# The Role of Personality and Techno Eustress in The Facilitation of Online Student Engagement: A Concept Paper

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## Abstract

Online learning revolutionises education, promoting inclusiveness and achieving SDGs. Yet technostress emerged, hindering engagement. Educators pivoted, adapting methods to alleviate stress and enhance online learning effectiveness. This research focuses on a private university in Malaysia that has faced challenges due to a lack of student engagement, resulting in reduced efficacy and attrition. Past studies found that students experienced technostress when they could not deal with the complexities of technology throughout the online teaching and learning process, which may have negatively impacted their academic performance. Instead of focusing on the adverse effects of technostress, this research delves into the bright side of technostress, known as techno-eustress, which refers to the situation where individuals perceive information systems as stimulating or exciting. Drawing on a few theories, namely Student Engagement theory, the Five-Factor Model of Personality, the Mindfulness to Meaning Theory, and the Transactional Model of Stress and Coping, this research aims to investigate the personality traits that enable students to effectively harness techno-eustress and explore how these traits integrate with techno-eustress to influence students' perceptions and reactions to IT demands, subsequently contributes to better online student engagement. A convergent case study mixed-methods research design, guided by a structured questionnaire and semi-structured interview, will be employed to gather data from 15 students who achieved outstanding academic performance in their online courses. A structured questionnaire will serve as a mechanism for understanding students' personality traits, assessing their experience with technological demands, and measuring their engagement in online classes. At the same time, a semi-structured interview will be used to understand how the students navigate the challenges they face and participate effectively in online classes. The findings are expected to provide valuable insights into the changing nature of online education.

*Keywords*: Personality traits, techno eustress, coping mechanism, online student engagement

# 1.0 Introduction

In today's world, online learning has become a key component of education, revolutionising how information is provided and consumed while also playing an essential role in reaching the Sustainable Development Goals (SDGs), notably SDG 4, which aspires for inclusive and equitable quality education (Haleem et al., 2022). Recent research has investigated numerous models and theories of technology integration among learners and educators, but this study seeks to expand the discourse by identifying the elements that influence online learning engagement, precisely the effect of technostress on students. The emphasis is placed on how incorporating such activities has improved teaching methods enriching teacher education, instructional approaches, and effectiveness. The need for educators to adapt to students' tech-savvy preferences is emphasised by the significant problem of finding novel ways to engage students and reduce technostress (Marmolejo & Groccia, 2022).

The COVID-19 pandemic has significantly transformed the education sector, requiring educators and students to showcase their resilience and adapt to new teaching and learning methods. Institutions had to rapidly transition to online learning, presenting challenges and opportunities for higher education (Adedoyin & Soykan, 2020). The global education system faced severe disruption as the pandemic caused massive social and economic upheaval. According to O'Hagan (2020), school closures in 195 countries affected 1.3 billion students from pre-K to university. Consequently, many nations swiftly shifted from traditional classroom instruction to online learning resources (Hensley et al., 2022).

In early 2023, the Malaysian Qualification Agency (MQA) permitted higher learning institutions to provide up to 60% of their lessons via online instruction and learning (Malaysian Qualification Agency, 2023). COVID-19 has considerably influenced education, including accelerating digital transformation in the classroom. (Soto-Acosta, 2020). This emphasises digital technologies and resources in teaching and learning, changing the educational environment. Post-pandemic, we must prioritise hybrid learning in higher education (Morrison, 2022). Online and in-person hybrid learning provides the flexibility and adaptation needed to recover from the epidemic.

Hybrid learning, a beacon of hope, not only offers flexibility but also holds the potential to inspire and accommodate diverse learning styles and preferences by combining traditional classroom settings with digital platforms (Alamri et al., 2021; Dziuban et al., 2018). Hybrid learning in higher education has various advantages, including flexibility and convenience, enabling students to access resources and study at their own speed (Alamri et al., 2021). It combines face-to-face and online interactions to deliver a personalised learning experience and increase student engagement (Eliveria et al., 2019). This approach promotes inventive pedagogical techniques and technology integration to facilitate interactive and engaging learning experiences (Singh et al., 2021). Research suggests incorporating online learning enhances learning outcomes, student contentment, and study behaviours (Pei & Wu, 2019; Paulsen & McCormick, 2020; Castro & Tumibay, 2021; Toney et al., 2021).

Although hybrid learning has several advantages, there are legitimate apprehensions about its integration into higher education, particularly with online instruction. During the pandemic, the abrupt shift from in-person to exclusively online learning may have a negative

effect on students. Research suggested that excessive digital use might cause burnout and disengagement (García-Morales et al., 2021; Maloney et al., 2023; Gregersen et al., 2023). The survey indicated that 85% of Malaysian tertiary education students expressed mental distress as a result of COVID-19, with 70.1% claiming difficulties with online learning (Menon, 2021). The abrupt move to online learning raised information technology stress, especially among students with limited internet access and computer abilities, resulting in poor self-motivation (Watermeyer et al., 2021; Devi, 2022).

