engagement	α= 0.88		α= 0.62	
I find FTF/ Online courses are very motivating for me.	4.09	0.88	2.57	1.27
I find FTF/ Online courses very engaging	3.92	0.91	2.84	1.12
FTF(FTF) / Online courses motivated me to do my best.	3.82	1.19	2.73	1.11
FTF/ Online discussions during the class motivated me to participate.	3.65	1.23	2.42	1.02
I tend to disengage from FTF/Online courses.[r]	2.73	1.02	3.50	1.14
Not having other students present hurts motivation in the FTF/ Online course.[r]	3.04	1.11	3.07	1.12
Value to Career	α= 0.85		α= 0.86	
I think I have made progress in the FTF Courses.	4.04	1.07	3.96	0.95
I think FTF/ Online courses will help me in my career.	4.00	1.07	3.46	1.02
FTF / Online courses will have little or no value to my career.[r]	1.78	1.07	2.46	1.02
I will be able to apply what I learn in my FTF/ Online courses to my job.	3.65	0.79	3.65	0.97
Taking courses FTF/Online or in-person will help me get a better job.	3.41	0.97	3.15	0.92
FTF/Online Courses will make me more competitive for raises and promotions.	3.14	1.03	2.73	1.07
I sometimes doubt the work relevance of my FTF/ Online courses. [r]	3.17	0.97	3.00	0.93
Overall Evaluation	α= 0.92		α= 0.91	
My experience with FTF/Online courses has been positive.	3.87	1.14	3.38	1.23
I would recommend FTF/ Online courses to my family or friends or anyone.	3.85	1.06	2.92	1.12
I feel FTF/ Online courses are valuable.	4.09	0.88	3.30	1.01
I enjoy being able to take courses in person(FTF)/ Online.	4.00	1.16	3.46	1.27
I hate FTF/ Online Courses.[r]	1.85	1.03	2.65	1.35
I've had bad experiences with FTF/Online Courses.[r]	2.53	1.05	2.61	1.29
I think the FTF/Online courses was well structured to achieve the learning outcomes (There was a good balance of lectures, tutorials, tests, exams, etc.).	3.85	0.85	3.69	0.97
The learning and teaching methods encouraged participation in FTF/ Online courses.	3.70	1.16	3.00	1.41
The overall environment in the FTF/online courses was conducive to learning.	3.95	0.97	3.07	1.19
The course objectives were clear in FTF courses/ Online (learning objectives, expectations, deadlines, assessments, and grading criteria).	3.92	0.95	3.80	1.05
The FTF/Online Courses' workload was manageable.	3.75	0.69	3.84	1.04
The FTF/Online course was well organized. (Timely, access to materials. Enough practice test sets, etc.).	4.07	0.78	4.11	1.10
Anxiety/ Frustration	α = 0.77		α = 0.78	

FTF/Online courses make me anxious.	3.19	1.26	3.19	1.38
FTF/Online Courses involve too much uncertainty.	2.51	1.14	3.11	1.21
I lose sleep worrying about my FTF/Online courses.	2.36	1.21	2.15	1.34
FTF/Online courses lessen my anxieties about learning. [r]	2.92	0.98	3 .03	1.11
Preference for FTF /online course	α = 0.57		α = 0.70	
I am more comfortable participating in discussions FTF or in-person/ Online.	3.46	1.22	3.00	1.38
Given the choice, I would always choose the FTF/Online course over the Online courses/FTF courses.	3.70	1.48	2.53	1.44

[r] *Indicates items that were reverse-coded for the scale in question.*

Table 1 shows that average measures for FTF preferences (3.70), value to career, overall experiences are higher than online courses (2.53). Students from the FTF cohort find FTF courses more engaging, motivating, and valuable to their careers than those from the online cohort. It reveals that, on average, the disengagement in students from online cohorts (3.50) is higher than in FTF cohorts (2.73). Equally, it refuted that the average measures for frustration or anxiety in an online cohort are higher than in the FTF cohort. In contrast, the average measures for the perception of courses & their value to their career, the students from the online cohort pointed that their online courses will have little or no value to my career (2.46) than that of the FTF cohort (1.78). Overall, on average, FTF courses seem better than online courses. The table also outlines that, on average, students hate online courses(2.65) than FTF (1.85). Cronbach alpha (α) for both online and FTF cohort groups are shown in the table on each construct variable.

Table 2: BFI-S

Cohort/ Year	**FTF Cohort (2019)**		**Online Cohort(2020)**	
Scales, alpha, coefficients, and items	**Item mean**	**Item SD**	**Item mean**	**Item SD**
Neuroticism (BFI 1)	α= 0.84		α= 0.87	
I am the person who worries a lot.	4.6923	1.791	4.6153	1.9406
Gets Nervous easily.	4.2820	1.9594	4.3076	1.8712
Remains calm in tense situations.[r]	4.5897	1.3122	4.2307	1.3358
Extroversion (BFI2)	α= 0.88		α= 0.85	
Is talkative.	4.6410	1.4046	4.2692	1.5889
Is outgoing, sociable.	4.7179	1.5034	4.5769	1.6774
Is reserved.[r]	4.00	1.4327	4.0769	1.5980

Openness (BFI 3)	α = 0.84		α = 0.72	
Is original, comes up with new and creative ideas.	4.3589	1.4046	3.9615	1.3705
Values artistic, aesthetic experiences.				
Has an active imagination.	4.7435	1.2715	4.3461	1.4951
	4.6923	1.3602	4.1923	1.6252
Agreeableness (BFI4)	α = 0.52		α = 0.35	
Is sometimes rude to others.[r]	2.7435	1.3122	3.4615	1.5028
Has forgiving nature.	5.2051	1.1960	5.0384	1.2483
Is considerate and kind to almost everyone.	5.8717	0.8638	5.5769	1.2384
Conscientiousness (BFI5)	α = 0.71		α = 0.17	
Does a thorough job.	3.6153	2.0470	5.4615	1.1395
Tends to be lazy.[r]	3.7179	1.5551	4.1538	1.6417
Does things efficiently.	5.3076	1.1732	5.1538	1.2551

[r] *Indicates items that were reverse-coded for the scale in question.*

Table 2 shows the average measures for BIF-S for each cohort. It reveals that average measures for neuroticism in FTF cohorts (4.52) are higher neurotic than the students from the online cohort (4.38). Similarly, it indicates that extraversion and openness to experiences are higher on average than in students from an online cohort. However, it points out that the average measures of agreeableness and conscientiousness for online cohorts are higher than FTF cohorts. The validity and reliability of the constructs are determined by the Cronbach alpha, as mentioned in the table. However, Cronbach alpha for conscientiousness constructs of BFI-S was found lower. This could be due to the lower sample size of the online cohort (26 participants) compared to the FTF cohort. The items of the conscientiousness cohort were not deleted or eliminated because the same constructs on the FTF cohort were found valid, i.e. alpha higher than 0.70. This could be studied further in more detail with a larger sample size across different demographics.

