A RISK ASSESSMENT BASED ON CYBERBULLY EXPERIENCE TOWARDS STUDENTS' PERFORMANCE

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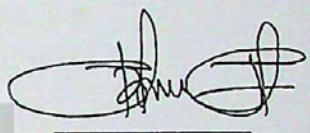

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ABSTRACT

The expansion of Information and Communication Technology (ICT) has transformed the ways adolescents connect, learn, and communicate, yet it has simultaneously introduced critical challenges, particularly the rising prevalence of cyberbullying. In Malaysia, secondary school students are among the most vulnerable groups, with increasing social media engagement exposing them to online harassment that threatens emotional well-being, behavioral stability, and academic performance. This research develops and validates a probability-based risk assessment model to evaluate the impact of cyberbullying on students' academic outcomes. Employing an action research design, the study integrates expert input from school counsellors with survey data from 258 secondary students in Kota Setar, Kedah. six key dimensions victimization experience, social media, guardian, personality, lack of knowledge usage the internet, and peer influence were identified and weighted to construct a Cyberbullying Probability Flowchart (CbPF) and a risk matrix for quantifying severity levels. The model was tested and refined through sensitivity analyses to ensure robustness and practical applicability. Findings reveal that students who spend more than three hours daily on social media face significantly higher cyberbullying risks, leading to declines in academic engagement, time management, and learning motivation. Gender and residence emerged as critical risk factors, with female students and parents' residents disproportionately affected by emotional distress and academic disruption. Common forms of cyberbullying included online harassment, exclusion from peer groups, rumor dissemination, and non-consensual sharing of personal content. Theoretically, this thesis advances knowledge by integrating digital behavior, psychosocial vulnerabilities, and academic performance into a unified risk assessment framework. Practically, it provides educators, parents, and policymakers with actionable strategies for early intervention, targeted prevention, and student support. Methodologically, it introduces a novel data-driven model that combines expert validation with probabilistic analysis, offering a replicable tool for assessing cyber-related risks in educational contexts. Ultimately, the study underscores the urgent need for collaborative and preventive measures to safeguard adolescents' well-being and academic success in an increasingly digital society.

Keywords: Cyberbullying, Risk Assessment, Academic Performance, Secondary Education, Social Media, Emotional Well-being, Malaysia

ABSTRAK

Perkembangan pesat Teknologi Maklumat dan Komunikasi (ICT) telah mengubah cara remaja berhubung, belajar dan berkomunikasi, namun pada masa yang sama ia turut membawa cabaran besar khususnya peningkatan kes buli siber. Di Malaysia, pelajar sekolah menengah merupakan antara kumpulan paling terdedah, dengan penggunaan media sosial yang semakin meluas mendedahkan mereka kepada gangguan dalam talian yang mengancam kesejahteraan emosi, kestabilan tingkah laku dan pencapaian akademik. Kajian ini membangunkan dan mengesahkan satu model penilaian risiko berasaskan kebarangkalian untuk menilai kesan buli siber terhadap prestasi akademik pelajar. Menggunakan reka bentuk kajian tindakan, kajian ini menggabungkan input pakar daripada kaunselor sekolah dengan data tinjauan melibatkan 258 pelajar sekolah menengah di Kota Setar, Kedah. Enam dimensi utama pengalaman mangsa, penggunaan media sosial, penjaga, personaliti, kurang pengetahuan penggunaan internet, dan pengaruh rakan sebaya telah dikenal pasti dan diberi pemberat untuk membangunkan Cyberbullying Probability Flowchart (CbPF) dan matriks risiko bagi mengukur tahap keterukan. Model ini diuji dan diperhalusi melalui analisis sensitiviti bagi memastikan keteguhan dan kebolehgunaan praktikalnya. Dapatan kajian menunjukkan bahawa pelajar yang menggunakan media sosial melebihi tiga jam sehari menghadapi risiko buli siber yang jauh lebih tinggi, sekali gus memberi kesan negatif terhadap penglibatan akademik, pengurusan masa, dan motivasi pembelajaran. Faktor jantina dan tempat tinggal muncul sebagai penentu utama, dengan pelajar perempuan serta mereka yang tinggal bersama ibu bapa didapati lebih terdedah kepada tekanan emosi dan gangguan akademik. Bentuk buli siber yang lazim termasuklah gangguan dalam talian, pengasingan daripada kumpulan rakan sebaya, penyebaran khabar angin, dan perkongsian kandungan peribadi tanpa kebenaran. Dari sudut teori, tesis ini memperluas pengetahuan dengan mengintegrasikan tingkah laku digital, kerentanan psikososial dan prestasi akademik dalam satu kerangka penilaian risiko yang menyeluruh. Dari sudut praktikal, ia menawarkan strategi yang boleh dilaksanakan oleh pendidik, ibu bapa dan pembuat dasar bagi tujuan intervensi awal, pencegahan yang disasarkan, dan sokongan kepada pelajar. Dari sudut metodologi, ia memperkenalkan model baharu berasaskan data yang menggabungkan pengesahan pakar dengan analisis kebarangkalian, sekali gus menyediakan alat yang boleh diguna semula untuk menilai risiko berkaitan siber dalam konteks pendidikan. Secara keseluruhannya, kajian ini menekankan keperluan mendesak pendekatan kolaboratif dan pencegahan bagi melindungi kesejahteraan serta kejayaan akademik remaja dalam era digital yang semakin mencabar.

Kata kunci: Buli Siber, Penilaian Risiko, Prestasi Akademik, Pendidikan Menengah, Media Sosial, Kesejahteraan Emosi, Malaysia

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PR	Probability
f	Factor
AVS	Average Score
ω	Weightage
TS	Total score
CbPF	Cyberbullying Probability Flowchart

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CHAPTER ONE

INTRODUCTION

1.1 OVERVIEW

This chapter introduces the research study, outlining key components to provide context for the research. It begins with an overview of the background, offering insight into the topic and its relevance. The problem statement is then discussed, highlighting the issues or gaps the research aims to address. Subsequently, the research questions are introduced, which direct the development of the study's aims. The chapter delineates the research scope, specifying its parameters and focus points. The study's relevance is addressed, highlighting its prospective contributions to the discipline. The chapter finishes with a summary of the thesis framework, outlining the content of the forthcoming chapters.

1.2 BACKGROUND OF STUDY

The rapid advancement of electronic technology and the global expansion of social media have generated many positive outcomes, particularly in communication, learning, and information sharing. However, these developments also present serious challenges, especially for secondary school students. With internet accessibility becoming increasingly widespread, adolescents now rely heavily on social media platforms as primary channels for interaction. While these platforms provide opportunities for connectivity and self-expression, they simultaneously expose young users to risks that may disrupt their emotional stability, social development, and academic progress. At a formative stage of psychological and social growth, adolescents are highly vulnerable to the adverse consequences of excessive and unsupervised online engagement. Issues such as cyberbullying, online harassment, invasion of privacy, and peer pressure in digital spaces have become common, often leading

to emotional distress, psychological instability, and disengagement from learning. These risks undermine not only academic performance but also students' personal growth, resilience, and overall well-being. Recent national statistics highlight the urgency of this issue. The Malaysia Computer Emergency Response Team (MyCERT) recorded 8,399 cyberbullying complaints between January and November 2024 averaging 27 cases per day marking a significant increase compared to previous years. Over a three-year span (2022–2024), nearly 9,500 cases were reported, indicating that cyberbullying is not only escalating but also becoming one of the most pressing digital threats faced by Malaysian adolescents. Facebook, WhatsApp, Instagram, TikTok, and Twitter were identified as the most common platforms associated with reported cases, with adolescents aged 13 to 17 representing the most affected group.