Mehta et al. (2021) revealed that digital learning environments may only sometimes benefit students. Some studies found that students experienced anxiety and technostress due to online learning obstacles (Al-Kumaim et al., 2021; Alshammari et al., 2022). Early studies have indicated concerns with the transition to online learning, such as behavioural qualities, engagement, material delivery, and institutional support (Dabbagh, 2000; Arbaugh, 2005; Kebritchi et al., 2017; Lazarevic & Bentz, 2021). Alonso et al. (2022) highlighted that characteristics that promote or inhibit student engagement are critical for academic performance. Engagement is an essential indicator of online learning efficacy and a predictor of learning outcomes (Ayouni et al., 2021; Brown et al., 2022). According to Stan et al. (2022), student engagement is an essential aspect of the whole educational process that is characterised by students' behavioural resolve and readiness to participate in active learning of their academic obligations.

## 1.1 The Need for This Research

Despite the increasing prominence of online education, a critical challenge remains the lack of student engagement, which adversely affects the effectiveness of e-learning and contributes to student attrition (Ferrer et al., 2022). Examining factors influencing student involvement and interaction, including personality characteristics, is crucial to improving information technology (IT) demands and reducing student attrition.

In online learning, technostress is often portrayed as an antagonistic force caused by IT, negatively affecting students (Bravo-Adasme & Cataldo, 2022). In higher education, students often experience technostress during online learning, with multiple studies emphasising the harmful effects of technostress on student well-being (Qi, 2019; Wang et al., 2021; Awang Kader et al., 2022; Saleem et al., 2024). Undergraduate students, for example, have reported greater stress levels during online learning owing to increasing workloads and the need to adjust to a new learning environment (Mohamed et al., 2021).

To date, studies on technostress have primarily focused on the adverse effects of technostress (Awang Kader et al., 2022), antecedents of technostress (Lee et al., 2022; Mushtaque et al., 2022), and mitigating technostress (Ioannou et al., 2022; Saleem et al., 2024), leaving a significant gap in understanding its potential benefits for students. Califf et al. (2020) suggested that techno-eustress, a positive perspective on technostress, could benefit individuals. This perspective shift stimulates a rethinking of how people perceive techno-eustress, including its causes and beneficial effects, resulting in a more balanced view of the phenomena (Tarafdar et al., 2017).

Given the potential positive influence that techno-eustress may have on the well-being of students, it is imperative to conduct an inquiry into the various factors that contribute to its perception. Technostress was influenced by users' perceptions of technological attributes such as complexity (Ragu-Nathan et al., 2008). However, the reason specific individuals find these

attributes distressing while others do not is still unknown. Ayyagari et al. (2011) proposed that personality has an impact on the way individuals perceive technostress. For instance, openness to experience and conscientiousness may impact engagement with technology and how tasks are approached (McCrae & Costa Jr, 1997; Galla et al., 2014). While personality traits have been shown to influence academic achievement (O'Connor & Paunonen, 2007; Komarraju et al., 2011; Brandt et al., 2020; Baruth & Cohen, 2023), their involvement in techno-eustress perception and student engagement in online learning has received less attention. A comprehensive understanding of this interaction is essential for effectively assisting students in the online learning environment.

In addition, the present knowledge of techno-eustress is mainly focused on quantitative aspects, disregarding contextual elements, individual interpretations, and lived experiences that influence the impression of techno-eustress (Shirish et al., 2021; Zhao et al., 2023; Nascimento et al., 2024). Qualitative research provides a valuable chance to investigate the intricate experiences, perspectives, and strategies for dealing with techno-eustress in people.

As such, this research will use a case study mixed-method approach to investigate this phenomenon, employing surveys, in-depth interviews, and thematic analysis to uncover the intricate interplay between technological challenges, individual perceptions, and coping strategies in the experience of techno-eustress, which contributes to better online student engagement.

## 1.2 Primary Investigative Focus

The core analytical enigma of this research focuses on a private university in Malaysia that was established more than 50 years ago. The university's online teaching and learning activities, using Google Workspace for Education, have faced challenges due to a lack of student engagement, resulting in reduced efficacy and attrition. Despite available resources, 50% of academic staff have received below-average ratings for several semesters. Less than half of students engage in online learning, and some lecturers reported students disappearing during online classes. The pass percentage during and post-pandemic decreased further as the institution adopted hybrid learning techniques, affecting students' performance in final assessments. More initiatives are needed to address these ongoing challenges in online education.