I conducted a correlation analysis in FTF and Online cohorts across each course's impression and BFI-S dimensions. The separate analysis is as below:

Table 3: **The stepwise multiple regression results with BFI dimensions regressed on course impression for the *FTF cohort (2019).***

Factor	**Predictor**	**Beta (β)**	**R^2**
Engagement	-	-	-

Value to career	Conscientiousness	0.191(t value 1.44 p value 0.16)	0.27
Overall evaluation	Conscientiousness	0.32*	0.41*
	Extraversion	(0.21·)	0.41·
Anxiety/Frustration	Extraversion	-0.313*	0.26*
	Neuroticism	0.16(t value 1.14 p value 0.26)	
Preference FTF	Extraversion	0.24 (t value 1.12 p value 0.17)	0.16

*Significance codes: *p<0.05, ·p<0.10, **p<0.01, ***P<0.001*

There were no significant predictors from BFI for engagement, which means there was no relationship between personality traits and engagement on FTF cohorts.

For value to career, 27% of the variance was explained by only one personality trait, i.e. conscientiousness. Conscientiousness (**0.191, t value 1.44**) is positively related with value to career, meaning higher conscientiousness cohorts derive higher value from FTF courses.

For overall evaluation, 41% of the variance was explained by two predictors (Conscientiousness, i.e. **0.32*** and Extraversion, i.e. **0.21·**). Both predictors have significant positive effects on student's overall evaluation of course impressions. Meaning students scoring higher on the conscientiousness traits are likely to have more positive experiences from FTF courses. Similarly, students scoring higher on extraversion traits have more positive experiences with FTF courses and evaluate FTF courses as a higher value on overall evaluation.

26% of the variance was explained by two predictors (extraversion and neuroticism). Neuroticism (0.16 t value 1.14 p-value 0.26) was positively related to anxiety or frustration, whereas extraversion (0.31*) was negatively related to anxiety or frustration. The analysis reveals that higher extroverted students are less anxious in FTF courses.

For a preference of FTF course, 16% of the variance was explained by one personality trait (extraversion). Extraversion (beta 0.24 t value 1.12 p-value 0.17) was positively related to a preference for the FTF course, meaning students scoring higher on extraversion traits prefer FTF courses over online courses.

Notably, neither agreeableness nor openness showed any significant relationship with any of the specific components of the FTF course impression. However, it should be noted that the results of my estimate are not significant at the conventional significance levels (in that case, I used t-value).

Table 4: The stepwise multiple regression results with BFI dimensions regressed on course impression for the *Online cohort (2020)*.

Factor	Predictor	Beta (β)	R2
Engagement	Conscientiousness	0.12(t value 1.26, p value 0.21)	0.23
Value to career	No predictor	-	-
Overall evaluation	Conscientiousness	0.14(t value 1.19, p value 0.23)	0.11
Anxiety/Frustration	Neuroticism	0.27*	0.19*
Preference Online	Conscientiousness	0.29(t value 1.43, p value 0.16)	0.07

*Significance codes: *p<0.05, ·p<0.10, **p<0.01, ***P<0.001*

For engagement, 23% of the variance was explained by only one personality trait, i.e. Conscientiousness. Conscientiousness (0.12 t value 1.26 p-value 0.21) was positively related to engagement meaning students scoring higher on conscientiousness trait engage higher/more than lower-scoring conscientious students in an online cohort.

Any personality traits explained no variance for value to career, which means there was no relationship between personality traits and value to a career in an online cohort.

For overall evaluation, 11% of the variance was explained by predictors, i.e. Conscientiousness. Conscientiousness (0.14, t value 0.14) was positively related to overall evaluation, meaning students scoring higher on the conscientiousness traits are likely to have more positive experiences from online courses.

19% of the variance was explained by only one predictor (neuroticism) for anxiety or frustration. However, neuroticism (0.27*) was positively related to anxiety or frustration. This analysis reveals that highly neurotic students are more frustrated in an online course.

For a preference of Online courses, 7% of the variance was explained by one personality trait (Conscientiousness). Conscientiousness (0.24 t value 1.12 p-value 0.17) was positively related to a preference for online courses, meaning students scoring higher on conscientiousness traits prefer online courses over FTF courses.

Notably, neither agreeableness nor openness showed any significant relationship with any of the specific components of the online course impression. However, it should be noted that the results of my estimate are not significant at the conventional significance levels (in that case, I used the t value).

After analysing two cohorts separately, I performed an interaction analysis using the interaction terms ftf yes and ftf no. Interaction analysis[6] was performed to have main effects for each interaction to study either interaction between BFI-S traits and course impressions by the course models themselves, i.e. FTF or online. Here FTF (ftf yes) or Online course(ftf no) acts as a third variable, also known as an interacting variable. The table below shows the interaction analysis between course impressions and personality traits. [7]

Table 5: Regression results with interaction analysis

Factor	**Interacting variable**	**Predictor**	**Beta (β) after interaction**	**R^2**
Engagement	ftfyes ftf yes	Openness (0.23* before interaction)	-0.37*	0.46*
		Neuroticism (-0.18* before interaction)	0.28*	0.46*
Anxiety/Frustration	ftfyes	Extraversion (-0.31* before interaction)	0.42*	0.22*
Overall Evaluation	ftfyes	Extraversion (-0.21* before interaction)	-0.36*	0.31*
		Conscientiousness (0.32* before interaction)	No effect	-
		Agreeableness (0.33* before interaction)	No effect	-

*Significance codes: *p<0.05, ·p<0.10, **p<0.01, ***P<0.001*

For engagement, openness and neuroticism were associated with engagement. Openness was positively associated with engagement (0.23*), whereas neuroticism(-0.18*) was negatively

[6] Afshartous, D., & Preston, R. A. (2011). Key results of interaction models with centering. *Journal of Statistics Education*, *19*(3).

[7] Detail results were attached in Appendix no.10.

associated with engagement. Meaning students who score higher on the openness traits were found highly engaged. Thus, a higher level of openness is associated with a higher level of engagement. However, when the interaction of ftf yes or ftf no was treated, it was found that openness (-0.37) was weaker in the FTF cohort than in the online cohort. On the other hand, it was found that those who scored higher on neuroticism (-0.18*) were less engaged. However, it was found that students who score higher on neuroticism (0.28*) were more engaged in the FTF cohort than online cohorts. For anxiety/ frustration, extraversion was positively associated with anxiety or frustration. Meaning students who score higher on extraversion (-0.31*) scores were less anxious or frustrated. However, when the interaction of ftf yes or ftf no was treated, it was found that students who score more on extraversion (0.42*) score were more anxious in the FTF cohort than the online cohort.
For overall evaluation, extraversion, conscientiousness, and agreeableness were associated with an overall evaluation. Conscientiousness (0.32*) and agreeableness (0.33*) were positively associated with overall evaluation, whereas extraversion (-0.21*) was negatively associated with an overall evaluation. Meaning students who score higher on conscientiousness and agreeableness traits were found to rate overall course evaluation. However, when the interaction analysis was done, it was found that extraversion (-0.36*) was negatively associated with overall evaluation meaning students who score higher on extraversion rate lower overall evaluation for FTF course compared to an online course. However, the impact of conscientiousness and agreeableness was not found during interaction analysis.
Models with interaction terms explained a higher level of variance and more explanatory power, as evident by the higher r2 shown in the table above.