These statistics reflect a troubling reality: cyberbullying is no longer an isolated issue but a widespread phenomenon requiring urgent attention. It calls for collective responses that include strengthening digital literacy, enforcing progressive cyber laws, and developing empathetic interventions that address the vulnerabilities of young people in online environments. Within the Malaysian education system, the growing prevalence of cyberbullying underscores the need for systematic approaches that protect students' psychosocial well-being while also supporting their academic achievement.

In response to these challenges, this study examines the relationship between cyberbullying experiences and academic outcomes among secondary school students. Specifically, it aims to develop a comprehensive risk assessment model that integrates probability analysis, weighted risk scoring, and demographic variables. By doing so, the research not only addresses a critical gap in the literature but also contributes practical tools and insights for creating safer, more supportive, and academically conducive digital environments in schools.

1.3 PROBLEM STATEMENT

The emergence of digital technology and social media has transformed how students interact, but it has also opened the door to cyberbullying an increasingly prevalent form of digital aggression among secondary school students. In Malaysia, reports from various agencies show a rising trend in cyberbullying cases involving teenagers, including incidents of online harassment, identity impersonation, social exclusion, and digital threats. While the emotional and behavioral consequences of cyberbullying have been widely recognized, its direct impact on students' academic performance remains underexplored through a comprehensive, data-driven approach.

While previous studies have examined the psychosocial effects of cyberbullying, there remains a notable deficiency in the development of a comprehensive, probability-based risk assessment model capable of directly measuring its impact on the academic performance of secondary school students. Most existing models are general in scope, failing to integrative incorporate demographic factors, patterns of social media usage, and victims lived experiences, and they often lack the application of robust quantitative methods validated through expert consultation and tested using real-world student data. Furthermore, the majority of studies within the Malaysian context have focused on university populations or relied on international analyses, thereby leaving a significant gap in understanding the interplay between emotional, behavioral, and academic factors among students aged 13 to 17 an age group recognized as being at the highest level of vulnerability. This gap aligns closely with the problem statement of the present study, which emphasizes the absence of an integrated instrument capable of accurately assessing cyberbullying risk levels in schools and supporting the implementation of evidence-based interventions.

Consequently, the objectives of this research are designed to (i) quantify the risks of cyberbullying on academic performance, (ii) develop a school-based risk measurement model, (iii) test the developed model in real-life scenarios, and (iv) validate it through sensitivity analysis. Collectively, these objectives directly

address the research questions concerning the measurement, testing, and validation of the proposed risk assessment instrument. Ultimately, addressing this research gap is expected to generate significant theoretical, practical, and methodological contributions, thereby strengthening the capacity of schools, parents, and relevant stakeholders to safeguard both the academic and psychosocial well-being of students in the digital age. Most previous studies have either addressed cyberbullying in general terms or focused solely on its psychosocial effects, without developing a quantitative model to assess the associated risks and levels of academic impact. Existing risk assessments tend to be generic and fail to account for the interplay between demographic factors, social media usage patterns, and personal experiences of bullying. This gap makes it difficult for schools to accurately identify students who are at high risk and in need of early intervention.

Furthermore, many available risk assessment tools have not been validated through expert consultation such as with school counsellors or tested using real student data. As a result, these models often lack practical applicability in actual educational contexts. To date, there is no established model that employs a probability-based approach combined with a risk matrix to evaluate students' exposure to cyberbullying, specifically based on factors such as time spent on social media, gender, place of residence, and academic level (form/grade).

Therefore, this study aims to develop and validate a risk assessment model capable of measuring the probability and impact of cyberbullying on students' academic performance. The model is constructed in collaboration with counseling experts, incorporating a Cyberbullying Probability Flowchart, a weighted impact factor system, and a risk matrix to categorize students based on their risk level. The outcomes of this study will not only help schools identify high-risk students more effectively, but also provide a foundation for implementing evidence-based interventions, contributing to a more responsive and data-driven education policy in today's digital age.

June F. Chisholm (2014) posits that female students are more likely to demonstrate passive and relational forms of aggression, such as the dissemination of rumors and the social exclusion of peers in digital environments. This assertion is supported by empirical findings from Yusof et al. (2022), whose study conducted in the Malaysian context revealed that female students are disproportionately more susceptible to becoming victims of cyberbullying, whereas their male counterparts are more frequently identified as perpetrators. Additional socio demographic variables, including single-parent family structures and heightened experiences of loneliness, have been identified as significant contributors to the vulnerability of individuals to cyberbullying victimization. Complementing these findings, Gao et al. (2024) underscore the moderating role of self-control in the cyberbullying context, noting that it exerts a more pronounced influence among female students. This suggests a gender-specific differentiation in psychosocial responses to online peer pressure. Consistent with these observations, Dellagiulia et al. (2023) found that while academic performance did not differ significantly across roles victim, perpetrator, or both victims of cyberbullying reported significantly lower levels of personal satisfaction. These psychosocial outcomes particularly symptoms of depression, anxiety, and social withdrawal appear to be especially prevalent among female victims.

Further substantiating the academic implications of cyberbullying, Cedeño et al. (2024) reported that students who had experienced involvement in cyberbullying exhibited notable deficits in both study time management and academic effort regulation. Female victims, in particular, recorded a 6.2% reduction in time management and an 8.3% decrease in effort regulation relative to their non-victim peers. These results affirm that the ramifications of cyberbullying extend beyond emotional and psychological harm, adversely influencing students' academic functioning.

In light of the above, a discernible gap remains in the current body of literature. Most extant studies have concentrated on university-level cohorts or international populations, leaving a paucity of empirical investigations that examine the interrelation between gender, emotional well-being, and academic outcomes among secondary school students within the Malaysian context. Moreover, there exists a noticeable absence of integrative models that holistically capture the intersection of psychosocial and academic variables in the study of cyberbullying's impact.

Secondly, Psychological Perspectives. Previous study on aggression and violence indicates that the motivations for such behaviors stem from both the objective characteristics of events and the interpretations of those occurrences. The interpretation of these occurrences is influenced by prior experiences, perspectives, personality traits, and societal beliefs transmitted through parental socialization and familial experiences. In the late 1990s, the dialogue transitioned from physical aggression predominantly among boys to relational aggression observed among girls and from immediate physical violence to virtual violence in cyberspace. A review of the cyberbullying literature indicates that comprehending the experience of cyberbullying is complicated by the dynamic interplay between public and private domains of interaction, the swift advancement of new technologies that render classifications of bullying behavior and victimization based on outdated technologies obsolete, and cultural variances in communication styles concerning the significance of online interactions for both the sender and receiver.

Additionally, Individual Functioning has been examined on the nature of cyberbullying. The anonymity in cyberbullying arises from the bully's ability to obscure their identity, resulting in a lack of identification and visibility. This facet of cyberbullying distinctly separates it from traditional bullying. Anonymity promotes disinhibiting, which refers to the reduction of psychological barriers that hinder the expression of one's deepest thoughts, emotions, and wants, so

altering an individual's typical patterns of self-disclosure, self-creation, and online communication.

