THEORETICALLY ASSESSED FRAMEWORK FOR CYBERBULLYING PREDICTION: A STUDY ON UNDERGRADUATE STUDENTS FROM UNIVERSITIES IN MALAYSIA USING PLS-SEM AND NEURAL NETWORK APPROACH

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By

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DEDICATION

This thesis is dedicated to the memory of my beloved sister-in-law, Dr. Mehak Sangi. She was a shining star in the field of medicine and her passion for her work was evident in everything she did.

Mehak's life was tragically cut short in September 2020 due to COVID-19. Her loss has left a void in our family that can never be filled. However, I find solace in the fact that her legacy lives on through her family, and those whose lives she touched.

Mehak, this is for you. I hope that in some small way, this thesis honours your memory and the remarkable person that you were. You will always be loved and missed.

ABSTRACT

THEORETICALLY ASSESSED FRAMEWORK FOR CYBERBULLYING PREDICTION: A STUDY ON UNDERGRADUATE STUDENTS FROM UNIVERSITIES IN MALAYSIA USING PLS-SEM AND NEURAL NETWORK APPROACH

Farhan Bashir

In the modern era, Information and Communication Technologies (ICTs) have become an integral facet of daily life, enabling both progress and challenges. One prominent challenge is the escalation of cybercrimes like cyberbullying. While ICTs offer numerous societal advantages, they also provide a platform for the propagation of harmful behaviors. Cyberbullying, defined as persistent online abuse intending to harm others, has gained prominence as ICTs have intertwined with academic pursuits, particularly within higher education institutions.

Malaysia, like many nations, grapples with the issue of cyberbullying, particularly concerning its youth. The prevalence of cyberbullying among Malaysian young adults raises alarm, given instances of cyberbullying-induced suicides. Cyberbullying ranks as the second most common form of adolescent violence in Malaysia, a statistic underscored by United Nations Children's Fund (UNICEF). A 2021 study by Cybersecurity Malaysia revealed a substantial

number of cyberbullying and sexual harassment cases reported to the Malaysian Communications and Multimedia Commission (MCMC) between January 2020 and July 2021, emphasizing the gravity of the issue.

While most of the existing cyberbullying studies predominantly focus on teenagers, its impact extends across age groups and becomes increasingly prevalent as individuals grow. In Malaysia, research has concentrated mainly on school-aged children, leaving a significant gap regarding cyberbullying among university students. Consequently, there is a significant gap in understanding the factors that contribute to Malaysian undergraduate university students (MUUS) engaging in cyberbullying. Therefore, it is important to examine and identify these contributing aspects.

Thus to address this gap, a representative sample of 428 Malaysian undergraduate students attending public and private institutions in Malaysia was surveyed using an online questionnaire to collect quantitative data. In order to rank the recently identified cyberbullying aspects that could possibly cause MUUS to become cyberbullies, a two-step multi-analytical study technique was employed, which comprised structural equation modelling (SEM) for hypothesis testing and non-compensatory artificial neural network (ANN) analysis.

The study found that aggression, anti-social behaviour, and subjective norms significantly influenced the cyberbullying attitudes of MUUS. Conversely, personality, cyberbullying awareness, self-esteem, and internalizing behaviour were insignificant predictors of a cyberbullying attitude. The cyberbullying

intention of Malaysian undergraduate university students (MUUS) was found to have significant and positive associations with various factors. These factors include moral disengagement, image, perceived behavioural control (PBC), peer-to-peer relationships, university climate, socioeconomic status, subjective norms, and cyberbullying attitude. The study's findings also indicated that neither parental practises nor the abuse of spouses, siblings, or other family members had a statistically significant impact on respondents' intentions to engage in cyberbullying. The research also revealed a positive moderating relationship between respondents' use of social media and their propensity to engage in cyberbullying.

The study has far-reaching implications for researchers, policymakers, parents, and students. By shedding light on the factors that contribute to cyberbullying among undergraduate university students in Malaysia, this research adds valuable new knowledge to the existing literature. The Malaysian government may use the identified criteria to guide policy choices for higher education institutions and encourage National Transformation 2050 (TN50) and a cyberbullying-free learning environment. The results of this study also support SDG No. 16, which aims to promote peace, justice, and stable institutions.

Apart from its policy implications, this study holds significant implications for personal morality and the education system. By diminishing the occurrence of cyberbullying, it can contribute to the value and well-being of the education system, fostering healthier mindsets among students. When creating cyber-friendly

policies, parents and the government can also greatly benefit from having a better understanding of the underlying reasons for cyberbullying. Taking proactive measures to prevent cyberbullying within families and classrooms is crucial for reducing its prevalence among university students. By raising awareness of the negative consequences of cyberbullying, such activities can effectively counteract online abuse and exploitation through social media. This study emphasises the significance of addressing cyberbullying as a serious issue that necessitates a multifaceted and cooperative approach.

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I am deeply grateful to my parents, Dr. Bashir Ahmed Shaikh and Nasim Begum, for their immense love, unwavering support, and constant encouragement throughout my academic journey. Their guidance and belief in my abilities have been instrumental in shaping my path to success. Their unwavering presence has provided me with the strength and motivation to overcome challenges and pursue my academic goals. I am truly blessed to have such caring and supportive parents

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success. I am deeply indebted to their presence in my life and for the unwavering support they have provided.

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APPROVAL SHEET

This thesis entitled **"THEORETICALLY ASSESSED FRAMEWORK FOR CYBERBULLYING PREDICTION: A STUDY ON UNDERGRADUATE STUDENTS FROM UNIVERSITIES IN MALAYSIA USING PLS-SEM AND NEURAL NETWORK APPROACH"** was prepared by FARHAN BASHIR and submitted as partial fulfilment of the requirement for the degree of Doctor of Philosophy (Computer Science) at Universiti Tunku Abdul Rahman.

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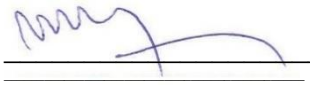

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SUBMISSION OF THESIS

It is hereby certified that ***FARHAN BASHIR*** **ID No:** ***20ACD00865*** has completed this dissertation entitled "**THEORETICALLY ASSESSED FRAMEWORK FOR CYBERBULLYING PREDICTION: A STUDY ON UNDERGRADUATE STUDENTS FROM UNIVERSITIES IN MALAYSIA USING PLS-SEM AND NEURAL NETWORK APPROACH"** under the supervision of **Dr. Ramesh Kumar Ayyasamy** (Main Supervisor) from the Department of Information Systems, Faculty of Information and Communication Technology, **Dr. Lee Chen Kang** (Co-Supervisor) Department of Information Systems, Faculty of Information and Communication Technology. **Dr. Mobashar Rehman** (External Co-Supervisor) Business School, Middlesex University London and **Dr. Manzoor Ahmed Hashmani** (External Co-Supervisor) Department of Computer and Information Science, Universiti Teknologi Petronas, Malaysia.

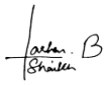
I understand that the University will upload softcopy of my dissertation in PDF format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

(FARHAN BASHIR)

DECLARATION

I hereby declare that the thesis is based on my original work except for the quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.



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LIST OF ABBREVIATIONS

ANN	Artificial Neural Networks
ATD	Attitude
CB-SEM	Covariance-based SEM
CR	Composite Reliability
ICTs	Information and Communication Technologies
INT	Intention
MCMC	Malaysian Communications and Multimedia Commission
MCO	Movement Control Order
MUUS	Malaysian University Undergraduate Students
MyCERT	Malaysia Computer Emergency Response Team
PBC	Perceived Behavioural Control
PLS	Partial Least Squares
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSMU	Problematic Social Media Usage
RMSE	Root Mean Square Error
SCT	Social Cognitive Theory
SEM	Structural Equation Modelling
SLR	Systematic Literature Review
SN	Subjective Norms
TPB	Theory of Planned Behaviour
UKM	Universiti Kebangsaan Malaysia
UM	University Malaya
UNICEF	United Nations International Children's Emergency Fund
USA	United States of America
UTAR	Universiti Tunku Abdul Rehman
UTP	Universiti Teknologi Petronas
VB-SEM	Variance-based SEM

CHAPTER ONE

INTRODUCTION

1.1 Overview

Bullying has always been a problem in learning environments, and as digital technology has advanced, a new variation of this problem has emerged called cyberbullying [1]. Due to the extensive use of online platforms in the contemporary digital era, such as social media, messaging services, and online forums, cyberbullying has substantially expanded. This form of harassment knows no boundaries, impacting individuals from diverse backgrounds, regardless of their age or gender [2].

This chapter sets out the research context for understanding bullying, cyberbullying, and the platforms used for cyberbullying. It begins by exploring cyberbullying impact on university students and comparing traditional and cyberbullying. The prevalence of cyberbullying in higher education and specifically in Malaysia is also discussed.

This chapter contains the issue description for the study, the existing research gap, the research questions, and the suggested research objectives. After a thorough analysis of the research issue, the study's boundaries are decided. Finally, this chapter finishes with the study's rationale, emphasising the significance of researching cyberbullying in universities and providing a full review of the remainder of the thesis.

1.1 Research Background

As per the World Internet Statistics of 2022, the number of global internet users has exceeded five billion, signifying the significant role of the online world in contemporary life and its profound influence on society [3]. The contemporary world heavily relies on technology, and the younger generation is at the forefront of leading digital lives. The rapid advancement of ICTs has significantly impacted individuals and their way of life. The modern world in which we live today is distinguished by an age in which widespread access to technology is available not only at work but also in our day-to-day domestic activities. Most of our daily time is dedicated to communicating with others via electronic devices, including but not limited to mobile phones, laptops, and game consoles. Our lives are entangled with one another like a densely knit ball of wool due to the interconnected nature of our modern cyber-wired world. Despite the myriad benefits that have been created as a result of the integration of the cyber world, something more sinister rears its head to wriggle its way into the youngsters lives who are more susceptible to it. The Internet has become a mixed blessing, providing unprecedented convenience in our everyday lives while also giving rise to various negative behaviours [4]. One such behaviour is cyberbullying, which is a type of bullying carried out through electronic devices. The publishing of offensive content on well-known social media platforms like Facebook, Instagram, and Twitter as well as through online chat and gaming services, are examples of many forms of cyberbullying [5]. The ability to say and do things anonymously on the Internet has made it a popular platform for social interactions and paved the way for cyberbullying [6].

The proliferation of ICTs has profoundly altered traditional forms of communication, the dynamics of social interactions, and connections among young people, particularly those who are students. The broad adoption of ICTs has changed how undergraduate university students experience cyberbullying. Social networking websites provide a multitude of channels through which students engage in nefarious cyberbullying behaviour, resulting in severe emotional and psychological trauma [7], [8].

The term bully has been used since the 1530s [9]. A bully or intimidator and someone they target are the essential components of each bullying situation. To satisfy his or her own need for dominance and superiority, the bully resorts to various forms of abuse toward the victim. Direct acts (such as beating or verbally attacking someone face-to-face) and indirect acts (such as ostracizing someone) fall under this category (i.e., rumours, gossip, etc.) [10], [11]. A power imbalance leads to bullying, which is described as forceful, purposeful, targeted, undesired, unethical, inappropriate, immoral, unaccepted, and disrespectful behaviour toward others [12]. This power imbalance and disparity in authority may be actual or only felt. Such behaviour is typically repetitive and recurrent [13]. Both lone perpetrators and groups of like-minded persons are capable of bullying [14]. Physical and verbal abuse, the distribution of false information, scathing remarks and rumours, threats, and exclusion from social groups are all examples of bullying behaviour [15].

As technology continues to advance, it undeniably revolutionizes human interactions, shaping the development of our culture. However, alongside these advancements, there has been a concurrent increase in undesirable behaviours

facilitated by technology. While these technological advancements have brought progress in various domains, they have also led to the proliferation of harmful activities. The prevalence of cyberbullying is intricately linked to the advancement of technology Cyberbullying is when someone or a group sends hostile or aggressive messages over and over again through electronic media with the purpose to hurt or upset someone else [16]. Unlike traditional bullying, cyberbullying allows perpetrators to remain anonymous and conceal their identity [17], [18]. This anonymity makes it easier for bullies to target victims online without the victim's knowledge. Individuals who are subjected to either type of bullying can encounter similar adverse outcomes, such as stress, depression, feelings of loneliness, psychological challenges, thoughts of suicide, and disturbances in sleep patterns [19]. Cyberbullying is considered to be more dangerous than traditional bullying since there is no face-to-face connection and the bully may conceal themselves behind a computer or phone [20]. The capability to maintain anonymity facilitates perpetrators in inflicting harm upon their victims without having to witness their physical reactions [21]. Youngsters are more likely to perform inappropriate activities due to the distancing effect that technology devices have on them than what is common in a classic “face-to-face” bullying situation [22].

The Internet's expansion has led to the creation of numerous websites, including social media platforms, where users can create personal profiles and share images and videos with friends and enemies alike. However, publishing personal information online poses a risk since it allows others to gain access to private information. This vulnerability puts many adolescents in the position of either being

victims of cyberbullying or participating in it as perpetrators. Social media platforms also provide the option to create anonymous profiles, which can be misleading and dangerous. Teenagers who conceal their identities can communicate without fear of consequences. Unfortunately, the widespread occurrence of social media abuse, including cyberbullying, is prevalent on popular platforms such as Facebook and Instagram. [23].

The extensive utilization of technology and the Internet has revolutionized the dynamics of bullying, eradicating the physical limitations that previously confined it to specific settings such as schools and neighbourhoods [24]. The geographical barriers that once limited bullying to physical spaces like neighbourhoods, schools, and universities have been lifted. With the ease of access to Internet, cyberbullying can occur from anywhere in the world, at any time of the day, leading to severe consequences [25]. While research on cyberbullying has mostly focused on teenagers, it's essential to recognize that it can impact individuals of any age, with prevalence increasing as people age [26].

Cyberbullying affects people all across the world, regardless of where they live or what culture they come from. Any part of the world can experience it, ranging from Western nations like the United States of America (USA) to the Middle East. [27] to the Asian region including Taiwan [28], China [29] Singapore [30]–[32], Pakistan [33]–[36], and Malaysia [5], [37]–[40]. In addition, the cyberbullying prevalence was noticed among school-aged children, college students, university students and working adults. There is a significant need for research on cyberbullying among undergraduate university students, as demonstrated by

several studies [5], [25], [39], [41], [42]. A survey of 638 college students in USA found that 57.4% had experienced cyberbullying, with 3.4% being victimized at least once a week [43]. In a study conducted in Malaysia, involving 1,263 young adults aged 18-35, it was found that 30.5% of the participants reported as cyberbullying victims, 20.3% admitted to engaging in cyberbullying behaviour, and a majority of 53.4% reported experiencing both roles of being a bully and a victim [37]. These findings demonstrate that cyberbullying remains a significant issue that extends beyond the school years. Although there has been significant research conducted on cyberbullying, most studies have focused on school-aged children, leaving a gap in understanding the factors associated with cyberbullying among undergraduate university students [5], [8], [37], [44]. Although cyberbullying is known to be a common occurrence among young adults [39], [43], [45].

According to the 2020 report published by the MCMC, Internet usage in Malaysia is experiencing an upward trend. Currently, 88.7% of the country's population utilizes the Internet, with individuals in their 20s and 30s constituting 46.0% and 21.2% of all Internet users, respectively [46].Cyberbullying is a reality of the digital world and an emerging global issue, and Malaysia is no exception. According to media reports, UNICEF has identified Malaysia as the second-ranked country in Asia for youth cyberbullying. The 2021 incident statistics report of Cybersecurity Malaysia shows that cyberbullying is a serious and top threat to Malaysian people, particularly youngsters. This report revealed that 417 cyber harassment cases were reported in 2021. The MCMC received almost 6,000 complaints of online harassment and sexual assault between January 2020 and July

2021, according to Malaysia's Minister of Communication and Multimedia, who made the announcement at a press conference [47]. The increase in internet usage among Malaysians, coupled with unproductive online behaviours, has led to a rise in negative behaviours, particularly cyberbullying, among the youth in the country [5]. Furthermore, much of the published research on this topic has been lacking in terms of its generalizability and the existence of a strong theoretical foundation when applied to Malaysia [5], [8], [25], [48]. The studies highlighted the critical need for immediate attention to be paid on the cyberbullying behaviour among undergraduate university students of Malaysia. Therefore, to bridge the existing research gap concerning cyberbullying behavior among MUUS, it is significant to investigate the factors contributing to cyberbullying behavior within this specific demographic and comprehend the underlying motivations behind such conduct. As a result, the main goal of this research is to undertake an extensive examination of the variables that might possibly affect MUUS's involvement in cyberbullying behaviour.

1.2 Undergraduates and Cyberbullying

The incorporation of ICTs into university culture has provided various avenues for networking and communication. However, a significant problem that has emerged due to their expanding use is the issue of cyberbullying. As technology usage continues to rise, so does the prevalence of cyberbullying. University students, in particular, are susceptible to this phenomenon due to their increased availability of the Internet and ICTs. This vulnerability is heightened because undergraduates spend a considerable amount of time online, whether for academic

purposes or personal leisure, increasing their chances of encountering online trolls and bullies [49], [50]. Moreover, the competitive nature of undergraduate education can exacerbate cyberbullying. Students may use online platforms to attack their peers in an attempt to gain an academic advantage or undermine their competition [51].

Thumronglaohapun et al. investigated the frequency of cyberbullying awareness, perception, and engagement among high school and college students. Establishing effective prevention strategies is imperative to curbing future instances of cyberbullying [52]. The study took place at fourteen educational institutions throughout Thailand, including four universities situated in Chiang Mai. A total of 721 high school students participated in the survey. The findings indicated a higher awareness of cyberbullying among women compared to men (92.1% vs. 82.7%). Notably, the study underscored that a noteworthy proportion of cyberbullying perpetrators exhibited limited awareness of the grave consequences of their actions. Their involvement in such conduct was largely motivated by the intent to mock their targets. These results highlight the worrisome lack of consciousness among cyberbullies regarding the detrimental impacts of their behavior. Zhong et al., conducted a study to examine gender differences in cyberbullying among Chinese college students, utilizing two independent samples and employed a non-parametric test to analyse the data [53]. The findings highlighted significant gender disparities in the context of cyberbullying. Specifically, male students scored significantly higher than female students, suggesting a higher propensity for males to engage in cyberbullying behaviour,

both as cyberbullies and cyber victims. The study emphasized the influence of various factors on cyberbullying among Chinese college students, highlighting gender as a significant factor at the personal background level.

Bernardo et al. [54] investigated the experiences of cyberbullying victimization and their implications for future aspirations in higher education. The study utilized a sample of 1653 university students from Spain. The primary objective was to assess whether being subjected to cyberbullying correlated with an increased likelihood of discontinuing higher education. The findings established a significant connection between the inclination to abandon university studies and being a target of cyberbullying. As this research indicates a substantial influence of cyberbullying on a student's academic path and educational ambitions, it raises pertinent concerns.

Kakamad and Rashid analysed the frequency of cyberbullying among Kurdish university students [55]. An online survey was completed by 275 people for the study. According to the results, male participants reported more cyberbullying than their female counterparts did. Kawshar et al. conducted a study to look at the factors that both directly and indirectly influence cases of cyberbullying among university students in Bangladesh [56]. The study aimed to gain insight into the various influences that contribute to the prevalence of cyberbullying within this specific population. The results showed several characteristics that are beneficial in reducing cyberbullying among university students in Bangladesh. Social influences, social media usage, internet addiction, social anxiety, and characteristic rage are all included in this list of criteria. The word "social influences" refers to the media, peers, and familial influences on a person's cyberbullying conduct. In

terms of "trait anger," it refers to a person's propensity to feel angry frequently and strongly [56]. Higher levels of trait anger may contribute to aggressive behaviours like cyberbullying, individuals with elevated anger levels may be more prone to lashing out or engaging in aggressive online behaviours like cyberbullying [57].

The utilization of the Internet and other electronic channels has become increasingly common for universities and colleges to communicate with students. As a result, cyberbullying has become increasingly prevalent within higher education institutions [58]. Undergraduate university students are more inclined to seek new experiences, social and sexual autonomy [59]. The establishment of Facebook, one of the most thriving social networking websites, as a local campus website, highlights the eagerness of university students to engage in communication and sharing.

Cyberbullying has been shown to have a negative impact on academic performance [60]. According to studies, those who experienced cyberbullying in high school had a threefold increased risk of experiencing it in college or university. [61]. The survey also showed that college students were more likely to experience cyberbullying than non-college students. However, study by Brack and Caltabiano (2014) revealed no discernible distinction in the levels of self-esteem between individuals who engage in cyberbullying and those who are victims. [62]. The researchers observed that there was no notable distinction in self-esteem between cyberbully perpetrators, victims, and those who fell into both categories. The authors also highlighted that individuals who engage in cyberbullying may feel a

sense of empowerment online but may not necessarily exhibit bullying behaviour in direct interactions.

This study looks at cyberbullying among MUUS. The first stage of the study was a systematic literature review (SLR) to have a thorough grasp of the variables impacting cyberbullying behaviour in this specific population. The main goal of the SLR was to find and assess previous research that looked at various aspects of MUUS cyberbullying conduct. The discovered elements, which comprise socio-cognitive, personal, psychological, and environmental aspects, have a significant impact on the study's primary research goal.

To better understand how individual traits affect MUUS's involvement in cyberbullying activity, the study focuses on personal factors including personality and cyberbullying awareness. Personal factors investigation uncovers the specific aspects of personality and cyberbullying awareness that are associated with cyberbullying behavior.

To obtain insight into the underlying psychological processes that motivate cyberbullying behaviours among MUUS, psychological factors such as antisocial behaviour, self-esteem, internalising behaviour, and aggression are examined. Investigating these psychological factors helps in understanding the motivations and psychological mechanisms behind cyberbullying behaviour. To investigate the cognitive processes that individuals use to rationalise and explain their involvement in cyberbullying, socio-cognitive aspects, notably moral disengagement, are investigated. Environmental factors, such as, socio-economic status, parenting

style, peer-to-peer relationships, domestic and sibling violence, image and university climate, are investigated to understand how the surrounding environment influences cyberbullying behaviour. These factors shed light on the environmental contexts that influence the prevalence and persistence of cyberbullying in the context of the academic and domestic environment.

In an effort to enhance comprehension of the intricate interplay among these factors and the cyberbullying conduct of MUUS, an exploration of personal, socio-cognitive, psychological, and environmental factors was conducted within the specific framework of MUUS.

1.3 Research Problem

Cyberbullying can have extensive and severe detrimental effects on an individual's well-being [5], [40], [42]. Cyberbullying is not only increasing globally, but also at a highly worrisome rate in Malaysia [5], [37], [38], [40]. In Malaysia, cyberbullying has been linked to a 17.1% rate of suicidal behaviour among young individuals [40]. It encompasses 8.4% of individuals who attempted suicide, 10.2% of those who formulated suicide plans, and 11.9% of individuals who experienced suicidal thoughts.

While not accorded adequate acknowledgment, cyberbullying undeniably constitutes a far-reaching concern in the Malaysian context. Extensive scholarly investigations and media depictions have consistently underscored the distressingly recurrent nature of cyberbullying among the country's youthful demographic [5], [25], [39]. Despite the scarcity of research on cyberbullying among MUUS and the

fact that a significant number of cyberbullying incidents go unreported due to people's lack of comprehension about the gravity of such occurrences, cyberbullying is gaining the attention of Malaysian researchers and professionals [5], [25], [63]. In research conducted by Lai et al. (2017) on 712 Malaysian students enrolled in public and private institutions in Malaysia, 66 percent of respondents reported having experienced cyberbullying [8]. Cyberbullying was also shown to be more prevalent among females than males, and among students of Malay descent in particular. Social media platforms such as Facebook were identified as common sites for cyberbullying to occur.

UNICEF has ranked Malaysia as the second-highest country in Asia for youth cyberbullying, indicating that Malaysia is currently grappling with cyberbullying [64]. This highlights the growing prevalence of cyberbullying in the country, indicating that it has become an increasingly significant issue. Recent data show that cyberbullying is now the third most dangerous cyber threat to Malaysians, after online fraud and intrusion [65]. Over 53% of Malaysian adolescents exhibit moderate to high levels of cyberbullying tendencies, according to a study done by academics from Universiti Kebangsaan Malaysia (UKM). More than 44% of Malaysian adolescents also suffer from cyber-related anxiety, despair, and stress because of having experienced moderate to severe cyberbullying themselves [66].

Adebayo et al. conducted research to determine whether or not there is a correlation between demographic parameters and experiences of cyberbullying among undergraduate students attending public universities in Malaysia [7]. The study selected 400 undergraduate students at a public university in western

Malaysia. Gender and program of study were found to have a significant positive association, while ethnicity did not exhibit a similar relationship. Lokithasan and colleagues examined the relationship between aggressive behavior—both proactive and reactive—low self-esteem, and cyberbullying in a cross-sectional study of college students in Malaysia [67]. Purposive sampling was used to choose the 255 participants for the study. The results showed a statistically significant and inversely associated relationship between cyberbullying and both proactive and reactive aggression. Furthermore, the findings suggest that, in contrast to undergraduates with high levels of reactive aggression, those with high levels of proactive aggression are more likely to engage in cyberbullying. In order to assess the prevalence of cyberbullying and social media addiction, Lee and colleagues conducted a cross-sectional study of 270 medical students at a public university in Malaysia [68]. According to their findings, 24.4% of participants had been victims of cyberbullying, while 13.0% have recently perpetrated cyberbullying. Furthermore, the findings show that psychological motivations such as positive attitudes towards cyberbullying and a desire for power are substantially connected with cyberbullying perpetration [68].

Cybersecurity Malaysia's 2021 incident data report further highlights that cyberbullying ranks among the top threats faced by Malaysians, particularly young people [69]. The report reveals that there were 417 documented incidents of cyber harassment in 2021 alone. These figures do not accurately represent the true extent of cyberbullying in Malaysia, with the actual number of incidents likely to be much higher than those reported [70]. Cyberbullying victims feel despondent and

powerless and may be unaware of how to report cyberbullying incidents. As a result, many cases go unreported [8]. Tragically, cyberbullying has resulted in several suicides in Malaysia. In 2020, a 17-year-old teenager took his own life after being cyberbullied by two classmates. Similar to this, a 20-year-old woman killed herself after receiving online abuse and left a letter accusing a Facebook user of being responsible for her demise [71].

1.4 Research Gap

In recent years, the issue of cyberbullying among college students has gained more attention, giving rise to a sizable body of literature on the subject. However, despite the increasing concern, there remains a significant research gap when it comes to the study of cyberbullying behaviour among MUUS [7], [39], [72], [73]. According to Johanis et al. (2020) cyberbullying can impact individuals of all ages, and nobody is immune to its effects [74]. University students, however, may be more vulnerable to cyberbullying because of their increased use of technology and social networking sites.

The prevalence of cyberbullying among MUUS highlights the importance of comprehending the underlying factors that motivate towards this behavior. This research takes a thorough approach to identify, investigate, and analyse a variety of contributing factors that lead to cyberbullying behaviour among MUUS. The primary objective of this study is to comprehensively evaluate a diverse array of pertinent factors linked to cyberbullying among MUUS, distinguishing itself from prior research that predominantly centered on a limited set of factors.

This research specifically investigates personal, socio-cognitive, psychological, environmental factors and their influence on cyberbullying behaviour among MUUS. This study endeavors to furnish a comprehensive comprehension of cyberbullying behaviors among Malaysian undergraduate university students (MUUS) along with their underlying drivers. This aim is pursued through an investigation of a diverse spectrum of cyberbullying factors, derived from a systematic literature review (SLR) specifically conducted to illuminate cyberbullying factors pertinent to university students [42]. Through the SLR, relevant studies were analysed to identify and categorize the identified factors associated with cyberbullying behaviour. The identified factors were subsequently categorized into four main groups: Personal, Socio-Cognitive, Psychological, and "Environmental Factors [42]. This study aims to deepen the understanding of cyberbullying behaviour among MUUS by investigating the identified factors.

Considering this, the existing body of study has uncovered a research gap, which necessitates the conduct of further research based upon a robust theoretical framework and sample that can be generalized. In order to better illustrate the existing research gap, a tabular version of the research gap was created, and this is displayed in Table 1.1.

Researchers have looked at cyberbullying from a variety of perspectives, with some focusing on individual characteristics, others on psychological factors, and only a select few on social and physical environments of cyberbullies. Table 1.1 highlights the limited scope of existing studies regarding a robust theoretical foundation. There is not a single study that can be found in the existing body of

research that has concentrated on all of the potential factors associated with cyberbullying behaviour while also having a strong theoretical base. In addition, it is essential to stress the fact that none of the studies have made use of the Structural Equation Modelling-Artificial Neural Network Approach (SEM-ANN) approach in the context of cyberbullying. However, SEM-ANN technique has been applied by researchers in various contexts related to human behaviour [75]–[77].

Table 1.1 Research Gap

	Study	Personal Factors	Psychological Factors	Environmental Factors	Theoretical Foundation	Focus on Undergraduate University Students	Malaysian Context	SEM-ANN Methodology
[44]	"Cyberbullying among young adults in Malaysia: The roles of gender, age and Internet frequency"	✔	✘	✘	✘	✘	✔	✘
[38]	"Unravelling the underlying factors SCulPT-ing cyberbullying behaviours among Malaysian young adults"	✘	✔	✔	✘	✔	✔	✘

[8]	“Prevalence of cyberbullying among students in Malaysian higher learning institutions”	✗	✗	✗	✗	✔	✔	✗
[48]	“Predicting the intention to cyberbully and cyberbullying behaviour among the undergraduate students at the international Islamic university Malaysia”	✗	✗	✔	✔	✔	✔	✗
[78]	“Determinant factors of cyberbullying: An application of Theory of	✗	✗	✔	✔	✔	✔	✗

	Planned Behaviour"							
[37]	"Self-esteem, empathy and their impacts on cyberbullying among young adults"	✗	✔	✗	✗	✗	✔	✗
[79]	"Actions, emotional reactions and cyberbullying – from the lens of bullies, victims, bully-victims and bystanders among Malaysian young adults"	✗	✔	✗	✗	✗	✔	✗
[25]	"Cyber aggression-victimization	✗	✗	✔	✗	✗	✔	✗

	among Malaysians youth"							
[80]	"Aggression and self-esteem on cyberbullying among undergraduates in Malaysia"	✗	✔	✗	✗	✔	✔	✗
[73]	"The prevalence of cyberbullying and its associated factors among young adolescents in Penang, Malaysia"	✔	✗	✗	✗	✗	✔	✗
[5]	"Psychological motives of cyberbullying among	✔	✔	✗	✗	✔	✔	✗

	Malaysian young adults"							
[7]	"Relationship between demographic factors and undergraduates cyberbullying experiences in public universities in Malaysia"	✔	✘	✘	✘	✔	✔	✘
[39]	"Cyberbullying behaviour: a study of undergraduate university students"	✔	✔	✘	✘	✔	✔	✘
[81]	"Cyberbullying among university students: concurrent relations to	✘	✔	✔	✘	✔	✘	✘

	belief in a just world and to empathy"							
[82]	"Potential sociodemographic predictors of cyberbullying behaviour among university students"	✔	✔	✘	✘	✔	✘	✘
[40]	"Finding the link between cyberbullying and suicidal behaviour among adolescents in peninsular Malaysia"	✘	✔	✔	✘	✘	✔	✘

1.5 Research Objectives

Cyberbullying behaviour among university students is impacted by diverse factors such as personal, socio-cognitive, psychological, technological, and environmental factors [83]. In order to gain a comprehensive understanding of this behaviour, it is vital to take into account multiple factors and identify those that are specific to MUUS [8], [37]. Consequently, the main objective of this study is to identify and thoroughly investigate the underlying factors that contribute to university students engaging in cyberbullying behaviour. The study has four primary research objectives, which are as follows:

RO1. To examine the factors associated with cyberbullying behaviour among MUUS**.**

RO2. To examine the impact of personal, psychological, socio-cognitive and environmental factors on cyberbullying attitudes and cyberbullying intention among MUUS.

RO3. To examine the impact of cyberbullying intention on cyberbullying behaviour among MUUS.

RO4. To examine the role of social media usage as a moderator between cyberbullying intention and cyberbullying behaviour among MUUS.

1.6 Research Questions

In order to address the identified gaps in the existing research, this study has formulated the following four research questions:

RQ1. What are the factors that drive MUUS towards cyberbullying behaviour?

RQ2. What is the impact of personal, psychological, socio-cognitive, and environmental factors on cyberbullying attitudes and cyberbullying intention among MUUS?

RQ3. What is the impact of cyberbullying intention on cyberbullying behaviour among MUUS?

RQ4. What is the role of Social Media usage as a moderator between cyberbullying intention and cyberbullying behaviour among MUUS?

1.7 Research Scope

The prevalence of cyberbullying among MUUS has surged due to escalated internet accessibility, concerning patterns of social networking, and the imprudent utilization of ICT's [5], [25], [37], [73]. Consequently, the scope of this study is confined to MUUS enrolled in both public and private universities within Malaysia.

In order to thoroughly investigate the hypothetical relationships formulated in this study and attain a more profound comprehension of cyberbullying

behaviors among undergraduate students, the adoption of a quantitative research methodology with MUUS as the participants becomes imperative. Given the dispersed distribution of Malaysia's academic institutions, it is necessary to establish a representative population to ensure the generalizability of the study's findings [79]. Consequently, data was collected from MUUS enrolled in both public and private universities located in five key Malaysian states, namely Perak, Selangor, Penang, Pahang, and Johor. The study's approach seeks to offer a holistic comprehension of cyberbullying behaviour among MUUS.

1.8 Theoretical Significance of the Study

This research aims to contribute to the existing knowledge on the prevalence of cyberbullying among MUUS. It adopts the dark triad personality construct and combines the Social Cognitive Theory (SCT) [84] and the Theory of Planned Behavior (TPB) to analyze cyberbullying behaviour of MUUS. The dark triad personality construct encompasses three personality traits: narcissism, Machiavellianism, and psychopathy [85]. Narcissism entails an inflated sense of self-importance, a strong craving for admiration, and a lack of empathy for others [29]. Machiavellianism involves manipulation, deceit, and a strategic approach to achieve personal goals [86]. Psychopathy encompasses traits such as callousness, impulsivity, and a lack of remorse or guilt [87]. These three traits were specifically chosen for personality factor in this research due to their relevance to cyberbullying behaviour among MUUS.

This study investigates the impact of problematic social media usage on cyberbullying behaviour, taking into account various factors such as individual factors, the university environment, and the home environment. The study aims to investigate the underlying factors that motivate university students to participate in cyberbullying behaviour and to uncover the interconnections between these factors. This research contributes to existing literature on cyberbullying by providing comprehensive understanding of cyberbullying behaviour among MUUS. Unlike conventional approaches that focus on a limited set of factors, this research takes a comprehensive approach by analysing multiple factors, including "personal", "socio-cognitive", "psychological", and "environmental" factors related to cyberbullying.

The theoretical significance of this study lies in its integration of established theoretical frameworks, such as the dark triad and the combination of SCT and TPB, to investigate cyberbullying behaviour among MUUS. It is worth emphasizing that this research makes a distinctive contribution through its research model, which incorporates the constructs of attitude, intention, and behaviour based on the TPB and SCT. This integration is rare and unseen in existing literature, making the study distinctive and valuable. The incorporation of TPB and SCT frameworks into the research model provides a comprehensive understanding of the factors influencing cyberbullying behaviour among MUUS. The utilization of the TPB framework in this study facilitates the exploration of how attitudes, subjective norms, and perceived behavioural control influence on cyberbullying intention. Additionally, the incorporation of SCT enables the examination of the

impact of “personal”, “psychological”, “socio-cognitive”, and “environmental” factors” on cyberbullying behaviour.

This study makes a valuable contribution to the theoretical understanding of cyberbullying, particularly within the context of university students. By employing this unique research model, not only does this study fill a gap in the existing literature, but it also provides a more comprehensive approach to investigate cyberbullying behaviour among university students. It allows for the exploration of the interplay between individual factors, social influences, psychological considerations and cognitive processes in shaping cyberbullying attitudes, intentions, and behaviours.

Methodologically, this quantitative research employs a self-administered survey to gather data. To ensure a robust analysis of the collected data, a two-step, multi-analytical technique is utilized. The first phase of data analysis involves the use of structural equation modelling (SEM), a well-established statistical method for examining complex relationships between the cyberbullying factors. SEM-ANN methodology enables to assess the direct and indirect effects of various factors on cyberbullying behaviour among MUUS.

In the second phase of data analysis, artificial neural network (ANN) analysis was employed, which further enhances the robustness of the study. ANN is a powerful computational model that can handle nonlinear relationships and identify patterns within the data. By utilizing ANN, this research not only examines the relationships between factors but also enables the ranking of their importance. Through sensitivity analysis conducted within the ANN framework, the relative

significance of different factors in influencing cyberbullying behaviour have been determined. This ranking provides valuable insights into the key drivers of cyberbullying among MUUS.

The SEM and ANN analyses ensures a comprehensive and rigorous examination of the “personal”, “psychological”, “socio-cognitive”, and “environmental” factors that contribute to cyberbullying behaviour. This approach enhances the accuracy and reliability of the study's findings, thereby providing valuable insights for researchers, policymakers, educators, universities, governments, and parents in addressing cyberbullying issues effectively. The findings will aid in understanding the precursors of cyberbullying behaviour among MUUS, and contribute to reducing cyberbullying incidents.

1.9 Practical Significance

The study's practical significance stems from its potential to inform policymakers, educators, universities, governments, and parents about the factors that drive cyberbullying behaviour among MUUS. Through the examination of multiple variables, including personal, socio-cognitive, psychological, and environmental factors, this study aims to offer a holistic understanding of the underlying drivers that encourage MUUS to participate in cyberbullying.

The findings of the study can be used to design interventions and prevention programs that are evidence-based and aimed at reducing cyberbullying incidents among MUUS. Policymakers and educators can employ the findings to develop policies and initiatives that target the factors that contribute to cyberbullying

behaviour. Universities can integrate the results into their counselling and support services to better assist students who may be victims or perpetrators of cyberbullying.

The findings of this study can provide parents with valuable insights into the online risks and challenges their children may encounter, empowering them to take necessary measures to protect them. Moreover, the study contributes to the existing body of knowledge on cyberbullying behaviour and lays a foundation for future research in this field. Ultimately, the practical significance of this study lies in its potential to positively impact the lives of university students and the wider community. The study provides several practical contributions in understanding and addressing cyberbullying among MUUS. These contributions are outlined for each of the main factors identified in the study:

Aggression, anti-social behaviour, and subjective norms: The study revealed that factors such as aggression, anti-social behaviour, and subjective norms significantly influenced the cyberbullying attitudes of MUUS. This suggests that addressing these factors can contribute to shaping more positive attitudes towards cyberbullying and reducing its occurrence. The practical contribution lies in promoting interventions and educational programs that target reducing aggression and anti-social behaviour, while also addressing subjective norms that may encourage cyberbullying.