5.0. DISCUSSION

My overall analysis demonstrated that personality traits and course impression dimensions impact students' perceptions and experience of FTF and online courses presented below.
From my overall analysis, I conclude that If someone had a positive experience with their online course, they are likely to prefer online over FTF. The analysis showed that conscientiousness showed a significant relationship with some of the course impressions in FTF (i.e. value to career, overall evaluation) and Online (i.e. engagement, overall evaluation, preference online over ftf) courses. This is one of the contradictory results from previous studies Poropat (2009) and H. Keller (2013) explains that conscientiousness showed a significant relationship with all courses in online

impression scales. However, it was not found significant on all five-course impressions online or FTF in my study. Additionally, during interaction analysis, it was found that conscientiousness has no impact on either FTF or online cohort. There are also different findings in my research because, in previous research, Keller, H., & S.J. Karau research (2013) mentioned that conscientious students could better exploit any course environment completely. Likewise, an identical finding was noted by (Kim et al., 2016) that conscientiousness is strongly associated with academic performance and other drivers of educational success. These findings are somehow accurate in my analysis, but further exploration is required to support those perspectives fully.

Additionally, in my analysis, it was found that neuroticism was associated with anxiety or frustration in both cohorts. Students who are extroverts are found less anxious in FTF courses. Like in previous research H. Keller, 2013, Swartz et al., 2018 mentioned that online students are introverts and more anxious than FTF learners. It was found consistent with that finding that students who score high on neuroticism are more frustrated in an online course (2013). With the previous proven studies, students who score less on neuroticism traits engage more in FTF courses; it was found that higher neurotic students from the FTF cohort are more engaged. Similarly, an interesting trend was found; students who score more on extraversion are more anxious or frustrated in the FTF cohort than in an online cohort. This strange notation brings to question the view of Swartz and Keller, H., & S.J. Karau research do online students are introverts, or their personality trait has changed after they have limited choice of studying thoroughly online during COVID-19.

Like Pérez Cereijo et al. (2001) and Kuong, H. C. (2009) disproved the view of Daugherty & Funke (1998) and expressed that isolation can be a problem with web-based learning, these strange traits noted could be explored or tested with further detailed and in-depth research. Busato et al. (1998) reported that neuroticism correlates positively with the undirected learning style, which is similar at the moment of crisis where students are learning more in unidirectional patterns due to lack of accurate planning and guidance universities or teachers. The different findings in my analysis regarding neuroticism might have occurred due to the COVID-19 crisis, which has created frustrations in students besides their studies, such as health, economic or financial situations, and uncertainty about what will happen next during and after the crisis rather than course-related anxiety on students from FTF cohort. Or the results were skewed due to the lower sample size. The detailed study will back up or disprove these findings

Siddiquei, N., & Khalid, R., outlines that extraversion and introversion are vital factors that intensify the academic performance of e-learners (2018). Similarly, my research also indicated that students who score higher on openness traits were found highly engaged consistently to the previous findings that a higher level of openness is associated with a higher level of academic engagement. But during the interaction analysis, it was found that students' openness was weaker in the FTF cohort than in the online cohort. Overall, extroverted students are less anxious, but during interaction analysis, I found convergence results that extroverted students are more anxious and less open in FTF courses than online courses. Students' shyness to participate in course activities and other factors might have made extroverted students less open in FTF courses. This also raises questions: did the traditional routine based FTF courses make students less open or closed to experience? And/or the uncertainty during the crisis, students of online cohorts might have enjoyed the new learning where they were not accustomed to, or online students' behaviour was changed during the crisis. Also, the social context of the learner is one factor in determining the preference of the online/ FTF courses, so knowing the social context will also add better ideas about students' preferences over those. However, a new study is required to explore why online students are more open and less anxious in online courses during crises that are different in contextual background. Seriousness might have led to anxiety or frustration, and shyness might have made students less flexible to cooperate in the course activities in FTF cohorts than online. So, this might have made higher extraversion scores of students lower overall valuation for FTF courses than online courses. This finding raises the accuracy of course evaluations they perform at the end of the course. Or the characteristics of the learning environment that has changed differently during this crisis or transition have brought differences in perceptions towards learning models than previous studies presented. Hence, universities should also analyze the validity of the course evaluation before, during, and after the crisis.

Educators often neglect educators' frustration, isolation, and disengagement; hence, new research on these controversial findings could give a clearer picture of what has made students from online cohorts open and less frustrated than FTF cohorts. Wegerif has highlighted frustrations that can quickly become alienated by asynchronous learning (1998), so this notation also supports new research required in case of frustrations in the FTF cohort. One report by the Ministry of Education, New Zealand, reports that the variation in expectations is not only influenced by the student's academic foundation or course selections but also by financial accessibility, knowledge of career

and qualification requirements as well as parents' educational backgrounds (Zhang, Q. (2020). So, further deep research on these aspects would provide precise results, and a new fabricated course design could be built that fits during crises that are still yet to develop. In addition, such courses could create a sense of social interaction with proper protocols and guidelines for social interaction into learning concepts that could reduce the exacerbated feelings of isolation, disengagement in learners.

In the case of value to a career, no significant relationship from either of the variables from BFI-S was found, which contradicts the previous findings Keller, H., & S.J. Karau research found that conscientiousness was positively related to value to career, and also have a positive and significant relationship with emotional stability and value to career (2013). Contrary to previous findings (H. Keller, 2013), my study found that extraversion negatively affects the overall evaluation. Extraversion has a negative relationship with an overall evaluation. Students who scored higher on extraversion were found to rate lower overall evaluation of the FTF course than an online one. Similarly, agreeableness was not found to have any impact on any of the course models. Likewise, the Big five personality traits were found to have no impact on value to career and preferences for course models.

Implications

Victoria University and other universities in New Zealand have challenges to respond to the threat of health crisis promptly and effectively and face challenges to develop the course design at the sudden move completely online even though there is a practice of blended learning. It has to stop all educational activities from March 23, 2020, for a month to reassess the overall academic curricular & preparation for technological shifts to speed up online learning. Moving online does not guarantee that students can learn or that teachers could teach online, but they should be assured that they have adequate technologies and plan to learn and teach online. There was an environment of uncertainty to staff and students regarding their teaching and learning, so universities and stakeholders should evaluate the impact of COVID-19 on the students' performance and the delivery of teachers.

Also, educators need to be accurate that students are not fixed in their academic motivation, engagement, or personalities. Consequently, it makes sense to match delivery modes and activities to the likely preferences of students (Komarraju and Karau, 2005). This also gives the idea that students' anxiety during this crisis is their education and the surrounding environment created by

the COVID-19, and uncertainty arose along with it. Systematic design of plans, implementation of plans, and assessment (Toquero, C. M., 2020) are most essential at this time to bring students and teachers under an umbrella to learn and teach together as well as education institutions or universities can establish a crisis-intervention plan and educate and communicate what to do during a crisis for students and teachers. We can note that during this global pandemic, due to disruption and ban of FTF learning and teaching, governments (e.g. China) across the globe have launched an initiative reformatory approaches in their educational system, mentioning online education as a distinct component in learning and teaching (Huang et al., 2020). But such reforms should be tested with students' experiences, performance, and other aspects to be utilized after post-COVID or at the time of crisis. And stakeholders in education draft proper guidelines and vision to incorporate with learning and teaching during unexpected crises. The rise in information and communication technologies (ICT) has facilitated teaching and learning. During this global health crisis, a complete online teaching and learning approach has exploited the feature of blended or hybrid modality that combines the advantages of FTF learning (FTF) and online learning at different levels of education and across different subject areas. To make instructional decisions to follow completely launching fully online learning environments, it is most essential that an instructor should first have a pedagogical foundation for content delivery (Summer, J & Waigandt, A., 2005). Also, universities must consider people's personality when planning and performing the transition to digital learning and work in times of crisis. Along with this, studies on the transition to working from home during a crisis can learn from this (my) research design

The tentative solutions: training faculty and familiarizing students with online course environments are recommended to improve online and hybrid courses. Also, while developing or launching any learning or teaching models, the scenarios of crisis and disturbances are to be considered.