Anonymity functions in additional manners as well. The attacker may fail to perceive the suffering caused to the victim. Furthermore, due to the nature of cyberbullying occurring in a mediated environment, tone and irony are often absent from any mediated communication. This is significant as an individual may interpret a message as a "threat" even when the sender has no such intention. The "power" that a cyberbully wields over their victim is partially contingent upon their proficiency with digital technologies or, in instances of ratting, their access to software created by individuals with advanced technical skills. This contrasts with traditional bullying, where physical strength is paramount. The adeptness of digital tools allows cyberbullies to obscure their identity and amplify the damage inflicted on their target by broadcasting the bullying to an audience of online witnesses.

This examination of peer influence provides an alternative theoretical framework for understanding cyberbullying. Behaviors that are thought to enhance an individual's standing within a peer group can be classified as those that augment social prominence (visibility) or social dominance (power and influence) inside the group. In terms of social importance, popular adolescents are perceived as leaders, athletic, physically appealing, and trendy or snobbish. Regarding social dominance, two subgroups of popular teenagers are identified. Some famous adolescents exhibit prosaically behaviors, while others display antisocial, coercive behaviors towards their peers, including bullying. The aforementioned category of popular 'tough boys' and 'mean girls' is referred to as "controversial" popular teenagers within the social peer context. Despite being widely regarded as popular, they receive high nominations for both likability and unsinkability when peers are asked to categories classmates. Controversial teenagers are thought to deliberately employ both prosaically and coercive behaviors to sustain or attain social dominance within their peer group. Consequently, bullying may

be regarded as a tactic employed by contentious teenagers to preserve their elevated standing within the peer group.

The systems approach examines the "problem of change" within the educational system, articulated years prior to the digital era. It emphasis's the understanding of schools as microcosms within the broader societal macrocosm, which is relevant to contemporary efforts to comprehend the issue of cyberbullying in educational institutions.

Indicates that explanations and corresponding strategies grounded in individual characteristics may possess some validity and achieve limited success; however, this validity is attained at the cost of recognizing overarching regularities that extend beyond the individual, which are more influenced by the system's structure and processes. Consequently, acknowledging cyberbullying as a phenomenon embedded in school culture, which reflects unsettling societal trends, may enhance the comprehension of cyberbullying and strategies for its prevention.

A macro-level approach entails an analysis of overarching economic and social factors associated with cyberbullying, which may result in policy changes, legislation, or social pressure aimed at altering corporate practices that contribute to this issue.

For instance, investigations centered on profit motives could reveal methods to diminish the profitability of certain business ventures such as smartphone applications, anonymous websites facilitating harassment, and spyware software development thereby rendering them less viable as revenue sources.

Cyberbullying has emerged as one of the most pressing challenges in an increasingly digital world. With the widespread use of social media among teenagers and students, various programs and strategies have been introduced

to curb this phenomenon in a comprehensive manner. Key approaches include awareness campaigns, psychosocial interventions, social-emotional learning (SEL) programs, corporate initiatives such as Digi CyberSAFE, and the enforcement of cyber laws by relevant authorities.

One of the most critical initial steps is to enhance digital media literacy among the public. Formal media literacy education, as implemented in the United States and European Union countries, plays a pivotal role in increasing public awareness regarding internet misuse and educating users to navigate online communication responsibly. This educational effort should involve parents as primary agents in guiding children to become ethical and responsible digital citizens. Furthermore, the increasing involvement of public figures and celebrities in seeking justice through legal avenues also contributes significantly to public awareness at all levels of society.

Within the framework of intervention and prevention, emphasizes that strategies must be addressed at multiple levels from micro to macro encompassing individual, interpersonal, familial, and broader social contexts. Although previous studies have produced inconsistent findings regarding the impact of cyberbullying on victims' well-being, comprehensive anti-bullying programs are hoped to be effective in reducing the prevalence of this issue.

According Aydoğan, M. G., Morgül, E., & Bulut, S. 2025, this study advocates for continued research to evaluate the effectiveness of Social and Emotional Learning (SEL) interventions in addressing incidents of cyberbullying. It also underscores the importance of longitudinal studies to assess the sustained impact of such programs over time.

Overall, the findings highlight the critical need to priorities the integration of SEL programs into school curricula and to promote collaboration between educators and researchers in fostering safer, more inclusive educational

environments that support the holistic development of adolescents in the digital age.

Recent studies have consistently demonstrated that the majority of parents in Malaysia have yet to fully grasp the severity of risks associated with cyberbullying affecting their children. A reliance on basic digital safeguards such as the installation of filtering software or default parental controls has proven insufficient in addressing the increasingly complex and evolving nature of online threats. Findings by Ghazali et al. (2025) highlight a significant disparity between parents' general awareness of preventive strategies and their actual knowledge of the digital platforms commonly used by adolescents, including social media and instant messaging applications.

Of greater concern is the phenomenon of underreporting, as evidenced by the fact that only 2.5% of parents surveyed acknowledged that their child had been a victim of cyberbullying. This figure is likely to underestimate the true prevalence of such incidents within the community. The data raise critical questions regarding parents' capacity to detect early indicators of cyberbullying and their readiness to take appropriate remedial actions.

The CyberSAFE® for the People programed, implemented under the MyDIGITAL initiative, represents a strategic effort to strengthen digital literacy among the general public in Malaysia. By offering free cyber security modules to users, the programed places particular emphasis on the importance of digital education as a foundational element in cultivating a technologically literate society. It aims to equip individuals with the awareness and competencies necessary to identify and manage risks associated with the online sharing of personal information, thereby fostering ethical and safe digital engagement. Malaysia Digital Economy Corporation (MDEC). 2025.

Finally, the enforcement of cyber laws remains a central pillar in tackling cyberbullying. The Malaysian Communications and Multimedia Commission (MCMC) plays a key role in enforcing Sections 211 and 233 of the Communications and Multimedia Act 1998, which prohibit the dissemination of obscene, false, or threatening content with the intent to harass or offend others. Violators of these provisions are subject to fines of up to RM50,000, imprisonment of up to one year, or both. Such stringent legal measures not only serve to penalize offenders but also signal a strong national stance that cyberbullying is a criminal offence not to be taken lightly.

In conclusion, a holistic and integrated approach involving awareness, education, social intervention, community engagement, and legal enforcement is essential to effectively combat cyberbullying. The success of these efforts depends heavily on the active participation of multiple stakeholders including families, schools, the private sector, civil society, and law enforcement in cultivating a digital culture that is safer, more empathetic, and socially responsible.

Despite numerous efforts to evaluate and mitigate the impact of cyberbullying on student performance, the outcomes remain largely unsatisfactory, as a significant number of students continue to fall victim to such harmful behaviors. In response to this ongoing issue, Action Research is proposed as a reflective and practice-based intervention strategy aimed at reducing the adverse effects of cyberbullying, particularly on academic achievement.

This methodological approach is well-positioned to identify both the direct and indirect consequences of cyberbullying within secondary school settings, where students frequently experience heightened levels of fear and anxiety. Such psychological distress can severely impair their ability to engage meaningfully in the learning process. In more severe cases, some victims may resort to school dropout as a means of escaping persistent online harassment, thereby disrupting their educational trajectories.

1.4 RESEARCH QUESTIONS

Building on the issues outlined in the preceding section, this study seeks to address the following research questions:

a) How can the risks of cyberbullying be quantified in relation to secondary Students' academic performance?
b) How can the risks of cyberbullying among secondary school students be systematically measured?
c) How can the proposed measurement model be applied and tested in real-life school settings as a case study?
d) How can the accuracy and reliability of the developed measurement model be validated through sensitivity analysis?