Personality, cyberbullying awareness, self-esteem, and internalizing behaviour: Although these factors were found to be insignificant predictors of cyberbullying

attitudes, they still hold practical value. Enhancing cyberbullying awareness and promoting positive self-esteem can be important strategies to prevent cyberbullying among MUUS.

The study revealed significant and positive associations between cyberbullying intentions among MUUS and factors such as moral disengagement, self-image, perceived behavioral control, peer-to-peer relationships, university climate, and socioeconomic status. Practical contributions include the need to develop interventions that target moral disengagement, promote positive peer relationships, create a supportive university climate, and address socioeconomic disparities to mitigate cyberbullying intentions.

Domestic and sibling violence and parenting styles: While these factors did not show a statistically significant effect on cyberbullying intentions in the study, they still hold practical implications. Increasing awareness about the consequences of domestic and sibling violence and promoting positive parenting styles can play a role in preventing cyberbullying among MUUS.

Problematic Social media use: The study found that problematic social media use had a beneficial moderating impact on the association between cyberbullying intentions and behavior. This emphasizes the necessity of encouraging MUUS to use social media in an ethical and responsible manner and raising awareness of the potential repercussions of cyberbullying.

Perceived Behavioural Control: The study identified perceived behavioural control as a significant factor influencing the cyberbullying intentions of MUUS.

This finding implies that interventions and strategies aimed at enhancing individuals' perceived control over their behaviour can potentially reduce cyberbullying intentions among MUUS.

Subjective Norms: The study found a substantial relationship between MUUS's intentions to engage in cyberbullying and subjective norms, which indicate the perceived social pressure to engage in or refrain from actions. This emphasizes how crucial it is to talk about social standards and encourage good social influences to reduce cyberbullying behavior.

Image: The study discovered a significant positive correlation between self-image and cyberbullying intentions among MUUS. This suggests that individuals' concerns about their image or reputation may influence their intentions to engage in cyberbullying. Addressing image-related concerns and promoting positive self-perception can contribute to preventing cyberbullying behaviours.

These results highlight the intricate interplay of various factors that contribute to the occurrence and persistence of cyberbullying.

1.9.1 Benefits to Malaysian Society

This study on cyberbullying among MUUS can benefit Malaysian society in several ways. The findings can help raise responsiveness about cyberbullying and its harmful effects on individuals and society. By highlighting the factors that contribute to cyberbullying behaviour, this research can help educators, policymakers, and parents better understand the motivations behind cyberbullying and take preventive measures to reduce its occurrence. The study's results can help

universities develop policies and guidelines to address cyberbullying on their campuses. Universities may establish a more secure and friendly learning environment that is free from the fear and anxiety that are frequently linked to cyberbullying by studying the factors that drive this behavior. The Malaysian government will be able to further its National Transformation 2050 (NT50) objective of creating an environment devoid of cyberbullying in all the nation's colleges by using this information. The results of this study will help parents and the government better comprehend the root causes of cyberbullying among college students. Overall, the study's conclusions can have a big impact on Malaysian society by helping to make the internet a safer and better place for everyone, which will eventually result in a society that is more connected and has better health.

1.9.2 Sustainable Development Goals

The main objective of this research is to contribute to achieving "Sustainable Development Goal 16," which is concerned with fostering justice, peace, and robust institutions. By identifying the underlying factors that contribute to cyberbullying, this research seeks to reduce cyber violence and create a safer online environment for university students. Furthermore, identifying the factors that are related to cyberbullying both at home and at university can increase awareness, which may aid in reducing the prevalence of cyberbullying among university students. Additionally, creating awareness against cyberbullying can help to prevent cyber abuse and exploitation through social media, ultimately contributing to a safer and more just society.

1.10 Summary

The research, which aims to determine the elements that contribute to cyberbullying conduct among MUUS enrolled in both Malaysian public and private universities, is summarised in Chapter 1. It provides an overview of the study's theoretical and applied importance, problem statement, and research gap. The research's scope is also described in this chapter, along with the study's goals and hypotheses. Reviewing relevant literature sources related to the research topic is the focus of the following chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter offers a comprehensive examination of bullying and cyberbullying issues, along with an exploration of their theoretical foundations and a literature review of previous research, aiming to provide an in-depth understanding of these subjects. Within the thesis, this chapter assumes a pivotal role by laying the foundation for theoretical underpinning, conceptual research framework, and research hypotheses. Its primary objective revolves around synthesizing existing research on cyberbullying among university students, encompassing comprehensive definitions of both conventional and cyber forms of bullying. Additionally, the chapter delves into the theoretical underpinnings of the study, incorporating the TPB and SCT, while introducing the proposed conceptual framework and outlining the formulated study hypotheses.

2.1.1 Topic Conceptualization-Defining Cyberbullying

Conceptualization is an essential step in research, as it involves defining and clarifying the meaning of a concept within a specific context [88]. It lays the groundwork for understanding and studying complex phenomena. In the case of cyberbullying, which has become increasingly prevalent due to the integration of ICTs into our daily lives [53].

While the advantages of modern technology are undeniable, there is also the risk of technology being abused [89]. Cyberbullying, a detrimental outcome of the

digital era, remains challenging to define accurately. Despite continuous endeavors, there is still no universally agreed-upon definition of cyberbullying [90]. One method for describing cyberbullying is to take into account the words "cyber" and "bullying" individually, attributing each word its general understanding before blending them to form a single meaning.

Taking this approach, "cyber" can be conceptualized as "related to technology." Defining "bullying" is a more complex task, as linguistic and cultural differences can result in varying conceptualizations of the term. Dan Olweus, a renowned researcher in the field of bullying, has provided one of the most well-known and frequently referenced definitions of bullying. First introduced in the 1970s and later reiterated in his influential book "Bullying in School", Olweus defines bullying as: "A person is being bullied or victimized when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other persons" [91]. Bullying can occur in various forms, including both physical and non-physical manifestations.

To differentiate it from mere aggression, bullying is commonly defined as involving four key elements: repetition, imbalance of power, intention, and aggression [92]. While both bullying and cyberbullying can occur, they differ in their modes of delivery. Traditional forms of bullying include physical assault (such as striking or kicking), verbal abuse (such as mocking or calling names), and property damage [93]. Alternatively, "cyberbullying refers to the use of electronic communication to harass or harm a person, such as spreading false information or issuing threats" [94]. This might be characterised as indirect bullying [9].

The distinctive feature of a cyberbullying definition is the use of ICTs in the facilitation of repeated, hostile online activities. Computers, gadgets, mobile phones (smart phones), and other forms of ICTs are all potential platforms for cyberbullying. What we call bullying in the digital age is called cyberbullying.

To enhance our understanding of the topic, it is crucial to explore the various definitions of cyberbullying that are presently in use. A summary of the operational definitions of cyberbullying offered by various scholars is provided in Table 2.1.

Table 2.1 Cyberbullying Definitions.

Cyberbullying Definitions	Reference	Author	Year
"An aggression that intentionally, repeatedly and over time carried out by a group or individual using electronic forms of contact (e.g. email, blogs, social media and text messages) with the intention to inflict harm and discomfort against another person who cannot easily defend him/herself."	[16], [95]	(Tian et al., 2018 and Tokunaga, 2010)	2010/2018
"intentional harmful behaviour carried out by a group or individuals, repeated over time, using modern digital technology to aggress against a victim who is unable to defend him/herself"	[96]	(Juvonen & Gross, 2008)	2008
"An aggressive, intentional act carried out by a group or an individual using electronic forms of contact, repeatedly and over time, against a victim who cannot easily defend him/herself"	[97]	(Patchin & Hinduja, 2010)	2010
"cyberbullying is bullying communicated through online environment"	[98]	(Ybarra et al., 2012)	2012
"Being cruel to others by sending or posting harmful material or engaging in other forms of social aggression using the Internet or other digital technologies".	[99]	(Willard, 2007)	2007
"An individual or a group wilfully using information and communication involving electronic technologies to facilitate deliberate and repeated harassment or threat to another individual or group by sending or posting cruel text and/or graphic technologies means".	[100]	(Mason, 2008)	2008
"An aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and overtime against a victim who cannot easily defend him or herself".	[101]	(Smith et al., 2008)	2008
"Cyberbullying involves the use of ICTs to carry out a series of acts as in the case of direct cyberbullying, or an act as in the case of indirect cyberbullying, intended to harm another (the victim) who cannot easily defend him or herself".	[102]	(Tian et al., 2018 and Tokunaga, 2010)	2012

The cyberbullying definition adopted in this research is: “An aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself” [101].

2.1.2 Cyberbullying Forms

Cyberbullying can manifest in various forms and involve a range of behaviours. It includes any form of social aggression carried out through the use of the ICTs, including sending nefarious text messages, making threats online, disseminating offensive images, posting insulting content, clogging email inboxes with messages, and sending harmful materials [103]. According to research [58], [104], the seven most prevalent forms of cyberbullying among university students are "Flaming," "online harassment," "cyberstalking," "denigration," "masquerading," "outing," "trickery," and "exclusion." Flaming involves the act of sending angry, harsh, or vulgar remarks about someone through text messages or email, either directed at the individual or posted within an online community [105]. Cyberstalking refers to a type of harassment where the perpetrator repeatedly sends threatening messages over the internet [106]. Denigration occurs when a cyberbully spreads false or damaging information about a victim to others online. Masquerade is a form of cyberbullying where the perpetrator disguises their identity and publishes or uploads harmful information about an individual to others, deceiving them into believing it comes from someone else [107]. Cyberbullying techniques like trickery and outing entail manipulating or pressuring the victim into disclosing private or embarrassing information, which is then made public by the abuser [107].

Exclusion, on the other hand, is when someone is intentionally left out of an online group, leading to immediate stigmatization [108].

2.1.3 Traditional vs Cyberbullying

Traditional bullying and cyberbullying have some things in common, like trying to hurt or upset the victim and doing the same thing over and over again. [109]. It's crucial to remember that these two types of bullying differ significantly from one another. Traditional bullying typically takes place face-to-face, such as in the schoolyard, neighbourhood, on the playground, or in the classroom. In addition to verbal abuse like name-calling, teasing, or spreading rumours, it frequently involves physical acts of aggression like hitting, kicking, or pushing [110]. The power imbalance in traditional bullying is often related to physical size, social status, or other factors that allow the bully to exert control over the victim. Cyberbullying, on the other hand, takes place online or through other digital media, such as social media, text messages, or email [58]. It often involves the use of technology to harass, intimidate, or embarrass the victim, and can be perpetrated anonymously or under false identities. Cyberbullying can also involve the dissemination of private or embarrassing information or images, and can quickly spread to a large audience [17]. Detecting and preventing cyberbullying incidents poses a greater challenge compared to traditional bullying, making it a notable distinction between the two [21]. Victims may not realize they are being targeted until the behaviour has escalated, and it can be challenging for parents, teachers, or other adults to monitor and control online interactions. It is crucial to acknowledge and address both traditional and cyberbullying, as they can have detrimental and

enduring impacts on the mental well-being, self-esteem, and social growth of the victims [17].

Cyberbullying is often impulsive and lacks premeditation, unlike physical bullying which is usually planned in advance [111]. In contrast to traditional bullying, where the aggressor carefully plans out their attacks, cyberbullying is frequently carried out spontaneously. [112]–[114]. Cyberbullying presents unique challenges that distinguish it from traditional bullying. Cyberbullying, unlike traditional bullying, does not require face-to-face interaction, making it easier for bullies to hide behind a computer screen and avoid facing the repercussions of their actions [115]. This lack of physical interaction also lowers the bully's empathy for the victim, as they cannot see the harm their actions cause [116]. Furthermore, the namelessness provided by the internet may make identifying cyberbullies particularly difficult, giving them a sense of impunity. [20]. Another key feature of cyberbullying is that it can quickly reach a large audience, potentially causing immense humiliation and distress for the victim. The viral nature of online harassment amplifies its impact, making it particularly challenging for those targeted to cope with the fallout [59].

2.2 Cyberbullying Factors

A SLR was performed in order to recognise the issues that contribute to cyberbullying conduct amongst MUUS [42]. The SLR helped in identifying and organizing the relevant factors associated with cyberbullying behaviour among MUUS. A thorough review of the existing literature was conducted, encompassing

empirical studies, theoretical frameworks, and pertinent scholarly publications. The objective was to obtain a comprehensive understanding of the factors explored in prior research and their potential influence on cyberbullying behavior among MUUS. This process aimed to establish a robust knowledge base concerning the factors pertinent to cyberbullying behavior among MUUS.

Before initiating the search for relevant studies, a predefined electronic search space was established. The study relied on prominent e-databases such as “Science Direct”, “Scopus”, and “IEEE Xplore”, selected for their comprehensive coverage of scientific literature within the pertinent domains. Additionally, specific journals such as "Journal of Computers in Human Behaviour" and "International Journal on Human-Computer Studies" were considered due to their relevance to human-computer interaction. The search strategy used several strategies, including the use of search strings, keywords, and Boolean operators (AND, OR), to assure the retrieval of relevant papers. These techniques were used to maximise the inclusion of pertinent studies and improve search performance. The chosen keywords included phrases like "cyberbullying," "internet bullying," "online bullying," and several aspects of cyberbullying among college students. The idea was to maximise coverage while minimising the inclusion of research that wasn't relevant. To include recent studies and preserve a realistic timeline for analysis, the search only included research papers that were published between January 2015 and January 2020.

The inclusion criteria were carefully defined to select appropriate literature for the study. Research that focused on cyberbullying among college students or other

higher education institutions and were published in English-language journals met these requirements. The research also had to have been published within a certain time range. The objectives of the research required to be in line with the assessment, debate, and investigation of university students' experiences with cyberbullying. Additionally, the presence of relevant keywords in the title, abstract, or keywords section was necessary. Both longitudinal and cross-sectional studies were considered.

In contrast, research that did not fit the predetermined criteria was filtered out using exclusion criteria. Studies that were presented at conferences, seminars, and symposiums, as well as book chapters, newspaper pieces, brief summaries of papers, abstracts, and unfinished studies, were all excluded. The removal of duplicate articles from diverse sources. Studies that were not reported in English or that didn't fulfil the review's quality standards were also disqualified. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was followed in the research selection procedure, which also incorporated author agreement. The title screening, deletion of duplicate studies, abstract and introduction screening, and final screening based on the predetermined inclusion and exclusion criteria made up the screening procedure. A total of 32 publications were chosen as prospective candidates for further research after this meticulous approach.

To ensure the reliability and validity of the selected studies, a rigorous quality assessment process was implemented. The standards developed by York University, the Centre for Reviews and Dissemination (CDR), and the Database of

Abstracts of Reviews of Effects (DARE) served as the basis for the evaluation criteria. Each study was evaluated using a standardized response scale of Yes (1), No (0), or Partial (0.5) for each criterion. The assessments were carried out independently by each author, and any discrepancies were resolved through constructive discussions until a consensus was reached. The final grades for each study were documented accordingly.

By employing this systematic approach, the systematic literature review (SLR) aimed to identify pertinent studies that shed light on the factors driving university students to participate in cyberbullying. The meticulous methodology involved predefined search parameters, utilization of multiple databases, consideration of relevant journals, application of inclusion and exclusion criteria, and rigorous quality assessment. These measures collectively contributed to the thorough and dependable findings derived from the review process.

After a thorough analysis, identified factors were subsequently categorized into four main groups: “Personal”, “Socio-Cognitive”, “Psychological”, and “Environmental Factors”, based on their nature, relevance, and discussion context in the literature. The categorization of these factors allows for a comprehensive understanding of the multiple dimensions influencing cyberbullying behaviour among MUUS. It enables the exploration of individual characteristics, psychological processes, cognitive mechanisms, and contextual influences that shape the occurrence and perpetuation of cyberbullying behaviour in the university setting. The SLR findings have been carefully compiled and organized into a comprehensive table. To maintain the flow and readability of the main text, the

table has been moved to Appendix A of this thesis. The condensed summary of key findings from the SLR can be found in Appendix A. The table in Appendix A presents essential details such as the study year, publisher, journal of publication, country, research methodology, cyberbullying factors investigated, and the observed relationship (positive or negative) between these factors and cyberbullying.

By utilizing this categorized framework, the study aims to delve into each category of factors and examine their specific associations with cyberbullying behaviour among MUUS. This systematic approach offers a structured and comprehensive analysis of the factors involved, leading to a deeper understanding of the intricate dynamics of cyberbullying behaviour among MUUS. Figure 2.1 serves as a visual representation, providing an overview of these categories and aiding in the comprehension of the factors that influence cyberbullying behaviour among MUUS.

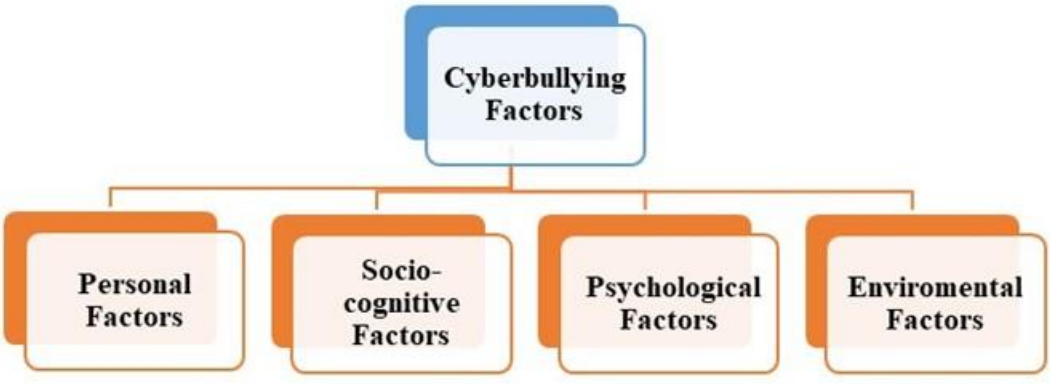

Figure 2.1 Cyberbullying factors categories

2.2.1 Personal Factors

Personal factors refer to characteristics and traits that are inherent to an individual and significantly influence their behaviour, including their attitude towards cyberbullying [39]. These factors possess the potential to exert a noteworthy influence on an individual's perceptions, behaviours, and attitudes concerning cyberbullying. Moreover, it is important to recognize that these factors can vary significantly among individuals, highlighting the complex nature of cyberbullying dynamics.

The awareness of cyberbullying and individual personality traits are important personal factors that can shape an individual's attitude towards cyberbullying [39], [42], [117]. Greater awareness of cyberbullying and its harmful effects on victims can lead to a change in behaviour, making individuals less likely to engage in cyberbullying [118]. Conversely, personality traits are also significant in identifying those who may engage in cyberbullying behaviour [53]. A conceptual map of personal factors linked to cyberbullying attitude among MUUS is presented in Figure 2.2.

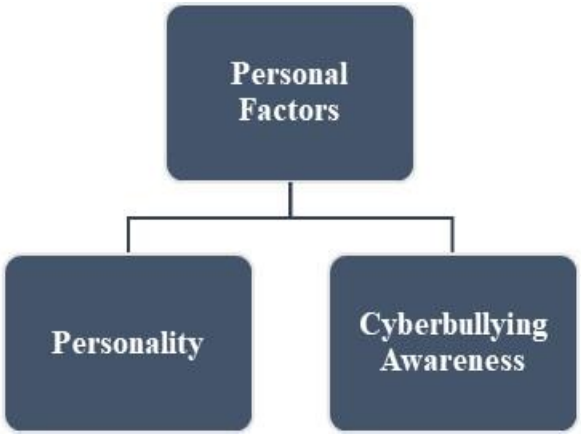

Figure 2.2 Personal factors.

2.2.2 Psychological Factors

Several psychological characteristics, such as aggressive conduct, antisocial behaviour, internalising behaviour, and self-esteem, may have a substantial influence on a person's viewpoint on cyberbullying [42]. These variables are crucial in determining a person's attitude towards cyberbullying [1], [45], [48], [119], [120]. Cyberbullying is linked to higher levels of hostility and antisocial conduct, according to researchers [121]–[123]. This finding is backed up by studies that show an association between cyberbullying and aggression [124], [125]. Internalising conduct and self-esteem are two more important psychological elements that influence the development of cyberbullying attitudes [42], [49], [126]. For instance, internalizing behaviour can make an individual a target of cyberbullying, which, in turn, may lead to that person becoming a cyberbully in the future [49], [127]. Similarly, low self-esteem has been linked to increased vulnerability to cyberbullying [128], [129], which can later result in the individual engaging in cyberbullying behaviours to regain a sense of control and power.

Psychological factors play a significant role in shaping an individual's cyberbullying attitude. Individuals can determine their risk of engaging in cyberbullying and take the necessary steps to prevent it by recognising and comprehending these factors. Figure 2.3 depicts a conceptual map of the psychological factors associated with cyberbullying.

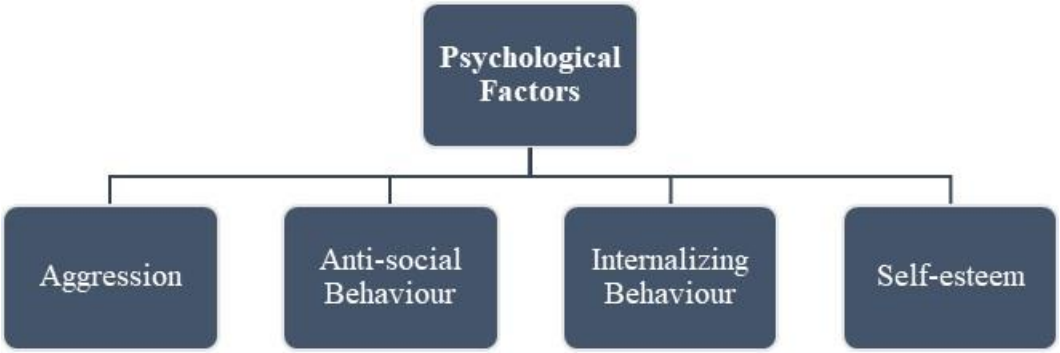

Figure 2.3 Psychological Factors

2.2.3 Socio-cognitive Factors

Socio-cognitive factors relate to the social and cognitive aspects that determine an individual's conduct, which are vital in evaluating their cyberbullying intent. These factors are critical in determining an individual's intention to participate in cyberbullying since they determine an individual's behaviour [130]. Moral disengagement is a significant socio-cognitive factor in the context of cyberbullying, where individuals rationalize harmful behaviour and diminish feelings of guilt or shame [131]. Individuals who are morally disengaged are more prone to engage in cyberbullying, whether they consider their behaviours to be appropriate or not. Therefore, a deeper understanding of socio-cognitive factors such as moral disengagement is critical in developing effective interventions to prevent cyberbullying and promote positive online behaviour.

2.2.4 Environmental Factors

2.2.4.1 Overview

Environmental factors encompass the external conditions, circumstances, and influences in an individual's surroundings, which significantly shape their behaviour [45]. Environmental variables are extremely important in deciding whether someone will engage in cyberbullying or not. A SLR was undertaken to identify various environmental factors contributing to the intention of engaging in cyberbullying [42]. The environmental factors identified in the study were categorized into two main categories, namely "family and household environmental factors" and "university environment factors".

The family and home environment includes socioeconomic status, domestic and sibling violence, as well as parenting style, all of which have been shown to directly affect someone's propensity to engage in cyberbullying behaviour [42].

The university environment, on the other hand, includes characteristics such as university atmosphere, peer-to-peer connections, and student image or reputation [42]. The general environment and cultural norms at a university, such as the degree of respect and tolerance among students and the assistance provided by faculty and staff, are referred to as the university climate [132]. In the university setting, peer interactions and student reputation or image also play important roles and can affect someone's propensity to engage in cyberbullying [133]. The interaction between these environmental factors and the individual creates a unique context that shapes their behaviour [134]. Therefore, understanding these factors is essential to develop

effective strategies for preventing and addressing cyberbullying. A conceptual diagram of the environmental factors related to cyberbullying behaviour of MUUS is shown in Figure 2.4.

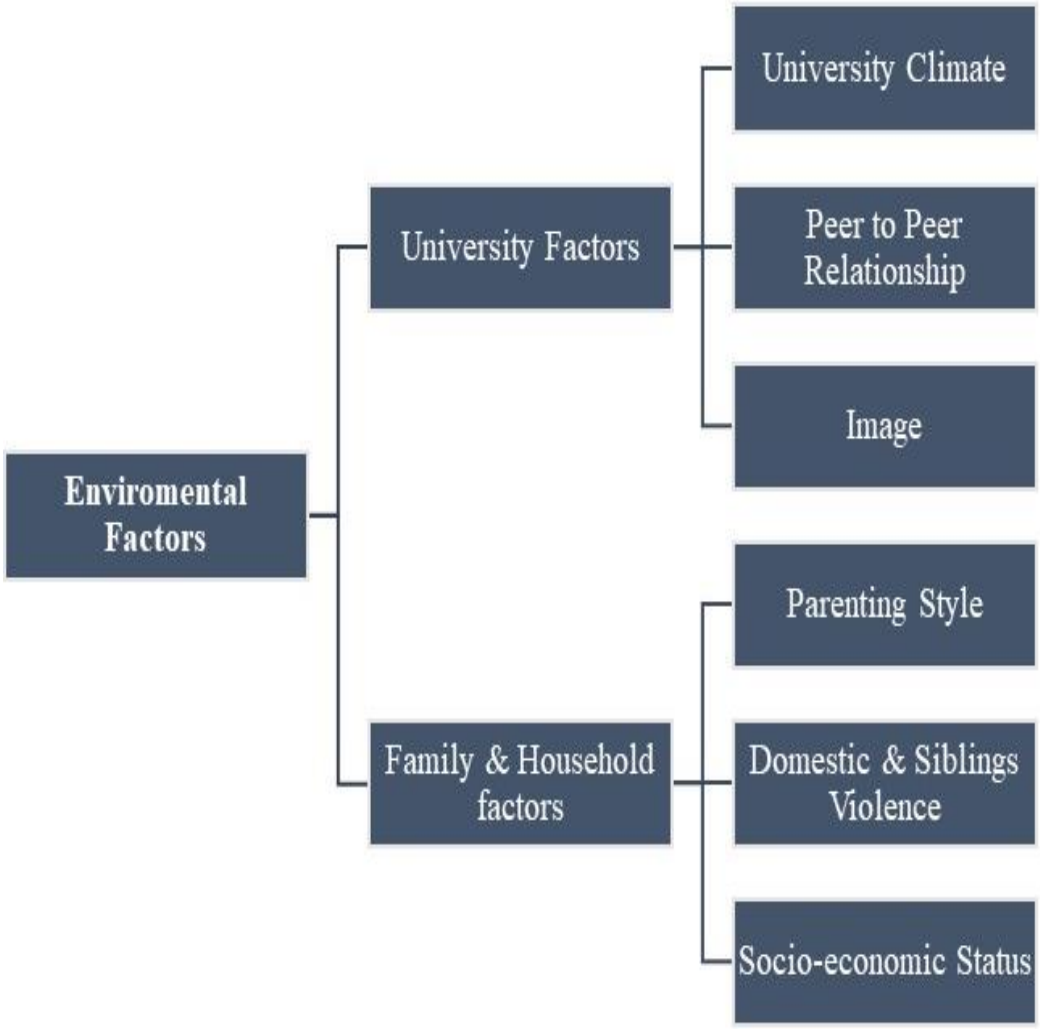

Figure 2.4 Environmental Factors

2.2.4.2 University Factors

The university factors have been identified as one of the important environmental factors related with MUUS propensity to engage in cyberbullying. A positive university climate, characterized by a supportive environment, clear rules and policies against bullying, and effective enforcement mechanisms, can greatly reduce the likelihood of cyberbullying [135]. Good peer interactions and a strong sense of belonging within a student's peer group can help to decrease cyberbullying. If a student feels alone or has bad relationships with their peers, they are more possible to participate in cyberbullying conduct [45]. The image or reputation of a student might also influence their propensity to engage in cyberbullying. For instance, if a student thinks that they have a poor image or reputation, they may be more prone to engage in cyberbullying as a means of asserting authority and control over others. [42]. Conversely, students with a good reputation or image are less likely to involve in cyberbullying.

The university climate have a significant influence on a student's behaviour, particularly their propensity to engage in cyberbullying. The prevalence of cyberbullying may be decreased by being aware of these university-related factors, creating a pleasant campus atmosphere, encouraging positive peer relationships, and promoting a positive image and reputation among students.

2.2.4.3 Family and Household Factors

An individual's participation in cyberbullying is heavily influenced by factors related to their family and household [45]. These factors encompass aspects such

as parenting approach, domestic and sibling abuse, family composition, and economic status. Studies have revealed that students who perpetrate cyberbullying usually have parents who provide less supervision and demonstrate less affectionate behaviour towards them [136]. Conversely, students who receive more assistance and mentoring from their parents are less inclined to participate in cyberbullying activities [137], [138].

Cyberbullying has been found to be associated with domestic violence, including violence among siblings. Lereya et al. (2013) revealed that bullying is associated with domestic violence, and those are victims of domestic and siblings violence are more likely to become cyberbullies [139]. Students who harass their siblings at home are more prone to bully others online [140]. Additionally, there is evidence to support the notion that family structure and socioeconomic position are linked to cyberbullying [141].

The family and home environment has long-lasting effects on an individual's behaviour and can have a significant influence on their propensity to engage in cyberbullying. Understanding these family and household factors and working to promote supportive and non-violent home environments, and positive parenting styles, can help reduce the incidence of cyberbullying.

2.3 The Underpinning Theories

Theoretical underpinning of the study involves the integration of two well-established theories, namely, the TPB and SCT, to comprehend the cyberbullying behaviour among MUUS. The conceptual framework is built on the base of TPB,

with components taken from SCT as an addition. Human conduct is complicated, thus forecasting it requires considering a variety of variables. SCT and TPB are the most often used theories that researchers have used to behaviour prediction [142]–[148]. SCT comprises three interrelated factors, namely personal, environmental, and behaviour, while TPB forecasts human conduct by utilising attitude, PBC, behavioural intention and subjective norms.

The integration of the TPB and SCT in this research study was motivated by their well-established theoretical foundations and strong empirical support within the existing body of literature. TPB provides a comprehensive framework for understanding the psychological determinants of behaviour, including the influence of attitudes, subjective norms, and PBC [144], [149]. By incorporating TPB, this study aims to explore the cognitive and motivational factors that contribute to cyberbullying behaviour among the target population. Likewise, SCT offers valuable insights into how individuals acquire and maintain behaviours through observational learning, self-efficacy beliefs, and outcome expectations [150]. The significance of personal, socio-cognitive, psychological, and environmental aspects in the context of cyberbullying among MUUS is especially important to SCT given that cyberbullying conduct may be impacted by personal, social, and environmental factors [42]. The integration of TPB and SCT strengthens the theoretical framework that facilitates a comprehensive exploration of the underlying factors driving cyberbullying behaviour among MUUS.

The TPB variables that guide this study include, Attitude, Subjective Norms, Intention, PBC and Behaviour. In contrast, the SCT model includes personal and

environmental factors. Personal factors encompass Personality, Cyberbullying Awareness, Aggression, Antisocial Behaviour, Self-esteem, and Moral Disengagement, while Environmental factors include Peer-to-Peer Relationships, Image, Socioeconomic Status, Domestic and Sibling Violence at University, and Parenting Style. The combination of TPB and SCT provides a thorough understanding of the factors that influence cyberbullying behaviour among MUUS, which may help in the development of effective preventative and intervention methods.

2.3.1 TPB and Cyberbullying Behaviour

The TPB, a widely accepted theory in social psychology, asserts that a person's attitudes, subjective standards, and PBC determine their conduct. TPB has been used in a variety of scenarios to forecast and explain human conduct, particularly behaviours related to cyberbullying [146], [151].

TPB has been utilised to assess MUUS's cyberbullying behaviour in the context of the current study. Attitudes toward cyberbullying, subjective norms that exist within the social environment of the students, and PBC over their actions can all be assessed using TPB constructs.

The attitude construct of TPB can help to determine the degree to which students view cyberbullying as acceptable or unacceptable [151]. Attitudes are formed through the evaluation of beliefs and emotions related to a behaviour. Subjective norms refer to the societal pressure that individuals perceive to engage in or refrain from a behaviour [152]. The social milieu that MUUS are exposed to

ICT's on a daily basis can have a considerable impact on the behaviour that they exhibit in the context of cyberbullying [153]. Therefore, understanding the subjective norms of the students is critical in predicting their cyberbullying behaviour. PBC refers to the degree to which a person believes they can exert control over a certain behaviour [154]. In the case of cyberbullying, PBC includes the ability to resist the urge to engage in the behaviour or the belief that they can stop if they wanted to [155].

TPB has been employed to investigate the intentions and conduct of both bullies and victims. Research indicates that the Theory of Planned Behavior (TPB) can effectively anticipate teenage cyberbullying behavior, with attitudes, subjective norms, and perceived behavioral control acting in concert to influence an individual's decision to engage in cyberbullying [48], [143], [151], [155]. Additionally, TPB can be used to identify potential interventions to reduce cyberbullying behaviour among university students [148]. TPB is a useful framework for understanding and predicting cyberbullying behaviour among undergraduate university students [155]. It has also been used to explore the factors that influence the intention to engage in cyberbullying, such as attitudes toward cyberbullying, subjective norms, and PBC [146]. Results from studies that have used the TPB to examine cyberbullying have been promising, suggesting that the TPB can provide valuable insights into the causes and potential interventions for cyberbullying [39], [156]. Overall, the TPB offers a comprehensive framework to examine the factors that influence cyberbullying behaviour among university

students. Figure 2.5 depicts the TPB, which is a widely used theoretical framework for understanding human behaviour.

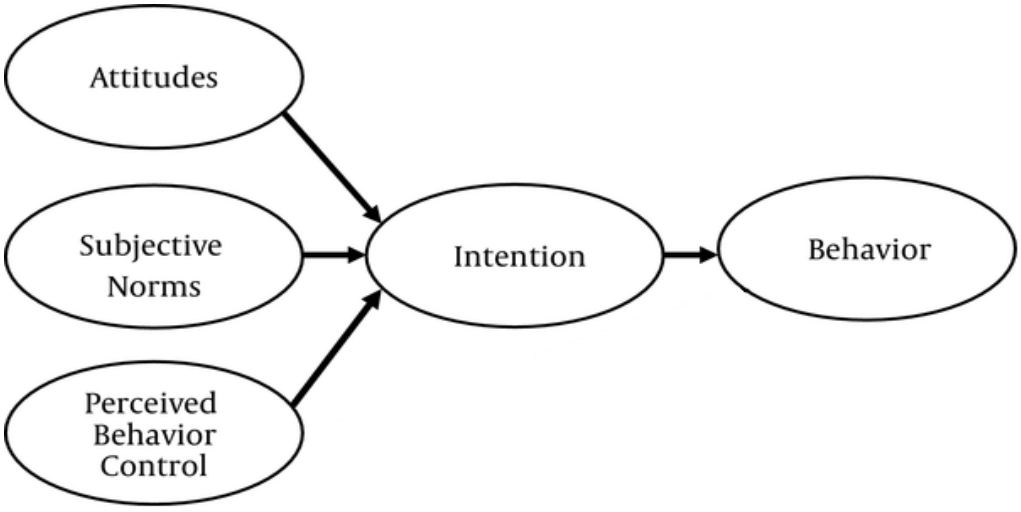

Figure 2.5 Theory of Planned Behaviour [149]

2.3.2 SCT and Cyberbullying Behaviour

SCT is a theoretical framework that emphasizes the reciprocal interactions between individuals, their environment, and their behaviour [157], [158]. According to SCT, individuals learn by observing others and their outcomes, and the cognitive processes such as attention, memory, and motivation play an essential role in learning and behaviour change [84], [159]. SCT suggests that behaviour is influenced by both personal factors and environmental factors, and these factors interact with each other to shape an individual's behaviour [160].

Several studies have applied the SCT to the context of cyberbullying behaviour and have found that the theory can be useful in explaining why some individuals engage in cyberbullying while others do not [150]. The SCT hypothesis states that

a person's personality influences their actions. SCT has recently been used in research to look at participants' cyberbullying habits [161]–[163]. According to this research, SCT has a big influence on how people behave when it comes to cyberbullying. People who participate in cyberbullying often have lower levels of moral involvement and less social information processing ability, which results in the development of aggressive online behaviours. SCT is crucial in the context of cyberbullying because it offers a thorough framework for comprehending the social, cognitive, and environmental aspects that affect a person's conduct [150], [164]. With the use of this information, effective interventions may be created to stop and lessen university students' use of cyberbullying. A more complete knowledge of cyberbullying activity is possible because of the application of SCT to the study of how individual and environmental variables interact to form the behaviour of both cyberbullies and victims. SCT may assist in identifying the elements that led to this conduct in the context of the present investigation. The SCT, a theoretical framework for comprehending human conduct that emphasises the importance of personal and environmental elements in influencing behaviour, is shown in Figure 2.6.

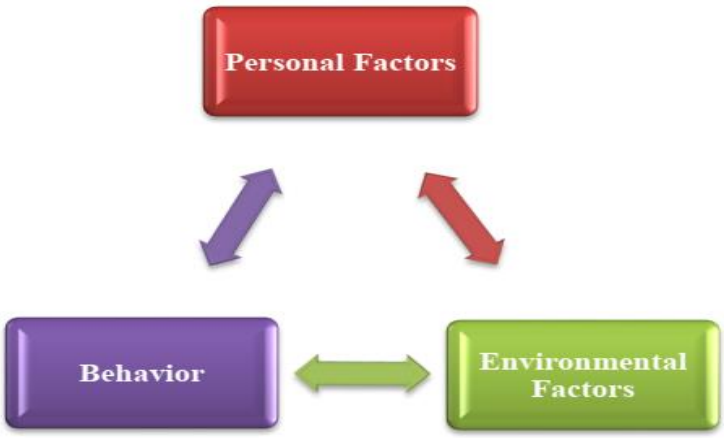

Figure 2.6 Social Cognitive Theory [158]**.**

2.4 Study Variables and Hypothesis Development

This segment of the thesis provides a comprehensive overview of the intricacies underpinning the study variables, coupled with an exhaustive assessment of pertinent literature. Furthermore, it delineates the process through which the study's hypotheses were formulated. The classification of variables contributing to cyberbullying revolves around four core categories: personal, socio-cognitive, psychological, and environmental factors. This categorization is derived from the findings of a SLR [42]. Subjective Norms, PBC, Attitude, Intention, and Behaviour are among the TPB variables. The personal factors from the SCT include Personality, Cyberbullying Awareness, Aggression, Antisocial behaviour, internalising behaviour, self-esteem, and moral disengagement are all examples of antisocial behaviour. Within the scope of the present study, SCT encompasses a range of social factors, including university climate, peer-to-peer relationships, parenting style, self-image, socioeconomic status, and encounters with domestic

and sibling violence. Subsequently, these factors are elucidated within the framework of cyberbullying.