6.0. AVENUES FOR FUTURE RESEARCH

Usual caveats to empirical work must be applied while interpreting the results of my analysis. Due to time constraints, I conducted this research on Victoria University's QUAN 102 course. I have compared two cohorts who studied the same course in different years and different delivery modes; hence the impact of personality on each course impression may not be comparable for the same

person when they perceive or experience FTF or online courses. So, these situations, along with other constructs, might have impacted the results that I have. In this research, I analyzed students' personality traits using 15 short Big Five Inventory Instruments due to limited time than the previous research that might have brought different results than Keller, H., & S.J. Karau research & S.J. Karau. (2013) research.

Although there are no reasons to indicate that tertiary student populations in different courses or academic levels at the same or different universities are likely to display distinct differences. Sample from diverse courses from different academic levels from different students would improve the robustness and generalizability of the study. The sample size could have potentially skewed the significant results produced. There was a lack of other demographic aspects such as income, marital status, work experience, task, and assignment in detail. Also, this research has not studied the time spent on course modules during learning and performing tasks compared to previous research by Robertson, Grant, & Jackson, 2005; Maki & Maki, 2007, which could be used for further research.

Most of the research was done before the COVID-19 global crisis. However, this research was done after the COVID-19 and other uncontrollable variables that have brought different results than previous studies about online students. The lack of study of those uncontrollable variables is one of the limitations, but it is also the future avenue for research yet to be studied. Future research offers additional opportunities to build on the present findings and potential implications for instructors and schools offering online and FTF programs. For example, future research might examine conscientiousness, openness, neuroticism in finer detail by using longer, more precise, and detailed scales or exploring what factors determine those traits.

Furthermore, it might also contribute knowledge about the actors that directly impact favouritism, either online and FTF courses, for which students prefer online learning components. They prefer FTF learning (p.293). Additionally, there could be avenues for research to study what made students from FTF cohorts more anxious and less open than those of the online cohorts. Likewise, I could analyze in more detail what has made students who are higher in extraversion score rate lower overall valuation for FTF courses than online courses, and its implications on student's

course evaluation. As I have already mentioned about the changing behaviour of FTF students with openness traits, further analysis could explore that.

Furthermore, future research could explore what aspects of learning styles in online and FTF learning environment preferences influenced students during the crisis. Such a study will give some in-depth sights into to what extent do learning style preferences influence students' success in different learning environments (Aragon et al., 2002) before, during, and after the crisis. Similarly, future research could consider the experiences of learning and teaching of universities, the impact of student evaluation before, during, and during crisis time.

To eradicate the limitations and if any inconsistency occurred/ caused, I would do in-depth research for better conclusion & discussions in the next trimester.

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APPENDIX

Appendix 1: Information for Participants

Student Transition from FTF (FTF) to Online Learning: Students' Perceptions and Experiences.

You are invited to participate in **"Student transition from FTF to online learning: students' perceptions and experiences".** This invitation has been sent to all the students who took QUAN102: Statistics for Business, either FTF or online, during Trimester 2 2019 or Trimester 2 2020.

Who am I?

My name is Deepak Gautam, a Master's student in Information Systems at Victoria University of Wellington. If you have studied QUAN 102 in T2 2019 or T2 2020, please complete this survey questionnaire as a part of my research project is to work towards my Research Project.

Project: "Student transition from FTF to online learning: Students' perceptions & experiences".

This research has been approved by the Victoria University of Wellington Human Ethics Committee # 0000028889.

What is the aim of the project?

This project objective is to uncover the perceptions and experiences of students regarding their exposure to FTF (FTF) and fully online learning of QUAN 102: Statistics for the Business course before & after the outbreak of COVID-19 alert level 4 in New Zealand. Furthermore, participants involved in this study will help the researcher understand the effects caused due to shifting into fully online learning through Blackboard or Zoom Video Conferencing or any remote mediums. Here online learning represents you took courses remotely/ online, and other online experience of quizzes, discussions, practice tests & tests, exams, tutorials, or also lab supports for SPSS or any statistical software. Online courses or FTF courses in the survey represent QUAN 102 teaching modules. QUAN 102 is taken for this research because it

combines practical (labs, practical, etc.) and theoretical course contents. As a student at Victoria University of Wellington, you are being invited to participate in this study because you fit the criteria for this study.

The Victoria University of Wellington Human Ethics Committee has approved this research to add a Research Master application reference number, i.e. 0000028889.

How can you help?

Your participation will help me find your perceptions and experiences regarding the course modules, either FTF (FTF) and fully online used for QUAN 102: Statistics for the Business course before & after the outbreak of COVID-19 alert level 4 in New Zealand. And it will help me to explore:

1. How has adopting fully online learning impacted the productivity of students?
2. How are students coping with online/remote studies, and what were the perceived challenges faced after transitioning to fully online learning?

What will happen to the information you give?

This research is anonymous as well; the survey is completely voluntary, anonymous, and unidentifiable. This means that nobody, including the researchers, will be aware of your identity. This survey will not collect any identifiable information from any of the participants in any form, either student identification numbers, phone or mobile number, email addresses, or any information that could help to retrace participants. It will take you 10-15 minutes to complete. Before submitting your responses, you will be able to save them as a PDF and review your responses. After the submission, you will not be able to change their responses. The result of this research will be statistically aggregated. The students can access the final project report or any academic papers being published about this on request.

Risks

There are no known or foreseeable risks for participants in the study and VUW or any parties. However, some personality questions are related to course platforms. That might trigger distress or make students worried about their responses for each course module when asking participants

to recall upsetting events during their course. In response to minimising distress or any bad memories, students will be guided to take student counselling or an academic support program.

a. **Student Counselling Services:** Student Counselling provides short-term counselling support for any issues that are affecting your studies. For example, life challenges, relationships, family issues, sexuality, depression, anxiety, stress, and addiction. Two or three counselling sessions are often enough to help manage things better and get your studies back on track. We encourage you to seek help as early as possible if you're struggling with your mental health—don't think of counselling as a last resort. If you need more sessions, we will discuss this with you and work together to develop a plan.

b. **Academic Support Program:** Help is available if you're feeling unwell or if something else serious happens around exam time. You're eligible to apply for an extension, aegrotat, or late withdrawal if exceptional personal circumstances significantly disrupt your studies.

Resources are available at https://www.wgtn.ac.nz/students/wellness for wellness programs, mediation, etc., and any academic support program available at https://www.wgtn.ac.nz/students/academic support in person from Level 0, Kirk Wing, Hunter Courtyard, Kelburn campus or through phone or online appointments.