1.5 RESEARCH OBJECTIVES

The primary objective of this research is to construct a predictive model for assessing the risk of cyberbullying exposure among secondary school students and its impact on their academic performance. To achieve this, the study sets out the following specific objectives:
a) To quantify the risks of cyberbullying in relation to secondary students' academic performance.
b) To develop a systematic model for measuring the risks of cyberbullying among students in schools.
c) To apply and test the developed model using selected secondary schools as case studies.
d) To validate the developed model through sensitivity analysis to ensure its robustness and reliability.

1.6 SIGNIFICANCE OF THE STUDY

To fulfil the objectives of this research, its significance is discussed from three key perspectives: theoretical significance, practical significance, and methodological significance. Each perspective contributes uniquely to the advancement of knowledge and practice in the field of education, particularly concerning the issue of cyberbullying among secondary school students.

1.6.1 Theoretical Significance

From a theoretical standpoint, this study contributes to the enrichment of the conceptual framework related to the impact of cyberbullying on students' academic performance and emotional well-being. By integrating psychosocial factors such as self-control, gender roles, and social support, the research extends existing understandings of cyberbullying dynamics. Moreover, it fills a critical gap in the Malaysian context, where studies on cyberbullying in secondary schools remain limited. The findings may serve as a theoretical foundation for the development of holistic and context-sensitive intervention models in future research.

1.6.2 Practical Significance

In practical terms, the study offers valuable insights for educators, school administrators, parents, and policymakers in addressing cyberbullying more effectively. The results can inform the design of targeted intervention programs, including the integration of digital literacy modules, implementation of Social and Emotional Learning (SEL) initiatives, and adoption of responsive classroom management strategies. Additionally, the findings may support relevant authorities and agencies in crafting inclusive, data-driven public awareness campaigns and cyber security policies aimed at protecting vulnerable student populations.

1.6.3 Methodological Significance

Methodologically, the study employs Action Research, a reflective and intervention-oriented approach that enhances the practical relevance of educational research. This method enables direct collaboration between researchers and school communities in identifying problems, designing interventions, implementing actions, and evaluating outcomes. As such, it contributes to the methodological diversification of educational inquiry while promoting sustainable and practice-based solutions that are responsive to the lived experiences of students and educators.

1.7 SCOPE OF THE STUDY

This study is confined to a specific case site, namely a cluster of secondary schools in Kota Setar, Kedah, Malaysia, during the 2024 academic year. The fieldwork engaged 10 school counsellors and 258 students aged 13 to 17 years (Forms 1–5) from public secondary schools, where Bahasa Melayu is the primary medium of instruction. Given this focus, the findings are context-bound and should not be overgeneralized to populations beyond the selected site without appropriate caution.

The scope of the research is deliberately circumscribed. It is limited to the experiences of secondary-level students, thereby excluding primary schools, tertiary students, and adult populations. Equally, the study does not address longitudinal mental-health trajectories, legal or policy frameworks, or parental consent dynamics, as these aspects fall outside the intended remit. Instead, the investigation adopts a cross-sectional action research design, conducted within a single school year, to develop a contextually grounded risk assessment model.

The study is primarily focused on the quantification of cyberbullying risks and their potential impact on academic performance, not on testing causal hypotheses

or explanatory models. While the introductory overview referenced broader influences on the social-media–performance nexus, the actual objectives are narrower and more precise: to develop, test, and validate a probability-based risk-assessment model. This model quantifies weighted risks of cyberbullying occurrence and their corresponding academic consequences. Specifically, six factors constructs are embedded within the framework:

i. Victimization experience factors
ii. Social-media factors
iii. Guardian factors
iv. Personality factors
v. Lack of knowledge usage of internet factors
vi. Peer Factors

Although Facebook was initially highlighted as a dominant platform in national-level statistics, the study recognizes the multi-platform reality of adolescent online engagement, encompassing WhatsApp, TikTok, Instagram, and others. Accordingly, the scope does not limit its interpretation to a single platform, but rather considers cyberbullying as a cross-platform phenomenon.

Within the broader academic programed of Technology, Operations, and Logistics Management, this study positions its contribution as a decision-support tool. The risk-assessment model provides schools, counsellors, and educational administrators with a structured mechanism for resource allocation, early-warning detection, and intervention planning for students identified as being at elevated risk.

This study is primarily concerned with analyzing risk assessment associated with cyberbullying experiences among secondary school students, with a particular focus on the influence of social media platforms. The core objective is to explore the role of social media in shaping students' academic engagement and overall

academic performance, as perceived and reflected upon by the students themselves.

Additionally, the research seeks to identify underlying factors that may mediate or moderate the relationship between social media usage and academic outcomes. Special emphasis is placed on evaluating how these interactions may contribute to declining academic performance among adolescents. By contextualizing these issues within the school environment, the study aspires to generate findings that will assist educational institutions in gaining deeper insights into the behavioral and academic implications of digital engagement.

Moreover, the results are expected to support school administrators in better understanding the extent and nature of students' use of social networking sites particularly Facebook and its impact on their academic focus and productivity. This evidence-based understanding will enable more informed and strategic decision-making regarding the integration of social media tools into educational settings, ensuring that such technologies are used constructively to enhance, rather than hinder, student learning and well-being.

In summary, the scope establishes clear boundaries of population (secondary students aged 13–17 in Kota Setar), timeframe (2024 school year, cross-sectional), methodology (probabilistic risk modelling with expert validation), inclusions (six factor), and exclusions (other educational levels, longitudinal outcomes, legal/policy analyses). By articulating these delimitations and assumptions, the scope ensures conceptual precision, methodological coherence, and alignment with the research objectives.

1.8 ORGANISATION OF THESIS

This thesis is structured into five chapters, including the current introductory chapter. The organization of the subsequent chapters is as follows:

a) Chapter Two: Literature Review

This chapter presents a comprehensive review of existing literature related to cyberbullying and its impact on students' academic performance. Particular emphasis is placed on analyzing the probability and impact of risk-related applications that affect secondary school students. Special attention is given to how cyberbullying influences academic outcomes.

The findings from this review are essential for the development of an effective risk assessment mechanism for identifying students who are vulnerable to cyberbullying. Additionally, these insights provide a foundation for the proposed intervention strategies aimed at reducing such risks.

b) Chapter Three: Research Methodology

This chapter outlines the research design and methodology adopted to achieve the objectives of the study. It details six key variables used to assess the likelihood and impact of cyberbullying on academic performance among secondary school students. A structured risk assessment method is introduced to optimize the identification of potential victims of cyberbullying, thereby informing effective preventive and mitigation strategies.

c) Chapter Four: Results and Discussion

This chapter discusses the results of the proposed technique in detail, structured around three main components: the outcomes of risk quantification, simulation data from the optimization model, and validation of the proposed system. The validation process includes sensitivity analysis and extreme case scenarios to

ensure the technique's practical applicability and alignment with the research objectives.

d) Chapter Five: Recommendations and Conclusion

The final chapter concludes the study by summarizing the key findings and highlighting the theoretical and practical contributions of the research. Limitations of the study are discussed, along with suggestions for future research directions within the context of cyberbullying and student academic performance.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

In the rapidly evolving landscape of digital globalization, cyberbullying has emerged as a critical form of virtual social aggression with direct and damaging implications for the well-being of students, particularly adolescents at the secondary school level. Unlike traditional bullying, which typically occurs in physical spaces and within limited timeframes, cyberbullying transcends spatial and temporal boundaries, occurring incessantly across various digital platforms such as social media, messaging applications, online games, and email. This borderless nature makes cyberbullying especially insidious and difficult to detect or control without a well-structured, strategic intervention framework (Olweus, 2012; Hinduja & Patchin, 2015).