2.4.1 Personality and Cyberbullying Attitude

The term "personality" refers to a person's distinctive thinking, emotions, and behavioural patterns that make them who they are and set them apart from others [53]. It is a multifaceted and intricate idea that aids in explaining why individuals act in certain ways in various circumstances. The predominant focus of the majority of existing studies was directed towards examining the influence of the Big Five character traits on cyberbullying behaviors [53]. Cyberbullying is an extra element of the dark trio that encompasses a different personality dimension [87], [165], [166].

The dark trio of personality constructs is made by of three key traits: narcissism, Machiavellianism, and psychopathy [85], [87]. Narcissism is characterized by an excessive sense of self-importance, a profound desire for admiration, and a notable absence of empathy towards others [167]. Machiavellianism refers to a tendency to manipulate and exploit individuals for personal gain, frequently employing deceitful or cunning methods [165]. Psychopathy is marked by a deficiency in remorse, guilt, and empathy, alongside a proclivity for impulsive and aggressive behaviors [168]. Both conventional bullying and cyberbullying behaviors exhibit a distinct correlation with the traits of narcissism, Machiavellianism, and psychopathy [87].

A multitude of studies have demonstrated a connection between the characteristics of the dark triad and engagement in cyberbullying behaviour [87], [166], [169]. The dark triads and cyberbullying have a favourable correlation, according to Goodboy and Martin's (2015) research [170]. Similar to this, Geel et al. (2017) found that conventional and cyberbullying practises in teens and adults are linked to the dark triad personality characteristics [166]. Dark triad Personality characteristics and cyberbullying conduct among Indonesian postsecondary students were researched by Safaria et al. in 2020 [171]. Their study revealed a significant positive correlation between all three attributes of the dark triad and cyberbullying. Research indicates that the most potent predictor of cyberbullying is Machiavellianism, followed by psychopathy and narcissism. These findings align with prior research, underlining the impact of personality traits on the likelihood of youth engaging in cyberbullying. Similar findings were reached in more recent research by Aisyah et al. (2022), which aimed to assess the impact of the dark triad and cyberbullying behaviour among MUUS [87]. The results demonstrated that cyberbullying is significantly linked to each of the three elements of the dark triad personality construct [87]. Furthermore, this study unveiled that students exhibiting pronounced dark triad traits displayed an elevated likelihood of engaging in cyberbullying behaviors as well as becoming victims of such actions. Given the undesirable nature of cyberbullying and the negative association of the dark triad with adverse behaviors, the first hypothesis is as follows:

H1: Dark triad personality traits positively affects the adoption of a cyberbully attitude.

2.4.2 Cyberbullying Awareness and Cyberbullying Attitude

Cyberbullying awareness discusses to a person's level of understanding and recognition regarding the concept, manifestations, potential consequences, and prevalence of cyberbullying within online and digital environments [117]. It encompasses an understanding of what cyberbullying is, the impact it can have on individuals and communities, and the steps that can be taken to prevent and respond to this behaviour [118], [172]. Awareness of cyberbullying can have a significant impact on an individual's attitude towards it. Just as a higher level of information about a product can affect a person's pre- and post-purchasing behaviour, the same holds true for cyberbullying. Those with a greater comprehension of the nature and repercussions of cyberbullying are less likely to engage in this behaviour than those who lack this knowledge [173]–[175].

Within the context of this current study, cyberbullying awareness has been included as a personal factor linked to SCT. According to SCT, a person's conduct is impacted by both internal and environmental influences, including attitudes, beliefs, and values as well as societal norms and expectations [84]. In the case of cyberbullying, an individual's awareness and knowledge about the issue can shape their attitudes and beliefs towards this behaviour [39]. Those who are aware of the harmful impact of cyberbullying are less likely to engage in this behaviour and more likely to intervene if they witness it [172]. This aligns with the SCT concept of personal factors influencing behaviour. In view of this, cyberbullying awareness has been taken a personal factor associated with SCT as it influences an individual's attitudes and beliefs towards this behaviour.

Studies show that people who know more about cyberbullying and how it affects victims are less likely to do it themselves [63], [172], [176], [177]. In addition, research has demonstrated that individuals with a high level of cyberbullying awareness are less likely to engage in cyberbullying themselves. Those who are cognizant of the potential repercussions of their online behaviour are less likely to indulge in cyberbullying, as they recognise the severe and detrimental effects it can have on others. Since, knowledge and awareness about cyberbullying can significantly impact an individual's attitude towards this behaviour. Therefore, hypothesis two is formulated as:

H2. Cyberbullying awareness negatively affects the adoption of cyberbullying attitude.

2.4.3 Aggression and Cyberbullying Attitude

In the realm of cyberbullying, aggression encompasses the intentional use of technology to inflict harassment or harm upon another individual [80]. Examples of such actions include disseminating false information, participating in cyberstalking, or posting offensive comments or images on the internet. SCT posits that an individual's propensity for aggression can be influenced by their social learning and cognitive processes. For instance, exposure to or personal experience with violent behavior could heighten the likelihood of engaging in cyberbullying.

In accordance with SCT, individuals with higher levels of aggression are more prone to engage in cyberbullying, as they tend to emulate behaviors they have observed in others. Additionally, if they witness others being rewarded for similar

actions, they might perceive bullying as a commonplace or even appealing behavior. According to research by Beran and Li, kids who engage in cyberbullying exhibit significant levels of hostility and antisocial conduct [178]. The research conducted by Ang et al. explored the issue of cyberbullying among adolescents in the United States and Singapore [179]. The research included 332 teenagers from Singapore and 425 adolescents from the United States, with the goal of examining the differences between proactive and reactive aggressiveness and cyberbullying in these two cultures. The findings showed a link between proactive aggressiveness and online bullying.

Additionally, SCT argues that people's attitudes and convictions towards other people's actions have an impact on them in addition to those actions themselves. In other words, those who have aggressive attitudes and beliefs are more likely to act aggressively, especially via cyberbullying. This leads to hypothesis number three, which is as follows:

H3: Aggression positively affects the adoption of cyberbullying attitude.

2.4.4 Antisocial Behaviour and Cyberbullying Attitude

Antisocial behaviour refers to actions or attitudes that violate social norms and rules, and often result in harm to others [122]. Antisocial conduct may take many different forms when it comes to cyberbullying, including spreading rumours or falsehoods, publishing humiliating images or videos, or sending threatening messages. For a variety of reasons, antisocial individuals often participate in cyberbullying. For example, they may have a disregard for the feelings and well-

being of others, and therefore find it easy to engage in behaviours that harm others. They may also have a distorted view of the consequences of their actions and believe that their behaviour is acceptable or even justified [180]. The research conducted by Garaigordobil (2017) delved into the correlation between antisocial behaviour, participation in bullying and cyberbullying, and the ability to resolve conflicts [181]. The study included a sample group of 3,026 individuals from Spain. According to the findings of the correlational analyses and variance analyses, young people who displayed high levels of antisocial behaviour, regardless of gender, were significantly more likely to be involved in all forms of bullying and cyberbullying, including as victims, bullies, and bystanders.

Cyberbullying has become a more common kind of antisocial conduct in online communication in the last ten years. With the involvement of 835 seventh graders from Switzerland, Sticca et al. (2013) undertook a short-term longitudinal study to look at possible risk factors for cyberbullying [182]. The study involved two assessments spaced six months apart. The study's results emphasize a significant association between cyberbullying and antisocial behaviour. Additionally, research has shown that individuals with antisocial tendencies may use cyberbullying as a way to assert power and control over others. As a form of retribution for alleged wrongs or a method of obtaining attention and notoriety, they may also participate in cyberbullying.

According to SCT, a confluence of social learning, cognitive processes, as well as unique traits and experiences, results in antisocial conduct and cyberbullying [142]. For instance, a person may be more prone to participate in cyberbullying

themselves if they have seen or experienced antisocial conduct in their own lives. Additionally, a person's beliefs and attitudes about the acceptability of bullying, as well as their emotional regulation and impulse control, can also play a role in their likelihood of engaging in cyberbullying. An important contributor to the growth of cyberbullying attitudes is antisocial conduct. As a result, the fourth research hypothesis is as follows:

H4. Antisocial behaviour positively affects the adoption of cyberbullying attitude.

2.4.5 Internalizing Behaviour and Cyberbullying Attitude

An individual's pattern of internalised emotional and psychological experiences is referred to as internalising conduct. It encompasses a variety of unpleasant feelings like despair and anxiety as well as behaviours motivated by these feelings including avoiding social settings and other people [183]. Internalising conduct may significantly damage one's quality of life and wellbeing, and it can be a key indicator of future mental health issues [184].

The link between internalising conduct and cyberbullying has drawn more attention in recent years. Internalising behaviour may serve as a personal component that affects a person's attitudes and behaviours towards cyberbullying, according to SCT's discussion of internalising behaviour and cyberbullying [185]. Due to their poor beliefs of themselves, people with high levels of internalising conduct may be more inclined to participate in cyberbullying [39], [186]. These individuals may use cyberbullying as a means of seeking attention, revenge, or a

sense of power and control. On the other hand, internalizing behaviour can also lead to feelings of guilt or shame and make an individual more susceptible to cyberbullying victimization.

Studies have consistently shown that individuals who engage in cyberbullying behaviour are often characterized by high levels of internalizing behaviour [45], [133], [187]. In addition, studies have shown that those who participate in cyberbullying are more prone to internalise behaviours because of their activity. They may experience feelings of guilt or shame, and they may become increasingly isolated and withdrawn as a result of their involvement in cyberbullying. The purpose of Tsitsika et al.'s (2015) research was to evaluate the level of cyber victimization among teenagers in six European nations and the relationship between that level of victimisation and internalising, externalising, and academic issues [186]. In Poland, Spain, Romania, the Netherlands, Greece, and Iceland, 10,930 European teenagers between the ages of 14 and 17 participated in a cross-sectional, school-based survey. Internalising conduct was a strong predictor of cyber victimisation, according to the results of multiple linear regression analysis. Doumas and Midgett (2020) conducted a school-based cross-sectional research to investigate the differences in internalising symptoms between bystanders and non-bystanders of cyberbullying among middle school children in the United States (grades 6th–8th) [115]. The findings confirmed that the internalizing symptoms of the participants were positively correlated with their cyberbullying attitude.

In addition to the negative impact of internalizing behaviour on the individual who engages in cyberbullying, research has also shown that internalizing behaviour

can be a significant predictor of cyberbullying victimization, individuals who exhibit high levels of internalizing behaviour may be more likely to be targeted by cyberbullies, and they may be less likely to have the resources to defend themselves or to seek help [45].

Internalizing behaviour is a complex and multifaceted construct that is closely associated with cyberbullying. It includes a variety of unfavourable feelings and actions, and it may significantly affect a person's health and quality of life. For individuals interested in understanding the factors that underlie cyberbullying activity, research has revealed that internalising behaviour is a key predictor of both cyberbullying perpetration and victimisation. This leads to the following hypotheses:

H5: Internalizing behaviour positively affects the adoption of cyberbullying attitude.

2.4.6 Self-esteem and Cyberbullying Attitude

Self-esteem is defined as an individual's overall sense of self-worth and personal value [188]. Higher levels of resilience, stronger relationships, and increased academic success are all associated with having a high sense of self-worth. On the other hand, having low self-esteem may have unfavourable effects, such as increasing the probability of becoming a cyberbully.

One's attitude towards cyberbullying is significantly influenced by one's sense of self-worth [189]. People who have a high sense of their own worth and value are less likely to participate in cyberbullying than those who have low self-esteem

[190]. They do not need to engage in negative behaviour to feel good about themselves and are more likely to engage in positive behaviours that reinforce their self-esteem. People with low self-esteem could participate in cyberbullying to boost their confidence [191]. They may derive a sense of power and control from harassing others online and believe that it will improve their self-worth. However, in reality, cyberbullying only perpetuates the cycle of negativity and further undermines an individual's self-esteem.

According to research, people who have a healthy sense of their own value and worth are less likely to participate in cyberbullying [189], [191]–[193]. They are more inclined to participate in good acts that increase their self-esteem, such as helping others or following their hobbies, and they do not need to criticise others to feel better about themselves. However, people with poor self-esteem could resort to cyberbullying to feel better about themselves. They may observe others engaging in cyberbullying and believe that it will improve their own self-worth. However, in reality, cyberbullying only perpetuates the cycle of negativity and undermines an individual's self-esteem. The study by Lei et al. (2020) endeavours to uncover the correlation between self-esteem and cyberbullying through a meta-analysis approach [194]. The study's results, which were based on an analysis of 61 papers with 49,406 student participants, provide strong proof of the link between low self-esteem and cyberbullying. The goal of Shaikh et al.'s research from the year 2021 was to examine how MUUS from both public and private institutions responded to cyberbullying [39]. The results of their research show that psychological elements, including self-esteem, internalising behaviour, and anti-social conduct, are

important in determining the MUUS's attitude towards cyberbullying. A research by Martinez et al. looked at the connections between bullying, cyberbullying, self-esteem, and empathy [195]. The study's findings demonstrate that those who participate in cyberbullying have much lower levels of self-esteem than people who do not. It is clear that stronger self-esteem has repeatedly been associated with a lower risk of engaging in cyberbullying. As a result, the study's sixth hypothesis is as follows:

H6: Self-esteem negatively affects the adoption of cyberbullying attitude.

2.4.7 Moral Disengagement and Cyberbullying Intention

An important socio-cognitive component that influences someone's propensity to participate in cyberbullying is moral disengagement [130]. According to the SCT, behaviour is the outcome of the interplay of a person's personal, behavioural, and environmental elements. SCT contends that moral disengagement is a personal characteristic that affects a person's choice to participate in cyberbullying behaviours [196].

Moral disengagement is the process of individuals who justify harmful behaviour and reduce their guilt or shame [130]. People with moral disengagement are more prone to participate in cyberbullying because they think their activity is acceptable and that they are not responsible for the results [168], [197], [198]. For example, a person who engages in moral disengagement may view cyberbullying as a means of getting back at someone who has wronged them, and they may believe that their actions are justified because they are "just having fun" or "teaching

someone a lesson." This cognitive process allows them to justify their behaviour and reduces the negative emotions that would otherwise be associated with it [199].

Therefore, the relationship between moral disengagement and cyberbullying intention can be understood through the lens of SCT. SCT suggests that an individual's behaviour is a result of the interaction between personal, behavioural, and environmental factors [196]. The personal aspect of moral disengagement interacts with other characteristics, including a lack of empathy or a propensity for violent conduct, in the case of moral disengagement and cyberbullying intention, to form the intention to participate in cyberbullying action [200].

Numerous studies have shown a direct link between teenage cyberbullying and moral disengagement. For instance, Fernández-Antelo and Cuadrado-Gordillo (2019) discovered that moral disconnection was definitely correlated with teenagers' cyberbullying behaviours [203]. The same was also discovered in more recent research, including those by Lazuras et al. (2019) among teenagers in Italy and Greece [24], [168], [198], [199], [201], [202]. The association between moral disengagement and cyberbullying activity is strongly supported by these data. As a result, moral disengagement is seen as a critical concept in understanding the mechanisms that drive cyberbullying and developing effective interventions to prevent it. Hence, the present study hypothesizes H7.

2.4.8 University climate and Cyberbullying Intention

The entire environment, cultural norms, and values inside the institution, particularly the amount of respect and tolerance among students, are referred to as

the university climate, staff, and administration [135]. It is seen as a significant environmental component that may affect a person's propensity to engage in cyberbullying activity.

The risk that someone may engage in cyberbullying behaviours can be significantly influenced by the academic environment. A supportive campus environment that promotes inclusion, respect, and a feeling of community might lessen students' intentions to participate in cyberbullying. On the other hand, children may be added possible to involve in cyberbullying in an environment at school that tolerates bullying and lacks a strong sense of community. According to research, a welcoming and accepting campus culture might be crucial in minimising cyberbullying [135]. A positive university climate that promotes a culture of respect, supports students in their academic and social pursuits, and addresses bullying behaviours can lower the intention of students to engage in cyberbullying [132]. The university climate is considered an important social factor from the socio-cognitive perspective, and understanding its role in shaping students' behaviour towards cyberbullying is crucial in developing effective strategies to prevent and address this issue [39].

The academic environment in which students learn has a significant impact on the prevalence of cyberbullying. Despite the limited research on the correlation between campus culture and students' cyberbullying intentions, the data unequivocally demonstrates a robust influence of the university environment on students' inclinations to partake in cyberbullying [195]. A university climate that permits or overlooks bullying and harassment increases the likelihood of students

having cyberbullying intentions [39]. A supportive campus atmosphere that promotes respect and inclusion, on the other hand, reduces the possibility of cyberbullying intents [195], [203]. The following theory is based on these data:

H8: A pleasant university atmosphere reduces the likelihood of cyberbullying.

2.4.9 Peer to Peer Relationships and Cyberbullying Intention

Peer-to-peer connections are interactions and relationships that take place between people of comparable ages and/or socioeconomic position [204]. In the background of this study, peer-to-peer relationships refer to the relationships between students in a university setting [42]. The role of peer-to-peer relationships in terms of cyberbullying is significant. Positive peer-to-peer relationships can act as a deterrent to cyberbullying behaviour, while negative relationships can contribute to an increased likelihood of cyberbullying [39]. Studies have shown that students who have supportive and positive relationships with their peers are less likely to engage in cyberbullying [25], [205]. On the other hand, students who experience social isolation or have negative relationships with their peers are more likely to engage in cyberbullying [45], [95], [137], [206]–[208].

Thus, it can be inferred that positive peer-to-peer relationships play a crucial role in reducing cyberbullying intention among students. This can be explained through SCT, where the environment, in this case peer-to-peer relationships, can impact an individual's behaviour and intention [84]. Consequently, a positive peer-to-peer relationship, considered an environmental variable within the scope of SCT,

is likely to exert a negative influence on cyberbullying intention. In light of this, hypothesis nine can be articulated as follows:

H9: Positive peer-to-peer relationships negatively affect cyberbullying intention.

2.4.10 Image and Cyberbullying Intention

Image refers to the perception and representation of oneself in the eyes of others. It encompasses various aspects, such as physical appearance, social status, and personal reputation. In the context of cyberbullying, image can play a significant role in the intention to engage in bullying behaviours. The desire for social recognition, power, and popularity can drive individuals to use cyberbullying as a way to enhance their image and status. Research has shown that cyberbullying can be seen as a symbol of power and popularity among adolescents, and those who engage in bullying behaviours often view it as a way to increase their social standing [114], [209].

A significant topic of interest in the study of cyberbullying is the connection between image and intention. It is commonly accepted that a person's reputation and image have a substantial impact on their actions and choices, including whether or not they engage in cyberbullying [114], [209]. There has been growing research in recent years that suggests there is a connection between image and cyberbullying and that intentions to engage in cyberbullying may be influenced by one's appearance [39], [42], [114].

According to studies, those who regard cyberbullying as a way to boost their popularity or boost their reputation are more likely to participate in cyberbullying practises [114], [209]. This highlights the idea that cyberbullying may be perceived as a status symbol among some individuals, and that individuals may use cyberbullying to improve their social standing. As a way to prevent shame or scorn, research has also shown that those who have a strong need to protect their image may be more inclined to participate in cyberbullying practises [39], [210].

Additionally, there is evidence that the fear of harming one's reputation and image may also motivate cyberbullying conduct. To retain their social position or to prevent being the subject of bullying themselves, those who feel threatened or frightened by other people's online presence may turn to bullying [114], [209], [211].

In the SCT framework, image is considered an environmental factor that influences an individual's behaviour and decision-making. This includes the individual's perception of their own image as well as the perception of others. In the context of cyberbullying, it is believed that the influence of image on cyberbullying intention may be mediated by a range of factors, including social norms, personal beliefs and attitudes, and individual characteristics such as personality and self-esteem. In view of this, hypothesis ten is derived as follows:

H10: Cyberbullying intention is favourably influenced by image (cyberbullying as a status symbol).

2.4.11 Parenting Style and Cyberbullying Intention

Parenting style is the general method a parent use to raise their kid. The four primary parenting philosophies are authoritative, authoritarian, permissive, and uninvolved [212]. Authoritative parents provide warmth and support in addition to clearly defining expectations and standards [208], [213]. They encourage their children to think for themselves and make decisions, and use positive discipline strategies to help their child learn from mistakes. Authoritarian parents are strict and demanding, with a focus on obedience and conformity [180]. They use punishment as a primary means of discipline, and may have high expectations for their child's behaviour without offering much warmth or support [180]. Permissive parents are warm and loving but have few rules or expectations [212]. They could stay out of arguments and let their kid make a lot of choices without supervision or repercussions. Parents that aren't involved tend to be distant and uninvolved, and they don't provide any parental direction or support for their kids. Despite meeting their child's fundamental necessities, they are not emotionally invested in their child's life [180], [214]. Research suggests that authoritative parenting tends to result in the most positive outcomes for children, including better academic performance, social skills, and mental health [136], [208], [212]. However, the most effective parenting style may vary depending on the child's temperament, age, and other factors.

Parenting style can have a significant impact on a child's risk of experiencing or perpetrating cyberbullying [137]. Children of authoritative parents who provide clear expectations and positive discipline strategies are less likely to engage in

cyberbullying or become victims of it [212]. These parents also tend to have a good understanding of their child's online activity and monitor their child's use of technology, which can help prevent cyberbullying [137]. In contrast, children of permissive or uninvolved parents may not receive adequate guidance on appropriate online behaviour or how to handle conflicts online, which can increase their risk of engaging in cyberbullying or becoming victims of it [208], [212]. Authoritarian parents may inadvertently contribute to cyberbullying by using harsh punishment or criticizing their child's online behaviour without providing guidance on how to improve it [212]. This may cause the youngster to feel resentful or frustrated, which might enhance their propensity to engage in cyberbullying [124]. Parents may help avoid cyberbullying by establishing clear expectations and guidelines for their children's online conduct, keeping an eye on their child's technology usage, and offering advice on how to resolve disputes online [73]. By doing so, parents can help create a safe and respectful online environment for their child and reduce the risk of cyberbullying.

SCT suggests that an individual's behaviour is influenced by their environment and their cognitive processes, including their thoughts, beliefs, and attitudes. Parenting style can be seen as an environmental factor that influences a child's cognitive processes and behaviours, including their risk for engaging in cyberbullying [136]. For example, children of authoritative parents, who provide clear expectations and positive discipline strategies, are more likely to develop a sense of self-efficacy, which is the belief in one's ability to handle difficult situations [212]. This sense of self-efficacy can lead to greater confidence in

managing conflicts and negative situations, which can reduce the likelihood of engaging in cyberbullying[215].

Additionally, children of authoritative parents are also more likely to develop strong communication skills and empathy, which can help them understand and respect the feelings and perspectives of others. This can reduce the likelihood of engaging in cyberbullying or other negative behaviours that harm others [116], [216]. Moreover, parents who use authoritative parenting styles also tend to closely monitor their child's online activity and provide guidance on how to behave appropriately online. This may lessen the chance of youngsters participating in cyberbullying by helping them better understand proper online conduct and how to resolve problems [208].

According to research, kids who have had good parenting methods that include high levels of support, warmth, and control, as well as parental monitoring and supervision of their online activity, are less likely to engage in cyberbullying [73], [137], [138], [217], [218]. Furthermore, children who have experienced parental discipline, such as clear rules and consequences, are less likely to engage in cyberbullying [124], [218]. These data imply that by providing a supportive, warm, and structured home environment for their children, parents may considerably minimise the occurrence of cyberbullying. Thus, it is hypothesized that:

H11: A positive parenting style has a detrimental impact on cyberbullying intention.

2.4.12 Domestic & Siblings Violence

Domestic violence and sibling violence are two forms of interpersonal violence that can have significant impacts on an individual's behaviour, including their cyberbullying intentions [13], [219]. Sibling violence is the physical, emotional, or sexual abuse that takes place between siblings. Domestic violence is any kind of abuse that takes place between intimate partners or family members. Both types of violence may result in a number of detrimental effects, such as psychological and emotional trauma, which can take many different forms, such as cyberbullying [146].

According to SCT, a person's surroundings and cognitive processes, including their ideas, beliefs, and attitudes, have an impact on their conduct [142]. Domestic and sibling violence can be seen as environmental factors that can influence an individual's cognitive processes and behaviours, including their risk for engaging in cyberbullying [42], [136]. Those undergraduate university students who have experienced domestic or sibling violence develop negative attitudes towards relationships and social interactions, which can lead to aggressive or violent behaviours, including cyberbullying [13], [42]. They also develop a sense of powerlessness, which can lead to a desire for control and dominance over others, including online [25], [42]. To assert control over others and vent anger or frustration, this may raise the likelihood of participating in cyberbullying.

Research has shown that children who experience domestic or sibling violence are at a higher risk for engaging in cyberbullying. For instance, a research by Zhong

(2021) showed that teenagers who experienced domestic abuse committed more cyberbullying [53]. Similar to this, a research by Dantchev et al. (2021) found that children who experienced sibling violence perpetrated more cyberbullying [220]. The relationship between domestic and sibling violence and cyberbullying can be explained by several mechanisms. First, those who experience violence may learn violent or aggressive behaviours as a way to cope with their experiences. This can lead to a greater propensity for engaging in aggressive or violent behaviours online, including cyberbullying [220]. Second, children who experience violence may develop negative attitudes towards relationships and social interactions, which can lead to a lack of empathy for others. This can make it easier for them to engage in cyberbullying without considering the impact of their actions on others. As a result, hypothesis twelve is provided as:

H12: Domestic and sibling violence positively affects cyberbullying intention.

2.4.13 Socioeconomic Status and Cyberbullying Intention

A person's SES is determined by their income, level of education, and line of work. SES has been linked to a number of health and wellbeing characteristics, including mental health and behaviour like cyberbullying, according to research [221]. SES is an important factor that has been associated with various aspects of human behaviour, including cyberbullying. According to many research, those with higher SES origins are more likely to participate in cyberbullying than people with lower SES backgrounds [137], [222]. The underlying reasons for this relationship

can be attributed to several factors, such as a sense of entitlement and higher access to technology [137].

The SCT provides a helpful foundation for comprehending how SES and cyberbullying are related. Individual behaviour is influenced by environmental influences, such as family, peers, and culture, in accordance with SCT. Individuals from higher SES backgrounds may be exposed to different environmental factors that increase their likelihood of engaging in cyberbullying behaviour [222]. This is because, higher SES individuals may have less parental supervision and guidance, leading to a lack of empathy and a greater sense of entitlement. Another reason is having more access to technology and be more familiar with its use, making them more adept at using it for harmful purposes [137], [137].

Research suggests that students with higher SES exhibit a greater inclination towards cyberbullying perpetration. A study conducted by Lee et al. (2022) found that high school students from higher socioeconomic backgrounds were more prone to engaging in cyberbullying compared to their counterparts from lower socioeconomic backgrounds [222]. Additionally, those from higher SES origins could encounter more social pressure to adhere to standards and expectations, such as the need to uphold social position and power. This pressure may lead them to use cyberbullying as a means of establishing dominance and control over others. In a distinct study by Yang et al. (2022), which observed 2,407 Chinese adolescents over a span of three years to explore the longitudinal connections between peer pressure and adolescents' cyberbullying perpetration, it was revealed that students hailing from affluent socioeconomic backgrounds were more prone to engage in

cyberbullying compared to their counterparts with lower socioeconomic status [198]. According to the study, this might be because children from better SES families may have more access to and chances to utilise technology, as well as a lower likelihood of suffering negative consequences for their activities. Considering the, it is proposed that:

H13: A higher socio-economic status has a positive impact on the cyberbullying intention of MUUS.

2.4.14 PBC and Cyberbullying Intention

An individual's ideas about their capacity to participate in a certain conduct are referenced by the TPB concept known as PBC [223]. It displays how much a person feels in control of their conduct and capable of engaging in the activity in question [151], [154]. PBC may be affected by a number of variables, including abilities, resources, and contextual conditions that either help or impede the activity [224].

In the case of cyberbullying, PBC may be quite helpful in figuring out whether a person intends to participate in this conduct. A person may be more likely to plan to participate in cyberbullying if they think they have control over their actions and believe they can do so. On the other hand, individuals may be less likely to aim to participate in this conduct if they feel they have little control over their actions or think it is challenging to engage in cyberbullying [148].

According to research, people are more likely to participate in cyberbullying if they believe they have the knowledge and resources to do so, and less likely to do so if they believe they don't [39], [151], [155]. Recent studies have also found a

strong relationship between PBC and cyberbullying intentions among undergraduate university students [146], [216], [225]. These studies also found that students who perceived that they had the skills and resources to engage in cyberbullying were more likely to have intentions to do so.

Overall, PBC is an important component of the TPB and plays a crucial role in determining an individual's intention to engage in a particular behaviour, such as cyberbullying. Moreover, the literature also suggests that students who observe that they have the knowledge and resources to engage in cyberbullying are more likely to have intentions to do so, while students who observe that they lack the necessary knowledge or funds are less likely to have intentions to occupy in cyberbullying behaviour. Thus, fourteenth hypothesis of this study is given as follows:

H14: PBC has a significant positive effect on cyberbullying intention.

2.4.15 Cyberbullying Attitude and Cyberbullying Intention

An individual's attitude is defined as their assessment or sentiments towards a certain thing, person, or circumstance [226]. It may affect a person's conduct and decision-making and might be neutral, good, or negative. When it comes to cyberbullying, a person's mindset may have a big impact on whether or not they participate in this activity [216], [224]. According to this theory, someone may be more prone to participate in cyberbullying aimed towards a specific individual or group if they have a bad opinion of them [151], [224]. Intention and attitude are closely connected concepts. A person's intention to participate in a certain conduct might be influenced by their attitude towards that behaviour [223]. An individual

may be more likely to plan to participate in cyberbullying if they have a favourable attitude towards the practise [146].

According to the TPB, a person's attitudes, subjective norms, and PBC have an impact on their conduct [226]. This theory places a significant emphasis on attitude since it affects a person's intention to participate in a certain conduct [149]. The fundamental predictor of conduct is intention. An individual's likelihood of carrying out a conduct increases with the strength of their desire to do so [155].

According to research, those who have a favourable attitude towards cyberbullying are more likely to participate in the practise, whilst those who have a negative attitude are less likely to do so. [34], [146]. The association between attitude and cyberbullying behaviours among university students has been the subject of several research. In a research they did with college students, Rashid et al. (2017) discovered a substantial positive correlation between people's opinions towards cyberbullying and their desire to engage in the practise [48]. Additionally, this research showed that students were less likely to participate in cyberbullying activity when they had more unfavourable opinions towards it. Similar findings from other research indicated that university students who had more favourable opinions of cyberbullying were more likely to participate in cyberbullying behaviours and more likely to utilise moral disengagement to excuse their actions [146], [151], [155], [216]. These results imply that views about cyberbullying may significantly affect whether university students engage in cyberbullying conduct. In light of this, the study's sixteenth hypothesis is as follows:

H15: Cyberbullying mindset influences cyberbullying intention significantly.

2.4.16 Subjective Norms and Cyberbullying Attitude

In the TPB, a concept known as "subjective norms" refers to how a person feels under societal pressure to participate in a specific conduct [226]. It reveals how much a person thinks that their classmates, family, or other significant people approve or disapprove of their actions [148]. Subjective norms may be quite influential in predicting whether someone will participate in cyberbullying and how likely they are to do so.

The connection between attitude and subjective norms is that both concepts have the capacity to affect a person's behavioural intentions [146]. While subjective norms are the result of external social pressure to participate in or refrain from an action, attitudes are an internalised assessment of a behaviour [152]. An individual's attitude towards an action may have a greater influence on their intents to participate in that behaviour than their sense of societal standards [227]. For instance, even if a person believes that their friends approve of cyberbullying, they may be less inclined to partake in it if they have a strong unfavourable attitude towards it [151], [224]. On the other side, people could be less likely to plan to participate in this conduct if they believe that their friends or significant others disapprove of cyberbullying [39].

The influence of subjective norms on cyberbullying behaviours has been substantiated by research. According to studies, people are more likely to participate in cyberbullying if they believe their friends are also doing it and less

likely to do it if they believe their friends disapprove of it [39], [146]. Recent research has also shown a considerable correlation between undergraduate university students' views towards cyberbullying and subjective standards. According to a research by Gini et al. (2019), undergraduate Italian students' views against cyberbullying were positively correlated with subjective norms [228]. The research also found that students were more inclined to view cyberbullying favourably if they believed that their classmates approved of it. According to a research by Martnez-Monteagudo et al. (2019), undergraduate Spanish students' views against cyberbullying were positively correlated with subjective norms [195]. The research also found that students were more inclined to view cyberbullying favourably if they believed that their classmates approved of it. Students who believe their classmates support cyberbullying are more likely to feel positively about it, whereas students who believe their classmates disapprove of it are less likely to feel positively about it [155]. In light of these studies, hypothesis sixteen is outlined as follows:

H16: Subjective norms influence cyberbullying attitudes significantly.

2.4.17 Cyberbullying Intention

A person's intention is their reason or objective for carrying out a specific action [226]. The intentional and frequent use of electronic communication to harass, intimidate, or hurt another person is referred to as cyberbullying [151]. As it relates to the perpetrator's aim or objective in participating in the conduct, intention is vital in cyberbullying. The intentional and frequent use of electronic communication to

harass, hurt, or intimidate another person is known as cyberbullying [58]. Therefore, it is a form of intentional behaviour aimed at causing harm to the victim.

The offender intends for their acts to upset or damage the victim [25]. They could want to humiliate or shame the victim, harm their reputation, or elicit a response from them. The perpetrator's actions may be reinforced by their feeling of control or power over the victim. Cyberbullying and purpose are related in that the offender aims to hurt or upset the victim by their behaviour. Their actions are deliberate choices to participate in destructive behaviours, not an accident or an oversight [229], [230].

In the case of cyberbullying, the TPB may assist in explaining the connection between intention and conduct. TPB contends that a individual's attitude to an activity, subjective norms (felt social pressure), and PBC (the ease or difficulty of completing the conduct) all have an impact on that person's behaviour [224], [226]. Ajzen (1991) said that intentions show the effort a person intends to put into carrying out a certain conduct [149]. In fact, intention is considered the strongest predictor of performing a behaviour. This means that an person's decision to involve in cyberbullying is solely based on their own will. Studies have shown that individuals with a positive intention to a particular act are more likely to perform that act [151], [224]. Additionally, according to Shaikh et al. (2021), behavior is the product of intention, and intention is the best predictor of behavior [39]. In order to forecast behavior, attitude alone is insufficient; intention and attitude must also be taken into account [231].

It is possible to anticipate a person's future conduct based on their current desire to engage in a certain activity [149]. Previous research has looked at the TPB factors in relation to cyberbullying, attitudes, intentions, PBC, subjective norms, and intentions. However, the role of purpose in modulating the relationship between cyberbullying attitudes and behaviours has not been fully investigated.

It is proposed that an individual's intention to engage in cyberbullying has both a direct and mediating effect on their behaviour. Therefore, the hypotheses are:

H17: Cyberbullying intention significantly and positively affects cyberbullying conduct.

H18 Cyberbullying intention regulates the association between cyberbullying attitude and cyberbullying activity in a good way.

2.4.18 Moderating Role of Problematic Social Media Usage

Problematic social media use (PSMU) is the term used to describe the excessive, obsessive, or addicted use of social media platforms, which may have detrimental effects including diminished wellbeing and increased discomfort [232]. The relationship between PSMU and cyberbullying has been a source of rising worry as social media usage has been connected to an increase in the frequency and severity of cyberbullying behaviours among teenagers and young adults [6].

By affecting self-regulation and decision-making, PSMU has been shown to increase the risk of participating in cyberbullying behaviours. This may result in a lack of empathy and a decline in prosocial behaviour [233]. Additionally, those

who have PSMU are more likely to feel negative emotions like anxiety and despair, which may increase the possibility that they may use cyberbullying as a coping mechanism[39], [123].

Additionally, social media platforms provide for anonymity, which makes it simpler for people to participate in cyberbullying activity without worrying about being recognised or held responsible for their acts [6], [234]. Because of a feeling of detachment from the repercussions of their actions, people may feel more confident to participate in cyberbullying conduct, which may worsen PSMU's harmful impacts [89].

In the context of cyberbullying, PSMU may be utilised as a mediating variable between respondents' intentions and actions. PSMU is characterised by excessive or addicted social media usage, when users grow concerned with the platform and suffer negative effects including worse academic results, greater social isolation, and mental health difficulties as a result [128].

PSMU may worsen the link between intention and conduct in the case of cyberbullying. For instance, if a college student also demonstrates PSMU, they may be more likely to act on their high-intensity intentions to participate in cyberbullying [233], [235]. This is due to the fact that PSMU may raise a person's impulsivity, emotional reactivity, and social anxiety—factors which might result in cyberbullying conduct [232]. However, if a college student has high intentions to participate in cyberbullying but does not use social media in a problematic way, they could be less likely to carry out these plans [233], [236]. This is due to the

possibility that a person may have stronger impulse control, less emotional reactivity, and higher social support in the absence of PSMU, which may operate as a protective shield against the effect of strong intentions to participate in cyberbullying.

The association between intention and conduct in the context of cyberbullying among undergraduate university students may thus be hypothesised to be moderated by PSMU. We may specifically suggest the following proposition:

H19: PSMU moderates the relationship between cyberbullying intention and behaviour.