Next, the university's administration surveyed 60% of students who struggled owing to a lack of IT skills during the transition to online learning. Only a tiny proportion of students enjoyed the freedom and the IT tools that enhanced their learning experience. The university's counsellor reported a roughly 80% rise in instances reported in 2021 over 2020. Academic stress and mental health were the most common issues identified for 2020-2023. Academic stressors include difficulties comprehending the subject matter, inability to concentrate in class, failure to complete homework, and ineffective use of learning resources. This situation is seen as most students experiencing technostress, a psychological occurrence linked to technology that negatively impacts one's health. Despite its negative connotation, technostress is a significant obstacle to efficient online education.

Contrary to the predominant pattern of elevated failure rates in particular courses, a significant observation arises whereby a subset of students not only successfully overcomes the obstacles but also attains exceptional outcomes, as demonstrated by praiseworthy results, which can be understood as techno-eustress. Although many students face challenges, this

group exhibits perseverance, commitment, and a high level of proficiency in efficient online learning techniques. Their accomplishments are a guiding light and source of educational motivation, demonstrating the capacity for achievement even in the face of challenges.

# 1.3 Research Objective

A case study mixed-methods research design will be employed to examine how students enrolled in online courses at the university utilise their personality traits to perceive IT demands as challenging techno-stressors that are difficult to overcome. Understanding these complicated interactions is critical in modern online education, where digital platforms are the foundation of learning. The underlying theories guiding this research are the Student Engagement theory (Fredricks et al., 2004), the Five-Factor Model of Personality (Costa & McCrae, 2008), the Mindfulness to Meaning Theory (Garland et al., 2015), and the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984).

# 1.4 Research Questions

The primary objective of this research is to investigate the personality traits that enable students to utilise techno-eustress to increase their level of engagement effectively. The following questions guide the research:

RQ1:   Which personality traits enable students to harness techno-eustress?

RQ2:   How do personality traits integrate with techno-eustress to influence students' perceptions and reactions to IT demands, ultimately affecting their level of engagement in online learning?

# 2.0 Critical Review of Relevant Theories

Student engagement theory offers a comprehensive framework for understanding the complex nature of student participation in educational activities. The model proposed by Fredricks et al. (2004) outlines three distinct constructs of student engagement: behavioural, emotional, and cognitive, which will also be used in this research. These dimensions are evident in online learning through active engagement, favourable emotional encounters, and profound cognitive commitment. The notion of student engagement provides a perspective for examining how people interact with technology, viewing student engagement as more than just showing up or finishing tasks but as a dynamic and growing activity (Bacher-Hicks et al., 2021).

Behavioural engagement in online education entails engaging in academic pursuits and utilising digital tools (Bergdahl et al., 2020). Online environments pose distinct obstacles, yet students can participate independently and socially (Baragash & Al-Samarraie, 2018). Goal-setting and strategic planning are critical (Sun et al., 2023), but technical difficulties and unfamiliarity with technology and devices might impede engagement (Sun & Kim, 2022). On the other hand, cognitive engagement includes the mental processes of analysing, evaluating, and reflecting on information and the ability to solve problems and think critically (Luan et al., 2023). Online students must prioritise cognitive engagement to manage the difficulties of virtual learning effectively (Sun et al., 2023). Studies indicate that students with low cognitive

ability may experience difficulty maintaining focus (Zhu et al., 2023). Frequent communication and teamwork can enhance cognitive involvement, with online learning platforms as catalysts to promote active engagement and facilitate meaningful educational experiences (Ng et al., 2022; Al-Samarraie & Saeed, 2018). Lastly, engaging students emotionally is essential in online learning because it shapes their perspectives, drive, principles, and passions (Bergdahl et al., 2020). The phenomenon can impact cognitive, behavioural, and social interactions and can be affected by establishing learning goals and personal relationships (Zhu et al., 2023). Facilitators are crucial in increasing emotional involvement by building a solid connection, encouraging active conversation, and employing positive techniques such as emojis and positive comments (Borup et al., 2020).

This research also examines the Transactional Model of Stress and Coping (TSC). This theory explains how different personality profiles enable students to view IT demands as demanding (techno eustress) and productively participate in an online learning environment. Individuals become stressed when demands or pressures exceed their available resources or their ability to cope with and mediate the stress (Folkman et al., 1986). The conditions or variables that cause stress, particularly in IT use, are called technostress creators (Tarafdar et al., 2010). TSC has been widely utilised in education, specifically online learning and student engagement. Zajacova et al. (2005) found a positive relationship between academic pressures and engagement, where increased stress levels are associated with decreased engagement. Vizoso et al. (2018) suggested that adaptive coping skills can effectively increase engagement, even when experiencing high-stress levels. Intervention programmes that teach efficient coping techniques have a favourable influence on engagement in online learning (Caleon et al., 2023).