Numerous studies have indicated that secondary school students constitute the most vulnerable group to cyberbullying due to their intensive use of social media and the transitional nature of their social identity development (Heiman & Olenik-Shemesh, 2018; Tan & Abdullah, 2025). In Malaysia, this concern is particularly pronounced. According to a recent report by UNICEF and Ipsos (2024), the country ranks second in Asia and fifth globally in reported cases of cyberbullying among adolescents. This statistic underscores the gravity of the issue and signifies that cyberbullying is no longer an isolated problem but a national phenomenon that demands urgent attention, especially within educational institutions.

The consequences of cyberbullying are multifaceted. It affects not only emotional dimensions such as stress, anxiety, and diminished self-worth but also significantly impairs social behaviour and academic performance. Victims of

cyberbullying frequently exhibit declining motivation, poor academic achievement, and withdrawal from classroom activities and peer interaction (Genta et al., 2017; Frontiers in Psychology, 2025). Furthermore, if not addressed through early intervention and emotional support systems, the psychological effects of cyberbullying may persist well into adulthood, compounding its long-term impact.

Given this context, the present literature review aims to examine and synthesize the most recent research on the impact of cyberbullying across three key domains: behavior, emotions, and academic performance among secondary school students. This chapter integrates findings from both local and international research namely from Tan and Abdullah (2025), RSIS International (2024), and Frontiers in Psychology (2025) to offer a comprehensive and up-to-date overview of this critical and evolving issue.

2.1 EMOTIONAL IMPACTS OF CYBERBULLYING

The emotional ramifications of cyberbullying among adolescents have been extensively documented as both severe and enduring, often manifesting in psychological disorders such as chronic anxiety, depression, emotional numbness, and diminished self-esteem. In extreme cases, sustained victimization may escalate to suicidal ideation or self-harming behaviors, particularly when students experience prolonged social isolation or a lack of adequate emotional support (Hinduja & Patchin, 2015; Olweus, 2012).

Empirical evidence emerging from Malaysia, as presented by Tan and Abdullah (2025), demonstrates a statistically significant relationship between the frequency of cyberbullying incidents and elevated anxiety levels, accompanied by a marked reduction in self-esteem among secondary school students. Their findings further reveal that gender moderates these outcomes, with female

students more likely to internalize emotional distress manifesting as self-blame, sadness, and rumination while male students more frequently exhibited externalized responses such as irritability, aggression, and social withdrawal. These patterns signal a critical need for gender-sensitive emotional support frameworks that are tailored to the distinct psychological coping mechanisms exhibited by male and female victims.

These findings are consistent with international research. A global meta-analysis conducted by RSIS International (2024) identified emotional deregulation as one of the most prevalent psychological consequences of cyberbullying among adolescents.

This inability to regulate emotions effectively often impairs cognitive functioning, thereby undermining students' ability to concentrate on academic tasks, engage with classroom learning, and maintain peer relationships. The compounded effect of emotional distress and academic disengagement presents a dual challenge to educational institutions tasked with ensuring both psychological and pedagogical well-being.

Adding to the growing body of concern, a recent investigation by *The Washington Post* (2025) reported the emergence of post-traumatic stress disorder (PTSD) symptoms among adolescents subjected to persistent, unmitigated episodes of cyberbullying. Reported symptoms included sleep disturbances, intrusive thoughts, hyper vigilance, and avoidance of online environments particularly social platforms where the victimization occurred. The study emphasizes the invasive nature of cyberbullying, which extends beyond the school environment into the victim's private and domestic spaces. This erasure of traditional “safe zones,” such as the home, exacerbates the psychological toll and creates a pervasive sense of vulnerability among victims.

Taken collectively, these empirical insights provide compelling evidence that the emotional consequences of cyberbullying are not only immediate but also potentially chronic if left unaddressed. This necessitates urgent educational reform oriented around trauma-informed care frameworks, which recognize the enduring effects of psychological trauma and aim to cultivate safe, empathetic, and supportive school environments (Perry & Szalavitz, 2017). It is imperative that schools invest in emotional resilience training, deploy accessible and culturally responsive mental health resources, and implement early identification systems to detect at-risk students. Only through such proactive measures can the escalating emotional burden of cyberbullying among adolescents be mitigated effectively.

However, the psychological consequences of cyberbullying are well-documented. In the short term, victims frequently report anxiety, emotional distress, and fear of peer judgment according to Tan & Abdullah, 2025. Over time, repeated exposure can lead to depressive symptoms, low self-esteem, sleep disturbance, and even suicidal ideation according to Zhu et al., 2023 demonstrated that cyberbullying victimization is a significant predictor of depression and anxiety among adolescents, although effect sizes vary depending on gender and family support.

2.2 BEHAVIOURAL CONSEQUENCES AND SOCIAL REACTIONS

Cyberbullying exerts a multidimensional influence on adolescent development, extending far beyond the realm of emotional distress to include marked changes in behavior and patterns of social interaction. These behavioral consequences are often manifested through increased aggression, social withdrawal, antisocial tendencies, and maladaptive coping mechanisms. Given that peer relationships and social norms play a pivotal role in adolescent identity construction, disruptions caused by cyberbullying frequently result in shifts in the way students

engage with peers, interpret group behavior, and respond to social conflict (Hinduja & Patchin, 2015).

Recent research published by Springer (2025) has emphasized that the roles adolescents assume during cyberbullying incidents whether as bystanders, defenders, victims, or perpetrators are strongly associated with individual differences in social-cognitive attributes, particularly empathy, perceived moral responsibility, and emotional regulation. Students who demonstrated higher levels of empathy and moral engagement were significantly more likely to take action in defense of victims, reflecting a proactive social stance. In contrast, students with diminished emotional regulation and heightened impulsivity were found to be more prone to either perpetrating bullying or remaining passive in the face of abuse. These findings highlight that cyberbullying is not merely a technological by-product but one shaped profoundly by psychological development and moral reasoning capacities.

Moreover, the behavioral repercussions of cyberbullying are cumulative and intensify over time. A longitudinal study conducted in Spain (Springer, 2025) documented how prolonged victimization contributes to escalating patterns of emotional deregulation, particularly manifesting as uncontrolled anger, irritability, and reactive aggression. These behavioral outcomes were further compounded by social mechanisms such as peer pressure, conformity to group norms, and the desire for social acceptance, which often encouraged retaliation or cyclical engagement in aggressive acts. Such behavioral loops deepen the complexity of the victim-perpetrator dynamic and hinder rehabilitation or intervention.

In numerous cases, adolescents who experience cyberbullying internalize their distress, resulting in self-directed behaviors such as truancy, classroom disengagement, loss of motivation, or complete social withdrawal. Conversely, some victims externalize their psychological turmoil through confrontational

behavior, acts of cyber retaliation, or by imitating the very bullying behaviors they have suffered an outcome consistent with Bandura's (1986) Social Cognitive Theory, which posits that behavior is learned through observation, imitation, and reinforcement in social environments.