2.5 Research Framework of Study

In this study, a comprehensive cyberbullying attitude-intention-behavioral model is employed, merging SCT and TPB into a unified framework. The primary objective is to scrutinize the foundational drivers and incentives contributing to cyberbullying behaviors within the MUUS population. The model comprises a total of nineteen variables five of which are extracted from the TPB framework: attitude, intention, subjective standards, and so on, perceived control over behavior, and behavior. The study also identifies other factors that influence attitude, such as personality, cyberbullying awareness, aggression, internalizing behaviour, self-esteem, and antisocial behaviour. The model suggests that the association between cyberbullying attitude and cyberbullying conduct is mediated by cyberbullying intention, with PSMU serving as a mediating variable between intention and behaviour. By using this model, the study identifies the specific factors and motives

that drive cyberbullying behaviour among MUUS, which can inform future interventions and strategies to prevent and address cyberbullying

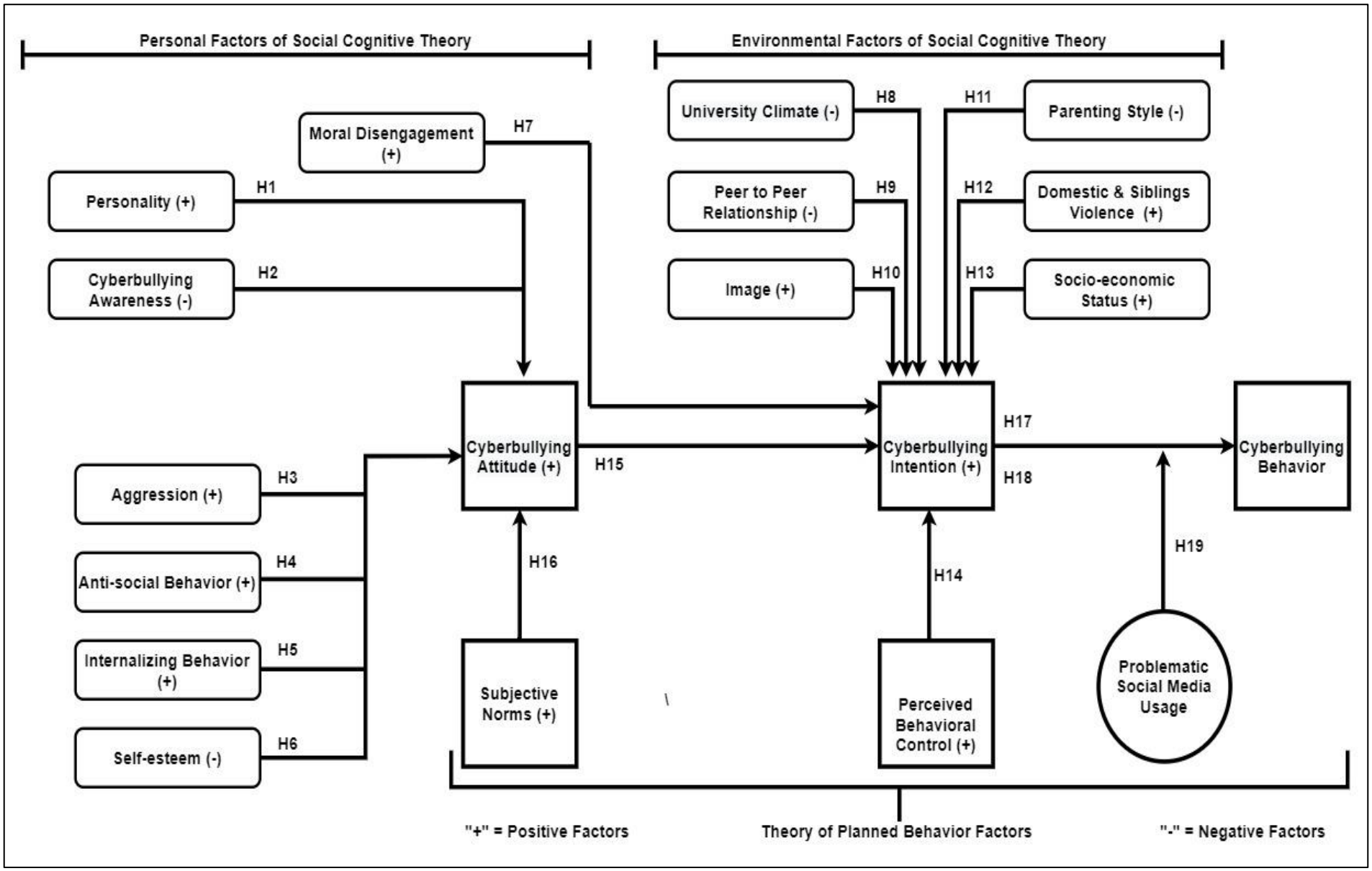

Figure 2.7 The Research Framework (Conceptualized Cyberbullying Attitude-Intention-Behaviour Model.)

2.6 Operational Definitions of Cyberbullying Factors

To give conceptual clarity and provide a complete understanding of the research model of the study, this section provides precise definitions of the cyberbullying factors employed in this study. These factors help to investigate the behaviour of cyberbullying within the target demographic and serve as the foundation of the research model. Additionally, by defining each factor, researchers and readers will have a thorough understanding of the cyberbullying factors that are investigated in this research.

Personality: The blend of ideas, emotions, and actions that make up a person's personality are referred to as their personality traits. The Dark Triad personality traits, i.e., Machiavellianism, Narcissism, and Psychopathy, are investigated in this research. These characteristics include manipulative, egotistical, and cruel social behaviours. These characteristics are thought to exist on a continuum, with different levels of each characteristic present in different people. The Dark Triad's characteristics have been associated with poor results in several areas, including relationships, the workplace, and ethics. The Personal Factor of the Research Model, which draws from SCT, explores the impact of personality on cyberbullying behaviours [237].

Cyberbullying Awareness: Cyberbullying awareness refers to the extent of understanding among MUUS regarding the nature, consequences, and prevalence of cyberbullying. It encompasses their knowledge and awareness of the various

aspects related to cyberbullying behaviour. This factor falls under the Personal Factor category and is influenced by SCT [117].

Aggression: Aggression encompasses feelings of rage or hostility that lead to aggressive or violent behaviour. It reflects an individual's eagerness to attack or confront others. Aggression is a major factor in the conduct of cyberbullying. In the context of cyberbullying, aggression is defined as repetitive, destructive online activities that are done with the goal to hurt, upset, or frighten other people. It entails the use of digital communication platforms for hostile, intimidating, or harassing behaviour, including social media, messaging applications, or online forums [27]. It is considered a Personal Factor influenced by SCT.

Anti-social Behaviour: Anti-social behaviour refers to actions or attitudes that violate social norms and rules, often resulting in harm to others. It encompasses behaviours that disregard the rights and well-being of individuals within the social environment [122]. This factor is part of the Personal Factor category and draws from SCT.

Internalizing Behaviour: Internalizing behaviour refers to a pattern of emotional and psychological experiences that occur within an individual. It includes a variety of unfavourable feelings including despair and anxiety as well as connected activities like withdrawing from social engagements and avoiding them [183]. This factor falls under the Personal Factor category and is influenced by SCT.

Self-esteem: Self-esteem is a person's assessment of their own value or worth. It includes how people see themselves and how different contexts affect their self-thoughts, emotions, and behaviour [188]. In the context of cyberbullying, one's subjective assessment of their own worth and value in connection to their online experiences is referred to as self-esteem. It covers how much a person feels comfortable, respected, and valued while interacting online as well as how cyberbullying may affect their sense of self-worth in general [188]. Self-esteem is considered a Personal Factor influenced by SCT.

Moral Disengagement: Moral disengagement is a psychological phenomenon in which people participate in harmful or immoral action without feeling guilty or sorrow. It involves the rationalization or justification of such behaviour, thereby enabling individuals to detach themselves from moral constraints [198]. It entails using different cognitive strategies to detach oneself from the moral ramifications of their acts, allowing them to participate in destructive behaviour without feeling sorrow or shame [238]. This factor falls under the Personal Factor category and draws from SCT.

Image: Image refers to individuals who perceive cyberbullying as a means to demonstrate status or exert power and control over others. It reflects the association of cyberbullying with the display of dominance or superiority. This factor is categorized under the Environmental Factor of the research model, influenced by SCT [38].

Socio-economic Status: Socio-economic status is the term used to describe how people or groups are positioned socially and economically and how it may be used to abuse or harass people online [221]. It includes how social and economic issues affect the conduct of cyberbullying. This component, which falls under the study model's Environmental component, is affected by SCT.

Domestic & Siblings Violence: Domestic and sibling violence refers to any type of physical, emotional, sexual, or economic abuse that occurs inside the family. It involves hostile or damaging interactions between parents, siblings, or other family members [219]. This factor falls under the Environmental Factor category and is influenced by SCT.

University Climate: The general atmosphere and attitudes within a university or college, including the norms, beliefs, and behaviours that create the social and academic environment, are referred to as university climate. It encompasses the institutional factors that may contribute to cyberbullying behaviour among university students. This factor is categorized under the Environmental Factor and is influenced by Social Cognitive Theory (SCT) [92].

Peer-to-Peer Relationship: Peer-to-peer relationships are exchanges and connections between people of the same age or socioeconomic standing, usually in the setting of a university or workplace. It encompasses the influence of peer dynamics and relationships on cyberbullying behaviour [239]. This factor falls under the Environmental Factor category and is influenced by SCT.

Parenting Style: Parenting style is the way parents interact with and mould their kids' online behaviour, including how they use technology, interact with others online and off, and what is proper behaviour [240]. It encompasses parental practices and attitudes that may contribute to cyberbullying behaviour. This factor is categorized under the Environmental Factor and is influenced by SCT.

Cyberbullying Attitude: When someone has a good or negative opinion about cyberbullying, they are said to have a cyberbullying attitude [241]. It is considered one of the variables in the TPB related to cyberbullying behaviour [155]. This factor examines individuals' attitudes toward cyberbullying and their inclination to engage in such behaviour.

Subjective Norms: Subjective norms are an individual's impression of what is deemed appropriate conduct within a group or community, as well as how that perception impacts their decision to engage in or refrain from cyberbullying [240]. It is another variable within the TPB related to cyberbullying behaviour.

Perceived Behaviour Control: Perceived behaviour control relates to an individual's perception in their capacity to control their activities and cyberbullying conduct [155]. It includes their impression of the available tools and assistance to help them make positive decisions about cyberbullying. This variable is likewise included in the TPB..

Cyberbullying Intention: The choice to participate in cyberbullying conduct is referred to as cyberbullying intention. It reflects their deliberate choice or

intention to perpetrate cyberbullying acts [155]. This factor is categorized under the TPB and examines the underlying motivations behind cyberbullying conduct.

Cyberbullying Behaviour: The use of technology or the internet to harass, threaten, or hurt others, especially through social media, text messages, and online forums, is referred to as cyberbullying activity [242]. It encompasses various forms of online aggression and victimization. This factor falls under the TPB and focuses on the actual engagement in cyberbullying acts.

Problematic Social Media Usage: Problematic social media usage is the excessive, obsessive, or addictive use of online communities that may have detrimental effects including lowered wellbeing and increased suffering [243]. It includes social media engagement behaviour and trends that might lead to cyberbullying. This component is derived from SCT and falls under the Environmental component category.

2.7 Summary

The literature on cyberbullying is thoroughly reviewed in Chapter 2, which also includes an overview of Ajzen's TPB and Bandura's SCT. The conceptual framework for the investigation, which incorporates these ideas and pertinent factors, is also presented in this chapter. The suggested conceptual framework, which serves as a framework for the research, is offered together with the study's hypothesis.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Each research necessitates the incorporation of a research methodology delineating the strategies for data collection, analysis, and interpretation. This chapter provide profound detail of the study's research design, sample plan, data collection methods, and data analysis processes that were employed. The aim of the present chapter is to explain the technique that was used to carry out the research in a clear and concise manner and to show that the results are reliable and valid.

In this chapter, an exploration of both the merits and demerits of the chosen research technique will be undertaken, alongside an examination of the ethical considerations that informed the study's execution. The objective of this study is to enhance the credibility and reliability of the research findings by furnishing a comprehensive and transparent account of the research process.

3.2 Research Process

Drawing from the research process framework proposed by [244] and depicted in Figure 3.1, the present study embraced the research onion model. This model delineates a sequential progression that researchers follow while devising a research strategy. Comprising various layers, each one signifies a distinct aspect of the research process, as expounded in [244]. To enhance lucidity and transparency

in the methodological approach, tick marks have been incorporated on each layer, denoting the techniques chosen for this study [244].

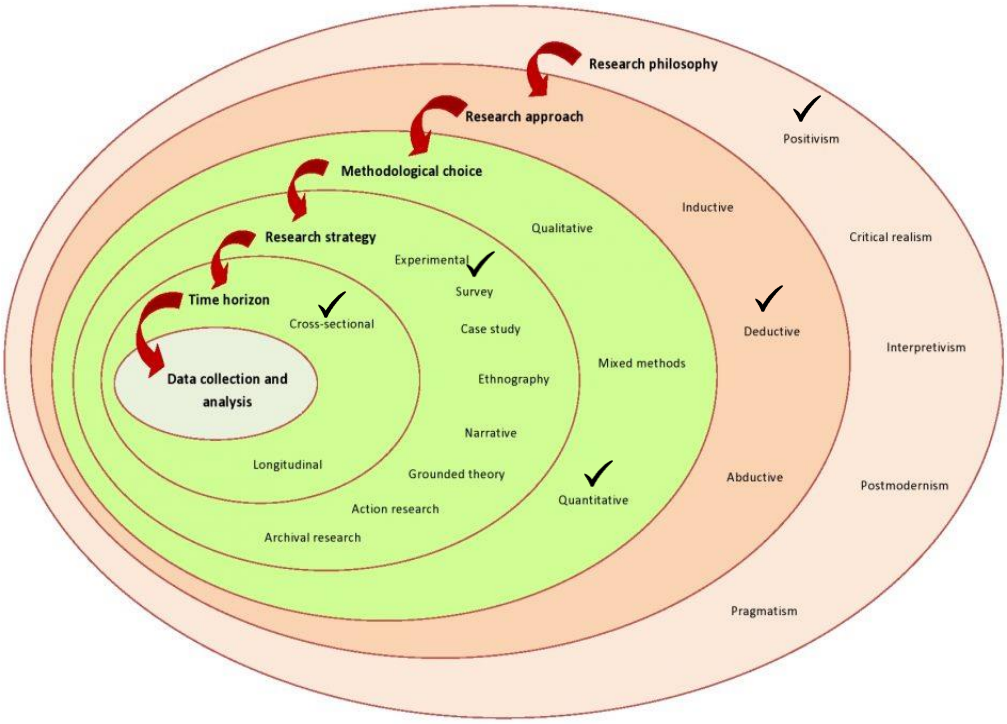

Figure 3.1 Research Process Onion [245]

3.3 Research Philosophy

The term "research philosophy "relates to the development of knowledge and the nature of that knowledge" [245]. It guides the researcher's approach to collecting, analysing, and interpreting data. There are several research philosophies, including positivism, interpretivism, critical theory, and pragmatism [246].

Interpretivism philosophy emphasizes subjective interpretation to understand human behaviour [247]. Critical theory, on the other hand, is a research philosophy

that seeks to challenge social inequalities and power structures [246]. Pragmatism is a research philosophy that seeks to combine different research approaches to solve a particular problem. Pragmatism favours mixed-methods research, where qualitative and quantitative methods are used in combination [248].

Positivism is a research philosophy that emphasizes objectivity, empirical observation, and scientific method [247]. It suppose that there is an impartial realism that can be observed and measured, and knowledge can be obtained through empirical evidence [249]. In positivist research, the researcher is away from the research subject, uses a systematic and objective approach to collect and analyse the data [244]. Positivism is commonly used in natural sciences, where researchers aim to establish cause-and-effect relationships between variables.

The current study aims to determine the factors that drive MUUS towards cyberbullying and considered positivism as an appropriate research philosophy. The study uses a quantitative approach, which involves the collection and analysis of numerical data through statistical methods. The use of a structured questionnaire allows the researcher to collect data systematically and objectively, without influencing the participants' responses [245]. The data collected will be analysed statistically, allowing the researcher to draw conclusions about the factors that contribute to cyberbullying among MUUS.

3.4 Research Approach of Current Study

Within the context of Saunders' research onion framework, the study adheres to a deductive approach [250]. A deductive approach involves examining existing

theories and hypotheses to draw conclusions and generalize findings to a broader population [244]. In this study, the research model and hypotheses are developed based on SCT and TPB, which provide a foundation for understanding cyberbullying behaviour.

The deductive approach is suitable for several reasons. Firstly, it allows for a systematic and structured investigation, starting from theory and moving towards empirical observations. By testing the research model and hypotheses derived from established theories, the study aims to validate or refute existing theoretical propositions regarding the factors influencing cyberbullying attitudes and intentions.

Secondly, deductive approach provides grounds for generalization. By following a deductive approach, the findings have the potential to inform and enhance the understanding of cyberbullying phenomena in broader context. Deductive approach promotes rigor and transparency in research and ensures that the study's design, data collection methods, and analysis are aligned with the research model and hypotheses. By considering deductive approach, the study aims to minimize biasness, maintain consistency, and facilitate the replication and verification of findings by other researchers.

3.5 Methodological Choice

There are two options i.e., quantitative, and qualitative methods. In contrast to the qualitative method, which relies on non-numerical data to elucidate the nature

of social phenomena, the quantitative approach establishes cause-and-effect links between variables using numerical data [251].

A positivist research philosophy is used in the context of the present study, which tries to identify the antecedents of cyberbullying behaviour among university students. For the present study, a positivist method is best since it enables the researcher to systematically and impartially uncover the factors that influence university students' cyberbullying behaviours [246]. The research employs a quantitative methodology, in which information is gathered using a well-structured survey or questionnaire. To determine the link between the predictor factors and the result variable, the survey data will be evaluated statistically.

The use of a positivist approach is especially appropriate for this study because cyberbullying behaviour is a complex social phenomenon that is difficult to understand through qualitative methods alone [249]. A positivist approach enables researcher to determine the factors that are statistically important in predicting university students' propensity for cyberbullying. The primary justification for using a positivist approach in this study is that it enables the establishment of cause-and-effect relationships between the predictor variables and the outcome variable, resulting in a thorough understanding of the factors that influence university students' cyberbullying behaviour.

3.6 Research Strategy “Survey”

The research strategy is a vital component of any study, establishing the research circumstances and providing direction to achieve goals and objectives of

the investigation [252]. In keeping with the purpose of the research, a quantitative method was used to identify the factors that Malaysian undergraduate students attending both public and private institutions found to be antecedents to cyberbullying. A self-administered survey was used to gather primary data using a survey research technique, which is often related to a deductive approach that allows the researcher to gather information swiftly and accurately from many individual students while protecting respondents' privacy.

This study used a cross-sectional time horizon, meaning that data was collected only once at given time, and the respondents were Malaysian undergraduate students from various universities in Malaysia. The respondents were selected by using a non-probability sampling technique, and the data was analysed using a multi-analytical strategy of SEM-ANN analysis.

A self-administered questionnaire was used in this research since it is the reliable, valid, and efficient way to get data from a large population [244]. The study collected data from MUUS who were the actual respondents using a self-administered questionnaire. The research used a self-administered questionnaire to get data from the real respondents MUUS. The questionnaire was created by modifying questions from relevant earlier research for each component. The questionnaire's validity and reliability were examined for an accurate assessment of the targeted constructs and findings. The questionnaire goes through a pre-test and pilot study before data collection to ensure its validity and reliability. In Table 3.1, the general strategy used for this investigation is laid out.

Table 3.1 Overall Research approach the study.

Strategy	Quantitative/Survey
Research Philosophy	Positivism
Research Approach	Deductive Approach
Methodological Choice	Quantitative
Research Strategy	Survey using a self-administrated questionnaire
Time Horizon	Cross-Sectional setting
Sampling Strategy	Non-Probability Sampling
Data Analysis	Multi-Analytical Approach using SEM-ANN

3.7 Sampling Strategy

3.7.1 Targeted Population

MUUS students enrolled in Malaysian public and private institutions selected as target demographic of this study. Malaysia's Ministry of Higher Education recently released figures for 2021 showing that there are 378,806 students enrolled in public institutions and 258,775 students enrolled in private universities [253]. The study focuses on both public and private universities and includes undergraduate students from all subjects and programs.

The study currently focuses exclusively on Malaysian citizens, excluding international students from the sample. The Ministry of Higher Education reports that 550,707 Malaysian students were enrolled in public institutions as of 2021. The number of Malaysian undergraduate students attending private institutions,

however, is not known. The number of higher education institutions in Malaysia is shown in Table 3.2.

Table 3.2 Number of Higher Learning Institutes in Malaysia [253]**.**

Higher Learning Institute Type	Number
Public Universities	20
Private Universities	47
University Colleges	34
Foreign University Campuses	10

3.7.2 Sampling Location and Sampling Frame

The sampling frame for this study encompasses undergraduate students currently enrolled in both public and private institutions within Malaysia. This choice is rooted in the fact that these students constitute a population prone to potential exposure to cyberbullying. Given the ubiquity of cyberbullying, all students share a heightened concern, as it represents a prevalent issue that can occur without direct physical interaction between the victim and the perpetrator [172].

Therefore, to ensure maximum response rate, the respondents selected for this study are from government and private higher education institutes across Malaysia, as they have access to the internet.

3.7.3 Sample Size

Sample size is the number of observations or individuals who are included in research. In research, the sample size is an important concern, especially for investigations that demand for statistical analysis. More intricate statistical analyses necessitate larger sample sizes, while the size of the sample and statistical power exhibit an inverse relationship [246].

Depending on the study issue, the style of analysis, and the population of interest, different scholars have advocated different minimum sample sizes. Beckett et al. suggested a sample size of 200–400 for SEM [254], while advanced SEM models require at least 200 responders [255]. To obtain a strong SEM, Harris and Schaubroeck (1990) recommended a minimum sample size of 200 [256]. According to Gorsuch (1990), there should be at least five respondents for each concept and a minimum of 100 respondents as a whole [257]. Hutcheson and Sofroniou (1999) recommended a minimum sample size of 150 [258]. Hair et al. (2017) suggested that 100 respondents are the "practical minimum sample size" when using SEM [260].

The study used sample size formula developed by Krejcie and Morgan (1970), which is often used to calculate sample size in limited populations [261]. In public universities, there are roughly 550,707 Malaysian citizens enrolled, According to the Malaysian Ministry of Higher Education, the number of students at private universities is unknown (2021) [253]. The optimum sample size for this study was calculated using a population estimate of 1 million Malaysian undergraduate

students, a 95% confidence interval, and a 5% margin of error. According to the Krejcie and Morgan formula, the minimum sample size is 384 [261]. The researcher has increased the sample size to 422 by an additional 10% to allow for any non-response or missing data.

The sample size of 428 employed in this study is enough for identifying the factors that drive MUUS to engage in cyberbullying and meets the sample size criteria. The sample size provides a reliable estimate and allows for relevant statistical analysis. The confidence interval sample size for the population by using Kreije and Morgan's (1970) is shown in Table 3.3.

Table 3.3 Determine Sample Size in a Large Population

	Confidence Interval=95%			**Confidence Level=99%**		
	Margin of Error			**Margin of Error**		
Population size	5%	2.5%	1%	5%	2.5%	1%
100	80	94	99	87	96	99
500	217	377	475	285	421	485
1000	278	606	906	399	727	943
10000	370	1,332	4,899	622	2,098	6,239
100000	383	1,513	8,762	659	2,585	14,227
500000	384	1,532	9,423	663	2,640	16,055
1000000	384	1,534	9,512	663	2,647	16,317

Source: [261]

3.7.4 Sampling Technique

Sampling technique is important to be considered by every research. It helps in determining the sample's representativeness and the findings' generalizability. This

study demographic target is MUUS at public and private colleges who reside in different states. This research has used a multi-stage sampling strategy, which includes choosing a sample in stages.

Based on data from the Ministry of Education for 2021 on local Malaysian students enrolled in public universities in Malaysia, Selangor, Johor, Kelantan, Perak, and W.P. Kuala Lumpur were the top five states with the highest enrolment of Malaysian students. The selection of these states is reasonable, as they represent a large portion of the target population and provide a diverse sample of public universities in Malaysia. After selecting the five states, a list of all universities in those states was prepared, and four universities (two government and two private) from each state were selected in the second sampling stage. This approach ensures that the sample is representative of both public and private universities and the different states. The sampling representatives were validated through a multi-stage sampling process.

The sampling technique implemented in this study ensures representativeness through a logical and systematic approach. By selecting the top five states with the highest number of Malaysian students (Ministry of Education, 2021) enrolled in public and private universities, the sample attains a significant portion of the target population. These states, including Selangor, Johor, Kelantan, Perak, and W.P Kuala Lumpur, represent diverse geographical regions and encompass a wide range of universities in Malaysia. Furthermore, the inclusion of both public and private universities, with two institutions from each state, accounts for the diversity in the higher education sector. This comprehensive sampling approach, validated through

a multi-stage process, ensures that the sample is well-distributed and representative of various universities across the selected states. As a result, the findings of the study can be confidently generalized to the larger population of Malaysian students in public and private universities.

The data was collected by following physical distancing measures during the COVID-19 pandemic, at that time most of the universities are closed in Malaysia. The study employed a convenience sampling technique to collect data from undergraduate students at those universities. This approach allows the researchers to collect data from participants who are easily accessible, reducing the time and cost of data collection [262]. Following the convenience sampling technique, the researchers employed a non-probability snowball sampling technique to collect data from undergraduate students enrolled in the selected universities. The snowball sampling technique is a useful method when it is challenging to identify participants in the target population [263]. Faculty members, student groups, and authorised authorities at the selected institutions received an email with a link to a Google Forms-created questionnaire. The request was made that they extend the invitation to Malaysian undergraduate students enrolled at their respective universities. This approach is beneficial because it allows the researchers to reach a larger and more diverse pool of participants and is cost-effective and convenient to implement [263].

Overall, the combination of convenience sampling, and non-probability snowball sampling techniques enabled the researchers to collect data from a representative sample of Malaysian undergraduate students enrolled in public and private universities across different states.

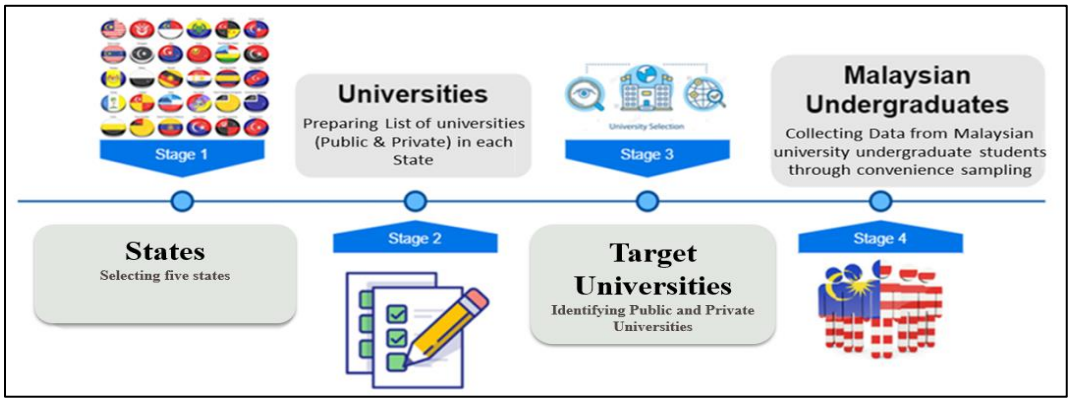

Figure 3.2 Sampling strategy

3.8 Time Horizon

There are two primary choices for the time horizon i.e., longitudinal, and cross-sectional studies. Longitudinal studies, often referred to as "diaries," involve the collection of data over an extended duration. Conversely, researchers opt for the cross-sectional technique when investigating a specific phenomenon at a particular moment in time. According to Sekaran and Bougie (2016), longitudinal studies are employed when researchers aim to gather information from the same respondents at two or more distinct time points to analyze changes over time [264]. However, cross-sectional studies, on the contrary, collect quantitative data at once to detect associating patterns among variables [252].

This study adopts a cross-sectional approach since the aim is to identify the factors associated with cyberbullying among MUUS at a specific point in time.

Cross-sectional studies can provide insights more quickly than longitudinal studies and are more cost-effective, as they do not require lengthy data collection periods. Additionally, academic studies are often time-bound, making a cross-sectional approach more practical for this study [265]. A cross-sectional time horizon enables the easy collection and organization of data, making it the most appropriate choice for this study.

The data collection for this research was conducted from October 2020 to February 2021, during a period when Malaysia implemented a MCO in response to the COVID-19 pandemic. The researcher adopted online data collection methods during this unique period of the temporary closure of the universities. Since, data was collected in 2020, the study acknowledges the influence of the pandemic and the associated changes in societal dynamics on cyberbullying behaviours and attitudes. This study enables a deeper understanding of the cyberbullying phenomenon within the specific temporal and socio-environmental context of the pandemic.

3.9 Research Instrument Development

3.9.1 Overview

Designing an effective survey questionnaire requires both artistic and scientific skills, as highlighted by (Malhotra, 1999) [266]. The questionnaire should be designed in a way that accurately captures information about the research problem. Ultimate efforts were taken to ensure that the measurement items of the questionnaire are simple, unambiguous, and easily understandable by the

respondents. This, in turn, minimizes the probability of misunderstanding the survey's measuring items by the respondents.

For this quantitative study, the researcher developed a questionnaire to collect data from the actual respondents. The process of developing the data collection instrument was based on the guidelines of Zikmund 2003; Sekaran and Bougie, 2011 [267], [268] and involved the following steps:

Setting objectives: The study's objectives were clearly described to enable the respondents for answering the questions quickly and have a clear understanding of the study.

Adopting items from literature: The researcher considered previous studies' outcomes and adapted relevant items from previously validated scales wherever possible to support the cumulative research practice.

Questionnaire design: The questionnaire was designed in line with similar studies reviewing the literature.

Multiple high-level items: The questionnaire included multi-item measures to capture the sense of each construct of the current study, as a single item cannot represent the concept of a variable [269].

Experts' opinion: The researcher sought an expert's opinion from researchers with expertise in cyberbullying.

Pre-testing: The preliminary version of the designed instrument will undergo pre-testing before collecting data from the respondents.

Pilot testing: The instrument underwent pilot testing before gathering data from actual respondents. Forty undergraduate students studying at public and private universities in Malaysia were employed to participate in the pilot testing phase of the questionnaire.

3.9.2 Instrument Measurement Scale Design

This study used a “five-point Likert scale,” ranging from “Strongly Disagree” to “Strongly Agree.” There are two reasons behind choosing the five-point Likert scale instead of a 7-point Likert scale or other scales. The first reason is that the five-point Likert scale offers ease to respondents in pointing out their answers. The second reason to choose the five-point Likert scale is that it is famous, well known, and widely used in global studies [270]. Table 3.4 shows the variables, items used as measures for this study, and sources from where the scales are adopted.

3.9.3 Research Instrument

A self-reporting questionnaire comprising 137 items was developed for this study. The questionnaire items were adapted from existing validated studies on cyberbullying-related factors. The questionnaire was divided into two sections. Part A elicited demographic information from respondents, such as gender, age, ethnicity, birthplace, university, primary field of study, and whether or not they had been victims of cyberbullying. Part A comprised 11 questions, and respondents who reported being cyberbullied were asked if they reported it to anyone.

Part B measured respondents' perceptions of cyberbullying-related factors using a five-point Likert scale (1 – Strongly disagree; 2; Disagree; 3 –Neither Agree

or Disagree; 4 - Agree; 5 – Strongly Agree). The questionnaire items were based on the factors presented in Table 1 and adapted from existing validated studies.

The measurement items used in the current study were not newly generated; instead, they were adapted from existing validated studies. This approach was chosen to ensure the reliability and validity of the measurement items. By utilizing established measurement items, the study built upon previous research and benefited from the existing evidence of their effectiveness in measuring the construct of interest. The adaptation process involved reviewing the literature to identify relevant scales and items that have been previously validated and widely used in the field. These scales were selected based on their theoretical alignment with the construct and their demonstrated psychometric properties, such as reliability and validity. The selected measurement items were then modified as needed to suit the specific research context while preserving their original intent and meaning.

The Measurement items can be categorized into two main types: formative and reflective [271]. Formative measurement items are designed to shape or define the construct being measured [272]. In other words, they are considered as indicators that contribute to the formation of the construct. On the other hand, reflective measurement items are intended to reflect or measure the construct itself, assuming that it is a latent variable [273]. In the context of the current study, the focus lies on reflective measurement items. Reflective measurement items were considered appropriate as they align with the research objectives and the nature of the study.

The measurement items used in this study aimed to capture participants' attitudes, intentions, and behaviours related to cyberbullying.

A panel of researchers with prior research expertise in the field of cyberbullying assessed the questionnaire, and changes were made based on their comments. The instrument was also pilot-tested with 40 Malaysian public and private university students, and no serious difficulties were discovered. The scale's total Cronbach's alpha was assessed to be 0.89, suggesting high instrument dependability. The demographic information gathered from respondents is presented in Table 3.4, and the variables and their respective items are presented in the following sections.

Table 3.4 Demographic Questions of the Respondents

S.No.	Question	Label
1	Gender	Male Female
2	Age Group	18 to 22 years 23 to 26 years Above 27 years
3	Ethnicity	Malay Chinese Indian Others
4	Home Town	Rural Urban
5	Studying at	Public University Private University
6	University Name	Write University Name
7	Major Area of Study	Select the Major Area of Study

8	Cyberbullying is:	When some student bullies another student on the Internet. When you send mean text messages or pics to another student. When you call another student name online. When you use a student's cell phone to get them into trouble. When you pretend to be another student online.
9	Have you ever been cyberbullied?	Yes No
10	If you have been cyberbullied, did you report it to anyone?	Yes No
11	Have you ever done any of the following to anyone?	Bullied another student on the Internet. Sent mean text messages or pics to another student. Called another student with bad names online. Used a student's cell phone to get them into trouble. Pretended to be another student online. No, I have not done any such activity in the past

3.9.4 Personality Measurement Items

This study assesses the personality construct through the lens of the dark triad, employing the Dark Triad Measurement Scale devised by Jonason & Webster [237]. The questionnaire in its entirety is included in Appendix B for reference.

Table 3.5 shows the reflective items used to measure the dark triad construct. The scale consists of 12 items, four for each of the three dark triad traits:

Machiavellianism, Narcissism, and Psychopathy. Each item is rated on a – 5 point Likert scale ranging from "strongly disagree" to "strongly agree."

Table 3.5 Personality Items

Dimension	Code	Measurement Items	Author
Machiavellianism	**PER1**	I tend to manipulate others to get my way.	[237]
	PER2	I have used deceit or lied to get my way.	
	PER3	I have used sweet talk to get my way.	
	PER4	I tend to exploit others towards my own end.	
Psychopathy	**PER5**	I tend to lack guilt/regret.	[237]
	PER6	I tend to be unconcerned with the morality of my actions.	
	PER7	I tend to be unsympathetic or insensitive.	
	PER8	I tend to be suspicious.	
Narcissism	**PER9**	I tend to want others to admire me.	[237]
	PER10	I tend to want others to pay attention to me.	
	PER11	I tend to seek prestige or status.	
	PER12	I tend to expect special favours from others.	

3.9.5 Cyberbullying Awareness Measurement Items

Cyberbullying awareness is being measured by using a scale adapted from [172]. The items used in this scale are shown in Table 3.6. The cyberbullying awareness scale consists of 7 reflective items, designed to assess participants' understanding and knowledge of cyberbullying. The items in the cyberbullying awareness scale cover a range of topics related to cyberbullying, including its definition, types, and effects on victims. Participants rate each item on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree."

Table 3.6 Cyberbullying Awareness Items

Dimension	Code	Measurement Items	Author
Cyberbullying Awareness	**CBA1**	Cyberbullying involves stealing of personal information such as e-mail addresses, and password.	[172]
	CBA2	Cyberbully deliberately sends infected e-mail messages to others.	
	CBA3	Cyberbullying is a threatening behaviour by using communication media over the Internet (chat rooms, instant messaging, e-mail, etc.) or telephone.	
	CBA4	Cyberbully would damage the reputation of others by distributing gossip and rumours.	
	CBA5	Cyberbullies share private information, images, and photos of the people without his/her permission.	
	CBA6	Blackmailing can be regarded as the act of cyberbullying.	

	CBA7	Cyberbullies gathers with other users on online platforms to exclude a person from a group/page.

3.9.6 Aggression Measurement Items

This research delves into the psychological construct of aggression, utilizing a scale adapted from [274]. The reflective items used to measure aggression are presented in Table 3.7. The aggression scale used in this research consists of 8 items, designed to measure both verbal and physical aggression. Participants rate each item on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The items in the aggression scale cover a range of aggressive behaviours, including both overt and covert aggression. The adapted aggression scale has been validated in previous research and has demonstrated good reliability and validity. The use of this scale in the current research provides a reliable and valid measure of aggression, which is an important variable in understanding the dynamics of cyberbullying behaviour among MUUS.

Table 3.7 Aggression Measurement Items

Dimension	Code	Measurement Item	Author
Aggression	**AGN1**	I teased students online to make them angry.	[274]
	AGN2	I made fun of students in chat group to make other students laugh.	
	AGN3	I encouraged other students to cyberbully other students on online platforms.	
	AGN4	I post things online about others to hurt them.	

	AGN5	I encourage students to fight on social media.
	AGN6	I posted hurtful things online about someone.
	AGN7	I called other students with bad names online.
	AGN8	I threatened to hurt or to hit someone because he/she was making fun of me on the internet.

3.9.7 Anti-social Behaviour Measurement Items

The physiological construct of antisocial behavior is evaluated through a scale adapted from Thornberry et al. (1994) [275]. The measurement items for antisocial behaviour are presented in Table 3.8. The scale used to measure antisocial behaviour consists of 8 reflective items, which are designed to assess a range of antisocial behaviours that individuals may engage in. The items in the scale cover a range of antisocial behaviours, including both minor and major delinquent acts, such as stealing, vandalism, and physical violence. Participants rate each item on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The adapted antisocial behaviour scale has been validated in previous research and has demonstrated good reliability and validity.

Table 3.8 Anti-social Behaviour Items

Dimension	Code	Measurement Items	Author
	ASB1	I have used the internet to get money or things from people.	
	ASB2	I have attacked someone using the internet and used social media to seriously hurt them.	

	ASB3	I have hit someone with the idea of hurting them.	
	ASB4	I have stolen something worth more than RM100 using the Internet.	[275]
	ASB5	I damaged or destroyed someone else's property on purpose.	
	ASB6	I took a car or motorcycle for a ride or drive without the owner's permission.	
	ASB7	I have skipped classes without any sensible reason.	
	ASB8	I don't mingle with those who are better than me.	

3.9.8 Internalizing Behaviour Measurement Items

The internalizing behaviour scale items have been adapted from [239] and are presented in Table 3.9. This scale has been a useful tool for assessing the psychological impact of cyberbullying behaviour among young people. The internalizing behaviour scale includes a set of 6 reflective items that assess internalizing behaviour of the respondents.