The exploration of techno eustress in the context of online learning is relatively uncharted territory, in contrast to the significant attention devoted to the investigation of technostress (Tarafdar et al., 2017). Eustress, derived from Selye's General Adaptation Syndrome (Selye, 1950), refers to the advantageous result of stressful situations marked by a positive and constructive nature (Quick et al., 1997). It arises from physiological and psychological responses to stimuli and is influenced by how individuals perceive and manage stress. Although eustress holds significant significance, it has yet to be extensively addressed in scientific literature. Bienertova-Vasku et al. (2020) contend that there is little empirical evidence to support the concept of eustress, and its effects are contingent upon the interactions between individuals and their external surroundings. In the view of techno eustress, students actively involved in their learning activities are better prepared to manage and overcome the barriers to technology use. Engaged students are more likely to use suitable coping mechanisms such as seeking assistance when necessary, experimenting with new technology tools, and adapting to changes in the digital learning environment. TSC provides a significant foundation for comprehending an important construct for this study, i.e., techno eustress, elucidating why specific individuals experience technology as a good challenge while others find it distressing.

The third theory chosen in this research is the Five-Factor Model of Personality. Costa and McCrae (2008) have identified five overarching constructs that define human personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Several studies have examined the complex relationship between personality traits and technostress in the academic setting to understand how individual differences can affect vulnerability to technostress (Korzynski et al., 2021; Pflügner et al., 2021; Phillips and Shipps, 2022; Schauffel et al., 2022). However, understanding how individual differences interact with the positive form of technostress (i.e., techno eustress) in online learning remains unexplored. To close this gap, this research looked into how the five constructs of Big Five personality

traits, as broad traits, connect and harness the positive effects of techno eustress, subsequently improving students' assessments of difficult technological stressors to promote better engagement in online learning.

The fourth theory chosen in this research is the Mindfulness to Meaning theory (MMT). MMT offers a thorough structure for comprehending how mindfulness practises aid in cognitive regulation, forming narrative meaning, and improved well-being (Garland et al., 2015). Mindfulness serves as the fundamental basis of MMT, fostering a state of being fully aware and accepting of one's thoughts, feelings, and experiences in the present moment (Langer, 1989). Engaging in mindfulness activities such as meditation and focused breathing improves mental clarity and emotional stability. The conscious reappraisal hypothesis facilitates the adaptive interpretation of life events (Wang et al., 2023). Studies have examined how mindfulness affects several aspects of IT system utilisation at the individual level. In their study, Wei et al. (2021) discovered that the specific personality traits referred to as IT mindfulness operate as a safeguard, reducing the impact of pressures on workers' ability to utilise technology creatively. In online learning, Shirish et al. (2021) discovered a positive link between IT mindfulness and learning efficacy in French undergraduates, mediated by techno-eustress. Lee et al. (2022) investigated the interaction between positive and negative emotions, mindfulness, and coping methods in Chinese university students during the COVID-19 epidemic, revealing a mutually beneficial association between positive affect and mindfulness. This research employs IT mindfulness as a construct that represents the narrow, context-specific personality trait that can only be observed when an individual interacts with IT tools in online learning (Thatcher et al., 2018)

## 2.1 Conceptual Framework

A conceptual framework clarifies the research problem by dividing it into particular concepts and ideas (Saunders et al., 2023). It also guides the research process, ensuring the research design, data collection, and analysis align with the research question and objectives. Furthermore, a conceptual framework aids in identifying pertinent factors related to the study subject and elucidates the connections between them.

The conceptual framework, illustrated in Figure 1, posits that distinct personality traits, both broad and narrow, impact how individuals perceive IT demands, resulting in different degrees of techno eustress. This, in turn, determines the level of online learning engagement.