Crucially, these behavioral transformations are not solely reactive but are shaped by the broader school climate, including the availability of peer support networks, the consistency of teacher interventions, and the effectiveness of institutional policies governing digital conduct. The degree to which a school fosters or neglects emotional and behavioral literacy can significantly influence how students respond to or perpetuate cyberbullying dynamics.

Taken together, these empirical insights illustrate that cyberbullying has a far-reaching impact on student behavior, driven by an interplay of intrapersonal, interpersonal, and contextual variables. Accordingly, addressing the behavioral dimensions of cyberbullying necessitates a shift from punitive or disciplinary measures to preventive and developmental approaches. Schools must actively cultivate a culture of empathy, digital citizenship, emotional intelligence, and ethical behavior. Educational interventions should priorities the development of students' social-emotional competencies, critical thinking, and conflict resolution skills while promoting accountability and peer-led advocacy to disrupt harmful behavioral cycles.

However, Behavioral impacts include both immediate and long-term responses. Short-term reactions often involve withdrawal from social interaction, heightened irritability, or retaliatory aggression. Longitudinal studies show that persistent victimization is associated with truancy, delinquency, and peer isolation according to Livingstone & Stoilova, 2023. Such outcomes reflect the cumulative erosion of social confidence, which in turn compounds risks to academic engagement.

2.3 ACADEMIC PERFORMANCE AND LEARNING DISRUPTIONS

The academic consequences of cyberbullying are increasingly recognized as a significant dimension of concern, extending its impact beyond emotional and behavioral domains to include measurable disruptions in learning processes and academic achievement. Cyberbullying interferes with both cognitive and metacognitive learning strategies that are vital for academic success, such as concentration, goal setting, time management, and self-monitoring. When students are exposed to repeated online harassment or digital victimization, their capacity to focus on educational tasks is compromised, leading to disengagement, reduced academic persistence, and deteriorating scholastic performance.

A recent study published in Frontiers in Psychology (2025) underscores the detrimental effects of cyberbullying on students' executive functioning. The study revealed that adolescents who were victims of cyberbullying exhibited significant impairments in time management, self-regulation, and sustained attention skills that are central to academic engagement and long-term educational attainment. Victimized students also reported difficulties initiating and completing academic tasks, particularly those requiring prolonged mental effort, self-discipline, or collaboration with peers. These findings suggest that the psychological toll of cyberbullying spills over into the academic domain, undermining students' ability to fully participate in the learning process.

Complementary evidence from a 2024 article published in MDPI Education Sciences further elaborates on the association between cyberbullying and academic decline. The study found that exposure to digital harassment led to the erosion of positive study habits, diminished intrinsic motivation, and avoidance of academic responsibilities. These outcomes are often compounded by increased absenteeism, classroom avoidance, and a general disinterest in academic pursuits. Such maladaptive patterns not only hinder academic development but may also set the stage for long-term disengagement from formal education systems.

Within the Malaysian educational context, these international trends are corroborated by the work of Tan and Abdullah (2025), who documented significant academic disruption among secondary school students affected by cyberbullying. Their findings indicated that victims frequently demonstrated reduced participation in classroom activities, lower levels of academic confidence, and poorer performance in both formative and summative assessments. Notably, teachers reported that cyberbullying victims were less likely to seek academic support or participate in collaborative learning, indicating a decline in help-seeking behaviors and social academic engagement.

Importantly, the academic impairments associated with cyberbullying should not be viewed in isolation from their emotional and behavioral antecedents. The triadic interaction between emotional distress, behavioral withdrawal, and academic disengagement reflects a complex feedback loop, wherein each domain amplifies the other. For instance, students who internalize emotional trauma may lose interest in learning, while those facing academic failure may become more susceptible to further victimization due to perceived vulnerability.

Given these multi-level impacts, it is imperative that educational institutions adopt proactive, evidence-based measures to mitigate the academic risks associated with cyberbullying. This includes the integration of psychosocial support services within the school framework, development of targeted academic intervention programs for at-risk students, and the incorporation of digital safety education within the formal curriculum. By addressing the cognitive, emotional, and environmental dimensions of cyberbullying, schools can foster a safer and more inclusive learning environment conducive to academic success.

However, academically, cyberbullying disrupts concentration, reduces classroom participation, and undermines motivation. While some studies establish a strong negative correlation between cyberbullying and grade point average (GPA) according to Chan et al., 2022 others have found no statistically

significant effect, suggesting the role of mediating variables such as teacher support and school climate according to Dellagiulia et al., 2023. These inconsistencies underscore the importance of contextual and demographic moderators when interpreting findings.

2.4 INTERPRETATION OF THE CHART: PERCENTAGE OF PARENTS REPORTING THEIR CHILDREN HAVE BEEN BULLIED, BY AGE.

The chart presents data on the percentage of parents who reported that their children have experienced bullying, categorized by age groups. The findings indicate a progressive increase in bullying prevalence with age, peaking among adolescents aged 14–18 (59.9%), followed by those aged 11–13 (56.4%), and slightly lower for those aged 19 and above (54.3%). The lowest percentage is observed among children aged 6–10 (47.7%). These patterns provide a compelling visual representation of the heightened vulnerability to bullying during middle and late adolescence precisely the demographic that this research focuses on. Figure 1 as below.

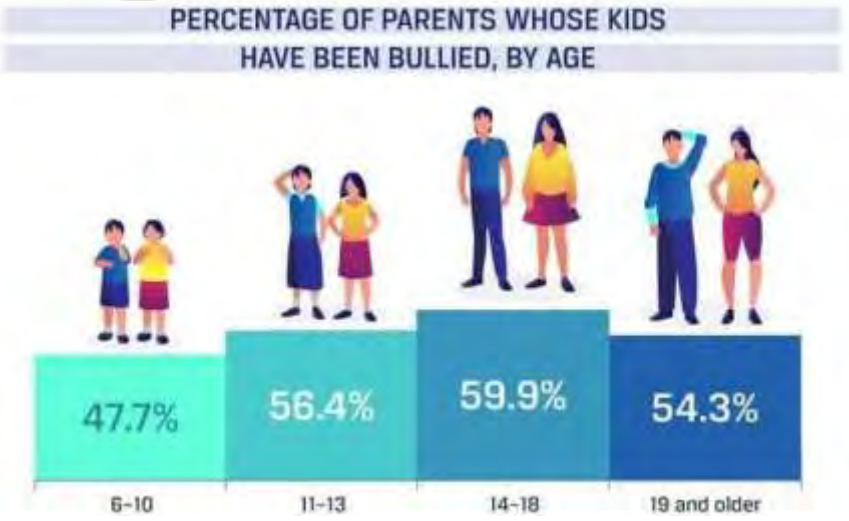

Figure 1: The percentage of parents whose kids have been bullied by age and the result found that 14-18 years old become a risk, 11-13 years old mild risk and 6-10 is low risk have been bullied.

The highest prevalence reported in the 14–18 age group aligns with the assertions made in the introduction of this thesis, which highlights that secondary school students are among the most vulnerable to cyberbullying. This age group is characterized by intense social media engagement, heightened peer dependence, and ongoing identity formation factors that collectively amplify susceptibility to online victimization (Heiman & Olenik-Shemesh, 2018; Tan & Abdullah, 2025). The chart thus reinforces the rationale for focusing the literature review on adolescents in secondary schools.