What will the project produce?

The information from my research will be used in my Master's Research Project FCOM 430. This research will help bring some recommendations on improving selected course modules and how to improve student support services. Henceforth, this research will also bring valuable output for the university to bring new plans and policies for a better academic support system.

If you have any questions or problems, who can you contact?

If you have any questions, either now or in the future, please feel free to contact:

Student:	**Supervisor:**
Name: Deepak Gautam	Name: Dr. Markus Luczak-Roesch
University email address:	Role: Supervisor
	School: School of Information Management

gautamdeep@myvuw.ac.nz Phone: 04 463 5878

Markus. Luczak-Roesch@vuw.ac.nz

Human Ethics Committee information

If you have any concerns about the ethical conduct of the research, you may contact the Victoria University of Wellington HEC Convenor: Associate Professor Judith Loveridge. Email hec@vuw.ac.nz or telephone +64-4-463 6028.

Appendix 2: Invitation to Participation

INVITATION TO PARTICIPATION FOR PARTICIPANTS

Tēnā koutou, QUAN 102 class of T1 2020. I hope this finds you all well.

You are invited to participate in a study about "Student transition from FTF to online learning: students' perceptions and experiences".

This study is independent of the QUAN 102 course, and I will not access this survey data. I'm forwarding this request is on behalf of Deepak Gautam (Investigator, an M.Com student) and Associate Professor Markus Luczak-Roesch (Deepak's supervisor). Please consider contributing to their research by taking a survey (it should take you no longer than 10-15 minutes to complete). You can access the survey via http://vuw.qualtrics.com/jfe/form/SV_enUbnIuUdpTPEi1
The Victoria University has approved this research of Wellington Human Ethics Committee under ID #0000028889.

Many thanks for your help, and wishing you all the very best,
John

John Randal
Associate Dean (Students), Wellington School of Business and Government
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Appendix 3: Consent form for the survey

CONSENT FORM FOR THE SURVEY(SAMPLE FROM QUALTRICS SOFTWARE)

My name is Deepak Gautam, a Master's student in Information Systems at Victoria University of Wellington. If you have studied QUAN 102 in T1 2019 or T1 2020, please complete this survey questionnaire as a part of my research project is to work towards my Research Project.

Project: "Student transition from FTF to online learning: Students' perceptions & experiences".

This research has been approved by the Victoria University of Wellington Human Ethics Committee # 0000028889.

This study is independent of the QUAN 102 course, so the course coordinator John Randal is not involved in the research and will not have access to the research data. However, Dr John Randal (the course coordinator) is happy to send the survey to all the students who took the class in the two years.

Your participation will help me find your perceptions and experiences regarding the course modules, either FTF (FTF) and fully online used for QUAN 102: Statistics for the Business course before & after the outbreak of COVID-19 alert level 4 in New Zealand. And it will help me to explore:

1. How has adopting fully online learning impacted the productivity of students?
2. How are students coping with online/remote studies, and what were the perceived challenges faced after transitioning to fully online learning?

The survey is completely voluntary, anonymous, and unidentifiable. You could exit the survey if you do not wish to complete it. It will take you 10-15 minutes to complete. Before submitting your responses, you will be able to save them as a PDF and review your responses. After the submission, you will not be able to change their responses. The result of this research will be statistically aggregated. The students can access the final project report or any academic papers

being published about this on request.

If you have any questions, either now or in the future, please feel free to contact:

Principal Investigator: Deepak Gautam, email: gautamdeep@myvuw.ac.nz

Supervisor: Dr Markus Luczak-Roesch, email: Markus. Luczak-Roesch@vuw.ac.nz or phone: 044635878

If you have any concerns about the ethical conduct of the research, you may contact the Victoria University of Wellington HEC Convenor: Associate Professor Judith Loveridge. Email hec@vuw.ac.nz or telephone +64-4-463 6028.

"I have read and understood the information sheet and that I am aware that this survey is voluntary, and I can withdraw from the study (survey) at any time before the survey is submitted."

- ○ **Yes, I consent and agree to participate!**
- ○ **No, I do not consent, do not agree to participate!**

Appendix 4: Survey Online Cohort (2020)

Survey Flow

Block: Information and Consent Page for Participants (1 Question)
Standard: Demographic Questions (3 Questions)
Standard: Questions Related to Online Course module (38 Questions)
Standard: Questions Related to your personality or what you feel about yourself. (15 Questions)
Standard: Support Services in case of difficulties and discomfort (1 Question)

Page Break

Q2.1 What is your Gender?

○ Male (1) Female (2) Other (3) Prefer not to disclose (4)

Q2.2 Have you attended an online or remote course before COVID-19?

○ Yes (1) No (2)

Q2.3 Did you study in New Zealand (NZ) or Overseas (in your home country) while studying QUAN 102 in T1 2020?

○ New Zealand (1) Overseas (2)

Q3.1 I find Online Courses are very motivating to me.

Q3.2 I find Online courses engaging.

Q3.3 Online courses motivate me to do my best.

Q3.4 Online discussions during the class motivated me to participate.

Q3.5 I tend to disengage from Online courses.

Q3.6 Not having other students present hurts motivation in online courses.

Q3.7 I think I have made progress in online courses.

Q3.8 I think online courses will help me in my career.

Q3.9 Online courses will have little or no value to my career.

Q3.10 I will be able to apply what I learn in my Online courses to my job.

Q3.11 Taking online courses will help me get a better job.

Q3.12 Online courses will make me more competitive for raises and promotions.

Q3.13 I sometimes doubt the work relevance of my Online courses.

Q3.14 My experience with Online courses has been positive.

Q3.15 I would recommend Online courses to my family or friends, or anyone.

Q3.16 I feel Online courses are valuable.

Q3.17 I enjoy being able to take courses Online.

Q3.18 I hate online courses.

Q3.19 I've had bad experiences with online courses.

Q3.20 I think the Online course was well structured to achieve the learning outcomes (There was a good balance of lectures, tutorials, tests, exams, etc.).

Q3.21 The learning and teaching methods encouraged participation in Online courses.

Q3.22 The overall environment in the Online courses was conducive to learning.

Q3.23 Online courses make me anxious.

Q3.24 The anonymity of Online courses makes me less anxious than Traditional or FTF(FTF) courses.

Q3.25 Online Courses involve too much uncertainty.

Q3.26 I lose sleep worrying about my Online courses.

Q3.27 Online courses lessen my anxieties about learning.

Q3.28 The course objectives were clear in Online courses (learning objectives, expectations, deadlines, assessments, and grading criteria)

Q3.29 The Online Courses' workload was manageable.

Q3.30 The online course was well organized. (Timely, access to materials. Enough practice test sets, etc.).

Q3.31 I find online courses better than FTF.

Q3.32 After moving fully online, I performed better than in FTF.

Q3.33 I've had difficulties with technologies and resources while doing online courses.

Q3.34 Online courses raised my cost associated with learning.

Q3.35 I have to give more time to Online courses than in FTF courses.

Q3.36 I am more comfortable participating in discussions online.

Q3.37 I prefer online courses over traditional/ FTF or remote courses.

Q3.38 Given the choice, I would always choose an online course over a traditional/ FTF course.

Q4.1 I am the person who worries a lot.