Table 3.9 Internalizing Behaviour items

Dimension	Code	Item	
Internalizing Behaviour	**INB1**	In the past month, I felt sad.	[239]
	INB2	In the past month, I felt lonely.	
	INB3	In the past month, people were not nice to me.	
	INB4	In the past month, I felt worried.	
	INB5	In the past month, I had trouble sleeping.	

INB6	In the past month, I felt shy.	

3.9.9 Self-esteem Measurement Items

The study has adapted the self-esteem measurement scale from [276] and the items are presented in Table 3.10. The self-esteem scale is a widely used tool for measuring an individual's overall sense of self-worth and self-acceptance. The scale includes a set of 5 reflective items that assess how positively or negatively an individual views themselves. These items are commonly used in research on self-esteem, and can provide valuable insights into the ways in which individuals view themselves and their own worth. The items are designed to capture both positive and negative aspects of self-esteem, including feelings of self-respect, self-confidence, and self-criticism. The self-esteem measurement scale items adapted from Rosenberg et al. (1995) is presented in Table 3.10.

Table 3.10 Self-esteem items

Dimension	Code	Measurement Items	Author
Self-esteem	**SE1**	On the whole, I am satisfied with myself.	[276]
	SE2	I feel that I have a number of good qualities.	
	SE3	I am able to do those things which other people can also do.	
	SE4	I feel that I am a person of worth, at least on an equal level with others.	
	SE5	I could handle negative comments from others.	

3.9.10 Moral Disengagement Measurement Items

The moral disengagement scale is a tool used to measure the degree to which individuals are capable of justifying harmful behaviour and distancing themselves from its moral implications. The scale consists of a series of 6 reflective items that reflect various cognitive mechanisms of moral disengagement.

In particular, the items presented in Table 3.11 are adapted from Diana and Sheri's (2016) study on moral disengagement in the workplace [277]. These items were designed to measure the degree to which individuals engage in moral justification, euphemistic labelling, advantageous comparison, and other forms of cognitive dissonance in the context of their work.

Table 3.11 Moral Disengagement items

Dimension	Code	Measurement Items	Author
Moral Disengagement	**MDE1**	Cyberbullying by annoying classmates is just teaching them a lesson.	[278]
	MDE2	If people give out their passwords to others, they deserve to be cyberbullied.	
	MDE3	It is okay to get revenge if someone cyberbully one of your friends.	
	MDE4	It is okay to spread nasty rumours about someone because it is not as bad as beating them up.	
	MDE5	Students who cyberbully other students because their friends push them to do it should not be blamed for what they do.	
	MDE6	If students cyberbully others in university, it is the teacher’s fault for not stopping it.	

3.9.11 University Climate Measurement Items

The items used to measure the university climate were adapted from Fisher's (2018) research on campus climate and student success [279]. These reflective items were specific to evaluate how much of a sense of belonging, support for diversity, safety and inclusion, respectful dialogue, and institutional commitment undergraduate students perceive on their campus. For the purpose of investigating the correlation between university climate and cyberbullying behaviour among MUUS, the study used the university climate measurement items that are presented in Table 3.12.

Table 3.12 University Climate items

Dimension	Code	Measurement Items	Author
University Climate	UC1	My university provides various personality development programs for students.	[279]
	UC2	My university wants me to do well.	
	UC3	My university has clear rules for behaving properly.	
	UC4	There is a counsellor at my university who will help me if I need it.	
	UC5	Classroom environment is harmonious in my university.	

3.9.12 Peer to Peer Relationships Items

The measurement items used to assess peer-to-peer relationships were adapted from Butcher et al.'s (2016) study on adolescent social networks and mental health. These items were specifically designed to evaluate the quality of peer relationships

based on factors such as support, trust, and communication. Table 3.13 shows the reflective items of the scale.

Table 3.13 Peer to Peer Relationship items

Dimension	Code	Measurement Items	Author
Peer to Peer Relationship	**PPR1**	My friends care about me.	[239]
	PPR2	My friends think I am a positive person.	
	PPR3	My friends are people whom I can trust.	
	PPR4	My friends always give me positive advices when I am in trouble.	

3.9.13 Image Measurement Items

The Image construct was measured using items adapted from [38]. In this study, the Image construct was used to assess the extent to which MUUS perceive cyberbullying as a means to enhance their image as a status symbol, show of power, and demonstration of their ability to exert influence. Table 3.14 shows the reflective items of the scale.

Table 3.14 Image measurement items.

Dimension	Code	Measurement Items	Author
Image	**IMG1**	People will dare not to challenge me if I am good at bullying others online.	[38]
	IMG2	I think others will admire me because I have the guts to cyberbully others.	
	IMG3	Cyberbullying makes one to be popular.	
	IMG4	Cyberbullying empowers one by hurting others.	
	IMG5	Cyberbullies believe they have a right to say/do anything online.	

3.9.14 Parenting Style Measurement Items

The measurement scale used to assess parenting style in this study consisted of 09 items, which were obtained from two different sources. Three of the items were adapted from Yusuf et al. (2014) study on parental communication, while the remaining three items were taken from the European Monitoring Centre for Drugs & Drugs Addiction Instrument, which assesses parental regulation [240].

The three items that were used to measure parental communication were designed to evaluate the extent to which parents communicate with their children in an open and supportive manner. The remaining three items, which were obtained from the European Monitoring Centre for Drugs & Drugs Addiction Instrument, were designed to assess the degree to which parents set clear rules and boundaries for their children. The parenting style measurement scale used in this study aimed to evaluate the impact of parental communication and regulation on cyberbullying behaviour among MUUS. Table 3.15 shows the reflective items of the scale.

Table 3.15 Parenting style items

Dimension	Code	Measurement Items	Author
Communication	**PS1**	My parents always educate me to communicate politely with others on online platform.	[240]
	PS2	My parents encourage me to talk about my difficulties.	
	PS3	If something is bothering me, my parents will ask me .	

Dimension	Code	Measurement Items	Author
Parental Regulation	PS4	I always follow the rules my parents have made for me to use the Internet.	
	PS5	My parents have a very strict rule that I will never be involved in cyberbullying.	
	PS6	It is always important to me to do what my parents tell me to do.	

3.9.15 Domestic and Siblings Violence Measurement Items

The measurement scale employed in this research to evaluate domestic and sibling violence was adapted from Canterino et al.'s study [219] conducted in 1999. The scale consisted of 4 items that were designed to assess the frequency and severity of violence experienced by the participants in their domestic and sibling relationships. The items covered violent behaviours, including physical violence, emotional abuse, and sexual abuse.

The domestic and sibling violence measurement scale used in this study aimed to evaluate the experience of domestic & siblings' violence among MUUS and its association with cyberbullying behaviour. The reflective items used in the measurement scale are presented in Table 3.16.

Table 3.16 Domestic and siblings' violence items

Dimension	Code	Measurement Items	Author
	DSV1	You have been emotionally or physically abused by your sibling or someone important to you.	

Domestic and Siblings Violence	**DSV2**	Within the last year, you have been hit, slapped, kicked, or otherwise physically hurt by someone.	[219]
	DSV3	Someone has forced you to have sexual activities.	
	DSV4	You are afraid of your siblings or anyone else.	

3.9.16 Socio-economic Status Measurement Items

The socioeconomic measurement scale items used in this study were adapted from [221] and are shown in Table 3.17. These items were selected to provide insights into the social and economic status of MUUS, who are the focus of this study on cyberbullying behaviour. The scale includes a range of items related to household income, parental education level, and other relevant socioeconomic factors. These items will be used to assess the influence of socioeconomic status on cyberbullying behaviour among MUUS. Table 3.17 shows the reflective items of the scale.

Table 3.17 Socio-economic status items

Dimension	Code	Measurement Items	Author
Socio-economic Status	**SES1**	My parents give me sufficient pocket money during my studies.	[221]
	SES2	I can afford basic items like the internet, utilities, clothes, laundry, and transport.	
	SES3	I can afford to buy adequate learning materials.	
	SES4	I can afford quality bedding items.	
	SES5	I receive adequate amount from my family to support my living at university.	

Dimension	Code	Measurement Items	Author
	SES6	I can afford quality food.	
	SES7	I can afford quality entertainment.	
	SES8	I can afford IT equipment and gadgets.	
	SES9	I work part time to earn some money to financially support my living at university.	

3.9.17 Perceived Behavioural Control Measurement Items

PBC is a construct that refers to an person's perception of their skill to control their conduct in a given situation. The PBC measurement scale items used in this study were adapted from [155] and are presented in Table 3.18. These items were selected to provide insights into the extent to which MUUS feel they have control over their cyberbullying behaviour.

Table 3.18 PBC items

Dimension	Code	Measurement Items	Author
Perceived Behavioural Control	**PBC1**	It is easy to bully someone using the internet or mobile phone if you can do it anonymously.	[155]
	PBC2	It is easier to bully someone using the Internet or mobile phone because you do not see the person face-to-face at the time when you bully him/her.	
	PBC3	It is easier to bully someone using the Internet or mobile phone if you know that your parents can not find it out.	
	PBC4	It is easier to bully someone using the Internet or mobile phone if you know that your teachers can not find it out.	
	PBC5	If your friends also bully using the Internet or mobile phone, it is easier to join in.	

	PBC6	I know how to modify others' photo to make fun of them online.
	PBC7	I know how to spread rumours of someone I do not like via online platform or social media.

3.9.18 Cyberbullying Attitude Measurement Items

Cyberbullying attitude measurement scale items are used to assess an individual's attitudes toward cyberbullying. These items can provide important insights into the beliefs and values that underlie cyberbullying behaviour, and can be used to inform prevention and intervention efforts. The reflective items form measuring cyberbullying attitude used in this study were adapted from [280] and are presented in Table 3.19.

Table 3.19 Cyberbullying attitude measurement items

Dimension	Code	Measurement Items	Author
Cyberbullying Attitude	**ATD1**	I find it exciting to spread rumours about others on internet and send pornographic materials to others online.	[280]
	ATD2	It makes me feel good to use the internet for sending messages to others after they have messaged me hurtful comments.	
	ATD3	Teasing others on the internet (e.g. Facebook, e-mails) is fun.	
	ATD4	Using the internet to create groups (e.g. Facebook groups) that are socially exclusive is fun to join.	

3.9.19 Subjective Norms Measurement Items

The subjective norms measurement scale items used in this study were adapted from [31]. These items were selected to provide insights into the extent to which MUUS perceive social pressure to engage in cyberbullying behaviour. Table 3.20 shows the reflective items of the scale.

Table 3.20 Subjective norms measurement items

Dimension	Code	Measurement Items	Author
Subjective Norms	**SN1**	I believe my friends would expect me to make rude or mean comments to someone on the internet (i.e. social media).	[31]
	SN2	I believe most of my friends would expect me to spread rumours about someone on the internet (i.e. social media), whether they are true or not.	
	SN3	I believe most of my friends would expect me to make aggressive or threatening comments to someone on social media.	
	SN4	I believe that my parents would not get angry if they found out I cyberbullied others.	
	SN5	I believe my family members would expect me to spread rumours about someone on the internet (i.e. social media), whether they are true or not.	
	SN6	I believe that the society would not care much about cyberbullying.	

3.9.20 Cyberbullying Intention Measurement Items

The items in the cyberbullying intention measurement scale assess an individual's propensity to engage in cyberbullying behaviors. These items, utilized

in this study, were adapted from [281]. Table 3.21 shows the reflective items of the scale.

Table 3.21 Cyberbullying intention measurement items.

Dimension	Code	Measurement Items	Author
Cyberbullying Intention	**INT1**	I intend to continue using the Internet to bully others in the future.	[281]
	INT2	I will always try to use the internet (i.e. social media) as a platform to cyberbully others in my daily life.	
	INT3	I plan to continue to use the internet (i.e. social media) as a platform to cyberbully others frequently.	
	INT4	I expect that I will bully someone using the Internet or mobile phone within the next month.	
	INT5	I am planning to bully someone using the Internet or mobile phone in the next six months.	

3.8.20 Cyberbullying Behaviour Measurement Items

Cyberbullying behaviour items are used to assess an individual's engagement in cyberbullying behaviour. The items used in this study were adapted from Calvete et al. (2010) study [242]. Table 3.22 shows the reflective items of the scale.

Table 3.22 Cyberbullying behaviour measurement items.

Dimension	Code	Measurement Items	Author
Cyberbullying Behaviour	**CBB1**	I have shared links of humiliating images to other people for them to see.	[242]
	CBB2	I have written embarrassing jokes, rumours, gossips etc. about a classmate to other people so they can read them online.	

Dimension	Code	Measurement Items	Author
	CBB3	I have hacked someone's e-mail or social media account to send messages by e-mail or social media that could make trouble for the other person.	
	CBB4	I have recorded videos or taken pictures while a group laughs and forces another person to do something humiliating or ridiculous.	
	CBB5	I have posted videos or pictures while a group laughs and forces another person to do something humiliating or ridiculous.	
	CBB6	I have recorded a video or taken pictures while someone hits or hurts another person.	
	CBB7	I have posted a video or pictures while someone hits or hurts another person.	
	CBB8	I have broadcasted online other people's secrets, compromising information or images.	
	CBB9	I have deliberately excluded someone from an online group.	
	CBB10	I have sent messages massively that includes threats or are very intimidating.	

3.8.21 PSMU Measurement Items

PSMU is a construct that has been used to measure the extent to which individuals experience negative consequences as a result of their social media use. The construct is assessed a scale that includes items that capture various aspects of problematic use, such as preoccupation, mood modification, and withdrawal. The measurement items for problematic social media usage, adapted from [243]. In this

study, PSMU has been used as a moderator between cyberbullying intention and behaviour of the respondents. Table 3.22 shows the reflective items of the scale.

Table 3.23 PSMU items.

Dimension	Code	Measurement Items	Author
Preoccupation	**PSM1**	I spend more time than I should using social media.	[243]
Escapism	**PSM2**	I use social media to forget about personal problems.	
Mood modification	**PSM3**	I feel better when I use social media.	
Reliance	**PSM4**	I feel anxious or upset when I am unable to use social media.	
Withdrawal	**PSM5**	I have tried to cut back on my social media use but failed.	
Conflict	**PSM6**	My use of social media has caused problems in my relationships.	
Deception	**PSM7**	I have lied to others about how much time I spend on social media.	
Inability to regulate	**PSM8**	I have trouble keeping track of how much time I spend on social media.	
Negative consequences	**PSM9**	My social media use has led to negative consequences in my life.	
Compulsion	**PSM10**	I feel like I have to use social media, even when I don't want to.	

3.9 Pretesting

Pretesting is an essential step in the development of any research instrument. It is a process that involves evaluating the validity and reliability of the questionnaire items to ensure that they effectively measure the defined variables [252]

The pretesting phase involved two steps. The first step involved evaluating the content validity of the questionnaire items to ensure that they accurately measured the intended variables. To pre-test the developed research instrument, the expertise of four experts was sought to ensure the quality and validity of the measures. Four experts in the field of cyberbullying were asked to evaluate each item of the questionnaire to ensure that they accurately measured the intended variables [282], [283]. The first expert, Prof. Madya Ts. Dr. Lai Chee Sern, hails from the Faculty of Technical and Vocational Education at Universiti Tun Hussein Onn, Malaysia. The second expert, Dr. Sarina Yusuf, is a senior lecturer at Universiti Pendidikan Sultan Idris. Dr. Mobashar Rehman, the third expert, is a senior lecturer specializing in digital business and analytics, management leadership, and organizations. The fourth expert, Dr. Aamir Amin, is a senior lecturer from the Department of Organizations, Systems, and People at the University of Portsmouth, UK. All of these experts possess extensive knowledge and expertise in the relevant field. Notably, Dr. Lee and Sarina have also presented papers on cyberbullying in Malaysia, further highlighting their experience and understanding of the subject matter. Their valuable insights and feedback during the pretesting phase have contributed to refining the research instruments and ensuring their suitability for the study.

The experts assessed the items for their relevance, clarity, and comprehensiveness. They provided valuable feedback on the wording, formatting, and sequence. The feedback received from the experts was used to refine and improve the instrument. The necessary amendments were made to ensure that the

questionnaire items accurately measured the defined variables. The revisions also helped to ensure that the instrument was clearer, more comprehensive, and more relevant to the study's research objectives.

The second step of the pretesting phase involved assessing the clarity and ease of understanding of the questionnaire items. To achieve this, the instrument was shared with five undergraduate students. The students were asked to assess the clarity, relevance, and ease of understanding of each item. Their feedback was used to refine and improve the instrument to ensure that it was clear and easy to understand.

The pretesting phase played a vital role in enhancing the credibility and validity of the study. The feedback from both experts and students was used to refine and improve the instrument to ensure that it accurately measured the defined variables.

3.10 Pilot Study

A pilot study is a preliminary research study that is conducted to test the feasibility and effectiveness of a research methodology or instrument before its full scale implementation. The pilot study serves as a crucial step in refining the questionnaire used for data collection in any research study. By conducting a small-scale rehearsal of actual data collection, the researchers can refine and improve the instrument to ensure its validity and accuracy. In this study, a pilot study was conducted to test the questionnaire developed for the research on cyberbullying behaviour among MUUS. Pilot testing is an effective way to identify any

ambiguities or issues with the instrument [245]. The aim of conducting the pilot test was to ensure the reliability and validity of the data collection instrument.

To increase the instrument's reliability, the current study conducted the pilot testing on 40 respondents, which is a larger sample size than the minimum recommended by [284]. The respondents were Malaysian undergraduate students studying at public and private universities in Malaysia. To ensure representation from both government and private universities, twenty undergraduate students from the University of Malaya (a government university) and twenty Malaysian students enrolled in the degree program at Universiti Tunku Abdul Rahman (UTAR) Kampar campus (a private university) were randomly selected to participate in the pilot testing activity.

Based on the pilot study, a total of 16 items were identified and subsequently removed from the measurement scales. Specifically, four items were removed from the self-esteem construct, four items from the cyberbullying attitude construct, three items from the cyberbullying behaviour construct, and five items from the university climate construct. These decisions were made based on the analysis of pilot study data, which helped identify items that were not effectively capturing the intended constructs or were redundant in nature. The refinement of the measurement scales through item removal enhances the clarity and precision of the constructs under investigation. Overall, Alpha reliability found was 0.901, as shown in Table 3.23.

During the pilot testing, the researchers checked the clarity, understanding, and comprehension of the items in the questionnaire. The respondents' feedback, suggestions, and opinions were taken into consideration to improve the instrument further. Necessary amendments were made to ensure that the questionnaire accurately measured the intended variables and provided reliable results. The pilot study phase allowed the researchers to identify and address any issues with the instrument, ultimately enhancing the credibility of the study and increasing the confidence of the researchers in the results.

3.11 Reliability of the Instrument

Ensuring the reliability of a data collection instrument is crucial to obtain accurate and consistent results. The process of validating a data collection instrument involves using statistical tools to assess the accuracy and consistency of the items. This is done to ensure that the instrument is measuring what it is intended to measure. As mentioned by Eignor (2006), the validation process of the data collection instrument is about determining the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests. In this study, various steps were taken to ensure the reliability and validity of the questionnaire used for data collection [285].

In addition to pre-testing and pilot study, another widely used test for checking the reliability of an instrument is Cronbach's alpha. As stated by Sekaran and Bougie (2011), Cronbach's alpha is a test for inter-item consistency, which

measures the internal consistency of items in a scale or survey [264]. The minimum accepted range of Cronbach's alpha is 0.6, as recommended by [286].

Table 3.24 Case Processing Summary

		N	%	N of Items
Cases	Valid	40	100.0	
	Excluded	0	.0	
	Total	40	100.0	145

To evaluate the reliability of the measuring items of the instrument used in this study, the internal consistency test and Cronbach's alpha were both used during the pilot study phase. The data collected from the participants of the pilot study phase were analysed using IBM-SPSS software to perform the Cronbach's alpha test, 145 cases are processed in SPSS-Version-22-0, shown in Table 3.22. The resulting Cronbach's alpha values for the variables were presented in Table 3.23, which demonstrated that the measuring items developed for this empirical investigation are reliable. The Cronbach's Alpha values obtained in this research ranged from 0.704 to 0.901, indicating that the measuring items developed for this study are reliable [286]. These results provide evidence that the questionnaire is internally consistent and can be used to measure the constructs of interest in the study.

Table 3.25 Pilot Test Reliability Results

Variables	No. of Items	Cronbach's Alpha
Self- Esteem	9	.838
Aggression	8	.810
Personality	12	.879
Cyberbullying Awareness	7	.786

Variables	No. of Items	Cronbach's Alpha
Anti-Social Behaviour	8	.779
Subjective Norms	6	.769
Perceived Behaviour Control	7	.891
Cyberbullying Attitude	8	.839
Moral disengagement	6	.746
Image	5	.766
Domestic & Siblings Violence	4	.713
Socioeconomic Status	9	.878
Peer-to-Peer Relationships	4	.726
Parenting Style	6	.835
University Climate	10	.840
Problematic Social Media Usage	12	.886
Cyberbullying Behaviour	13	.876
Internalizing Behaviour	6	.855
Cyberbullying Intention	5	.879
All constructs Combined	**145**	**0.901**

3.12 Validity of the Instrument

Validity is a crucial aspect of research instrument development as it determines how accurately the instrument measures the intended concept [287]. In this study, validity is assessed using three commonly used methods: content validity, convergent validity, and discriminant validity.

Content validity refers to the extent to which a measurement instrument captures different aspects of a construct. It involves a critical assessment of the

relevance of the content of the measurement instrument by the researcher [288]. To ensure content validity, a thorough review of the instrument by experts in the field is conducted. This process include expert judgment, content validity index, and face validity. Taherdoost (2016) discuss content validity as an important aspect of ensuring the quality of a measurement instrument [289].

Convergent validity assesses whether the research instrument is related to other measures of the same construct [290]. It involves correlating the scores of the research instrument with the scores of other instruments measuring the same construct. It is established by examining the factor loading within each dimension using factor analysis. Confirmatory factor analysis is commonly used to test convergent validity. Farrell (2009), proposed factor loading to establish convergent validity [291].

Discriminant validity, on the other hand, refers to the extent to which measures of distinct latent variables are unique [292]. It involves assessing whether a measure reflects only the variance attributable to its intended latent variable and not additional latent variables. This can be achieved by examining the correlation of the measures with other variables using correlation analysis. Hair et al. (2017) used correlation analysis to examine the discriminant validity of each component in their study [259].

Ensuring the validity of a research instrument is essential to ensure accurate measurement of the intended concept. Researcher has used content validity,

convergent validity, and discriminant validity to assess the validity of the developed research instrument. The results of these tests are presented in chapter 4.

3.13 Data Collection

In order to collect primary data, the target population of this study, which comprises MUUS, was identified. The data for this study was collected in the last quarter of 2020 during a period when Malaysia implemented a Movement Control Order (MCO) due to the COVID-19 pandemic. As a result, universities were temporarily closed, making it necessary to collect data online. The data for this study was collected through a questionnaire specifically developed for this research. The questionnaire was designed to capture the necessary information required for the study's objectives. The questions were carefully constructed to ensure that they were easy to understand, relevant to the study, and that they captured the intended information.

The selection of the participants was based on the Ministry of Education's 2021 data on local Malaysian students enrolled in public universities, and data collection was conducted in the top five states with the highest number of Malaysian students enrolled, namely Selangor, Johor, Kelantan, Perak, and W.P. Kuala Lumpur. By selecting these states, the study aimed to gather data that is representative of the broader Malaysian undergraduate university student population.

Overall, the data collection process was conducted in a manner that ensured the integrity and reliability of the data collected. The final sample size was significant

and provided a robust base for analysis, and the inclusion of both online and offline methods ensured that a diverse range of participants was reached.

3.13.1 Ethical Consideration

Ethical considerations are a crucial aspect of any research study. For this particular study, the researcher obtained ethical approval from the UTAR Scientific and Ethical Review Committee before commencing the study. The approval letter, Re: U/SERC/99/2020, is dated 9th July 2020, and it is attached in Appendix C of this thesis.

The ethical considerations for this study included the privacy and confidentiality of the participants. The researcher ensured that the data collected from the participants was kept confidential and only used for the purpose of the study. Informed consent was obtained from each participant before the data collection process commenced, and they were given the option to decline participation if they did not wish to participate.

The researcher also ensured that the data collection process did not cause any harm or discomfort to the participants. The participants were not exposed to any risk, and the researcher made every effort to minimize any potential harm that may arise from their participation.

The researcher also followed the guidelines for data protection and data storage, ensuring that the data collected was securely stored and only used for the purpose of the study. The data was only accessible to the researcher and was not shared with any third parties.

3.13.2 Data Screening

Data screening is an essential step in any research study, and it involves the evaluation and cleaning of collected data to ensure its quality, accuracy, and consistency [258]. In this study, data screening was conducted to check for missing data, outliers, and other errors that could affect the validity and reliability of the results.

The collected data was screened using various methods, including descriptive statistics, frequency distributions, and histograms. To ensure the accuracy of the data, the responses were cross-checked with the original questionnaires, and any discrepancies were corrected. Furthermore, the data was screened for any violations of assumptions required for statistical analysis, such as normality and homogeneity of variance.

3.14 Data Analysis Plan

Data analysis is a critical part, a two-step multi-analytical approach was employed to analyse the collected data. SEM was used in the first step, and ANN Analysis was used in the second step. SEM is a tool that can execute multiple regression tests at the same time, and it demonstrates computing algorithms and statistical and mathematical tools [293]. On the other hand, ANN is the best approach for studies with predictive scope and weak theories that do not involve understanding underlying relationships [294].

The integrated SEM-ANN approach has been adopted in many studies, such as wearable health device adoption [76], social media addiction [75], predicting

antecedents of m-commerce adoption [295], social CRM adoption [296], customer intentions to purchase [297], e-learning [298], ERP systems [299], and IOS adoption. To date, no study has utilized the SEM-ANN approach to investigate cyberbullying behaviour, making this research the first of its kind.

The study adopts a two-step, multi-analytical approach to identify and validate the proposed framework. The first step involves using SEM to identify multiple relationships among the variables and test associated hypotheses. Since cyberbullying behaviour adoption is complex, it is important to comprehend the factors that encourage MUUS to engage in it. SEM is a robust technique for hypothesis testing and validating the framework [300]. However, it oversimplifies the complexities involved in decision-making by using statistical modelling for the linear model [301]. To address this issue, the study employs the ANN approach to test non-linear relationships in the proposed research model [294]. ANN can identify non-linear relationships and make more accurate predictions than traditional regression techniques. However, due to its "Black Box" feature, ANN is unsuitable for examining causal relationships and testing hypotheses [75]. Therefore, the study uses a two-stage multi-analytical approach. In the first analysis stage, PLS-SEM verifies factors that significantly influence MUUS' cyberbullying behaviour. In the second analysis stage, the significant/supported variables from SEM are used as input to the ANN analysis approach to more accurately predict factors that engage Malaysian students in cyberbullying behaviour.

To adopt a balanced approach, the study initially uses PLS-SEM to examine the overall research model and test the hypotheses. Based on the results of SEM,

significant variables are selected as input for ANN, which mitigates the issue of overfitting associated with artificial neural networks [76]. The study is one of the first to integrate SEM and Artificial Neural Networks to determine the precursors of cyberbullying behaviour, as previous studies have mostly used SEM alone to predict cyberbullying behaviour.

The descriptive and inferential statistics were used to analyse the data gathered from the respondents. Descriptive statistics were obtained using the Statistical Package for Social Science (SPSS) Version 28, and they gave an overview of the profile of the participants. The demographic characteristics of the participants were examined using descriptive analysis, which enables researchers to compare variables numerically [250]. The demographic data were explained by employing frequency and percentage to display their specific quantity. The mean and standard deviation of each construct of the data collection instrument were highlighted to describe the central tendency and dispersion in the gathered data. SPSS was also used for data preparation, analysing missing data, outliers, normality, response pattern, linearity, multicollinearity, and homoscedasticity.

The SmartPLS 3.0 software was used to test the hypotheses and analyse the data using PLS-SEM. PLS-SEM is a suitable method to analyse the complex model with small sample size data. SEM is used to test the hypotheses and predict cyberbullying behaviour. ANN analysis was performed using SPSS 28 to analyse the data and to identify the underlying pattern or relationship among the constructs. ANN is a useful tool for exploring complex nonlinear relationships that are difficult

to identify using traditional methods [75]. The ANN model's performance was evaluated using the Root Mean Square Error (RMSE) [302].

3.14.1 SEM-ANN Approach

SEM can be carried out using two basic types, namely Covariance-based SEM (CB-SEM) and Variance-based SEM (VB-SEM) [303]. CB-SEM analysis tools include AMOS, EQS, and LISREL, while VB-SEM analysis tools include Smart PLS, Visual PLS, and PLS Graph. CB-SEM is better suited for theory development and testing, while VB-SEM is useful for theory prediction [259]. CB-SEM tools are ideal for hypothesis testing in studies with strong theoretical foundations, while VB-SEM is useful for studies with a focus on explaining the variance and building theories. Before testing causal relationships using CB-SEM, it is essential to adhere to multivariate assumptions such as linear relationships, normal distribution, and no multicollinearity [260]. The minimum sample size required for CB-SEM is 100 respondents, and outliers must be avoided [259]. On the other hand, VB-SEM is less stringent and requires a minimum sample size calculated using the 10-times thumb rule [301].

ANN is a flexible approach that does not require multivariate assumptions, making it suitable for studies with weak theories and predictive scope [299]. ANN cannot perform hypothesis testing due to its Black box operation, but it can detect linear and non-linear relationships and learn through artificial intelligence features [75]. The integrated SEM-ANN approach is a hybrid methodology that can test hypotheses and detect non-linear relationships among the variables [77]. This

combination complements each other as SEM can detect only linear relationships and perform hypothesis testing, while ANN can detect non-linear relationships and improve predictivity [76], [77], [299], [304]. The comparison between ANN, VB-SEM, and CB-SEM is exhibited in Table 3.24, which exhibits the strengths and shortcomings of ANN, CB-SEM, and VB-SEM.

Table 3.24 Comparison between CBSEM, VBSEM, and ANN [260]**.**

	Covariance Based Structural Equation Modelling	**Variance Based Structural Equation Modelling**	**Artificial Neural Networks**
Goal of study	**Theory testing**	**Theory building**	**Prediction**
Objective	Maximize model fit	Maximize variance explained	Minimize predictive error
Theory dependency	Strong	Moderate to strong	Weak
Algorithm	Covariance-based	Variance-based	Artificial intelligence
Measurement philosophy	Common variance	Total variance	Prediction accuracy
Model specification	Only the reflective model	Reflective and formative model	Not applicable
Model complexity	Low to moderate	Low to High	Low
Data type	Metric	Metric and non-metric	Metric and non-metric
Normal distribution	Required	Optional	Not required
Linearity	Required	Required	Optional
Homoscedasticity	Required	Optional	Not required

"**Table Continued"**

	Covariance Based Structural Equation Modelling	Variance Based Structural Equation Modelling	Artificial Neural Networks
Absence of multicollinearity	Required	Required	Not required
Absence of outliers	Required	Optional	Not required
Sample size	At least 100[a]	10-time rule	50-time rule
Hypothesis development		Required	Not required
Predictive power measurement	Beta coefficient	Beta coefficient	Normalized importance
Strengths	Provided model fit indices	Can test the formative model	Can detect both linear and nonlinear relationships
	Theory confirmation	Robust against non-normal data	Can test the non-compensatory model
	Test common factor model	Can test a small sample	Robust against noises
		Robust against outliers	No hypothesis required
		Can test non-normal data	No theoretical foundation is required

"**Table Continued"**

	Covariance Based Structural Equation Modelling	Variance Based Structural Equation Modelling	Artificial Neural Networks
		Provide predictive relevance	High predictive accuracy
		Provide effect size	Able to "learn."
		Theory building	No multivariate assumptions required
		Test composite model	Robust against outliers
Weaknesses	Cannot detect nonlinear relationships	Cannot detect nonlinear relationships	Cannot test hypotheses
	Unable to "learn."	Unable to "learn."	Cannot test moderation and mediation effect
	Cannot test the formative model	A hypothesis is a must	No parameter estimates
	A hypothesis is a must	It needs a moderate theoretical foundation	No model fit indices
	Large sample size	Cannot test the non-compensatory model	No effect size
	Subject to outliers	No normalized importance	

Based on the limitations and requirements of this study, a multi-analytical hybrid SEM-ANN approach has been used for data analysis. This approach has been chosen because it overcomes the limitations of traditional SEM and ANN methodologies. Since, SEM can only detect linear relationships and perform hypothesis testing, it cannot identify non-linear relationships. On the other hand, ANN algorithms can detect both linear and non-linear relationships, but cannot perform hypothesis testing due to their Black Box operation.

Therefore, the integrated SEM-ANN approach has been selected as it combines the strengths of both methods, allowing for the detection of both linear and non-linear relationships while also being able to perform hypothesis testing. This hybrid approach ensures that the SEM and ANN methods do not compete with each other, but instead, complement each other, making it the most appropriate methodology for this research study.

3.15 Summary

This chapter provides a detailed description of the research methodology employed in this study. The chapter starts by outlining the research philosophy, approach, and strategy used in the study. The research philosophy adopted for this study was positivism, which emphasizes objectivity, measurement, and observation. The research approach was deductive, and the research strategy was survey research.

The data collection process was performed through an online survey using a convenience sampling strategy. The survey instrument was developed by adapting

items from previously validated scales, and the process involved a pre-testing and pilot study to refine and improve the instrument's quality. The data collected through the survey questionnaire was coded, cleaned, and analysed by using a combined SEM and ANN approach.

The chapter also provides a detailed explanation of the data analysis plan used in the study. The hybrid SEM-ANN approach was chosen as the most appropriate method for the data analysis process. This approach was selected because it enabled the detection of both linear and non-linear relationships between the variables in the study, and it also allowed for hypothesis testing.

In summary, Chapter 3 outlines the research methodology, data collection, and analysis process used in this study. The use of a hybrid SEM-ANN approach, along with the adapted survey instrument, provided a robust and effective approach to the study's objectives. The chapter concludes by highlighting the importance of adhering to ethical considerations during the research process.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Introduction

Chapter 4 stands as a cornerstone in this study, unveiling the culmination of this research in the form of results and findings. Within this chapter, the researcher meticulously addresses the research questions and hypotheses crafted for this study. The overarching objective of this chapter is to present the outcomes in a manner characterized by clarity and brevity, accentuating the principal revelations that directly correspond to the research questions and hypotheses established earlier. The findings and results are presented in various formats, such as tables, graphs, and images, to provide a visual representation of the analysed data.

In this study, hybrid SEM-ANN approach was used to analyse the data, and the results are presented in this chapter. The findings shed light on the factors driving cyberbullying among Malaysian undergraduate students, providing valuable insights for Government, policymakers, educators, and parents to develop effective interventions to mitigate this issue.

4.2 Response Rate

A total of 650 online surveys were distributed to potential participants during the survey period from October 2020 to February 2021. Due to the COVID-19 outbreak and the MCO implemented by the Malaysian government, data collection was conducted online as universities were temporarily closed. The response rate

was calculated by dividing the number of completed online surveys (428) by the total number of online surveys distributed (650), resulting in a response rate of approximately 65.8%.

4.3 Quality of Data

Ensuring the quality of data is essential in research, and this can be achieved through data screening, cleaning, and verification [305]. These processes help to identify and correct any errors, inconsistencies, or anomalies in the data, which can impact the reliability and validity of research findings [306].

To ensure accuracy in data collection for this study, the researchers implemented several measures. Firstly, questionnaires were printed on A4 size paper, and great attention was given to the data entry process. Each questionnaire was thoroughly checked for errors to minimize mistakes that could have arisen due to typing or other factors during the data entry process.

Additionally, the researchers created an online questionnaire on Google Forms to increase accessibility to a wider range of participants. To ensure quality data collection through this method, the researchers took several steps. The questionnaire was tested with a small group of participants to identify any potential issues with the design or functionality of the form. Clear instructions and guidelines were included for participants to follow when completing the form, and contact details were provided to assist with any issues encountered while submitting the response.

To minimize errors and ensure accuracy in the online questionnaire, the researchers also implemented data validation rules. These rules helped prevent participants from entering invalid or inappropriate data, such as non-numeric characters in a numeric field.

Overall, these careful measures taken by the researcher in both paper and online questionnaires helped ensure high standards for data quality and accuracy. This allowed for greater confidence in the results of the analysis, and increased the usefulness of the research for future policy and practice related to cyberbullying prevention and intervention.

4.4 Data Processing

In this quantitative study, the data processing procedures were designed to accommodate the online data collection method. Following the online survey responses, a systematic approach was employed to clean and validate the data [264]. The collected survey responses were exported to an Excel spreadsheet, serving as a centralized storage for efficient data management. Various checks were conducted to identify missing values, outliers, and any inconsistencies in the responses. Once the data cleaning process was completed, it underwent transformations and preparations for statistical analysis. This involved coding variables, creating derived variables, and organizing the data in a suitable format for analysis.

4.5 Data Editing

Data editing is an important process that is used to identify and correct inconsistent, illogical, or incomplete responses in a questionnaire [268]. In this study, the researcher observed a set of processes to improve the precision and accuracy of the collected data.

Regarding data distribution, the study used PLS-SEM approach which does not require the assumption of normality of distribution [260]. This is because PLS-SEM uses a non-parametric bootstrapping technique and assumes that the study sample is an accurate representation of the population [259]. Hence, normal distribution was not verified in the study.

In terms of missing data, it is important to note that the data for this study was collected online rather than through physical means. The online data collection method was chosen due to the COVID-19 pandemic and the movement control measures implemented in Malaysia during the data collection period. This online approach facilitated the efficient and convenient collection of data from participants. Furthermore, the use of the Smart PLS software allowed for the management of missing data by replacing them with the means or column averages of the respective factors [293]. However, it is worth mentioning that no questionnaire was returned with missing data, indicating a high level of completeness in the collected data. The combination of online data collection and the utilization of the Smart PLS software contributed to the integrity and quality of the dataset for analysis. Additionally, the online questionnaire was designed to be

user-friendly and easy to navigate, with clear instructions and guidelines for participants to follow, reducing the likelihood of missing data.