The elevated rates of bullying among adolescents have significant emotional implications. As discussed in Section 2.2, victims of cyberbullying in this age range often suffer from anxiety, depression, emotional deregulation, and low self-esteem (RSIS International, 2024; The Washington Post, 2025). The chart reflects not only a frequency of occurrence but also an age-specific risk window during which the psychological impacts of bullying may be most profound, particularly due to the interplay of hormonal, social, and cognitive development during adolescence.

Higher bullying prevalence during adolescence is also correlated with changes in student behavior. Victims in this age group may exhibit avoidant behaviors (e.g., withdrawal, silence), retaliatory aggression, or mimic the bullying they experience behaviors driven by peer dynamics, impulsivity, and emotional instability (Springer, 2025). The peak prevalence at 14–18 years may also indicate a period when students are still learning to regulate their emotions and social responses, thus increasing the likelihood of maladaptive behavioral patterns in the absence of proper support.

The chart's implications also extend to educational outcomes. As previously discussed in Section 2.4, cyberbullying has been shown to affect focus, time management, motivation, and overall academic performance (Tan & Abdullah, 2025; Frontiers in Psychology, 2025). Adolescents aged 14–18, who are often at

critical junctures in their academic trajectories such as preparing for national examinations may experience amplified academic disruption as a result of victimization, highlighting the importance of school-based intervention strategies.

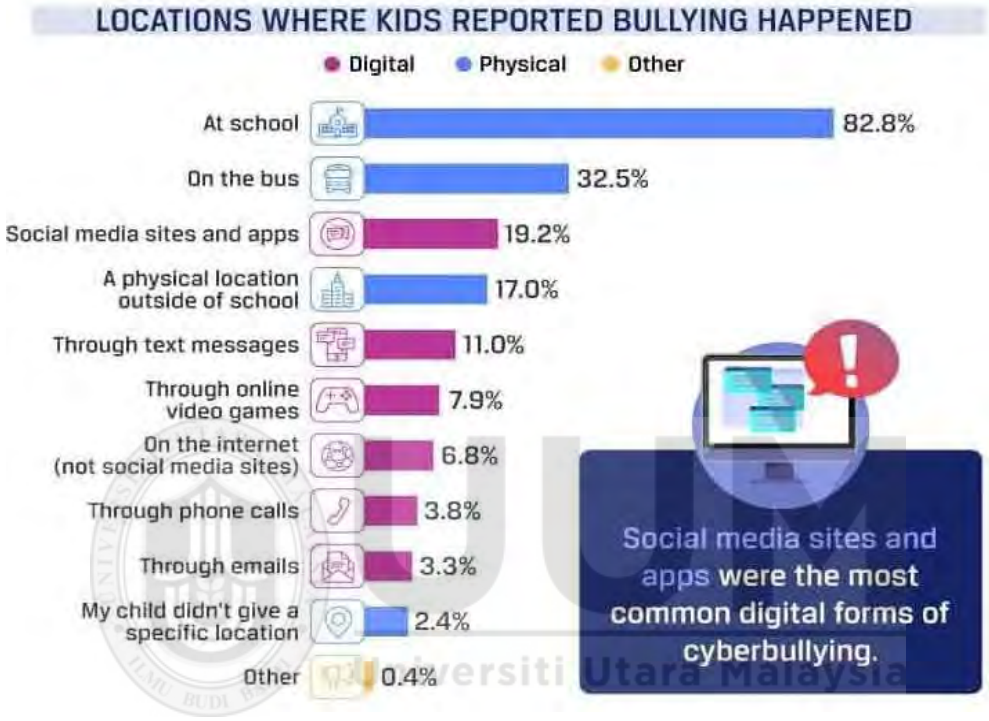

Figure 2: Show that location more risk where kids reported bullying happened.

The statistical distribution of bullying locations provides critical insight into the situational contexts in which emotional, behavioral, and academic consequences are likely to emerge. The dominance of school-based incidents (82.8%) situates the phenomenon firmly within the students' primary learning environment. From an emotional perspective, repeated exposure to bullying within a core educational setting can lead to heightened anxiety, diminished self- esteem, and persistent feelings of insecurity. The fact that such incidents occur in a place that is supposed to provide safety and support may amplify the psychological harm, as reported in previous research where school-based

victimization was linked to increased depressive symptoms and reduced sense of belonging (Hinduja & Patchin, 2025).

Behaviorally, the high prevalence within school premises suggests the potential for maladaptive coping strategies to manifest in the classroom, including withdrawal from peer interaction, reduced participation in group activities, or oppositional behavior towards authority figures. Such patterns align with findings from Al-Hinai et al. (2025), where dual victims demonstrated elevated levels of both internalizing and externalizing behaviors.

The second-highest category bullying on the bus (32.5%) indicates that transitional spaces between home and school are also critical risk zones. Emotional responses here may include anticipatory anxiety prior to commuting, while behavioral outcomes may involve route avoidance or absenteeism. These patterns could directly influence academic performance due to decreased attendance and reduced engagement.

The digital categories (with social media sites and apps at 19.2%, text messages at 11.0%, and online games at 7.9%) reflect the persistent nature of cyberbullying beyond the physical school day. This "24/7" exposure increases the likelihood of chronic stress, as students cannot fully disengage from harmful peer interactions. As supported by Solas-Martínez et al. (2025), continuous exposure to online harassment correlates with reduced task value, lower self-efficacy, and elevated test anxiety, which collectively impair academic outcomes.

The 17.0% of bullying in physical locations outside school further broadens the scope, suggesting that anti-bullying policies and interventions cannot be limited to institutional environments. This external occurrence can also blur the boundaries between school and community experiences, influencing how students perceive their overall safety and social networks.

From an academic performance standpoint, the data's implication is clear: when bullying occurs across multiple contexts school, transit, and digital it has a compounding effect on the victim's capacity to focus, participate, and achieve. The overlap between physical and digital domains intensifies these impacts, creating a cyclical pattern where emotional distress fuels behavioral withdrawal, which in turn hampers learning outcomes. This aligns with the multifactorial risk assessment model proposed in this research, which recognizes the interconnectedness of environmental factors, emotional responses, and educational achievement.

2.5 DEFINITION OF RISK

According to Patchin and Hinduja , 2021 provide an in-depth analysis of the risk factors contributing to cyberbullying incidents and their impact on victims within an increasingly complex and uncertain digital environment. They emphasize that cyberbullying not only causes immediate harm such as emotional distress and psychological injury but also leads to serious long-term psychological and social consequences, including anxiety disorders, depression, and persistent social isolation.

A key aspect highlighted in their study is the anonymity of cyberbullies, which complicates the identification and accountability of perpetrators. This anonymity exacerbates victims' feelings of uncertainty and fear, as they are often unaware of who is behind the bullying, thereby increasing their emotional and social vulnerability. According to Patchin and Hinduja, this factor also broadens the scope of risk, given that cyberbullying can occur across multiple online platforms without limitations of time or place.

Furthermore, the study underscores the importance of developing a comprehensive risk assessment framework to effectively address cyberbullying.

Such a framework should encompass not only the identification of physical and digital risks but also psychosocial factors that influence victims' vulnerability, including family background, social support, and pre-existing mental health conditions. This holistic approach is considered critical in designing intervention strategies that can mitigate the effects of cyberbullying and enhance victims' resilience against digital stressors.