Figure 1 Conceptual Framework
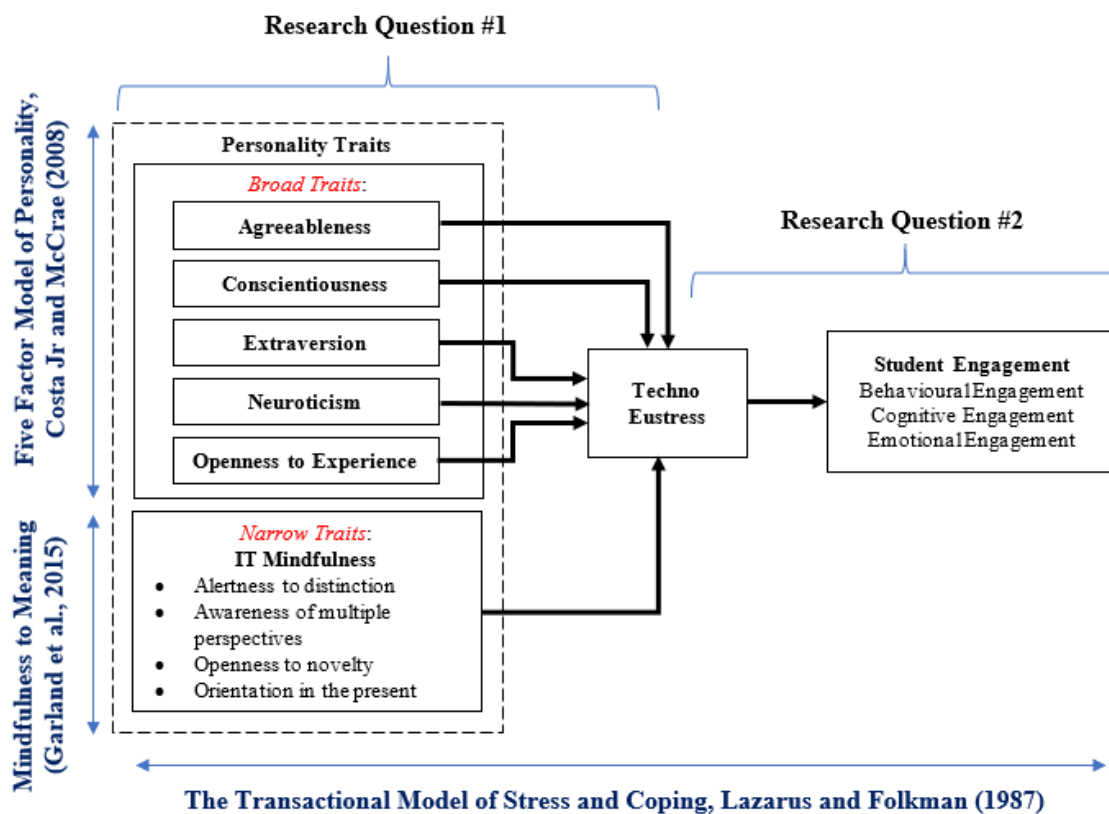


By incorporating the Student Engagement Theory (three constructs i.e., behavioural engagement, cognitive engagement, and emotional engagement), the Transactional Model of Stress and Coping (techno eustress as a construct), the Five-Factor Model (five constructs i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience) and the Mindfulness to Meaning Theory (IT Mindfulness as a construct) into this research, this framework provides a comprehensive lens for understanding how individual personality differences contribute to the nuanced experience of IT demands and, as a result, online learning engagement. The proposed relationships serve as a framework for this research that combines qualitative and quantitative methodologies. This research provides vital insights into the changing nature of online education.

## 3.0 Research Design

This section demonstrates and validates the research philosophy, approach, and design used to answer the study questions. It emphasises the study's chronological framework and gives relevant approaches for data gathering, sources, and sampling techniques, all while addressing ethical issues.

The researcher implements pragmatism as the research paradigm because of its capacity to harmonise objectivism and subjectivism, integrating facts and values with a range of

experiences. It recognises diverse interpretations and realities, prioritising research questions and employing a variety of methodologies to investigate linked concerns (Creswell & Creswell, 2023). Pragmatists stress that our comprehension of objective realities is shaped by personal experiences (Bell et al., 2022). This research utilises the abductive reasoning approach, which involves the creative integration and justification of ideas to produce novel knowledge (Saunders et al., 2023). Unlike induction and deduction, abduction allows for ongoing development of the theoretical framework before, during, and after the research process to align theory and reality (Dubois & Gadde, 2017).

This research used a convergent case study-mixed methods design, which allows for a thorough evaluation of the research questions and triangulation of data sources, increasing the validity and reliability of the research's conclusions (Guetterman & Fetters, 2018; Creswell & Clark, 2017). The core principle of convergent mixed method is to compare the two outcomes to understand a problem better, confirm one set of findings with the other, or determine if participants respond similarly when evaluating quantitative predetermined scales and answering open-ended qualitative enquiries (Guetterman & Mitchell, 2016). It entails comparing quantitative and qualitative data sources to grasp a problem thoroughly. Combining many data sources, including quantitative and qualitative data, improves the accuracy and dependability of the study's findings, leading to a more comprehensive understanding of the case. This research employs a single case design because the phenomenon at the private university under investigation was exceptional, and outsiders had restricted access to it.

## 3.1 Data Collection Methods

Mixed methods research addresses questions that cannot be answered only using "*qualitative*" or "*quantitative*" methodology. It entails collecting, analysing, and integrating quantitative and qualitative data within a single study or a series of investigations (Saunders et al., 2023).