As for outliers, the Smart PLS software effectively treats them without removing them, and outliers only need to be removed if they arise due to measurement error [307]. The researcher may have ignored the process of removing outliers because no any significant outliers that could impact the analysis were observed. Additionally, removing outliers can potentially reduce the sample size and alter the distribution of the data [308]. Furthermore, as the Smart PLS software can effectively treat outliers without removing them, the researcher may have felt that it was unnecessary to spend additional time and effort to identify and remove outliers. Overall, the decision to ignore the process of removing outliers is based on a combination of the absence of significant outliers and the effectiveness of the software used in the analysis.

4.6 Demographic Analysis

The demographics of the respondents provide insight into the profile of the participants who took part in the study. Respondents demographic are presented in Table 4.1, which includes information on gender, age group, ethnicity, university type, hometown, and experience with cyberbullying. The study included 428 respondents, with 206 (48.13%) males and 222 (51.87%) females. The gender distribution of the respondents is relatively similar, with a slightly higher proportion of females.

In terms of age group, the majority of respondents fell within the 15-20 (42.52%) and 20-25 (53.74%) age brackets, with only 16 (3.74%) respondents above the age of 25. This age distribution is similar to the overall population of Malaysia, where approximately 60% of the population falls within the 15-44 age range.

Regarding ethnicity, the study included 202 (47.19%) Malay respondents, 160 (37.38%) Chinese respondents, and 66 (15.42%) Indian respondents. These results align with the ethnic makeup of the Malaysian population, where Malays comprise the majority (69.1%), followed by Chinese (22.6%) and Indians (6.7%).

The study participants were from both public and private universities, with 205 (47.89%) from public universities and 223 (52.10%) from private universities. The distribution of respondents from both types of universities is relatively similar, indicating that the sample is well-represented.

In terms of hometown, the study included respondents from both urban (52.57%) and rural (47.42%) areas, with a slightly higher proportion from urban areas. The distribution of respondents from both types of areas is relatively balanced. This distribution reflects the urban-rural composition of the student population in Malaysia.

Regarding cyberbullying, 193 (45.09%) respondents reported that they have been cyberbullied, while 80 (18.69%) were not sure, and 155 (36.21%) reported that they have not been cyberbullied. In terms of reporting cyberbullying, 205

(47.89%) respondents reported that they have reported it to someone, while 223 (52.10%) did not report it.

The data presented in the respondents' demographics table highlights a concerning trend. While nearly half of the respondents (45.09%) reported that they had been cyberbullied, a significant majority (52.10%) of those who had been bullied did not report it to anyone. This suggests that a large number of cyberbullying cases go unreported, indicating a major issue that needs to be addressed. The lack of reporting may be due to several factors such as fear of retaliation, shame or embarrassment, lack of knowledge about how to report, or a belief that nothing will be done to stop the cyberbullying. It is essential to create awareness campaigns and provide a safe reporting mechanism to ensure that all cases of cyberbullying are reported and dealt with effectively.

Overall, the respondents' demographics show that the sample is diverse and representative of the Malaysian population, with similar distributions across various demographic factors. The demographics also provide insight into the prevalence of cyberbullying and reporting behaviour among university students in Malaysia.

Table 4.1 Demographic profiles of the respondents

	Respondents Number	Percentage
Gender		
Male	206	48.13 %
Female	222	51.87 %
Total	428	
Age Group		
15-20	182	42.52 %
20-25	230	53.74 %
Above 25	16	3.74 %
Ethnicity		
Malays	202	47.19 %
Chinese	160	37.38 %
Indians	66	15.42 %
University Type		
Public	205	47.89 %
Private	223	52.10%
Home Town		
Urban	225	52.57 %
Rural	203	47.42%
Have you ever been cyberbullied?		
Yes	193	45.09 %
No	155	36.21%
Not Sure	80	18.69%
If you have been cyberbullied, did you report it to anyone?		
Yes	205	47.89 %
No	223	52.10%

4.7 Measurement Model Analysis

The measurement model is a critical component of research that outlines the relationship between the latent constructs and the observable indicators or items used to measure them [301]. It defines how the observed variables relate to the underlying latent variables and how the latent variables relate to each other. The measurement model is crucial for ensuring the consistency and suitability of both the data and data collection instrument, and satisfying this basic assumption is

imperative for the proper application of structural models for hypothesis testing [309].

In PLS analysis, examining the structural and measurement model is recommended, and Smart PLS 3.0 is a useful tool for assessing all the paths simultaneously, as noted by [310]. To establish a valid measurement model, several tests are employed, including composite reliability, convergent validity, discriminant validity, indicator reliability, explanation of variance through R square, and goodness of fit of the research model. These tests play a crucial role in ensuring the validity and reliability of the measurement model and accurately representing the underlying constructs being measured.

Figure 4.1 presents the measurement model used in this study, which was assessed using the aforementioned tests to establish its validity and reliability. Overall, the measurement model is a fundamental aspect of research, and its proper application ensures that the research accurately reflects the constructs being measured.

In the context of the current study, the measurement items for the constructs were adapted from existing validated studies, indicating that they are reflective in nature. By using reflective measurement items, the study assumes that the constructs are latent variables that underlie the observed indicators. These indicators are expected to be influenced or caused by the constructs being measured. This approach allows for a more comprehensive understanding of the constructs and their relationships. Formative constructs are characterized by

measurement items that define or create the construct [272]. In other words, the indicators or items are considered to be causal indicators that form or shape the construct itself. Changes in the indicators may lead to changes in the construct. Formative constructs are often used when the theoretical understanding of the construct suggests that it is composed of multiple dimensions or aspects that contribute to its formation [273].

On the other hand, reflective constructs are measured by indicators that are reflective of the construct's underlying theoretical concept [271]. The indicators are considered to be an observable manifestation of the construct. Reflective constructs assume that the construct causes or influences the measured indicators. Changes in the construct will lead to changes in the indicators. Reflective constructs are commonly used when the construct is viewed as a latent or unobservable variable that cannot be directly measured [272].

The use of reflective constructs in the current study was based on the established theoretical frameworks and validated measurement scales from previous research. By utilizing these existing measurement items, the study ensures consistency and comparability with prior studies, enhancing the reliability and validity of the measurements.

4.7.1 Construct Reliability

Construct reliability is a crucial component in assessing the quality of a measurement model. It refers to the extent to which the latent construct or variable is accurately and consistently measured by the observed indicators or items.

Essentially, it measures how well the items are capturing the underlying trait or construct that they are designed to measure [289].

Two commonly used statistical tests to evaluate construct reliability are Cronbach's alpha and composite reliability. Cronbach's alpha is a widely used measure of internal consistency and is regarded as a measure of scale reliability. On the other hand, composite reliability measures the internal consistency of scale items, similar to Cronbach's alpha, and represents the total amount of true score variance relative to the total scale score variance [260].

To establish construct reliability, researchers frequently use Cronbach's alpha coefficient as a criterion, which measures the internal consistency of a set of items. A high alpha coefficient, usually above 0.7, indicates good internal consistency and reliability of the items to measure the construct [310]. While both Cronbach's alpha and composite reliability are valuable measures of construct reliability, research using PLS-SEM suggests that constructs achieving values of at least 0.70 on both measures are deemed reliable [301].

Table 4.2 presents the Cronbach's Alpha and Composite Reliability (CR) values for each construct in the study. Cronbach's Alpha is a measure of internal consistency reliability and indicates the extent to which the measurement items within a construct are correlated with each other [311]. Higher values of Cronbach's Alpha (closer to 1) suggest greater internal consistency and reliability [312].

The CR is a measure of the construct's reliability, considering both the systematic variance and measurement error variance [260]. It indicates the extent

to which the observed variables (measurement items) within a construct are consistently measuring the same underlying concept. Higher values of CR (closer to 1) indicate greater reliability [292], [313].

Looking at the table, the construct "Aggression" has a Cronbach's Alpha of 0.919, indicating high internal consistency among its measurement items. The CR value for "Aggression" is 0.937, suggesting that the measurement items reliably measure the underlying concept. Similarly, the construct "Anti-social Behaviour" has a Cronbach's Alpha of 0.951, indicating high internal consistency, and the CR value is 0.959, indicating high reliability.

The table also displays the Cronbach's Alpha and CR values for other constructs, providing an assessment of the internal consistency and reliability of the measurement items within each construct. In summary, Table 4.2 shows the Cronbach's Alpha and Composite Reliability values, demonstrating the internal consistency and reliability of the measurement items for each construct in the study. These values affirm the robustness of the measurement instruments and provide confidence in the reliability of the constructs measured in the research.

Table 4.2 Construct Reliability

Constructs	Cronbach's Alpha	Composite Reliability
Aggression	**0.919**	**0.937**
Anti-social Behaviour	**0.951**	**0.959**
Cyberbullying Attitude	**0.880**	**0.917**
Cyberbullying Awareness	**0.865**	**0.873**
Cyberbullying Behaviour	**0.974**	**0.977**
Cyberbullying Intention	**0.946**	**0.959**
Domestic & Siblings violence	**0.917**	**0.942**
Problematic Social Media Usage	**0.903**	**0.928**

Image	**0.844**	**0.894**
Internalizing Behaviour	**0.883**	**0.911**
Moral Disengagement	**0.853**	**0.884**
Parenting Style	**0.822**	**0.864**
Peer to Peer Relationship	**0.892**	**0.907**
Perceived Behavioural Control	**0.933**	**0.941**
Personality	**0.827**	**0.855**
Self Esteem	**0.917**	**0.918**
Socio-economic Status	**0.831**	**0.763**
Subjective Norms	**0.929**	**0.944**
University Climate	**0.852**	**0.890**

4.7.2 Construct Validity

The assessment of construct validity is an essential part of evaluating a measurement model, as it determines whether the observed indicators or items used to measure a latent construct or variable actually measure the intended construct accurately [289]. It examines whether the items align with the underlying theory of the construct being measured and whether they represent the construct appropriately.

To establish construct validity, researchers commonly employ tests such as convergent validity and discriminant validity. Convergent validity assesses whether the various indicators of a construct are measuring the same underlying construct. On the other hand, discriminant validity examines whether the different constructs in the model are distinct and are not measuring the same underlying construct [260].

4.7.3 Convergent Validity

Convergent validity is an important aspect of construct validity in which researchers assess whether different indicators or items of a latent construct are

measuring the same underlying construct [290]. It is crucial for ensuring that the measure is reliable and consistent.

Average Variance Extracted (AVE) is a commonly used measure of convergent validity, which represents the amount of variance that is shared among the indicators of a latent construct relative to the measurement error. AVE values range from 0 to 1, with higher values indicating greater convergent validity. According to Hair et al. (2014), an AVE value of 0.50 or higher is considered to be an acceptable level of convergent validity [260].

Table 4.3 Convergent Validity (AVE)

Constructs	Average Variance Extracted (AVE)
Aggression	0.712
Anti-social Behaviour	0.748
Cyberbullying Attitude	0.736
Cyberbullying Awareness	0.638
Cyberbullying Behaviour	0.809
Cyberbullying Intention	0.822
Domestic & Siblings violence	0.801
PSMU	0.514
Image	0.720
Internalizing Behaviour	0.679
Moral Disengagement	0.630
Parenting Style	0.564
Peer to Peer Relationship	0.616
Perceived Behavioural Control	0.583
Personality	0.573
Self Esteem	0.544
Socio-economic Status	0.409
Subjective Norms	0.740
University Climate	0.620

4.7.4 Discriminant Validity

Discriminant validity is a critical aspect of measurement model assessment that evaluates whether different constructs in the model are distinct and not measuring the same underlying construct [260]. To establish discriminant validity, researchers commonly use two approaches: the Fornell-Larcker criteria and the heterotrait-monotrait correlation ratio (HTMT). The Fornell-Larcker criteria determines if the variance of two constructs is less than the variance of the separate components [292]. The HTMT ratio assesses the extent to which the correlation between two constructs is greater than the correlation of each construct with itself. A commonly used threshold for discriminant validity is an HTMT ratio less than 0.85 [255].

For this study, both the Fornell-Larcker criterion and the HTMT ratio were used to assess discriminant validity. Table 4.4 displays the results the Fornell-Larcker criteria demonstrates that the square root of the AVE for each concept (bold-italic) is greater than the inter-construct correlations, indicating that discriminant validity has been achieved [292]. Table 4.5 displays the results of the HTMT ratio, which shows that the values are below the threshold of 0.85, indicating that discriminant validity has also been achieved using this approach [255].

The rationale for using both approaches is that they provide complementary information about the distinctiveness of constructs in the model. The Fornell-Larcker criterion assesses whether the constructs are empirically distinct, while the HTMT ratio assesses whether the constructs are conceptually distinct. By using both approaches, we can be more confident in the assessment of discriminant

validity. Based on the results presented in Tables 4.4 and 4.5, it can be concluded that discriminant validity has been achieved for all constructs in the model.

Table 4.4 Discriminant validity- Fornell and Larcker Criterion

Constructs	AGN	ASB	ATD	CBA	CBB	INT	DSV	PSMU	IMG	INB	MDE	PS	PPR	PBC	PER	SE	SES	SN	UC
AGN	**0.844**																		
ASB	0.570	**0.865**																	
ATD	0.536	0.640	**0.858**																
CBA	0.263	0.000	0.100	**0.799**															
CBB	0.593	0.815	0.710	0.024	**0.899**														
INT	0.595	0.834	0.607	0.028	0.831	**0.907**													
DSV	0.479	0.706	0.565	0.139	0.734	0.706	**0.895**												
PSMU	0.247	0.286	0.269	0.235	0.307	0.284	0.400	**0.717**											
IMG	0.511	0.718	0.589	0.142	0.760	0.771	0.839	0.438	**0.848**										
INB	0.307	0.401	0.373	0.073	0.426	0.382	0.382	0.257	0.397	**0.824**									
MDE	0.514	0.630	0.492	0.226	0.668	0.670	0.696	0.390	0.712	0.330	**0.794**								
PS	0.123	0.157	0.125	0.192	0.156	0.235	0.264	0.494	0.263	0.075	0.331	**0.751**							
PPR	0.150	0.144	0.063	0.242	0.156	0.219	0.217	0.345	0.251	0.047	0.225	0.468	**0.785**						
PBC	0.369	0.465	0.494	0.278	0.511	0.469	0.599	0.411	0.647	0.334	0.517	0.197	0.324	**0.763**					
PER	0.621	0.497	0.477	0.283	0.563	0.534	0.466	0.228	0.520	0.489	0.535	0.113	0.132	0.364	**0.757**				
SE	0.205	0.225	0.145	0.300	0.204	0.158	0.296	0.389	0.288	0.034	0.295	0.394	0.371	0.300	0.187	**0.738**			
SES	0.241	0.315	0.131	0.138	0.261	0.303	0.342	0.504	0.300	0.124	0.286	0.345	0.346	0.215	0.090	0.281	**0.739**		
SN	0.562	0.715	0.661	0.078	0.763	0.783	0.780	0.385	0.768	0.321	0.689	0.258	0.147	0.484	0.509	0.195	0.329	**0.860**	
UC	0.108	0.037	0.071	0.270	0.142	0.125	0.159	0.507	0.222	0.099	0.195	0.469	0.631	0.293	0.114	0.411	0.358	0.174	**0.787**

Note. AGN=Aggression, ASB= Antisocial Behaviour, ATD= Attitude, CBA = Cyberbullying Awareness, CBB= Cyberbullying Behaviour, INT= Intention, DSV = Domestic & Siblings Violence, PER= Personality, PSMU= Problematic Social Media Usage, IMG= Image, INB = Internalizing behaviour, MDE = Moral Disengagement, PS= Parenting Style, PPR= Peer to Peer Relationships, PBC= Perceived Behavioural Control, PER = Personality, SE= Self-esteem, SES= Socioeconomic status, SN= Subjective Norms, UC= University Climate

Table 4.5 Discriminant validity- HTMT Criterion

Constructs	AGN	ASB	ATD	CBA	CBB	INT	DSV	PSMU	IMG	INB	MDE	PS	PPR	PBC	PER	SE	SES	SN	UC
AGN																			
ASB	**0.606**																		
ATD	0.582	**0.689**																	
CBA	0.217	0.076	**0.092**																
CBB	0.622	0.844	0.761	**0.070**															
INT	0.640	0.878	0.656	0.112	**0.864**														
DSV	0.521	0.754	0.623	0.107	0.777	**0.757**													
PSMU	0.204	0.241	0.240	0.355	0.242	0.233	**0.342**												
IMG	0.549	0.762	0.650	0.106	0.798	0.819	0.813	**0.402**											
INB	0.340	0.446	0.429	0.097	0.463	0.422	0.424	0.303	**0.446**										
MDE	0.565	0.676	0.546	0.210	0.711	0.724	0.764	0.343	0.786	**0.373**									
PS	0.134	0.156	0.139	0.305	0.152	0.233	0.270	0.544	0.299	0.126	**0.361**								
PPR	0.152	0.148	0.086	0.322	0.143	0.197	0.207	0.488	0.254	0.063	0.252	**0.637**							
PBC	0.345	0.423	0.507	0.334	0.467	0.428	0.581	0.471	0.659	0.369	0.502	0.251	**0.354**						
PER	0.656	0.513	0.504	0.353	0.575	0.554	0.494	0.243	0.554	0.552	0.587	0.150	0.143	**0.355**					
SE	0.235	0.227	0.134	0.441	0.194	0.171	0.351	0.469	0.339	0.059	0.360	0.516	0.527	0.325	**0.226**				
SES	0.147	0.162	0.129	0.227	0.146	0.157	0.237	0.600	0.193	0.172	0.167	0.407	0.524	0.320	0.139	**0.428**			
SN	0.605	0.759	0.722	0.108	0.801	0.836	0.843	0.321	0.831	0.358	0.756	0.271	0.147	0.440	0.534	0.226	**0.174**		
UC	0.122	0.061	0.076	0.381	0.139	0.127	0.165	0.671	0.241	0.124	0.215	0.579	0.777	0.359	0.173	0.516	0.575	**0.180**	

Note. AGN= Aggression, ASB= Antisocial Behaviour, ATD= Attitude, CBA = Cyberbullying Awareness, CBB= Cyberbullying Behaviour, INT= Intention, DSV = Domestic & Siblings Violence, PER= Personality, PSMU= Problematic Social Media Usage, IMG= Image, INB = Internalizing behaviour, MDE = Moral Disengagement, PS= Parenting Style, PPR= Peer to Peer Relationships, PBC= Perceived Behavioural Control, PER = Personality, SE= Self-esteem, SES= Socioeconomic status, SN= Subjective Norms, UC= University Climate.

4.7.5 Indictor Reliability: Factor Loading

Indicator reliability refers to the degree to which an indicator or item measures the underlying construct or factor it is intended to measure. Factor loading is one of the commonly used methods to assess indicator reliability. Factor loading is calculated in the correlation matrix as the measurement of each item that correlates with the specified principal component. Higher factor loadings indicate a stronger relationship between the item and the underlying factor, with values ranging from -10 to +10 [315].

In this study, none of the indicators had a factor loading that was less than 0.50, which is the suggested value according to Hair et al. (2017). This indicates that all indicators had a significant relationship with the underlying factor, supporting their reliability and validity as measures of the construct. Furthermore, none of the items were eliminated based on factor loading, and the factor loading values for all indicators are shown in Appendix D.

4.7.6 Explanation of Variance

The explanation of variance is a statistical concept that is crucial in quantitative research. It refers to the degree of variability within the data means and is important for assessing the quality of data. Higher rates of variance are typically preferred before undertaking hypothesis testing, as accurate predictions require high-quality data that is assessed through variance.

One common way to measure the explanation of variance is through R-squared (R2) in regression analysis. R2 is defined as the amount of variance in the

dependent variable explained by the independent variable(s). A higher R2 value indicates that the independent variable(s) have a stronger relationship with the dependent variable and can explain a larger proportion of the variance.

According to Akossou and Palm, (2013), an R2 value above 0.35 or 35% is considered a good value, indicating that the research explains strong and appropriate variance for hypothesis testing [316]. In this study, the R square values for each dependent variable in the research framework are presented in Table 4.6, and all values exceed the recommended threshold of 0.35.Therefore, it can be concluded that the present research has appropriately explained the variance and that the data is suitable for further hypothesis testing.

Table 4.6 R Square values

Constructs	R Square	R Square Adjusted
Cyberbullying Attitude	0.524	0.516
Cyberbullying Behaviour	0.703	0.701
Cyberbullying Intention	0.675	0.668

4.7.7 Model Fitness

Assessing the model or goodness of fit is an important aspect of any research study as it helps determine whether the collected data and the instruments used for data collection are suitable for further analysis. The model fitness can be defined as the degree to which the hypothesis on the regression line fits the data collected through surveys or other data collection instruments [301].

There are various statistical and mathematical tests available to assess model fitness, but in the current study, the SRMR statistical test was used to determine the

model's fitness. SRMR is one of the most commonly used model fitness tests employed by PLS-SEM researchers. It measures the average difference between the observed correlations and the model-implied correlations, with lower values indicating better model fit.

According to the PLS-SEM literature, a model can be considered to have achieved good fitness when the SRMR value is less than or equal to 0.08 [310]. In the present study, the SRMR value is 0.07, which indicates good model fitness. This means that the collected data and the instrument used in this study are suitable for further analysis and hypothesis testing.

Overall, the SRMR value of 0.07 suggests that the model's parameters are accurate and that the relationships between the variables in the model are well-defined. Therefore, the present study has achieved good model fitness based on the SRMR value. The SRMR value is presented in Table 4.7.

Table 4.7 The Model fitness

	Saturated Model	**Estimated Model**
SRMR	0.073	0.084

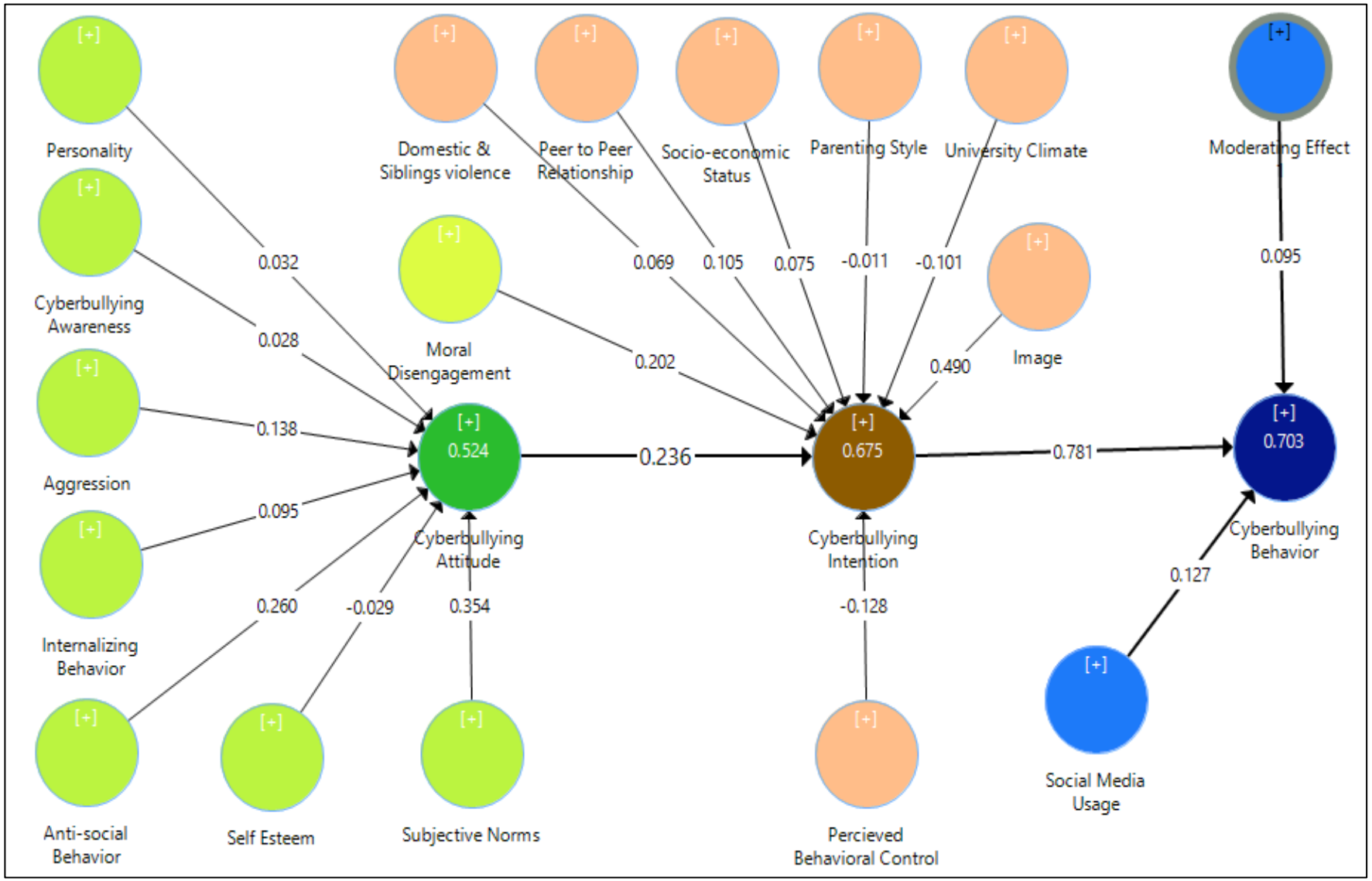

Figure 4.1 Structural Equation Modelling (PLS Algorithm)

4.8 Structural Model Assessment

The subsequent step in structural equation modelling involves evaluating the hypothesized relationships to support or reject the proposed hypotheses. The structural model for the present study is exhibited in Figure 4.3, and the proposed hypotheses are evaluated by analysing the path coefficients and statistical significance of the relationships among the latent constructs.

4.8.1 Hypotheses Testing

The current study utilized a structural equation model to test the hypotheses formulated for this research. To ensure robustness of the findings, a bootstrapping procedure was employed, generating 5,000 sub-samples. The proposed hypotheses were deemed statistically significant with a p-value of less than 0.05. Table 4.8 presents the results of the structural equation model.

Table 4.8 Hypothesis Testing

Hypothesis	Path Coefficient	Sample Mean (M)	T Statistics	P Values	Decision
AGN -> ATD	0.138	0.137	2.444	0.015	Supported
ASB -> ATD	0.260	0.259	3.540	0.000	Supported
ATD -> INT	0.236	0.234	5.816	0.000	Supported
CBA -> ATD	0.028	0.032	0.616	0.538	Not Supported
INT -> CBB	0.781	0.780	32.839	0.000	Supported
DSV -> INT	0.069	0.072	1.086	0.277	Not Supported
IMG-> INT	0.490	0.485	7.527	0.000	Supported
INB -> ATD	0.095	0.099	1.938	0.053	Not Supported
MDE -> INT	0.202	0.201	3.918	0.000	Supported
PS -> INT	-0.011	-0.009	0.316	0.752	Not Supported
PPR -> INT	0.105	0.102	2.369	0.018	Supported
PBC -> INT	-0.128	-0.125	2.945	0.003	Supported
PER -> ATD	0.032	0.032	0.533	0.594	Not Supported
SE -> ATD	-0.029	-0.012	0.467	0.641	Not Supported

Table Continued

Hypothesis	Path Coefficient	Sample Mean (M)	T Statistics	P Values	Decision
PSMU -> CBB	0.127	0.131	4.670	0.000	Supported
SES -> INT	0.075	0.076	2.083	0.037	Supported
SN -> ATD	0.354	0.354	5.706	0.000	Supported
UC -> INT	-0.101	-0.090	2.308	0.021	Supported

Note. AGN= Aggression, ASB= Antisocial Behaviour, ATD= Attitude, CBA = Cyberbullying Awareness, CBB= Cyberbullying Behaviour, INT= Intention, DSV = Domestic & Siblings Violence, PSMU= Problematic Social Media Usage, PER= Personality, IMG= Image, INB = Internalizing behaviour, MDE = Moral Disengagement, PS= Parenting Style, PPR= Peer to Peer Relationships, PBC= Perceived Behavioural Control, SE= Self-esteem, SES= Socioeconomic status, SN= Subjective Norms, UC= University Climate.

4.8.2 Hypothesis Testing Results

The study developed several hypotheses related to the effect of different factors on cyberbullying attitude, purpose and behaviour. The hypotheses were tested using statistical analysis, including calculating path coefficients and conducting t-tests to determine the significance of the results.

The study found that aggression (H3) and anti-social behaviour (H4) had a positive and significant impact on cyberbullying attitude, and cyberbullying attitude had a positive and significant impact on cyberbullying intention (H15). Social media usage (H19), image (H10), moral disengagement (H7), and peer-to-peer relationships (H9), PBC (H14) also had significant impact on cyberbullying intention.

On the other hand, the study found that cyberbullying awareness, domestic and sibling violence, internalizing behaviour, parenting style, personality, and self-esteem were not predictors of cyberbullying attitude and intention respectively.

H1: The present research has developed a hypothesis that aggression has a positive and significant impact on cyberbullying attitude. The hypothesis has been accepted based on P=0.015 and T=2.442. The path coefficient (β=0.138) shows that a one-unit increase in aggression will lead to a 13.8% increase in cyberbullying attitude.

H2: The present research has developed a hypothesis that antisocial behaviour has a positive and significant impact on cyberbullying attitude. The hypothesis has

been accepted based on P=0.001 and T=3.448. The path coefficient (β=0.260) shows that a one-unit increase in antisocial behaviour will lead to a 26% increase in cyberbullying attitude.

H3: The present research has developed a hypothesis that cyberbullying attitude has a positive and significant impact on cyberbullying intention. The hypothesis has been accepted based on P=0.000 and T=5.887. The path coefficient (β=0.236) shows that a one-unit increase in cyberbullying attitude will lead to a 23.6% increase in cyberbullying intention.

H4: The present research has developed a hypothesis that cyberbullying awareness has a positive and significant impact on cyberbullying attitude. The hypothesis has been rejected based on P=5.32. It is concluded that awareness of cyberbullying does not contribute to cyberbullying attitude.

H5: The present research has developed a hypothesis that cyberbullying intention has a positive and significant impact on cyberbullying behaviour. The hypothesis has been accepted based on P=0.000 and T=32.782. The path coefficient (β=0.781) shows that a one-unit increase in cyberbullying intention will lead to a 78.1% increase in cyberbullying behaviour.

H6: The present research has developed a hypothesis that domestic and sibling violence has a positive and significant impact on cyberbullying intention. The hypothesis has been rejected based on P=2.68. It is concluded that domestic and sibling violence is not a predictor of cyberbullying intention.

H7: The present research has developed a hypothesis that social media usage has a positive and significant impact on cyberbullying intention. The hypothesis has been accepted based on P=0.000 and T=4.754. The path coefficient (β=0.069) shows that a one-unit increase in social media usage will lead to a 6.9% increase in cyberbullying intention.

H8: The present research has developed a hypothesis that image has a positive and significant impact on cyberbullying intention. The hypothesis has been accepted based on P=0.000 and T=7.579. The path coefficient (β=0.490) shows that a one-unit increase in image will lead to a 49% increase in cyberbullying intention.

H9: The present research has developed a hypothesis that internalizing behaviour has a positive and significant impact on cyberbullying attitude. The hypothesis has been rejected based on P=0.051. It is concluded that internalizing behaviour is not a predictor of cyberbullying attitude.

H10: The present research has developed a hypothesis that moral disengagement has a positive and significant impact on cyberbullying intention. The hypothesis has been accepted based on P=0.000 and T=4.024. The path coefficient (β=0.202) shows that a one-unit increase in moral disengagement will lead to a 20.2% increase in cyberbullying intention.

H11: The present research developed a hypothesis that parenting style has a positive and significant impact on Cyberbullying Intention. The hypothesis has been rejected based on P=0.756. It is concluded that parenting style is not a predictor of cyberbullying Intention.

H12: The present research developed a hypothesis that Peer to Peer Relationship has a positive and significant impact on Cyberbullying Intention. The hypothesis has been accepted based on P=0.020 and T=2.327. The path coefficient (β=0.105) results show that one unit increase in Peer to Peer Relationship will lead to a 10.5% increase in Cyberbullying Intention.

H13: The present research developed a hypothesis that PBC has a positive and significant impact on Cyberbullying Intention. The hypothesis has been accepted based on P=0.003 and T=2.934. The path coefficient (β=-0.128) results show that one unit increase in PBC will lead to a 12.8% decrease in Cyberbullying Intention.

H14: The present research developed a hypothesis that Personality has a positive and significant impact on Cyberbullying Attitude. The hypothesis has been rejected based on P=0.588. It is concluded that personality is not a predictor of Cyberbullying Attitude.

H15: The present research developed a hypothesis that Self Esteem has a positive and significant impact on Cyberbullying Attitude. The hypothesis has been rejected based on P=0.635. It is concluded that Self Esteem is not a predictor of Cyberbullying Attitude.

H16: The present research developed a hypothesis that Socio-economic Status has a positive and significant impact on Cyberbullying Intention. The hypothesis has been accepted based on P=0.038 and T=2.076. The path coefficient (β=0.075) results show that one unit increase in Socio-economic Status will lead to a 7.5% increase in Cyberbullying Intention.

H17: The present research developed a hypothesis that Subjective Norms has a positive and significant impact on Cyberbullying Attitude. The hypothesis has been accepted based on P=0.000 and T=5.581. The path coefficient (β=0.354) results show that one unit increase in Subjective Norms will lead to a 35.4% increase in Cyberbullying Attitude.

H18: The present research developed a hypothesis that University Climate has a positive and significant impact on Cyberbullying Intention. The hypothesis has been accepted based on P=0.026 and T=2.226. The path coefficient (β=-0.101) results show that one unit increase in University Climate will lead to a 10.1% decrease in Cyberbullying Intention.

4.8.3 Moderating Effect

The present research posits that PSMU acts as a moderating variable between the causal relationship of Cyberbullying Intention and Cyberbullying Behaviour. Specifically, the interaction of PSMU between Cyberbullying Intention and Cyberbullying Behaviour is expected to further strengthen the impact of Cyberbullying Intention on Cyberbullying Behaviour.

The results of the moderation analysis have confirmed this theoretical assertion. Based on a P-value of 0.000, the moderation analysis has shown that Social media Usage has a significant moderating impact in between Cyberbullying Intention and Cyberbullying Behaviour. The path coefficient result (β=0.095) indicates that Social media Usage further strengthens the impact of Cyberbullying Intention on Cyberbullying Behaviour by 9.5%. Table 4.9 provides an illustration of the

moderating effect. Additionally, a graphical representation of the moderating effect can be seen in Figure 4.2.

Table 4.9 Moderating Effect

Hypothesis	Path Coefficient	Sample Mean (M)	T Statistics (|O/STDEV)	P Values	Decision
Moderating effect of PSMU between INT & CBB	0.095	0.024	3.978	**0.000**	**Supported**

Note. PSMU= Problematic Social Media Usage, INT= Intention, CBB= Cyberbullying Behaviour

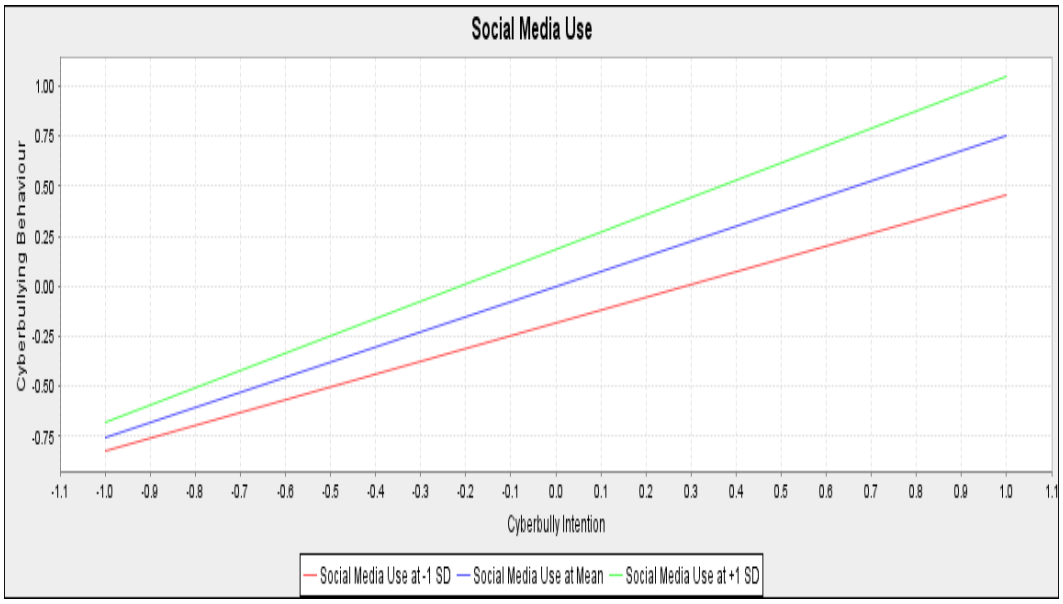

Figure 4.2 Moderating role of Problematic Social Media Usage

The graph depicted in Figure 4.2 illustrates the moderation effect of PSMU on Cyberbullying Intention and Behaviour. The results indicate that the moderation was successful, as PSMU strengthened the relationship between Cyberbullying Intention and Behaviour. Specifically, as PSMU increases, the effect of Cyberbullying Intention on Behaviour becomes stronger.