Q4.2 Gets Nervous easily.

Q4.3 Remains calm in tense situations.

Q4.4 Is talkative.

Q4.5 Is outgoing, sociable.

Q4.6 Is reserved.

Q4.7 Is original, comes up with new and creative ideas.

Q4.8 Values artistic, aesthetic experiences.

Q4.9 Has an active imagination.

Q4.10 Is sometimes rude to others.

Q4.11 Has forgiving nature.

Q4.12 Is considerate and kind to almost everyone.

Q4.13 Does a thorough job.

Q4.14 Tends to be lazy.

Q4.15 Does things efficiently.

Appendix 5: Survey FTF Cohort (2019)

Survey Flow

Block: Information and Consent form for participants (1 Question)
Standard: Demographic Questions (3 Questions)
Standard: Questions related to your experiences and perceptions for the FTF course module (31 Questions)
Standard: Questions Related to your personality or what you feel about yourself. (15 Questions)
Standard: Support Services in case of difficulties and discomfort (1 Question)

Page Break

Start of Block: Demographic Questions

Q2.1 What is your Gender?

☐ Male (1) Female (2) Other (3) Prefer not to disclose (4)

Q2.2 What is your Age?

_____

Q2.3 Did you study in New Zealand (NZ) or overseas (Home country) while studying QUAN 102 in T1 2020?

○ New Zealand (1) Overseas (2)

Start of Block: Questions related to your experiences and perceptions for the FTF course module

Q3.1 FTF courses are very motivating to me.

Q3.2 I find FTF courses very engaging

Q3.3 FTF(FTF) courses motivated me to do my best.

Q3.4 FTF discussions during the class motivated me to participate.

Q3.5 I tend to disengage from FTF courses.

Q3.6 Not having other students present hurts motivation in the FTF course.

Q3.7 I think I have made progress in the FTF Courses.

Q3.8 I think FTF courses will help me in my career.

Q3.9 FTF courses will have little or no value to my career.

Q3.10 I will be able to apply what I learn in my FTF courses to my job.

Q3.11 Taking courses FTF or in person will help me get a better job.

Q3.12 FTF Courses will make me more competitive for raises and promotions.

Q3.13 I sometimes doubt the work relevance of my FTF courses.

Q3.14 My experience with FTF courses has been positive.

Q3.15 I would recommend FTF courses to my family or friends or anyone.

Q3.16 I feel FTF courses are valuable.

Q3.17 I enjoy being able to take courses in person(FTF).

Q3.18 I hate FTF Courses.

Q3.19 I've had bad experiences with FTF Courses.

Q3.20 I think the FTF courses was well structured to achieve the learning outcomes (There was a good balance of lectures, tutorials, tests, exams, etc.).

Q3.21 The learning and teaching methods encouraged participation in FTF courses.

Q3.22 The overall environment in the FTF courses was conducive to learning.

Q3.23 FTF courses make me anxious.

Q3.24 FTF Courses involve too much uncertainty.

Q3.25 I lose sleep worrying about my FTF courses.

Q3.26 FTF courses lessen my anxieties about learning.

Q3.27 The course objectives were clear in FTF courses (learning objectives, expectations, deadlines, assessments, and grading criteria)

Q3.28 The FTF Courses' workload was manageable.

Q3.29 The FTF course was well organized. (Timely, access to materials. Enough practice test sets, etc.).

Q3.30 I am more comfortable participating in discussions FTF or person.

Q3.31 Given the choice; I would always choose the FTF course over Online courses.

Q4.1 I am the person who worries a lot.

Q4.2 Gets Nervous easily.

Q4.3 Remains calm in tense situations.

Q4.4 Is talkative.

Q4.5 Is outgoing, sociable.

Q4.6 Is reserved.

Q4.7 Is original, comes up with new and creative ideas.

Q4.8 Values artistic, aesthetic experiences.

Q4.9 Has an active imagination.

Q4.10 is sometimes rude to others.

Q4.11 Has forgiving nature.

Q4.12 Is considerate and kind to almost everyone.

Q4.13 Does a thorough job.

Q4.14 Tends to be lazy.

Q4.15 Does things efficiently.

Appendix 6 Stepwise regression analysis model for FTF cohort (2019)

$$summary(lm(engagement \sim extra + cons + open + agre + neuro, d2019))$$
$$summary(lm(valuetocareer \sim extra + cons + open + agre + neuro, d2019))$$
$$summary(lm(overallevaluation \sim extra + cons + open + agre + neuro, d2019))$$
$$summary(lm(anxiety \sim extra + cons + open + agre + neuro, d2019))$$
$$summary(lm(pref \sim extra + cons + open + agre + neuro, d2019))$$

Appendix 7 Stepwise regression analysis model for Online cohort (2020)