To accomplish the research's objectives, the researcher will extensively use a multi-pronged strategy for gathering data, using four separate approaches. A thorough literature analysis that delved into already-existing secondary data to build a strong understanding of the research landscape set the groundwork. Document analysis subsequently examined pertinent materials to generate significant insights. A structured questionnaire served as a strategic instrument to comprehend the participants' personality traits, and degree of techno eustress, and gauge their level of engagement in online classes. Subsequently, the breadth of the qualitative analysis will be attained by conducting semi-structured interviews to investigate real-life experiences thoroughly. The aim is to understand how techno-eustress affects students' perceptions and responses to challenges, ultimately impacting their engagement in online learning. The results of this survey will be examined in conjunction with data obtained from qualitative interviews to provide a comprehensive understanding of the research topic.

Considering the intricate nature of the research enquiries and the requirement for a varied and inclusive sample, purposive sampling is the most suitable sampling technique for this research. Purposeful sampling involves selecting individuals with pertinent academic performance, perspectives, and experiences to ensure that the gathered data closely corresponds to the research objectives. This research explicitly examines 15 students who achieved outstanding academic performance in their online classes. The screening criteria encompass:

- Registered for online courses for the Academic Year 2023/2024.
- Achieved a minimum CGPA of 3.500 or a minimum grade of A-, with consideration given only to grades obtained in online courses.

## 3.2 Research Instruments

This research will use two instruments: a structured questionnaire and a semi-structured interview. The structured questionnaire will serve as a mechanism for understanding students' personality traits, assessing their experience with techno-eustress, and measuring their engagement in online classes. Subsequently, participants will be interviewed in semi-structured formats, allowing for a more in-depth examination of their experiences and viewpoints.

The structured questionnaire was developed by adapting items from available literature to ensure validity, clarity, and accuracy for the participants (Bell et al., 2022). It assesses students' personality traits, techno-eustress, and engagement levels in online learning by combining subjective feelings and objective facts (See Appendix A for a sample of the structured questionnaire).

This research includes comprehensive, semi-structured interviews to collect data on the impact of techno-eustress on students' perspectives and reactions to difficulties encountered that impact their engagement in online classes. Open-ended questions enhanced the interviews, facilitating a thorough comprehension of the subject matter (Saunders et al., 2023). The questions were customised to address the specific study challenge, facilitating a natural and seamless flow of conversation. Each session will last 30 to 45 minutes, and the participants' comments will be transcribed for analysis. Despite requiring a significant amount of time, the abundance of intricate information validates the exertion (Jain, 2021) (See Appendix B for a sample of the interview guide).

## 3.3 Data Analysis Procedures

The data analysis framework is a methodical technique for examining gathered data. It guides the process from the preliminary survey to the semi-structured interview, using quantitative and qualitative analysis methods to derive significant and valuable findings.

This research uses IBM SPSS software for quantitative analysis to ensure data cleanliness and consistency. The software codes responses for verification and implements data screening procedures to address missing values and errors. The application will also analyse the frequency and distribution of categorical data related to participants' demographic profiles. The structured questionnaire was created using a 5-point Likert scale, and the researcher must define the score range to calculate the mean for IT mindfulness, techno eustress, and engagement. To compute this range, the researcher will subtract the lowest number on the scale from the highest number and divide it by the highest number (5-1=4, 4/5=0.8) (Bosch et al., 2022; Sözen & Güven, 2019; Boonyarattanasoontorn, 2017). The scoring range of the Likert scale used in this research is shown in Table 1.

This research will employ inductive thematic analysis to examine qualitative interview data (Saunders et al., 2023). Thematic analysis will examine reoccurring themes and their interconnections, enabling customisation to suit unique research goals (Braun and Clarke,

2012). The interpretation step entails analysing the frequency of themes, assessing correlations, and recognising patterns within the themes. This research also employs triangulation, which uses several data sources to improve the reliability and robustness of findings by including different perspectives (Saunders et al., 2023). The findings from the quantitative will be used to compare, integrate, and interpret together with the qualitative results.

Table 1 Scoring range of the Likert Scale

| Description | Value | Range | Indicator |
|---|---|---|---|
| Strongly Disagree / Never | 1 | 1.00 – 1.80 | Very Low |
| Disagree / Almost Never | 2 | 1.81 – 2.60 | Low |
| Neither Agree nor Disagree / Sometimes | 3 | 2.61 – 3.40 | Neutral |
| Agree / Often | 4 | 3.41 – 4.20 | High |
| Strongly Agree / Always | 5 | 4.21 – 5.00 | Very High |

The data analysis processes for semi-structured interviews encompass several crucial components. One of the primary processes is transcription. The interviews will be transcribed exactly as they were recorded in written format. The researcher thoroughly examines and reviews the transcripts to comprehensively understand the data. This will assist the researcher in discerning significant themes, patterns, and categories (Creswell, 2013).