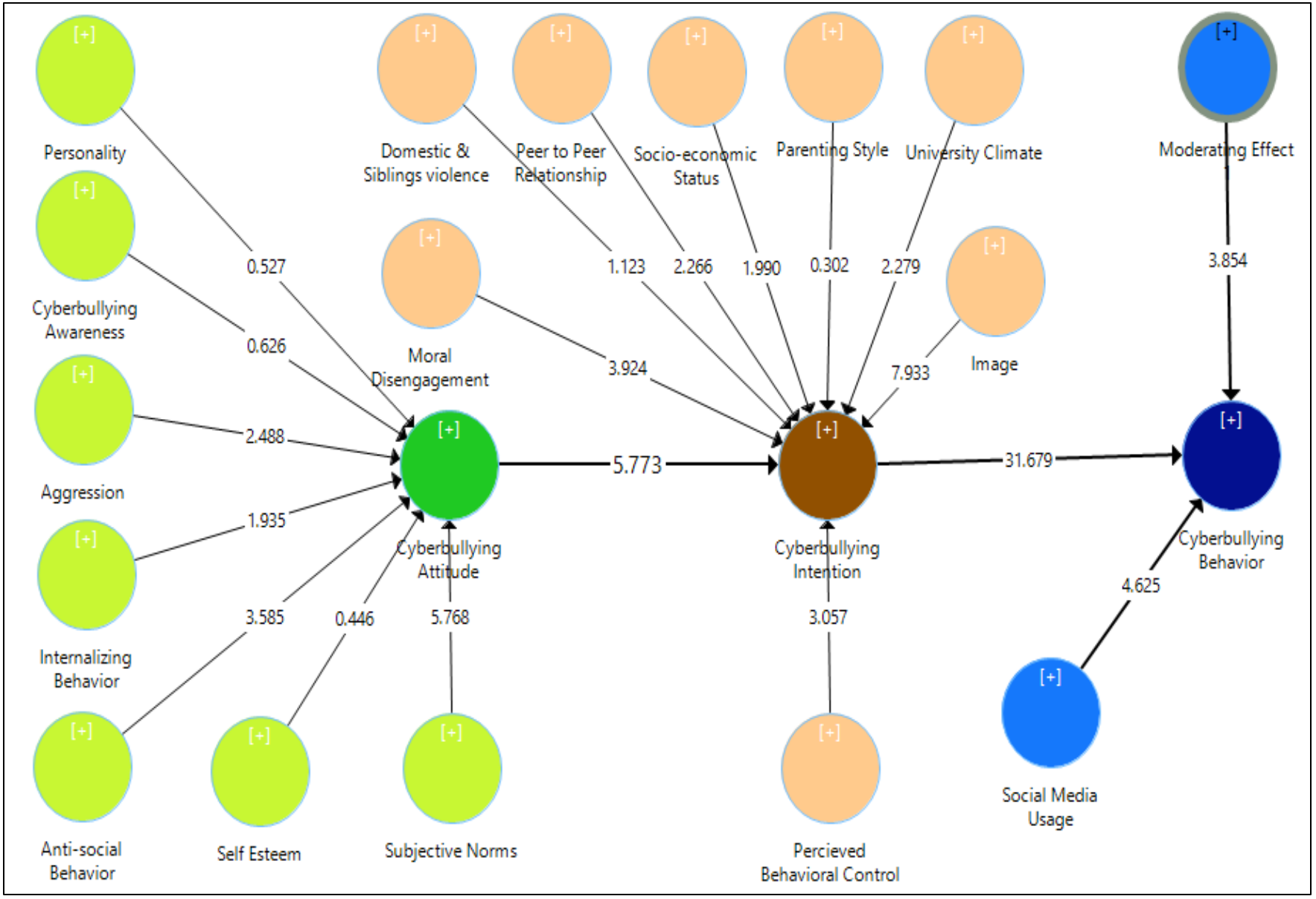

Figure 4.3 Structural Equation Modelling (Bootstrapping)

4.9 ANN Analysis

Traditional statistical techniques, such as SEM and multiple regression analysis, are insufficient to understand and anticipate the complexity of human decision-making [299], [317]. Due to their propensity to simply observe linear models, they frequently oversimplify the underlying complexity of choice adoption [318]. ANN, one of the most effective and powerful artificial intelligence systems, are suggested to deal with issue. An ANN technique may identify both linear and non-linear correlations [317]. In contrast to conventional analytic methods, ANN does not need the fulfilment of any distribution assumptions, such as normality [75], [298], [318].

The two-stage data analysis methodology, which combines partial PLS-SEM and ANN, has been adopted in this study [75]. By incorporating ANN analysis, the study aims to enhance the predictive accuracy of the PLS-SEM results and assess the relative importance of each independent variable in predicting the dependent variable.

Compared to linear regression analysis, ANN analysis is a non-linear regression analysis that is more effective in enhancing the predictive accuracy of data analysis results [76]. The present study builds on prior research [77], [319] by designing an ANN model to generate an output yield based on input variables, where the independent variables are considered as inputs and the dependent variable is the output.

In line with measurement model categorization, the present study created three different ANN models using data extracted from the results of the PLS-SEM measurement model. The latent variable score for each respondent on each variable was used as data for the ANN analysis, consistent with previous studies [75], [77], [304]. To avoid oversimplification bias in the ANN model, the feed-forward backward propagation (FFBP) with a sigmoid function and principal component analysis were used to train and test the ANN algorithm, with a tenfold cross-validation approach [75].

During the ANN analysis, the research framework of the study was split into three ANN models. Model A consisted of four inputs (Aggression, Antisocial behaviour, Internalizing behaviour, and Subjective Norms) and one output (Cyberbullying attitude). Model B included seven inputs (Cyberbullying attitude, image, moral disengagement, Peer to Peer Relationship, perceived behaviour control, university climate, and socio-economic status) and one output (Cyberbullying intention). Model C had two inputs (Social Media Usage and Cyberbullying Intention) and one output (Cyberbullying behaviour). Each model incorporated a hidden layer with specific hidden neurons, as presented in the respective ANN models. To avoid overfitting, a 10-fold cross-validation procedure was performed with a training-to-testing ratio of 90:10. The ANN analysis was conducted using the IBM SPSS neural network module. The results of the ANN analysis for each model are provided in the following sections. Figure 4.4 represents Model A - Cyberbullying attitude, Figure 4.5 depicts Model B -

Cyberbullying intention, and Figure 4.6 showcases Model C - Cyberbullying behaviour.

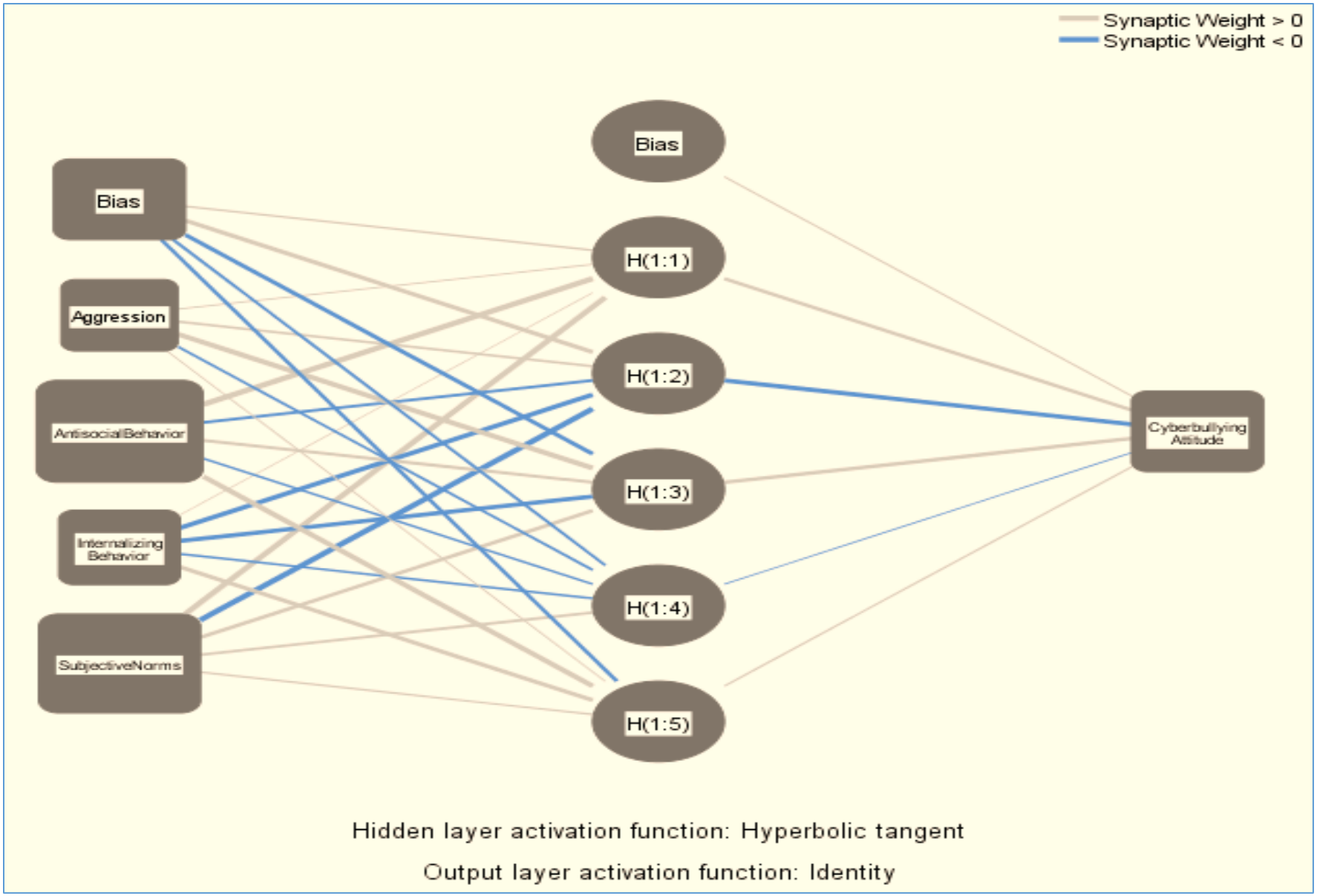

Figure 4.4. ANN Mode A- Cyberbullying Attitude

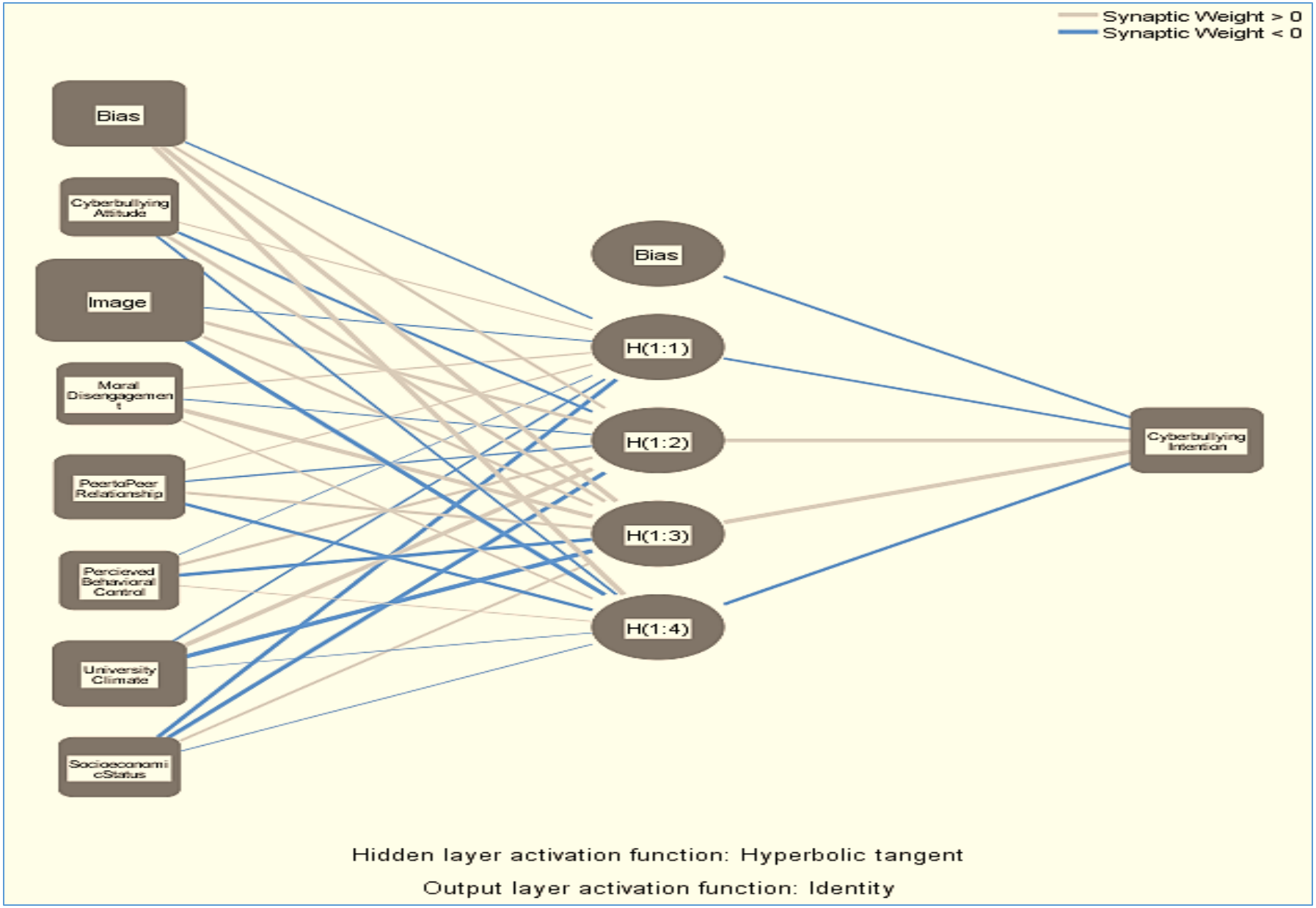

Figure 4.5. ANN Model B- Cyberbullying Intention

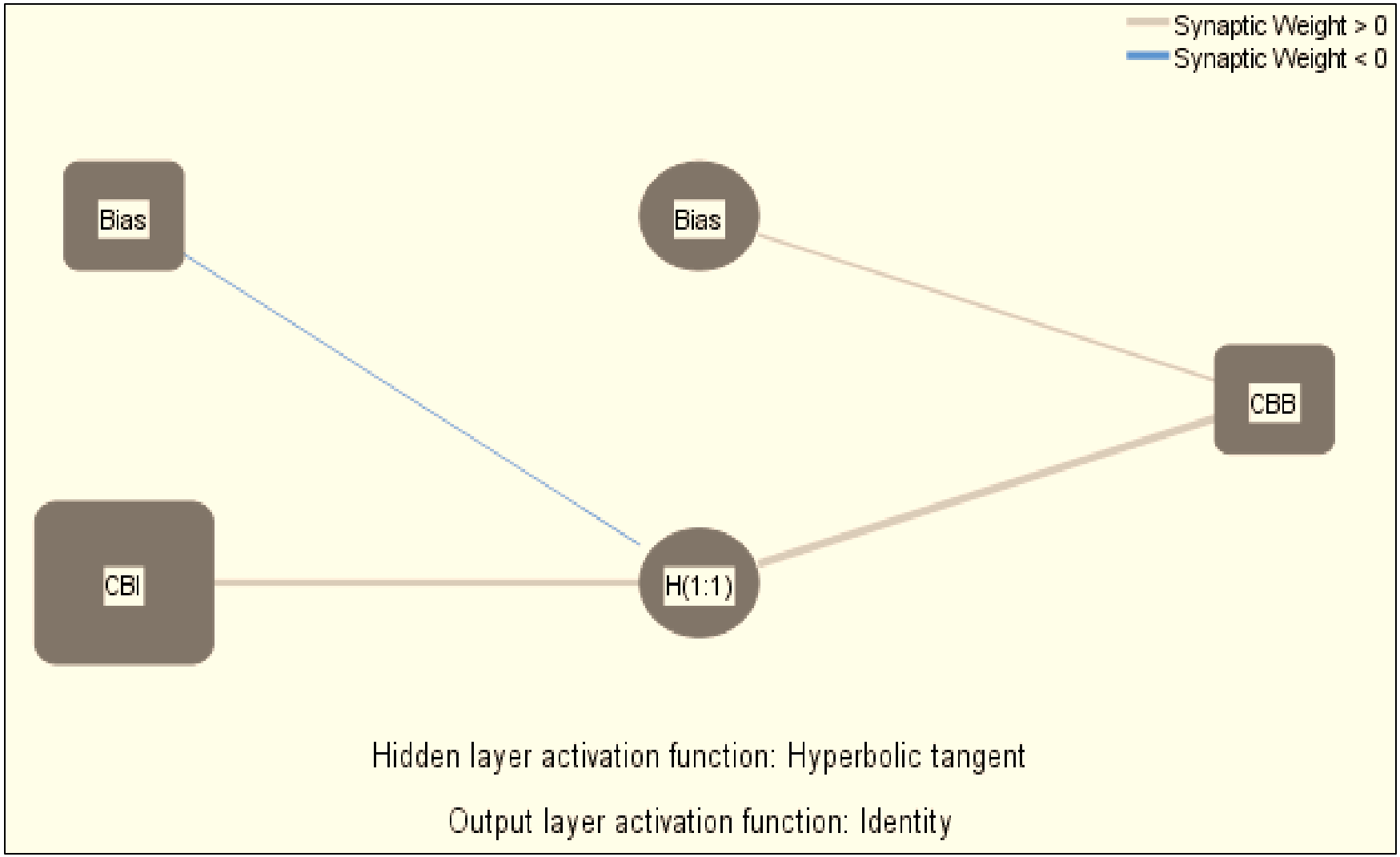

Figure 4.6 ANN Model C- Cyberbullying Behaviour

4.9.1 ANN Model Validation

According to the present research, three models have been created and analysed using the ANN methodology. Model A focuses on Cyberbullying Attitude, Model B on Cyberbullying Intention, and Model C on Cyberbullying Behaviour. Model A consisted of four inputs Aggression, Antisocial behaviour, Internalizing behaviour, and Subjective Norms. The input variables for Model B include Cyberbullying Attitude, Image, Moral Disengagement, Peer-to-Peer Relationship, Perceived Behaviour Control, Subjective Norms, and University Climate. Whereas, the input variables for Model C include PSMU and Cyberbullying Intention.

Validation of the ANN model is a critical step in the analysis process, as it determines the accuracy of predictions made by the model [75]. The accuracy of the model is assessed by calculating the RMSE, which measures the standard deviation of the residuals, or prediction errors. Residuals represent the distance between the observed data and the predicted data, and a low RMSE value indicates a better fit of the model to the data. RMSE is considered one of the standard ways to measure the error of a model in predicting quantitative data [320].

RMSE was calculated for model assessment of all the three ANN models of the study [75], [298], [317]. ANN models gave exact predictions as the RMSE values are very low for training and testing data sets. The RMSE average value estimates for training and testing procedures are comparatively small, showing a good accuracy level in predicting cyberbullying behaviour variability. RMSE values of

the testing and training of all the three models were calculated; these values also show good accuracy levels. Hence, models attain excellent model fit.

Table 4.10 shows the model validation results for all three ANN models. For Model A, which focuses on Cyberbullying Attitude, the RMSE value for both training and testing algorithms is between 0 and a non-negative value. The mean value of RMSE for the training ANN algorithm is 0.485, and the mean value of RMSE for the testing ANN algorithm is 0.476. These results indicate that Model A has achieved statistical validation based on the RMSE values.

For Model B, which focuses on Cyberbullying Intention, the RMSE value for the model is 0.372 for training and 0.313 for testing. These values indicate a better model fit compared to Model A, suggesting that the input variables (Cyberbullying Attitude, Image, Moral Disengagement, Peer-to-Peer Relationship, Perceived Behaviour Control, Subjective Norms, and University Climate) are effective predictors of Cyberbullying Intention.

For Model C, which focuses on Cyberbullying Behaviour, the RMSE value for the model is 0.389 for training and 0.347 for testing. These values indicate a good model fit, with the input variables (PSMU and Cyberbullying Intention) effectively predicting Cyberbullying Behaviour.

In summary, all three ANN models have achieved statistical validation based on the RMSE values. Average RMSE values for the ANN models are relatively small which indicates good model fit for all three ANN models [75]. The results suggest that the input variables used in the models are effective predictors of

Cyberbullying Attitude, Intention, and Behaviour, highlighting the importance of considering multiple factors in understanding and addressing cyberbullying.

Table 4.10 RMSE Values

	Cyberbullying Attitude		Cyberbullying Intention		Cyberbullying Behaviour	
Network	RMSE-Training	RMSE-Testing	RMSE-Training	RMSE-Testing	RMSE-Training	RMSE-Testing
1	0.469	0.514	0.357	0.373	0.377	0.355
2	0.475	0.538	0.378	0.301	0.397	0.317
3	0.514	0.389	0.391	0.289	0.392	0.340
4	0.487	0.443	0.376	0.229	0.395	0.335
5	0.487	0.438	0.454	0.308	0.392	0.354
6	0.463	0.557	0.378	0.303	0.372	0.464
7	0.492	0.483	0.347	0.312	0.384	0.312
8	0.487	0.465	0.310	0.382	0.397	0.270
9	0.490	0.478	0.353	0.304	0.383	0.391
10	0.482	0.457	0.377	0.330	0.402	0.335
Mean	0.485	0.476	0.372	0.313	0.389	0.347
SD	0.013	0.048	0.0349	0.040	0.009	0.049

4.9.2 ANN-Sensitivity Analysis

Sensitivity analysis has been employed to identify the relative importance of independent variables on the dependent variable in the respective ANN models. For Model A, where cyberbullying attitude is used as the output variable. The results indicate that four independent variables have a significant impact on cyberbullying attitude, namely aggression, anti-social behaviour, internalizing behaviour, and subjective norms. The sensitivity analysis further reveals that subjective norms are the most effective input in predicting cyberbullying attitude as output, with a relative importance of 92.80%. Anti-social behaviour is the second most effective input with a relative importance of 78.40%, followed by aggression and internalizing behaviour, which have almost equal importance with a relative importance of 38.93% and 37.83%, respectively. These findings suggest that subjective norms and anti-social behaviour are critical factors in predicting cyberbullying attitudes, while aggression and internalizing behaviour are less important. The results of sensitivity analysis are consistent with the path coefficient results of PLS-SEM.

Model B of the study determines the relative importance of each independent variable on cyberbullying intention. The model includes Cyberbullying Attitude, Image, Moral Disengagement, Peer to Peer Relationship, PBC, University Climate, and Socio-economic Status as input variables, and cyberbullying intention as the output variable. The results of the sensitivity analysis show that Image is the most important and significant predictor of cyberbullying intention with 100% relative

importance. This means that image has the highest impact on the cyberbullying intention among all the input factors. The importance of Image is followed by both Moral Disengagement and Peer to Peer Relationship, with 54.51% and 53.31% relative importance, respectively. This indicates that both these variables are equally important in predicting cyberbullying intention after Image. Furthermore, the results illustrate that University Climate is relatively important, with 43.49% relative importance. Cyberbullying Attitude and PBC are equally important in predicting cyberbullying intention with 36.60% and 37.52% relative importance, respectively. Finally, Socio-economic Status has reported 28.35% relative importance, indicating that it is also important in predicting cyberbullying intention. Interestingly, the relative importance of each independent variable on cyberbullying intention also corresponds to path coefficient results of PLS-SEM. This highlights the consistency of the results obtained from different techniques and enhances the reliability of the findings.

The sensitivity analysis results show that Cyberbullying Intention is the most important input for predicting Cyberbullying Behaviour, with a relative importance score of 100%. This indicates that Cyberbullying Intention has a strong impact on Cyberbullying Behaviour. The second most important factor is Problematic Social Media Usage, which has a relative importance score of 24.45%. This suggests that PSMU is a relatively weaker predictor of Cyberbullying Behaviour compared to Cyberbullying Intention. Table 4.11 showcases the results of sensitivity analysis.

Table 4.11 Sensitivity Analysis

	Cyberbullying Attitude				Cyberbullying Intention							Cyberbullying behaviour	
Neural Network	**ATD**	**ASB**	**INB**	**SN**	**CA**	**IMG**	**MDE**	**PPR**	**PBC**	**SN**	**UC**	**PSMU**	**CBI**
1	0.139	0.349	0.144	0.368	0.084	0.253	0.146	0.138	0.151	0.121	0.107	0.719	0.281
2	0.11	0.39	0.136	0.363	0.089	0.301	0.12	0.142	0.093	0.154	0.102	0.889	0.111
3	0.177	0.228	0.171	0.424	0.141	0.328	0.157	0.193	0.073	0.087	0.021	0.809	0.191
4	0.148	0.299	0.135	0.418	0.113	0.32	0.141	0.129	0.145	0.061	0.09	0.887	0.113
5	0.149	0.318	0.153	0.38	0.107	0.301	0.249	0.128	0.082	0.124	0.009	0.858	0.142
6	0.164	0.31	0.153	0.373	0.14	0.312	0.152	0.173	0.086	0.119	0.019	0.787	0.213
7	0.157	0.202	0.21	0.431	0.093	0.238	0.138	0.145	0.098	0.173	0.115	0.753	0.247
8	0.125	0.34	0.174	0.362	0.089	0.227	0.15	0.147	0.109	0.126	0.153	0.791	0.209
9	0.211	0.502	0.112	0.175	0.085	0.295	0.144	0.197	0.142	0.108	0.029	0.843	0.157
10	0.21	0.241	0.129	0.42	0.11	0.295	0.15	0.124	0.074	0.135	0.112	0.739	0.261
Average Importance	0.159	0.3179	0.1517	0.3714	0.1051	0.287	0.1547	0.1516	0.1053	0.1208	0.0757	0.8075	0.1925
Normalized Importance	38.93%	78.40%	37.83%	92.80%	36.60%	100.00%	54.51%	53.31%	37.52%	43.49%	28.35%	100%	24.45%

Note. AGN= Aggression, ASB= Antisocial Behaviour, ATD= Attitude, CBB= Cyberbullying Behaviour, INT= Intention, DSV = Domestic & Siblings Violence, PSMU= Problematic Social Media Usage, IMG= Image, MDE = Moral Disengagement, PPR= Peer to Peer Relationships, PBC= Perceived Behavioural Control, SES= Socioeconomic status, SN= Subjective Norms, UC= University Climate

4.10 Summary

Chapter 4 presents the data analysis and findings of the study. The chapter begins with an introduction to the SEM-ANN approach, its strengths and how it was applied in the study. The data analysis process is then described, including the collection and analysis of data using SEM-ANN. Measures taken to ensure data validity and reliability are discussed, as well as limitations of the data set.

The findings of the research are presented next, including results of SEM-ANN analysis, statistical information and visualizations. Significant relationships among variables, as well as any unexpected findings, are also presented.

The next chapter discusses the implications of the findings for the field of cyberbullying research and for MUUS are discussed. Recommendations for interventions or policies aimed at reducing cyberbullying behaviour are suggested, as well as directions for future research in this area. The limitations of the study are also discussed, and areas for improvement in future research are suggested.

CHAPTER FIVE

DISCUSSION AND IMPLICATIONS

5.1 Introduction

In this concluding chapter, the focus is on presenting the key findings and research implications of the study, which aimed to investigate the factors affecting cyberbullying behaviour among MUUS.

The significant results of the study are presented and discussed in detail, highlighting the factors that influence cyberbullying behaviour among this population. Theoretical and practical implications of the findings are also explored, which can be used to inform policy and practice aimed at preventing and addressing cyberbullying behaviour in Malaysian universities.

The chapter also acknowledges the limitations of the study and recommends future research areas that can build upon the findings presented here. The aim is to provide a comprehensive summary of the research conducted, and its potential contribution to the field of cyberbullying research in Malaysia and beyond.

5.1 Key Findings and Discussion

Table 5.1 illustrates the research questions that were developed to achieve the objectives of the study and the corresponding research findings aligned with these objectives and questions.

Table 5.1 Research Questions and Corresponding Findings

Research Question	Research Objective	Research Findings
RQ.1 What are the factors that drive MUUS towards cyberbullying behaviour?	**RO1**. To examine the factors associated with cyberbullying behaviour among MUUS.	A SLR was performed to extract critical factors related to cyberbullying behaviour of undergraduate university students in Malaysia. The extracted factors have been classified as Personal, Socio-cognitive, Psychological and environmental factors.
		Personal factors that include personality and cyberbullying awareness in the current research context are not associated with the cyberbullying attitude of MUUS.
RQ.2 What is the impact of personal, psychological, socio-cognitive, and environmental factors on cyberbullying attitudes and cyberbullying intention among MUUS**?**	**RO2**. To examine the impact of personal, psychological, socio-cognitive and environmental factors on cyberbullying attitudes and cyberbullying intention among MUUS.	**Psychological factors**, including aggression and anti-social behaviour in the current research context, significantly impact the respondents' cyberbullying attitude. However, self-esteem and internalising behaviour are not associated with the cyberbullying behaviour of MUUS.
		Moral Disengagement as a socio-cognitive factor in the context of current research shows a significant positive impact on the

		cyberbullying intention of MUUS. **Environmental factors**, i.e. university climate, peer-to-peer relationships, image (as a symbol of power) and socioeconomic status, significantly impact the cyberbullying intention of MUUS. Whereas, domestic and sibling violence, and parenting style does not impact cyberbullying intention of the respondents.
RQ.3 What is the impact of cyberbullying intention on cyberbullying behaviour among MUUS**?**	**RO3.** To examine the impact of cyberbullying intention on cyberbullying behaviour among MUUS.	Cyberbullying intention of respondents significantly predicts cyberbullying behaviour of MUUS.
RQ.4 What is the role of Social Media usage as a moderator between cyberbullying intention and cyberbullying behaviour among MUUS?	**RO4**. To examine the role of social media usage as a moderator between cyberbullying intention and cyberbullying behaviour among MUUS.	PSMU positively moderates the relationship between cyberbullying intention and cyberbullying behaviour of MUUS.

The goal of this study was to examine the factors and motives driving cyberbullying behaviour among undergraduate university students in Malaysia. The study utilized a two-stage SEM-ANN approach to analyse and validate a model based on the TPB and SCT. The findings demonstrated that factors such as aggression, anti-social behaviour, and subjective norms significantly influenced cyberbullying attitudes among participants. However, personality, cyberbullying awareness, self-esteem, and internalizing behaviour did not significantly affect cyberbullying attitudes. Furthermore, Image, moral disengagement, peer

relationships, university atmosphere, cyberbullying attitude, and PBC were revealed as important predictors of the intention to engage in cyberbullying in the study. Conversely, factors such as parenting style, domestic and sibling violence, and socio-economic status did not have a significant impact on the intention to engage in cyberbullying. The study also found that perceived social norms were predictors of attitudes towards cyberbullying, intention was found to be a predictor of actual cyberbullying activity. Furthermore, the research found that purpose influenced the association between attitude and behaviour. The results of the study indicate that cyberbullying behaviour is influenced by multiple factors, implying that interventions targeting these factors can help decrease the frequency of cyberbullying among tertiary students.

The study shows that individuals with higher levels of aggression are more likely to adopt positive attitudes towards cyberbullying, which in turn increases the likelihood of engaging in cyberbullying behaviours. This relationship can be explained through several theoretical frameworks. The SCT proposes that an individual's attitudes, beliefs, and values are shaped by social influences, such as family, peers, and media, and that these factors can influence behaviour [84]. The TPB suggests that an individual's behaviour is influenced by their attitudes towards the behaviour, their perceived social norms, and their perceived control over the behaviour [223]. Thus, it is possible that individuals with aggressive tendencies may be more likely to adopt positive attitudes towards cyberbullying due to exposure to aggressive behaviour in their social environment, which in turn increases the likelihood of engaging in cyberbullying behaviours. Moreover, the

findings of the study are consistent with existing literature that has also demonstrated a positive association between aggression and cyberbullying behaviours [321]–[324]. Previous research has found that individuals with aggressive personalities are more likely to engage in cyberbullying behaviours [321]. These findings highlight the importance of addressing aggressive tendencies and attitudes towards cyberbullying in prevention and intervention efforts. Studies have found that aggressive individuals tend to have lower levels of empathy, which is an important factor in understanding and caring about the feelings of others [116], [216]. They also tend to have a greater tendency to seek out conflict and aggression, which can make them more likely to engage in cyberbullying. In addition, aggressive individuals may feel empowered by the anonymity and distance provided by electronic communication, which can lead to more extreme and harmful behaviours online [119]. The finding that individuals with higher levels of aggression are more likely to adopt positive attitudes towards cyberbullying underscores the need to address aggression in prevention and intervention efforts aimed at reducing cyberbullying behaviours. Furthermore, the finding that attitudes towards cyberbullying mediate the relationship between aggression and cyberbullying behaviours highlights the importance of addressing attitudes towards this behaviour in prevention and intervention efforts.

Antisocial behaviour was found to have positive impact on adoption of cyberbullying attitude. This means that individuals who engage in antisocial behaviour are more likely to adopt attitudes that support and encourage cyberbullying behaviour. The relationship between antisocial behaviour and

cyberbullying attitudes can be explained by several factors. First, individuals who exhibit antisocial behaviour tend to have a lower level of empathy and emotional regulation. This can make them less likely to consider the feelings and well-being of others, and more likely to engage in impulsive and harmful behaviours, including cyberbullying [23]. Second, individuals who engage in antisocial behaviour may also seek out online environments where they can engage in cyberbullying behaviour without fear of consequences. They may also form online communities that share similar attitudes and behaviours, which can further reinforce and normalize cyberbullying behaviour [325]. Furthermore, research has suggested that exposure to violent media, such as movies or video games, can contribute to the development of antisocial behaviour and attitudes [180]. This exposure can desensitize individuals to violence and increase their tolerance for aggressive behaviour, which can lead to the adoption of cyberbullying attitudes and behaviours. Many studies have found that there are several risk factors associated with cyberbullying behaviour, and antisocial behaviour is one of the most consistent predictors of this behaviour [39]. An individual characterized as antisocial may find it easier and more convenient to adopt a cyberbullying attitude [23], [166]. Additionally, the relationship between antisocial behaviour and cyberbullying attitudes has been shown to exist across different age groups, genders, and cultures. This further supports the idea that antisocial behaviour is an important risk factor for the adoption of cyberbullying attitudes. The finding that antisocial behaviour positively affects the adoption of cyberbullying attitudes highlights the importance of addressing and discouraging antisocial behaviour, as

well as educating individuals about the harmful effects of cyberbullying and the importance of empathy and respect towards others, both online and offline.

The study has found a positive association between moral disengagement and cyberbullying intention among MUUS. This finding suggests that individuals who exhibit higher levels of moral disengagement are more likely to have the intention to engage in cyberbullying behaviours. Moral disengagement is a psychological mechanism that allows individuals to justify their harmful or unethical behaviours by distancing themselves from the consequences of those actions [238]. This can involve rationalizing or minimizing the harm caused by their actions, blaming others for their behaviour, or denying personal responsibility for the consequences of their behaviour. In the context of cyberbullying, individuals who engage in moral disengagement may justify their behaviour by minimizing the harm caused to their victims, blaming the victim for their own harassment, or denying responsibility for their actions [168]. The positive association between moral disengagement and cyberbullying intention has been observed in previous research as well, indicating that this relationship is not unique to MUUS [32]. This finding highlights the need for interventions that address moral disengagement in order to prevent cyberbullying behaviour. Several studies have established a positive association between moral disengagement and cyberbullying behaviour in adolescents. For instance, Cuadrado-Gordillo and Fernández-Antelo (2019) found a positive correlation between moral disengagement and cyberbullying behaviour among Spanish adolescents [326]. Similar findings were reported in studies conducted by Lazuras et al. (2019) among Italian and Greek adolescents [131], and more recent

studies by [24], [168], [198], [199], [201], [202]. These findings provide compelling evidence of the relationship between moral disengagement and cyberbullying behaviour, emphasizing the critical role of moral disengagement in driving this behaviour. Understanding this relationship is crucial in developing effective interventions aimed at preventing cyberbullying among adolescents.

The positive association between moral disengagement and cyberbullying intention among MUUS emphasizes the need to address moral disengagement as a risk factor for cyberbullying behaviour. Further research is needed to identify effective interventions and prevention strategies that target this factor and others in order to reduce the prevalence of cyberbullying. The study looked at the association between university atmosphere and undergraduate students' intentions to engage in cyberbullying. The study found a link between a favourable campus atmosphere and a lower risk of engaging in cyberbullying behaviour. Research has shown that a positive university climate can lower the cyberbullying intentions of undergraduate university students [132], [200]. The findings suggest that supportive and inclusive university environment that promotes healthy relationships, empathy, and mutual respect can positively influence students' intentions and behaviours towards cyberbullying [135].

In a positive university climate, students are more likely to develop pro-social behaviours and attitudes that discourage cyberbullying. They are more likely to recognize the harm caused by cyberbullying and understand the importance of treating others with respect and kindness. Moreover, a positive university climate can provide students with the necessary resources and support to address any

incidents of cyberbullying that may occur. Students who feel supported and protected by their university community are more likely to report incidents of cyberbullying and seek help when needed. In contrast, a negative university climate characterized by intolerance, hostility, and disrespect can increase the likelihood of cyberbullying behaviour. In such an environment, students may feel more comfortable engaging in harmful behaviours online, as they may perceive such behaviour as acceptable or even normal. Therefore, it is essential for universities to prioritize creating a positive and inclusive climate that fosters healthy relationships and discourages cyberbullying. This can be achieved through various strategies, such as promoting awareness campaigns, establishing policies and procedures for addressing cyberbullying, and providing resources and support to students who have experienced cyberbullying. It is crucial for universities to recognize that their role goes beyond providing academic instruction and includes creating a safe and inclusive environment that fosters the personal and social development of students. In such an environment, students can learn positive social behaviours and attitudes that discourage harmful behaviour like cyberbullying. By prioritizing the creation of a positive university climate, universities can foster a culture of respect, empathy, and inclusion, which can ultimately lead to a decrease in cyberbullying incidents. This can be achieved through initiatives such as anti-bullying campaigns, counselling services, and disciplinary measures for those who engage in cyberbullying.

The study's results indicate that peer relationships are a critical predictor of an individual's intention to participate in cyberbullying. This finding reinforces the

notion that an individual's relationships with their peers can significantly influence their attitude and behaviour towards cyberbullying [25], [137]. Studies have consistently shown that peer relationships play a critical role in shaping an individual's intention to engage in cyberbullying behaviour [32]. In fact, research has demonstrated that positive peer relationships can act as a protective factor against cyberbullying intentions among university students [45].In the context of MUUS, fostering positive peer relationships may be particularly important given the prevalence of cyberbullying in the country. Encouraging positive peer relationships involves promoting a culture of respect, empathy, and kindness among students [180]. This can be achieved through various means, such as offering peer support programs, facilitating group discussions on topics related to empathy and respect, and providing opportunities for students to work collaboratively on projects. When students have positive relationships with their peers, they are more likely to feel a sense of belonging and connection to the university community [327]. This, in turn, can lead to a decrease in feelings of isolation, which has been linked to a higher likelihood of engaging in cyberbullying behaviour [328]. Furthermore, positive peer relationships can create a sense of accountability among students. When individuals feel accountable to their peers, they are less likely to engage in behaviours that are harmful or hurtful towards others [95], [329].The promotion of positive peer relationships is crucial in reducing cyberbullying intentions among MUUS. By creating a culture of respect, empathy, and kindness, universities can foster a sense of belonging and

accountability among students, which can ultimately lead to a decrease in cyberbullying behaviour.