$summary(lm(engagement \sim extra + cons + open + agre + neuro, d2020))$

$summary(lm(valuetocareer \sim extra + cons + open + agre + neuro, d2020))$

$summary(lm(overallevaluation \sim extra + cons + open + agre + neuro, d2020))$

$summary(lm(anxiety \sim extra + cons + open + agre + neuro, d2020))$

$summary(lm(pref \sim extra + cons + open + agre + neuro, d2020))$

Appendix 8: Analysis in R packages]

```
> ## years
> d2019 <- full[which(full$ftf=="no"),]
> d2020 <- full[which(full$ftf=="yes"),]
> # for 2019
> summary(lm(engagement ~ extra + cons + open + agre + neuro, d2019))

Call:
lm(formula = engagement ~ extra + cons + open + agre + neuro,
    data = d2019)

Residuals:
     Min       1Q   Median       3Q      Max
-1.53734 -0.50996 -0.02515  0.73349  1.19067

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.06832    1.35669   0.787    0.440
extra        0.10481    0.12322   0.851    0.405
cons         0.12571    0.16874   0.745    0.465
open         0.23397    0.16504   1.418    0.172
agre         0.06693    0.22942   0.292    0.773
neuro       -0.18123    0.12023  -1.507    0.147

Residual standard error: 0.8659 on 20 degrees of freedom
Multiple R-squared:  0.2724,    Adjusted R-squared:  0.09048
F-statistic: 1.497 on 5 and 20 DF,  p-value: 0.2351

> summary(lm(valuetocareer ~ extra + cons + open + agre + neuro, d2019))

Call:
lm(formula = valuetocareer ~ extra + cons + open + agre + neuro,
    data = d2019)

Residuals:
     Min       1Q   Median       3Q      Max
-1.30317 -0.51878  0.02811  0.51493  1.18375

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.60093    1.06778   0.563    0.580
extra        0.11072    0.09698   1.142    0.267
cons         0.19198    0.13281   1.446    0.164
open         0.04731    0.12990   0.364    0.720
agre         0.19975    0.18056   1.106    0.282
neuro        0.03626    0.09463   0.383    0.706

Residual standard error: 0.6815 on 20 degrees of freedom
Multiple R-squared:  0.278,     Adjusted R-squared:  0.09754
F-statistic:  1.54 on 5 and 20 DF,  p-value: 0.2223
```

```
> summary(lm(overallevaluation ~ extra + cons + open + agre + neuro, d2019))

Call:
lm(formula = overallevaluation ~ extra + cons + open + agre +
    neuro, data = d2019)

Residuals:
     Min       1Q   Median       3Q      Max
-1.07975 -0.46669 -0.00062  0.48279  1.06861

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.56564    1.15024  -0.492   0.6282
extra        0.21466    0.10447   2.055   0.0532 .
cons         0.32908    0.14306   2.300   0.0323 *
open        -0.01035    0.13993  -0.074   0.9418
agre         0.33162    0.19451   1.705   0.1037
neuro       -0.02857    0.10194  -0.280   0.7821
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.7342 on 20 degrees of freedom
Multiple R-squared:  0.419,     Adjusted R-squared:  0.2738
F-statistic: 2.885 on 5 and 20 DF,  p-value: 0.04044

> summary(lm(anxiety ~ extra + cons + open + agre + neuro, d2019))

Call:
lm(formula = anxiety ~ extra + cons + open + agre + neuro, data = d2019)

Residuals:
    Min      1Q  Median      3Q     Max
-1.3538 -0.7720 -0.1667  0.7642  1.9040

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.07321    1.64359   1.261   0.2217
extra       -0.31329    0.14927  -2.099   0.0487 *
cons         0.02742    0.20442   0.134   0.8946
open         0.06467    0.19994   0.323   0.7497
agre         0.19300    0.27793   0.694   0.4954
neuro        0.16645    0.14566   1.143   0.2666
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.049 on 20 degrees of freedom
Multiple R-squared:  0.2621,    Adjusted R-squared:  0.07764
F-statistic: 1.421 on 5 and 20 DF,  p-value: 0.2596
```

```
> summary(lm(pref ~ extra + cons + open + agre + neuro, d2019))

Call:
lm(formula = pref ~ extra + cons + open + agre + neuro, data = d2019)

Residuals:
     Min       1Q   Median       3Q      Max
-2.37849 -0.75111  0.00324  0.97366  1.63104

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.64127    1.90206   0.337    0.740
extra        0.24524    0.17275   1.420    0.171
cons         0.10748    0.23657   0.454    0.654
open         0.15265    0.23139   0.660    0.517
agre        -0.07963    0.32164  -0.248    0.807
neuro        0.07851    0.16857   0.466    0.646

Residual standard error: 1.214 on 20 degrees of freedom
Multiple R-squared:  0.1606,    Adjusted R-squared:  -0.04931
F-statistic: 0.765 on 5 and 20 DF,  p-value: 0.5857
```

```
> # for 2020
> summary(lm(engagement ~ extra + cons + open + agre + neuro, d2020))

Call:
lm(formula = engagement ~ extra + cons + open + agre + neuro,
    data = d2020)

Residuals:
    Min      1Q  Median      3Q     Max
-1.1680 -0.4190  0.0040  0.3341  1.1879

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.63897    0.90350   4.028 0.000288 ***
extra       -0.11826    0.08550  -1.383 0.175373
cons         0.12831    0.10142   1.265 0.214170
open        -0.13611    0.09325  -1.460 0.153300
agre         0.02753    0.12701   0.217 0.829652
neuro        0.10294    0.06783   1.518 0.138093
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.5986 on 35 degrees of freedom
Multiple R-squared:  0.2375,    Adjusted R-squared:  0.1285
F-statistic:  2.18 on 5 and 35 DF,  p-value: 0.07872

> summary(lm(valuetocareer ~ extra + cons + open + agre + neuro, d2020))

Call:
lm(formula = valuetocareer ~ extra + cons + open + agre + neuro,
    data = d2020)

Residuals:
     Min       1Q   Median       3Q      Max
-1.51861 -0.43075 -0.01476  0.55932  1.37118

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.24423    1.15741   2.803   0.0082 **
extra       -0.03932    0.10953  -0.359   0.7218
cons         0.01494    0.12992   0.115   0.9091
open        -0.06555    0.11945  -0.549   0.5866
agre         0.10529    0.16270   0.647   0.5218
neuro        0.05231    0.08689   0.602   0.5511
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.7668 on 35 degrees of freedom
Multiple R-squared:  0.05127,   Adjusted R-squared:  -0.08427
F-statistic: 0.3782 on 5 and 35 DF,  p-value: 0.8602
```

```
> summary(lm(overallevaluation ~ extra + cons + open + agre + neuro, d2020))

Call:
lm(formula = overallevaluation ~ extra + cons + open + agre +
    neuro, data = d2020)

Residuals:
    Min      1Q  Median      3Q     Max
-1.5892 -0.4819  0.1066  0.4397  1.2161

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  4.23796    1.08887   3.892 0.000426 ***
extra       -0.14585    0.10304  -1.415 0.165788
cons         0.14619    0.12223   1.196 0.239701
open        -0.08240    0.11238  -0.733 0.468284
agre        -0.01002    0.15307  -0.065 0.948201
neuro        0.02251    0.08175   0.275 0.784663
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7214 on 35 degrees of freedom
Multiple R-squared:  0.1092,    Adjusted R-squared:  -0.01802
F-statistic: 0.8584 on 5 and 35 DF,  p-value: 0.5185

> summary(lm(anxiety ~ extra + cons + open + agre + neuro, d2020))

Call:
lm(formula = anxiety ~ extra + cons + open + agre + neuro, data = d2020)

Residuals:
     Min       1Q   Median       3Q      Max
-1.94055 -0.55611 -0.03506  0.67193  1.70439

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.09238    1.46713   0.745   0.4615
extra        0.11462    0.13884   0.826   0.4146
cons        -0.24363    0.16468  -1.479   0.1480
open         0.13950    0.15142   0.921   0.3632
agre         0.07137    0.20624   0.346   0.7314
neuro        0.27294    0.11014   2.478   0.0182 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.972 on 35 degrees of freedom
Multiple R-squared:  0.1974,    Adjusted R-squared:  0.08271
F-statistic: 1.721 on 5 and 35 DF,  p-value: 0.1555
```

```
> summary(lm(pref ~ extra + cons + open + agre + neuro, d2020))

Call:
lm(formula = pref ~ extra + cons + open + agre + neuro, data = d2020)

Residuals:
    Min      1Q  Median      3Q     Max
-2.5481 -0.6235  0.2081  0.8745  1.6684

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  4.52430    1.85473   2.439   0.0199 *
extra       -0.16085    0.17552  -0.916   0.3657
cons         0.29877    0.20819   1.435   0.1601
open        -0.08528    0.19142  -0.446   0.6587
agre        -0.18809    0.26073  -0.721   0.4754
neuro       -0.03075    0.13924  -0.221   0.8265
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.229 on 35 degrees of freedom
Multiple R-squared:  0.07208,   Adjusted R-squared:  -0.06048
F-statistic: 0.5437 on 5 and 35 DF,  p-value: 0.7418
```

Appendix 9 Interaction analysis between course impressions and personality traits and ftf yes and ftf no.

$$summary(lm(engagement \sim ftf : extra + ftf : cons + ftf : open + ftf : agre + ftf : neuro, full))$$
$$summary(lm(valuetocareer \sim ftf : extra + ftf : cons + ftf : open + ftf : agre + ftf : neuro, full))$$
$$summary(lm(pref \sim ftf : extra + ftf : cons + ftf : open + ftf : agre + ftf : neuro, full))$$
$$summary(lm(overallevaluation \sim ftf : extra + ftf : cons + ftf : open + ftf : agre + ftf : neuro, full))$$
$$summary(lm(anxiety \sim ftf : extra + ftf : cons + ftf : open + ftf : agre + ftf : neuro, full))$$