The next step is coding. Coding aims to classify the data and discern prevalent themes and patterns. The researcher will categorise the codes into more general groups based on their similarities and differences (Yin, 2018). Theme development arises after coding. Themes are abstract notions that encapsulate the fundamental nature of the data (Creswell, 2013). Data interpretation can be performed at this point. The researcher will analyse the data according to the identified categories. The researcher will subsequently do a member check by asking participants to review the findings to verify that they represent their experiences. This is to validate the findings by cross-referencing them with the original data. Lastly is the reporting of findings. The researcher will document the findings, encompassing a detailed account of the methodologies employed, the outcomes obtained, and the conclusions drawn (Yin, 2018).

## 3.4 Validity and Reliability of Research

Validity and reliability are critical factors in determining research quality (Saunders et al., 2023). Validity includes the suitability of measurement instruments, the precision of result interpretation, and the capacity to apply findings to a broader context. The researcher will use various evidence sources to improve construct validity in this research, including survey questionnaires, interviews, and archival records (Yin, 2018). One key advantage of collecting data through case studies is the capacity to draw from diverse evidence sources, which provides a more thorough comprehension of the case study's scope (Creswell & Creswell, 2023). Moreover, this research's qualitative and quantitative data triangulation allows the researcher to conduct surveys and follow-up interviews with the same participants to see if the results align and complement each other.

Next, internal validity encompasses comparing patterns and constructing explanations, establishing a connection between variables within certain circumstances (Yin, 2018). The researchers will do pattern matching by comparing observed patterns with expected patterns or those established in previous studies. Furthermore, explanation building has to be accomplished by examining case study data to generate an explanation for the case. (Saunders et al., 2023). The data collected from various sources, including interview transcripts, audio recordings, and researcher's notes, will be analysed to ensure a thorough conclusion and justification. Multiple viewpoints and member checks will be used to ensure rigour. Data collection, analysis, and interpretation shall be documented to ensure traceability (Creswell & Creswell, 2023).

External validity relies on analytical generalisation, which involves drawing logical conclusions based on analysing specific cases rather than statistical generalisation. Analytical generalisations might be deduced from the theoretical framework or novel notions that arise after the study (Yin, 2018). A thick description of qualitative research might help determine its transferability and replicability. The text offers an elaborate account of the research's context, citations, and subjects, allowing readers to make inferences and analyse the data (Creswell & Creswell, 2023).

Lastly, the interview guide will be utilised during the semi-structured interviews to guarantee the study's dependability. The researcher will use established theories to guide the analysis and interpretation of the findings. Also, the researcher will conduct member checks to ensure that the findings correctly reflect the perspectives and experiences of study participants (Saunders et al., 2023). Furthermore, the researcher will establish communication with the lecturers who conducted the online classes to verify the findings of his study. On the other hand, reliability also refers to the consistent reproduction of results (Bell et al., 2022). Reliability is strongly linked to the study's replication process, which includes a protocol detailing methods and databases for collecting data. Conducting interviews, categorising replies, and employing analytical data processing techniques can improve the reliability of results.

## 3.5 Theoretical and Practical Implications

This research explores the relationship between personality traits, techno-eustress, and student engagement in an online learning environment. It addresses a gap in the existing research by emphasising the significance of considering students' psychological well-being and stress management while creating and executing online learning environments. This research further enhances educational practices in online courses by enabling educators to customise teaching approaches to match individual preferences and foster more captivating online learning experiences.

The research also helps to improve student support services in online learning settings. Institutions of Higher Learning (IHLs) may use this information to develop and execute focused assistance initiatives and resources to enhance student well-being, grit, and academic achievement. Institutions of Higher Learning (IHLs) can offer workshops, webinars, and counselling services to develop essential personality traits, stress management, and coping strategies. This empowers students to excel in online learning and academic endeavours. Additionally, IHLs can create online communities, peer support groups, and mentorship programmes to enhance the sense of belonging among online learners. Collaboration with external partners like mental health organisations and technology companies allows for

developing innovative tools and resources to promote the right traits and manage technostress effectively among online learners.

Lastly, this research makes a valuable contribution to the development of educational policy on online learning and digital literacy. Policymakers should lobby for funding for research, training, and professional development opportunities that concentrate on personality characteristics and stress management in online learning. Through promoting cooperation among researchers and educators, evidence-based techniques and interventions may efficiently enhance student achievement in digital learning settings.

## 4.0 Summary

This research investigates how students in one private university in Malaysia use their personality traits to perceive IT demands as challenging techno-stressors to improve their engagement in online classes. This research will use a pragmatism paradigm, applying abductive reasoning to highlight participants' subjective experiences and accounts regarding their involvement in online classes and the elements that influence it. The researcher utilises a convergent case study mixed-methods technique to investigate the research topics. The objective is to gain insight into how students utilise their unique personality traits to view IT demands as challenging techno-stressors, leading to better engagement in online classes. A structured questionnaire will be administered to students to ascertain their personality traits, assess their level of techno-eustress, and measure their level of engagement in online classes. Subsequently, face-to-face semi-structured interviews will be conducted using a detailed interview guide to explore real-life experiences thoroughly. The goal is to understand how techno-eustress affects students' perceptions and responses to challenges, ultimately impacting their engagement in online learning.