The research has identified a significant positive association between an individual's image and their cyberbullying intentions. The study discovered that those who place a high value on their image are more likely to engage in cyberbullying in order to preserve or improve their perceived image [114], [209]. This aligns with previous research which has found a correlation between image and aggression, suggesting that individuals may use aggression to protect or enhance their image [234]. Recent studies have shown that individuals who view cyberbullying as a status symbol are more likely to engage in such behaviour [114] , [177]. This image of cyberbullying as a status symbol has been identified as a significant predictor of cyberbullying intention among university students [42]. Individuals, who perceive cyberbullying as a status symbol may see it as a means of enhancing their social status or reputation [32].This perception of cyberbullying as a status symbol can be particularly influential among university students, who may be more sensitive to issues of social status and reputation [228].The findings hold particular significance in the digital age, where people's online reputation and image may have a substantial influence on their personal and professional life. Therefore, interventions aimed at reducing cyberbullying behaviour should consider addressing individuals' concerns about their image as a critical factor in reducing the desire to engage in cyberbullying behaviour. This research highlights the importance of considering the broader social and psychological factors that drive cyberbullying behaviour, and not simply focusing on the specific online

behaviours. By understanding the underlying motivations and attitudes towards cyberbullying, interventions can be tailored to address the root causes of the behaviour and promote a more positive and respectful online environment.

The study found a positive relationship between socio-economic status and cyberbullying intention of the respondents. The findings suggest that higher socio-economic status is associated with an increased likelihood of engaging in cyberbullying intention. Individuals from more affluent backgrounds may have greater access to technology and social media platforms, as well as more disposable income to spend on electronic devices and internet access, which may increase their exposure to cyberbullying behaviours [177]. Existing studies have consistently found a positive correlation between higher socioeconomic status and increased cyberbullying intention among students [137], [198]. These findings suggest that socioeconomic status may play a significant role in developing intentions towards cyberbullying, with students from higher socioeconomic backgrounds more likely to engage in such behaviour. Therefore, interventions aimed at reducing cyberbullying should consider the role of socioeconomic status and work towards creating a more inclusive and equitable environment for all students. The impact of higher socio-economic status on cyberbullying intention also has implications for the development of effective interventions to prevent cyberbullying. Interventions designed to reduce cyberbullying behaviour should consider the potential role of social status concern in driving cyberbullying behaviour among individuals from higher socio-economic backgrounds.

The study assessed the correlation between perceived behaviour control and the cyberbullying intentions of undergraduate university students. Perceived behaviour control is an individual's belief in their ability to perform a particular behaviour [155]. The results indicated a statistically significant positive association between perceived behaviour control and cyberbullying intentions of the students. The results indicate that students who held the perception of having greater control over their cyberbullying behavior exhibited a heightened tendency to intend to engage in cyberbullying [146]. These findings align with prior research, which has demonstrated that perceived control is a robust predictor of deviant behaviours, including cyberbullying [216], [224], [225]. The results underscore the significance of promoting students' perceived control over their online behaviour, such as through education and training programs. By empowering students to understand the ramifications of their online actions and feel confident in making positive choices online, organizations can help mitigate the prevalence of cyberbullying and encourage responsible online behaviour.

The attitudes of MUUS towards cyberbullying have a significant positive effect on their intention to engage in such behaviour. This suggests that students who hold favourable attitudes towards cyberbullying are more likely to have an intention to engage in it. This finding highlights the importance of addressing attitudes towards cyberbullying as a key factor in preventing and reducing its occurrence. This finding aligns with earlier studies that have demonstrated a positive correlation between attitudes and intentions related to cyberbullying [39], [151], [216]. To promote positive online behaviour and foster a safe and respectful online

environment, it is essential to address attitudes towards cyberbullying. Through the implementation of interventions directed at shaping the attitudes of undergraduate students concerning cyberbullying, Malaysian universities can effectively contribute to the prevention and mitigation of cyberbullying incidents among their students. Such interventions may include educational and awareness programs that focus on the negative consequences of cyberbullying and promote positive attitudes towards online behaviour. Collectively, this revelation emphasizes the essential role of addressing attitudes towards cyberbullying as a fundamental component in effectively countering the pervasive challenge of cyberbullying prevalence within Malaysian universities.

The impact of subjective norms on the cyberbullying attitude of MUUS was investigated in this study. The results suggest a positive and statistically significant correlation between subjective norms and the cyberbullying attitude of MUUS. This finding indicates that students who perceived higher levels of social pressure and expectations to engage in cyberbullying behaviour were more likely to have a positive attitude towards cyberbullying. Previous studies have also reported a strong positive relationship between subjective norms and cyberbullying attitude, indicating that individuals are more likely to engage in cyberbullying if they believe that their peers approve of such behaviour, and less likely to do so if they perceive disapproval from their peers [39], [146]. These findings highlight the significant influence of subjective norms on students' attitudes towards cyberbullying and demonstrate the importance of promoting positive social norms to prevent and reduce cyberbullying. The significance of this finding lies in the role of subjective

norms in shaping students' attitudes towards cyberbullying. It highlights the importance of promoting a culture of respect and positive online behaviour to reduce the prevalence of cyberbullying and promote positive attitudes towards responsible and respectful online behaviour. Furthermore, it emphasises the need of universities educating students and parents on the value of good subjective norms, as well as encouraging students to confront and reject bad subjective norms that lead to cyberbullying. By promoting positive subjective norms, the Government of Malaysia can create a more supportive and respectful online environment for the youngsters of the country.

This study reveals that there is a positive correlation between cyberbullying intention and behaviour among undergraduate students in Malaysian universities. This indicates that students who possess a stronger intention to engage in cyberbullying are more likely to exhibit such behaviour. These findings align with previous research on the topic, such as the studies conducted by [39] and [224], which have reported that individuals with a greater intention to engage in cyberbullying behaviour are more likely to do so. Similarly, research by [21], [39], [146], [151], have also found that positive intentions can reduce cyberbullying behaviour, further emphasizing the significance of an individual's intentions in shaping their actions. The results of this study highlight the critical role of cyberbullying intention in shaping the behaviour of MUUS. The findings indicate that interventions targeting cyberbullying intention should be prioritized alongside those addressing attitudes and subjective norms. Approaches to reducing cyberbullying intention may include education and awareness campaigns,

counselling services, and restorative justice programs that address the harm caused by cyberbullying. These findings have significant implications for preventing and intervening in cyberbullying behaviour among MUUS. By focusing on addressing cyberbullying intention, interventions can be developed to decrease the likelihood of students engaging in cyberbullying behaviour. This study's finding that cyberbullying intention significantly and positively affects cyberbullying behaviour underscores the importance of addressing this issue in preventing and intervening in cyberbullying. By promoting positive online behaviour and creating a safer and more respectful online environment for all students, interventions can be developed to reduce cyberbullying behaviour among MUUS.

According to the findings of this study, cyberbullying intention positively modulates the association between cyberbullying attitude and behaviour. Which means that, stronger an individual's attitude towards cyberbullying, the more likely they are to engage in such behaviour, and this relationship is mediated by their intention to engage in cyberbullying [48]. This suggests that individuals with optimistic behaviour towards cyberbullying are more likely to exhibit such behaviour when they possess a stronger intention to do so [155]. These findings have significant implications for understanding and preventing cyberbullying behaviour. Interventions that target not only attitudes but also intention may be more effective in reducing cyberbullying behaviour. By addressing individuals' intentions to engage in cyberbullying, interventions can help to break the relationship between attitudes and behaviour, ultimately leading to a decrease in cyberbullying incidents [177].

This study found that PSMU moderates the relationship between cyberbullying intention and behaviour. PSMU enhances the relationship between cyberbullying intention and behaviour. The study found that individuals with high levels of PSMU were more likely to engage in cyberbullying behaviour, even if their intention to engage in such behaviour was weak. On the other hand, individuals with low levels of PSMU were less likely to engage in cyberbullying behaviour, even if their intention to do so was strong. This suggests that PSMU is an important factor that influences the link between cyberbullying intention and behaviour. Individuals who exhibit PSMU may be more susceptible to engaging in cyberbullying behaviour, regardless of their intention [235]. These findings have important implications for understanding and preventing cyberbullying behaviour. Interventions that target PSMU may be effective in reducing the incidence of cyberbullying behaviour. Through the implementation of interventions targeting problematic social media usage, it becomes possible to mitigate the propensity for individuals to partake in cyberbullying behaviors, irrespective of their intentions [55]. By acknowledging the influential role played by PSMU in shaping cyberbullying behaviors, the groundwork can be laid for devising interventions that foster prudent and conscientious utilization of social media, ultimately cultivating a safer and more respectful online milieu for everyone involved [232].

The study found that personality traits were not significantly associated with the cyberbullying attitude of MUUS. This finding advocates that individual personality traits alone may not be strong predictors of cyberbullying attitude. The lack of a significant relationship between Dark Triad personality and cyberbullying

attitudes in this study can be attributed to various factors. Firstly, cyberbullying attitude is complex and influenced by multiple factors, suggesting that personality traits alone may not fully capture its intricacies. Secondly, the measurement of personality traits, particularly using the Dark Triad construct, may not have fully captured the specific nuances relevant to cyberbullying attitudes. The composition of the sample, consisting of MUUS, and the cultural context may have influenced the results. Methodological considerations, including measurement items choice and measurement limitations can also be the reason of insignificant relationship between personality and cyberbullying attitude of MUUS.

Cyberbullying awareness was not found to be significantly associated with the cyberbullying attitude of the MUUS. This implies that simply being aware of cyberbullying does not have a direct impact on the cyberbullying attitude. The statistical insignificance can be explored through several potential reasons.

It is important to consider the measurement of cyberbullying awareness. While efforts were made to assess participants' knowledge and understanding of cyberbullying phenomena, the chosen measurement instrument may not have fully captured the complexity and depth of cyberbullying awareness. The measurement items used to assess awareness might not adequately capture the nuances and intricacies of the construct, leading to insignificant association of cyberbullying awareness with cyberbullying attitude.

Additionally, it is extremely important to recognize that cyberbullying awareness alone may not be sufficient to influence individuals' attitudes towards

cyberbullying. Other factors, such as personal beliefs, socio-cognitive influences, and psychological factors, can also shape attitudes. It is plausible that these factors may have a stronger impact on individuals' attitudes compared to cyberbullying awareness alone. Like, subjective norms, which were found to be significant in this study, represent the perceived social expectations and influences on one's behaviour. These subjective norms may overshadow the influence of cyberbullying awareness on shaping attitudes.

Even though individuals may be aware of the harm cyberbullying can cause, their attitude might still be influenced by personal factors, such as their belief in the effectiveness of cyberbullying, social norms, or individual disposition. In other words, just being aware of the negative effects of cyberbullying doesn't automatically mean that an individual's attitude towards engaging in such behavior will be negative.

The sample characteristics and cultural context should also be taken into account. This study focused on MUUS, who may have unique perspectives and experiences related to cyberbullying. Cultural factors, social norms, and educational environments can influence individuals' attitudes towards cyberbullying. It is possible that the influence of cyberbullying awareness on attitudes varies within different cultural contexts, thus contributing to the lack of significant findings.

The lack of a significant relationship between self-esteem and cyberbullying attitude in this study warrants further discussion and exploration. Several factors

may contribute to this finding. In the context of this study, it was hypothesized (H5) that individuals with higher levels of self-esteem may be less likely to engage in cyberbullying, as they may have a stronger sense of self-worth and empathy towards others. However, the measurement of self-esteem in this study may not have captured the nuanced relationship with cyberbullying attitudes. The chosen measurement instrument may not have adequately captured the specific aspects of self-esteem that are relevant to cyberbullying attitudes, leading to a lack of significant association. People's attitudes don't always align with their behaviors due to cognitive dissonance or situational factors. A person might have high self-esteem but might still hold a more permissive attitude towards cyberbullying, especially if they perceive potential benefits from such behavior.

Additionally, it is crucial to consider the complex interplay of multiple factors that contribute to the development of cyberbullying attitudes. Cyberbullying attitudes are influenced by a range of individual, social, and psychological factors. Factors such as aggression, anti-social behaviour and subjective norms were found to be significant predictors of cyberbullying attitudes in this study. It is possible that these factors may have stronger and more direct influences on cyberbullying attitudes compared to self-esteem. Other psychological factors may overshadow the influence of self-esteem, resulting in an insignificant relationship.

Moreover, the sample characteristics and cultural context should be taken into account. The study focused on Malaysian undergraduate students, who may have unique cultural and social experiences that shape their attitudes towards cyberbullying. Cultural factors, social norms, and educational environments can

influence individuals' perceptions of self-esteem and their attitudes towards cyberbullying. It is possible that the influence of self-esteem on cyberbullying attitudes may vary within different cultural contexts, thus contributing to the lack of significant findings.

Methodological limitations also need to be considered. The chosen items and scales may not have fully captured the specific dimensions of self-esteem relevant to cyberbullying attitudes. Moreover, the cross-sectional nature of the study design limits the ability to establish causal relationships between variables. Future research could consider longitudinal designs to better understand the temporal relationship between self-esteem and cyberbullying attitudes.

The present study aimed to examine the relationship between internalizing behaviour and cyberbullying attitudes among Malaysian undergraduate students. Contrary to expectations and previous research, no significant association was found between internalizing behaviour and cyberbullying attitudes. This finding challenges the widely accepted notion that internalizing behaviour plays a significant role in shaping individuals' attitudes towards cyberbullying. The cultural context and social norms within the Malaysian university setting may interact with internalizing behaviour differently compared to other contexts. It is important to consider that cultural factors can influence how individuals express and cope with internal distress. In Malaysia, individuals may be more inclined to suppress or internalize their emotional experiences rather than externalize them through aggressive behaviours, which can weaken the association between internalizing behaviour and cyberbullying attitudes. The selected assessment tools may not have

captured the nuances and complexity of internalizing behaviour in the specific context of cyberbullying. Different dimensions of internalizing behaviour, such as depressive symptoms or social withdrawal, may have varying relationships with cyberbullying attitudes, and future studies could explore these dimensions more comprehensively.

Although the p-value for the relationship between internalizing behaviour and cyberbullying attitudes was not statistically significant ($p = 0.053$), it is worth noting that the margin was very small, approaching the conventional threshold of significance ($p < 0.05$). This suggests that further research with a larger sample size or different analytical approaches may yield different results and provide a clearer understanding of the relationship. While the non-significant results are disappointing from a statistical standpoint, it is important to interpret the findings with caution. Statistical significance should not be the sole determinant of practical or theoretical significance. The proximity to the conventional threshold indicates the need for further exploration and should not undermine the relevance of considering internalizing behaviour in the broader context of cyberbullying research.

The study found an insignificant relationship between domestic and sibling violence and cyberbullying intention among MUUS. This finding contrasts with previous research that has suggested a potential association between exposure to violence in the domestic and sibling contexts and engagement in cyberbullying behaviours [13], [42].Existing studies have proposed several explanations for the potential link between domestic and sibling violence and cyberbullying intention

[53]. It is argued that individuals who experience violence within their family or sibling relationships may internalize aggressive behaviours and negative coping strategies, which could manifest in their online interactions, including cyberbullying [220]. Additionally, exposure to violence at home may contribute to a normalization of aggressive behaviours, leading individuals to perceive cyberbullying as acceptable or justified.

However, the insignificant relationship observed in this study challenges these assumptions. It is important to consider several factors that could account for this disparity. Firstly, the specific context of the study, which focused on MUUS, may introduce cultural and contextual differences that influence the relationship between domestic and sibling violence and cyberbullying intention. Cultural norms, attitudes towards violence, and the prevalence of specific family dynamics may vary across different populations, potentially influencing the association between these variables.

The measurement and operationalization of domestic and sibling violence and cyberbullying intention in this study may have played a role in the insignificant results. The assessment tools employed may not have captured the nuanced aspects of domestic and sibling violence, or the specific indicators of cyberbullying intention, leading to an underestimation or misrepresentation of the relationship between these variables. Future studies should consider using more comprehensive and contextually relevant measures to explore this relationship further. It is also worth noting that the insignificant relationship may be influenced by the complex interplay of other psychological and contextual factors. For instance, the presence

of protective factors, such as supportive relationships or coping mechanisms, could mitigate the potential impact of domestic and sibling violence on cyberbullying intention. Additionally, individual differences and personal characteristics, such as resilience or social skills, may moderate the relationship between these variables.

While the current findings suggest an insignificant relationship between domestic and sibling violence and cyberbullying intention, it is crucial to interpret these results with caution. The absence of statistical significance should not be interpreted as a definitive conclusion that no relationship exists. Rather, it highlights the need for further research and exploration of this relationship in different populations and cultural contexts.

This study's small association between parenting style and cyberbullying intention need thorough research and interpretation. The lack of statistical significance suggests that there is no clear association between parenting style and the intention to engage in cyberbullying behaviours among the respondents. One possible explanation for this finding is that parenting style may not be the sole determinant of cyberbullying intention. Cyberbullying is a complicated conduct that is impacted by a number of individual, societal, and environmental variables. While parenting style is an important aspect of the socialization process, other factors such as peer relationships, media exposure, and individual traits may also contribute to cyberbullying intention. It is likely that the impact of parenting style on cyberbullying intention is mediated or moderated by these additional factors, leading to non-significant relationship.

The measurement and operationalization of parenting style and cyberbullying intention may have played a role in the insignificant results. Parenting style is a multidimensional construct that encompasses dimensions such as warmth, control, autonomy, and communication. Different measurement tools and scales may capture these dimensions differently, which can impact the observed relationship [330]. It is possible that the measures used in this study did not fully capture the nuances and complexities of parenting style and its potential influence on cyberbullying intention. Parenting practices and styles can vary across cultures, and the influence of parenting on cyberbullying intention may differ as well [214]. The participants in this study were Malaysian undergraduate students, and the cultural values, norms, and expectations regarding parenting and online behaviour in Malaysia may differ from other cultural contexts. Therefore, the insignificant relationship between parenting style and cyberbullying intention in this specific sample may be influenced by cultural and contextual factors unique to Malaysia.

It is worth noting that the existing literature on parenting style and cyberbullying intention has produced mixed findings. While some studies have reported significant associations [137], [73], [137], [138], [217], [218], others have found no or weak relationships [331]. This inconsistency across studies may be attributed to the heterogeneity of samples, measurement differences, cultural variations, and the complex nature of cyberbullying.

5.2 Theoretical Implications

The research looks at MUUS's online bullying habits. The TPB and SCT are employed as the study's primary theoretical pillars, and these two theories form the foundation of the study's theoretical framework. Data analysis is done using the SEM-ANN approach.

The TPB is a well-known theory that has been used extensively in a variety of academic domains, such as health psychology, marketing, and environmental psychology, to predict and explain behaviour. In contrast, the SCT places a strong emphasis on how self-efficacy, result expectancies, and observational learning influence behaviour. The present research offers a thorough theoretical framework for comprehending the aspects that lead to cyberbullying conduct among MUUS by merging these two ideas.

Moreover, the study is ground breaking in terms of its intellectual contribution. It proposes a validated model based on TPB and SCT to predict cyberbullying behaviour among MUUS, integrating the dark triad as a personality construct. Additionally, the study provides a holistic view of the factors that contribute to cyberbullying behaviour, analysing the impact of PSMU along with individual, university environment, and home environment factors.

The study found that PSMU can moderate the relationship between intention and behaviour. Specifically, individuals who exhibit PSMU are more likely to engage in cyberbullying behaviour even if they have low intention to engage in cyberbullying. This suggests that PSMU may exacerbate the negative effects of

cyberbullying and should be addressed in interventions aimed at reducing cyberbullying behaviour. The study also emphasises the function of purpose as a moderator between attitude and behaviour. This finding is significant because it suggests that interventions aimed at changing attitudes towards cyberbullying behaviour may be more effective if they focus on changing intentions rather than solely on changing attitudes.

The theoretical implications of this study are significant, as they provide a foundation and a comprehensive framework for future research on cyberbullying behaviour among MUUS. The study sheds light on personal morality in terms of victimization, insult, and cyberbullying. This information can be used to develop effective interventions to reduce the extent of cyberbullying behaviour in the existing higher education system of Malaysia. By using TPB and SCT as theoretical underpinnings and the SEM-ANN method for data analysis, a more accurate and robust analysis of the factors that contribute to cyberbullying behaviour, enabling the development of effective interventions to reduce such behaviour among MUUS.

The use of the SEM-ANN approach in this study brings added value compared to using PLS-SEM alone. While both methods are widely used in structural equation modelling, they differ in terms of their underlying principles and capabilities [77]. PLS-SEM is a statistical technique that focuses on capturing the variance in the observed variables and estimating the relationships between latent constructs [301]. It is well-suited for exploratory research and models with complex relationships. PLS-SEM allows for the estimation of path coefficients, determination of construct reliability and validity, and assessment of model fit.

Whereas, ANN analysis is a machine learning technique inspired by the structure and function of biological neural networks [75], [76], [302]. It is particularly effective in handling large datasets, capturing non-linear relationships, and making accurate predictions [77]. ANN analysis learns patterns and associations in the data, allowing for more comprehensive modelling of complex phenomena [332].

In this study, the addition of ANN analysis alongside PLS-SEM provides several benefits. First, it enhances the predictive power of the model by leveraging the pattern recognition capabilities of the neural network. This enables more accurate predictions of cyberbullying behaviour based on the observed variables and latent constructs. Second, the ANN analysis captures non-linear relationships between the predictors and the cyberbullying behaviour. ANN allows for the detection of complex interactions and nonlinear effects that may not be adequately captured by the linear relationships in PLS-SEM. By incorporating ANN analysis, the study uncovers more nuanced and comprehensive insights into the factors influencing cyberbullying behaviour.

The use of ANN sensitivity analysis in this study allowed for the ranking of factors based on their importance in predicting cyberbullying behaviour among MUUS. The ranking obtained from the sensitivity analysis provides valuable insights into the relative importance of different factors and informs the development of targeted interventions and resource allocation strategies. By focusing on the top-ranked factors identified through the analysis, policymakers, educators, and stakeholders can tailor their interventions to address the areas that have the most influence on cyberbullying behaviour. This targeted approach

increases the effectiveness of interventions and promotes a safer online environment. The sensitivity analysis results also guide future research directions and contribute to the development of theoretical frameworks by highlighting the significance of certain factors and identifying potential avenues for further investigation. It is important to interpret the ranking in conjunction with other findings and considerations, as factors with lower ranks may still play important roles in specific contexts or in interaction with other factors. The results of the ANN sensitivity analysis are presented in Table 4.11, providing an overview of the relative importance of each factor and offering insights into their influence on cyberbullying behaviour among MUUS.

Lastly, the use of SEM-ANN allows for model validation and comparison. The PLS-SEM results can serve as a baseline for model evaluation, while the ANN analysis provides an additional perspective. By comparing the findings from both approaches, the study gains a more robust understanding of the relationships and can assess the consistency and robustness of the results.

The theoretical implications of this study contribute to a better understanding of the factors that influence cyberbullying behaviour and can inform the development of effective interventions to address this issue among MUUS.

5.3 Practical Implications

The study has several practical implications for various stakeholders, including Malaysian Government, universities, educators, policymakers, mental health professionals, cyber psychologists, parents, and students. This research presents

new findings concerning university students' cyberbullying behaviour. By investigating the factors associated with cyberbullying behaviour among MUUS, the findings of this study contribute to Malaysia's national agenda on "Sustainable Development Goals (#16)" and "National Transformation 2050 (TN50)." The findings assist the Malaysian government and relevant authorities to develop strategies and policies to control cyberbullying prevalence. Furthermore, the findings serve as guidance for families, parents, and higher educational institute administration to produce a healthy atmosphere wherever it is tough for Malaysian undergraduate students to understand in cyberbullying behaviour.

For the Malaysian government, the study highlights the need for policies and regulations to address cyberbullying in the country. By understanding the nature and impact of cyberbullying among university students, the government can develop effective interventions to prevent cyberbullying and support the victims. The study can also help the government to identify high-risk groups and tailor interventions accordingly. By addressing cyberbullying at the national level, the government can contribute to creating a safer and more respectful online environment for all Malaysians. Additionally, the study highlights the importance of promoting positive online behaviour and digital citizenship education in schools and universities, which can be included in the national education curriculum.

For universities, the study can help inform policies and guidelines on preventing and addressing cyberbullying among their students. By understanding the nature and prevalence of cyberbullying, universities can develop proactive measures to prevent cyberbullying and provide support for victims. The study can also help

universities to identify high-risk groups and tailor interventions accordingly. By addressing cyberbullying among their students, universities can promote a safer and more respectful campus environment and enhance the academic and personal growth of their students.

Educators can use the findings of this study to develop and implement effective strategies to prevent cyberbullying among university students. Policymakers can use the results of this study to develop policies and regulations to address cyberbullying in Malaysia. By understanding the nature, prevalence, and impact of cyberbullying among university students, policymakers can develop effective interventions to prevent cyberbullying and support the victims. Mental health professionals and cyber psychologists can use the findings of this study to identify the signs and symptoms of cyberbullying and develop effective interventions to support the victims. By providing appropriate support and counselling, mental health professionals can help the victims cope with the emotional and psychological impact of cyberbullying.

Parents can use the insights gained from this study to talk to their children about online safety and help them develop appropriate online behaviour. By understanding the types of behaviour that constitute cyberbullying and the impact of cyberbullying on victims, parents can take proactive measures to prevent cyberbullying among their children.

Finally, the study has practical implications for the university students themselves. By understanding the precursors of cyberbullying behaviour, students

can be more aware of their own behaviour and the potential harm it can cause to others. They can also learn how to prevent and report incidents of cyberbullying and take proactive measures to promote positive online behaviour.

By using the insights gained from this study, educators, policymakers, mental health professionals, parents, and students can work together to prevent cyberbullying and support the victims. This will ultimately contribute to creating a safer and more respectful online environment in Malaysia.

5.4 Policy Implications

Based on the findings of this study on cyberbullying among MUUS, the following specific policy implications can be derived:

Develop comprehensive policies: The Malaysian government can develop comprehensive policies and regulations to address cyberbullying in the country, especially among university students. These policies should focus on prevention, early intervention, and support for victims. The policies can include clear definitions of cyberbullying and specific actions that can be taken against cyberbullies.

Development of Cyberbullying Prevention Programs: Given that aggression, anti-social behaviour, and subjective norms were found to significantly influence cyberbullying attitudes of MUUS, it is crucial to develop targeted prevention programs that address these factors. These programs should focus on

promoting empathy, conflict resolution skills, and positive social norms to discourage cyberbullying behaviour among university students.

Integration of Cyberbullying Awareness into Curriculum: The study found that cyberbullying awareness is not among significant predictors of cyberbullying attitudes. However, to enhance preventive efforts, educational institutions should integrate cyberbullying awareness into their curriculum, emphasizing the consequences of cyberbullying and promoting self-esteem among students.

The Malaysian government can raise awareness about cyberbullying among university students and the wider community. This can be done through social media campaigns, public service announcements, and awareness-raising events. The government can also work with universities to incorporate cyberbullying education into their curriculums.

Strengthening University Policies and Reporting Mechanisms: The significant associations between moral disengagement, image, perceived behavioural control, peer-to-peer connections, university atmosphere, and desire to engage in cyberbullying highlight the need for universities to establish robust policies and reporting mechanisms. These policies should clearly define cyberbullying, outline consequences for offenders, and provide confidential channels for reporting incidents.

Creating Supportive Campus Environments: The study highlighted the influence of university climate on cyberbullying intentions. Therefore, universities should actively foster supportive and inclusive campus environments that promote

positive interpersonal relationships, respect diversity, and discourage any form of bullying or harassment. This can be achieved through awareness campaigns, peer support programs, and the establishment of safe spaces for students to seek help and report incidents.

Training and Sensitization Programs for University Staff: To effectively implement robust university policies and reporting mechanisms, it is essential to provide comprehensive training and sensitization programs for university staff members. These programs should educate staff about the dynamics of cyberbullying, equip them with the knowledge to identify signs of cyberbullying, and train them on how to respond promptly and effectively to reported incidents.

Parental Education and Involvement: The study found no significant effect of domestic and sibling violence and parenting styles on cyberbullying intentions among university students. However, promoting parental education and involvement in addressing cyberbullying can still be valuable. Educational campaigns targeting parents can raise awareness about cyberbullying, provide guidance on monitoring their children's online activities, and facilitate open communication channels.

Enhancing Social Media Literacy and Responsible Use: The study found that social media use had a positive moderating effect on the connection between cyberbullying intention and behaviour. Policy initiatives should focus on promoting social media literacy and responsible use among university students. Educational campaigns and workshops can provide guidance on privacy settings, digital

footprints, and responsible online behaviour to mitigate the risk of cyberbullying incidents.

Multi-Stakeholder Collaboration: Addressing cyberbullying requires collaborative efforts among various stakeholders. Policymakers, educational institutions, parents, and students should collaborate to develop and implement comprehensive prevention strategies, share best practices, and regularly evaluate the effectiveness of interventions.

Provide support for victims: The government can provide support for victims of cyberbullying, including counselling services and legal assistance. The government can also collaborate with mental health professionals to develop effective interventions for victims of cyberbullying.

Strengthen enforcement: The Malaysian government can strengthen enforcement against cyberbullying by providing law enforcement agencies with adequate resources and training. This can include the development of specialized cybercrime units that are equipped to handle cyberbullying cases.

Collaborate with universities: The government can collaborate with universities to develop policies and interventions to prevent cyberbullying among university students. This can include the development of reporting mechanisms and the implementation of prevention programs.

Overall, the policy implications of this study emphasize the need for a collaborative approach to preventing and addressing cyberbullying among MUUS.

The government, universities, parents, and students can work together to create a safer and more respectful online environment for all Malaysians.

5.5 Recommendations

Cyberbullying is a significant issue in Malaysian universities, which requires urgent attention. Therefore, several recommendations have been formulated to tackle this problem and create a more secure and constructive learning atmosphere. The proposed recommendations aim to address the underlying causes of cyberbullying, encourage individuals to take ownership of their online conduct, and promote a culture of respect and tolerance. By implementing these recommendations, it is envisaged that universities, families, students, and society as a whole can collaborate to reduce the incidence and severity of cyberbullying in Malaysia. Based on the key findings of the study, the following recommendations can be made:

Develop and implement effective prevention programs: Educators, policymakers, and university administrators should collaborate to develop and implement effective prevention programs to reduce cyberbullying among university students. These programs should identify high-risk groups and tailor prevention strategies accordingly.

Focus on Socio-Cognitive Interventions: Given the significant impact of moral disengagement on cyberbullying intention, universities should prioritize interventions that target socio-cognitive factors. These interventions can include promoting ethical decision-making, empathy, and responsible behaviour through

educational programs, workshops, and awareness campaigns. By addressing moral disengagement, universities can help students develop a stronger sense of moral responsibility and discourage engagement in cyberbullying behaviours.

Enhance Awareness of Psychological Factors: Since aggression and anti-social behaviour significantly impact the cyberbullying attitude of undergraduate university students, it is crucial to raise awareness about the consequences of such behaviours. Universities can conduct educational campaigns and workshops that focus on anger management, conflict resolution, and promoting positive social interactions. By addressing these psychological factors, universities can help create a more supportive and respectful campus environment, reducing the likelihood of cyberbullying incidents.

Enhance Mental Health Support Services: Given the impact of psychological factors on cyberbullying attitudes, universities should prioritize the enhancement of mental health support services for students. This can include increasing access to counselling services, promoting mental health awareness campaigns, and providing resources for stress management and emotional well-being. By offering comprehensive mental health support, universities can help students develop healthy coping mechanisms and resilience, reducing the likelihood of engaging in cyberbullying behaviours as a result of underlying psychological issues.

Foster Positive University Climate: Given the significant impact of university climate on cyberbullying intention, it is essential for universities to create a positive and inclusive campus climate. This can be achieved by implementing policies and

initiatives that promote respect, tolerance, and diversity. Universities should establish clear guidelines on acceptable online behaviour, provide support systems for victims, and encourage a sense of belonging and community among students. By fostering a positive university climate, the prevalence of cyberbullying can be reduced.

The government of Malaysia, as part of its National Transformation 2050 (TN50) initiative, should take steps to create a cyberbullying-free learning experience at universities. This could include implementing policies and regulations to address cyberbullying and providing support for victims of cyberbullying.

Strengthen Peer Relationships and Support Networks: Since peer-to-peer relationships significantly impact cyberbullying intention, universities should focus on promoting healthy and supportive peer interactions. This can be done through the implementation of peer mentoring programs, support groups, and initiatives that encourage positive social connections among students. By strengthening peer relationships, universities can create a sense of camaraderie and encourage students to look out for one another, reducing the likelihood of cyberbullying incidents.

Building positive peer relationships and effective communication skills are essential in preventing cyberbullying. Universities can organize workshops and activities that promote teamwork, empathy, and conflict resolution skills. By providing opportunities for students to develop strong interpersonal skills, universities can foster a positive social environment where cyberbullying is less

likely to occur. Encouraging collaboration and empathy can contribute to a culture of respect and understanding among students.

Develop Social Media Literacy Programs: Given the positive moderating effect of social media usage on the relationship between cyberbullying intention and behaviour, it is crucial for universities to prioritize social media literacy programs. These programs should educate students about responsible online behaviour, the impact of cyberbullying, and strategies for dealing with online conflicts. By enhancing students' digital literacy skills, universities can empower them to navigate social media platforms in a respectful and responsible manner.

Encourage Pro-Social Norms: Since subjective norms significantly predict the cyberbullying attitude of undergraduate university students, universities should promote pro-social norms and values. This can be achieved through awareness campaigns, role-modelling by faculty and staff, and the incorporation of pro-social messages into the curriculum. By emphasizing positive social norms, universities can create a culture where cyberbullying is strongly discouraged, and students are encouraged to treat others with respect and empathy.

Implement online and offline cyberbullying prevention programs: To effectively prevent cyberbullying, both online and offline prevention programs are necessary. These programs should include educating individuals on the potential harm of cyberbullying, emphasizing responsible online behaviour, and providing guidance on how to report incidents of cyberbullying.

Encourage parental involvement: Parents have a critical role to play in cyberbullying prevention. Parents should be encouraged to monitor their children's online activities, educate their children on responsible online behaviour, and discuss the potential harm of cyberbullying.

Promote collective effort: Addressing cyberbullying requires a collective effort from universities, families, students, and society. It is important to establish partnerships and collaborations to promote a culture of respect and kindness both online and offline.

Emphasize the responsibility of students: Students, as a key group in terms of cyberbullying, need to learn the responsibilities associated with the use of technology. Universities should incorporate cyberbullying prevention programs into the curriculum to educate students on the potential harm of cyberbullying and emphasize the importance of responsible online behaviour.

These recommendations aim to address the specific findings of the study and provide practical steps for universities to tackle cyberbullying among undergraduate students. By implementing these recommendations, universities can contribute to creating a safe and supportive learning environment that fosters positive online behaviour and student well-being.

5.6 Study's Limitations

There are several limitations that must be addressed, even though this research has shed useful light on the cyberbullying behavior of MUUS enrolled in public and private universities in Malaysia.

First off, since the research was done on a Malaysian population, it is crucial to recognize that cultural variables may influence how people behave when they engage in cyberbullying. Although it offers important insights on the cyberbullying behavior of this demographic, care should be used when extrapolating the results to other communities or cultural settings. Future studies should include a broad sample to improve the generalizability of the results since various cultural norms, values, and educational systems may have distinct effects on cyberbullying dynamics.

Secondly, this study relied on self-reported data, which is subject to biases and inaccuracies. Participants may underreport or over report their experiences of cyberbullying due to social desirability bias, memory recall issues, or discomfort in disclosing sensitive information. This potential bias could impact the accuracy and validity of the findings. Future studies could consider utilizing alternative data collection methods, such as observational data or qualitative interviews, to complement self-report measures and provide a more comprehensive understanding of cyberbullying behaviour.

Thirdly, this study only focused on cyberbullying behaviour among university students and did not explore the experiences of other groups, such as faculty

members or staff. It is possible that these groups may also be involved in cyberbullying, and future research should aim to explore these experiences. Whereas literature suggests that cyberbullying may occur among various individuals within the academic setting. Including a broader range of participants would offer a more holistic understanding of the prevalence, dynamics, and impact of cyberbullying within the university context.

Finally, since this research was cross-sectional in nature, it only offers a picture of the prevalence and consequences of cyberbullying at a specific moment in time. A longer-term study that tracks participants would provide researchers a more complete grasp of how cyberbullying develops and changes over time.

5.7 Future Research

Future research on cyberbullying at Malaysian universities has a number of potentials given the constraints of this study. Some potential areas for further investigation include:

Additional Factors: Although the model exhibited strong predictive capabilities, the current research did not encompass several potentially significant factors. To gain a more comprehensive understanding of the determinants driving cyberbullying within Malaysian institutions, future investigations could encompass additional factors.

Cross-cultural studies: This research showed that culture may have a significant impact on cyberbullying conduct. Future research might examine the

cultural variations and similarities in cyberbullying behaviours in order to design more efficient preventive and intervention measures.

Longitudinal studies: Since this study used a cross-sectional technique, it is difficult to determine which factors are causative. Future studies may examine how attitudes and behaviours related to cyberbullying change over time and evaluate the veracity of the relationships between the parameters revealed in the study by collecting data longitudinally.

Mixed-methods approaches: While this study used a self-administered questionnaire, future studies could employ a mixed-methods approach, using interviews or focus groups to gather richer, more in-depth data on cyberbullying experiences and attitudes. This could provide a more nuanced understanding of the phenomenon and help to identify additional factors that contribute to cyberbullying.

Intervention studies: This study identified several factors that contribute to cyberbullying behaviour in Malaysian universities. Future studies could explore the effectiveness of different intervention strategies, such as institute-based education programs or online support groups, in reducing cyberbullying behaviour and promoting positive online interactions.

Comparative studies: While this study focused specifically on cyberbullying behaviour among MUUS, future studies could compare cyberbullying prevalence and contributing factors across different educational levels, such as postgraduates. This could help to identify patterns in cyberbullying behaviour and risk factors and inform the development of targeted prevention and intervention strategies for

different age groups. Moreover, comparative studies could be conducted between different cultures and countries to examine how cyberbullying prevalence and contributing factors vary across different contexts.

By conducting further research in these areas, a more nuanced and complete understanding of the issue of cyberbullying in Malaysian universities can be gained.

5.8 Summary

The study topics, aims, and outcomes are briefly summarised at the beginning of Chapter 5. A thorough examination of the study's theoretical, practical, and policy implications follows a detailed presentation of the study's primary results in the chapter. For policymakers, practitioners, and the larger research community in general, the chapter's practical implications section in particular offers crucial insights. The study's shortcomings are also acknowledged in the chapter, along with the fact that further research is necessary to expand on the results.

Lastly, the chapter provides recommendations and future research directions that could inform future studies in this area. Overall, Chapter 5 provides a comprehensive summary of the study's key findings, implications, and limitations, as well as practical recommendations for future research to help address the issue of cyberbullying in Malaysian universities.

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