Here, data_2019$ftf <- "yes" and data_2020$ftf <- "no"

Appendix 10 Interaction analysis in Rstudio, and results

```
> summary(lm(engagement ~ ftf * extra + ftf * cons + ftf * open + ftf * agre + ftf * neuro, full))

Call:
lm(formula = engagement ~ ftf * extra + ftf * cons + ftf * open +
    ftf * agre + ftf * neuro, data = full)

Residuals:
     Min       1Q   Median       3Q      Max
-1.53734 -0.46531  0.00025  0.45976  1.19067

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.068319   1.108597   0.964   0.3394
ftfyes       2.570652   1.539381   1.670   0.1006
extra        0.104812   0.100685   1.041   0.3024
cons         0.125709   0.137883   0.912   0.3659
open         0.233970   0.134863   1.735   0.0884 .
agre         0.066934   0.187465   0.357   0.7224
neuro       -0.181228   0.098247  -1.845   0.0705 .
ftfyes:extra -0.223074   0.142663  -1.564   0.1236
ftfyes:cons   0.002601   0.182714   0.014   0.9887
ftfyes:open  -0.370079   0.174178  -2.125   0.0381 *
ftfyes:agre  -0.039403   0.240176  -0.164   0.8703
ftfyes:neuro  0.284168   0.126813   2.241   0.0291 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7076 on 55 degrees of freedom
Multiple R-squared:  0.4661,    Adjusted R-squared:  0.3593
F-statistic: 4.365 on 11 and 55 DF,  p-value: 0.0001092

> summary(lm(valuetocareer ~ ftf * extra + ftf * cons + ftf * open + ftf * agre + ftf * neuro, full))

Call:
lm(formula = valuetocareer ~ ftf * extra + ftf * cons + ftf *
    open + ftf * agre + ftf * neuro, data = full)

Residuals:
     Min       1Q   Median       3Q      Max
-1.51861 -0.47178 -0.01476  0.54702  1.37118

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.60093    1.15458   0.520    0.605
ftfyes        2.64330    1.60323   1.649    0.105
extra         0.11072    0.10486   1.056    0.296
cons          0.19198    0.14360   1.337    0.187
open          0.04731    0.14046   0.337    0.738
agre          0.19975    0.19524   1.023    0.311
neuro         0.03626    0.10232   0.354    0.724
ftfyes:extra -0.15004    0.14858  -1.010    0.317
ftfyes:cons  -0.17704    0.19029  -0.930    0.356
ftfyes:open  -0.11286    0.18140  -0.622    0.536
ftfyes:agre  -0.09446    0.25014  -0.378    0.707
ftfyes:neuro  0.01605    0.13207   0.121    0.904
```

```
Residual standard error: 0.7369 on 55 degrees of freedom
Multiple R-squared:  0.1617,    Adjusted R-squared:  -0.005956
F-statistic: 0.9645 on 11 and 55 DF,  p-value: 0.4888

> summary(lm(pref ~ ftf *extra + ftf * cons + ftf * open + ftf * agre + ftf * neuro, full))

Call:
lm(formula = pref ~ ftf * extra + ftf * cons + ftf * open + ftf *
    agre + ftf * neuro, data = full)

Residuals:
     Min       1Q   Median       3Q      Max
-2.54811 -0.72813  0.03172  0.93070  1.66841

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.64127    1.91679   0.335    0.739
ftfyes        3.88303    2.66163   1.459    0.150
extra         0.24524    0.17409   1.409    0.165
cons          0.10748    0.23840   0.451    0.654
open          0.15265    0.23318   0.655    0.515
agre         -0.07963    0.32413  -0.246    0.807
neuro         0.07851    0.16987   0.462    0.646
ftfyes:extra -0.40609    0.24667  -1.646    0.105
ftfyes:cons   0.19129    0.31592   0.606    0.547
ftfyes:open  -0.23793    0.30116  -0.790    0.433
ftfyes:agre  -0.10847    0.41527  -0.261    0.795
ftfyes:neuro -0.10926    0.21926  -0.498    0.620

Residual standard error: 1.223 on 55 degrees of freedom
Multiple R-squared:  0.1981,    Adjusted R-squared:  0.03775
F-statistic: 1.235 on 11 and 55 DF,  p-value: 0.2867

> summary(lm(overallevaluation ~ ftf * extra + ftf * cons + ftf * open + ftf * agre + ftf * neuro, full))

Call:
lm(formula = overallevaluation ~ ftf * extra + ftf * cons + ftf *
    open + ftf * agre + ftf * neuro, data = full)

Residuals:
     Min       1Q   Median       3Q      Max
-1.58918 -0.47553  0.08754  0.45649  1.21607

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  -0.56564    1.13754  -0.497  0.62100
ftfyes        4.80359    1.57958   3.041  0.00361 **
extra         0.21466    0.10331   2.078  0.04241 *
cons          0.32908    0.14148   2.326  0.02374 *
open         -0.01035    0.13838  -0.075  0.94067
agre          0.33162    0.19236   1.724  0.09033 .
neuro        -0.02857    0.10081  -0.283  0.77793
ftfyes:extra -0.36051    0.14639  -2.463  0.01695 *
ftfyes:cons  -0.18289    0.18749  -0.975  0.33360
ftfyes:open  -0.07206    0.17873  -0.403  0.68839
ftfyes:agre  -0.34164    0.24645  -1.386  0.17126
ftfyes:neuro  0.05108    0.13012   0.393  0.69617
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7261 on 55 degrees of freedom
Multiple R-squared:  0.3126,    Adjusted R-squared:  0.1751
F-statistic: 2.274 on 11 and 55 DF,  p-value: 0.02274

> summary(lm(anxiety ~ ftf * extra + ftf * cons + ftf * open + ftf * agre + ftf * neuro, full))

Call:
lm(formula = anxiety ~ ftf * extra + ftf * cons + ftf * open +
    ftf * agre + ftf * neuro, data = full)

Residuals:
    Min      1Q  Median      3Q     Max
-1.9405 -0.7373 -0.0541  0.7357  1.9040

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.07321    1.56782   1.322   0.1915
ftfyes       -0.98083    2.17706  -0.451   0.6541
extra        -0.31329    0.14239  -2.200   0.0320 *
cons          0.02742    0.19500   0.141   0.8887
open          0.06467    0.19073   0.339   0.7358
agre          0.19300    0.26512   0.728   0.4697
neuro         0.16645    0.13894   1.198   0.2361
ftfyes:extra  0.42791    0.20176   2.121   0.0385 *
ftfyes:cons  -0.27105    0.25840  -1.049   0.2988
ftfyes:open   0.07483    0.24633   0.304   0.7625
ftfyes:agre  -0.12163    0.33967  -0.358   0.7216
ftfyes:neuro  0.10648    0.17934   0.594   0.5551
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.001 on 55 degrees of freedom
Multiple R-squared:  0.2275,    Adjusted R-squared:  0.07295
F-statistic: 1.472 on 11 and 55 DF,  p-value: 0.1688
```