During the pilot study phase, three experts will be consulted to comment on the questionnaire items and interview guide. Each expert will be asked to advise on several aspects, such as the appropriateness of the scale used, the correctness of the instructions given, the clarity or vagueness of the items in the structured questionnaire, and the appropriateness of the interview questions. The primary objective of the pilot study method is to evaluate the content validity of the questionnaire and interview guide that has been developed. Subsequently, a pilot test will be conducted with three students to assess the survey and interview questions. Every survey item and interview question will undergo a comprehensive examination during this procedure. After the pilot study, the primary study will be conducted with the remaining participants. After that, the interview data will undergo transcription, thematic analysis, and coding.

This research also considers ethical principles and conduct. To guarantee comprehension among participants, a formal invitation email was sent detailing the research's purpose, roles, methods, risks, and rewards. Participants will have their anonymity and confidentiality ensured, and they will have the option to withdraw at any moment. The "Invitation to Participate in a Research Study" document will provide comprehensive information about participants' rights. It also included the researcher and supervisor's contact information and a consent form. Before the interviews, participants will receive a Participation Information Sheet (PIS) outlining the research's context, goals, potential hazards, and advantages. Explicit permission will be acquired, and anonymity will be guaranteed.

Furthermore, secrecy will be maintained by securely storing electronic information, using pseudonyms, and excluding identifying details from research and reporting. The utmost importance will be given to maintaining participant privacy, confidentiality, and comfort. The data acquired, including personal information and recordings, will be carefully processed and stored following the Malaysian Personal Data Protection Act 2010 (PDPA). Once its purpose has been fulfilled, such as when the thesis is accepted, the data will be securely disposed of to guarantee confidentiality and adherence to data protection requirements.

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## Appendix A
## Structured Questionnaire

**Big Five Inventory (Sample)**

Here are several characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

**I am someone who…**

____Is talkative
____Tends to find fault with others
____Does a thorough job
____Is depressed, blue
____Is original, comes up with new ideas

____Tends to be lazy
____Is emotionally stable, not easily upset
____Is inventive
____Has an assertive personality
____Can be cold and aloof

**IT Mindfulness (Extract)**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

| IT Mindfulness | | | | | |
|---|---|---|---|---|---|
| I find it easy to create new and effective ways of using new technologies | 1 | 2 | 3 | 4 | 5 |
| I am very creative when using new technologies | 1 | 2 | 3 | 4 | 5 |

**Techno Eustress (Extract)**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Seldom | Sometimes | Often | Always |

| **Techno Eustress** | | | | | |
|---|---|---|---|---|---|
| How often do you feel that stress that stems from technology positively contributes to your ability to handle your work-related problems? | 1 | 2 | 3 | 4 | 5 |
| In general, how often do you feel motivated by your stress that stems from technology? | 1 | 2 | 3 | 4 | 5 |

**Student Engagement**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

| **Behavioural Engagement** | | | | | |
|---|---|---|---|---|---|
| I follow the rules of the online class. | 1 | 2 | 3 | 4 | 5 |
| I have trouble using the online class. | 1 | 2 | 3 | 4 | 5 |

| **Emotional Engagement** | | | | | |
|---|---|---|---|---|---|
| I like taking online classes. | 1 | 2 | 3 | 4 | 5 |
| I feel excited about my work in the online class. | 1 | 2 | 3 | 4 | 5 |

| **Cognitive engagement** | | | | | |
|---|---|---|---|---|---|
| I check my coursework for mistakes. | 1 | 2 | 3 | 4 | 5 |
| I study at home even when I do not have a test. | 1 | 2 | 3 | 4 | 5 |

**Thank you for your time and participation. You will be notified via email if you qualify for the interview phase.**

**Appendix B: Interview Guide**

| Purpose | Interview Questions | Prompts |
|---|---|---|
| To understand the perception of participants on techno eustress | ● Can you recall any situations where you experienced positive stress related to using technology for your studies? <br> ● How do you believe positive stress (eustress) influences your approach to overcoming challenges in online learning? | ● Think about moments when you felt motivated or energised by using technology in your online learning. How did these experiences impact your engagement with the coursework? |

| To understand how participants respond to challenges when faced with technostress from IT demands | ● How do you typically perceive challenges or stressors related to technology use in your online learning experience?<br>● How do you personally cope with stressors related to using technology for your coursework? | ● Can you recall when you encountered a challenging technological issue while studying online? How did you react to it? |
|---|---|---|