Patchin and Hinduja also stress the necessity of ongoing education and awareness among students, parents, and educators regarding the risks of cyberbullying, as well as the role of technology in detecting and preventing such incidents. They advocate for stricter school policies and digital platform regulations to address issues related to anonymity and technological misuse, thereby minimizing cyberbullying risks within today's digital communities.

Overall, Patchin and Hinduja's (2021) research makes a significant contribution to the understanding of cyberbullying risks by emphasizing that effective risk management requires a multidimensional approach that integrates technological, psychological, social, and educational factors.

However, according to Smith and Steffgen, 2022 conceptualize cyberbullying as a multidimensional risk phenomenon wherein unpredictable actions within digital spaces lead to various negative consequences for victims. They emphasize that cyberbullying produces not only immediate impacts but also long-term effects on victims' mental well-being, social status within peer groups, and academic engagement.

The authors highlight that psychological outcomes of cyberbullying include heightened levels of stress, anxiety, depression, and social isolation, which ultimately diminish victims' capacity to function optimally in learning environments.

The study further underscores the complexity of risks posed by cyberbullying due to its digital nature, which allows for the rapid and widespread dissemination of harmful messages or images, thereby intensifying the trauma experienced by victims. Additionally, perpetrators' ability to operate under disguised identities complicates efforts to identify and hold them accountable, further escalating victims' anxiety and diminishing their sense of security.

In addressing these multifaceted risks, Smith and Steffgen advocate for integrated interventions encompassing both educational and technological components. Educational approaches involve awareness programs and training in social skills and digital literacy aimed at building students' resilience and mental fortitude against digital threats. On the technological front, they recommend the deployment of monitoring software, efficient online reporting systems, and automated detection algorithms capable of proactively identifying cyberbullying behaviors.

The authors argue that prevention- and recovery-oriented interventions are essential not only to mitigate the harm caused by cyberbullying but also to strengthen victims' digital resilience, a critical factor in contemporary technology-driven educational settings. Consequently, effective cyberbullying risk management requires a multidimensional approach that engages educators, parents, technology developers, and policymakers collaboratively.

Overall, Smith and Steffgen's, 2022 research significantly advances the understanding of the complex dynamics of cyberbullying risk and underscores the necessity of holistic strategies integrating educational and technological domains in its management. Then, Livingstone and Stoilova, 2023 argue that risk in the digital era, particularly in relation to cyberbullying, cannot be separated from the inherent complexity of the online environment, which reflects the interplay between technological structures and social behaviors.

They identify three key elements that contribute to the risks associated with cyberbullying: user anonymity, the broad accessibility and global reach of digital platforms, and the diverse forms of digital abuse that emerge through online interactions.

Anonymity, according to the authors, not only allows perpetrators to conceal themselves behind false identities but also diminishes their sense of accountability and social consequences for deviant behaviors such as insults, threats, or the dissemination of false information. In many cases, victims are unable to identify their perpetrators, which intensifies psychological distress and prolongs emotional suffering due to the absence of clarity and the inability to defend themselves.

In addition, the expansive networks facilitated by modern digital platforms enable bullying content such as offensive comments, humiliating images, or mocking videos to spread rapidly and reach large audiences. This significantly escalates reputational harm and social pressure on victims within a short period of time. Digital abuse, moreover, is not confined to a single mode of communication; rather, it spans multiple channels including private messages, public comment sections, social media, online games, and instant messaging apps. This diversity makes the experience of cyberbullying difficult for victims to control or avoid.

In response to these multidimensional risks, Livingstone and Stoilova emphasize the importance of adopting a socio-technical approach to both understanding and managing them. From a technological perspective, this entails the regulation and design of digital platforms, including algorithmic moderation, content blocking features, and robust user safety policies. From a social standpoint, they underscore the value of digital literacy the capacity of users, particularly adolescents, to critically understand, assess, and act responsibly in digital spaces.

Moreover, user behavior plays a critical role in the propagation of digital risks, especially in online environments where social norms may normalize ridicule, mockery, or the non-consensual sharing of sensitive content. Therefore, the authors advocate for interventions that not only address technical dimensions but also embed values-based digital education within schools and communities.

Overall, Livingstone and Stoilova's, 2023 research offers a significant contribution to the understanding of cyberbullying risks by proposing an interdisciplinary and holistic framework. They assert that managing risk in the digital age requires collaborative efforts among policymakers, platform providers, educators, parents, and young people themselves to foster a safer, more responsible, and empathetic digital ecosystem.

Risk is conventionally defined as the combination of the probability of an event occurring and the severity of its potential consequences. Within the domain of cyberbullying research, risk concepts have been operationalized through frequency of exposure, intensity of victimization, and perceived harm. However, existing literature often applies generic risk-management frameworks that dilute focus on the specific context of adolescent cyberbullying. For instance, some studies rely heavily on self-reported exposure frequency without integrating indicators of academic impact according to Stopbullying.gov, 2023. Others borrow wholesale from project-management style risk matrices, which while useful for organizational contexts, lack sensitivity to psychosocial and developmental nuances among adolescents.

A critical review of cyber-risk scholarship reveals that while Routine Activity Theory according to Cohen & Felson, 1979 and Social-Ecological perspectives have been influential, their operationalization in empirical cyberbullying studies is uneven. Probability is typically inferred from time spent online or number of platforms used, whereas impact is restricted to psychological self-reports. Few studies attempt to model academic outcomes explicitly, leaving a gap for

integrative approaches that connect risk probabilities with tangible educational performance metrics.

2.5.1 Existing Cyberbullying Risk Models

Several risk-assessment models have been applied to cyberbullying, each with distinct emphases. Models based on Routine Activity Theory conceptualize victimization as the convergence of motivated offenders, suitable targets, and absence of capable guardianship in digital environments. Social-Ecological frameworks extend this analysis by embedding individual vulnerabilities within layers of peer, family, school, and societal influences according to Hong et al., 2022, Protection Motivation Theory has also been employed to explain how adolescents cognitively appraise cyber threats and their coping capacities.

Despite these theoretical advances, empirical implementations reveal limitations. Most models focus primarily on exposure frequency and psychological outcomes. Few explicitly incorporate academic performance as a dependent variable, and even fewer validate their frameworks with practitioner input such as school counsellors. Additionally, recent platform diversification, especially the rise of TikTok harassment according to Zhu et al 2023 and Lwin & Chen, 2024, is rarely integrated into older models that disproportionately emphasis Facebook. This oversight risks rendering models outdated and less relevant to contemporary adolescent online behavior.

2.5.2 Theoretical Anchoring

The present study anchors its risk-assessment framework in two complementary theoretical perspectives: the Social-Ecological Model and Protection Motivation Theory.

The Social-Ecological Model provides a multi-layered lens to situate individual-level vulnerabilities such as personality traits and digital literacy deficits within broader interpersonal, institutional, and societal contexts. Peer influence and guardianship, for example, are conceptualized as meso-level dynamics that mediate individual susceptibility to cyberbullying exposure.

According to Protection Motivation Theory (Rogers, 1983) complements this framework by explaining the cognitive mechanisms through which adolescents evaluate threats and their coping resources. Threat appraisal involves perceived severity and vulnerability, while coping appraisal considers self-efficacy and response efficacy. Applied to cyberbullying, this theory rationalizes why victimization history, peer dynamics, and guardianship collectively shape both the probability of risk occurrence and the perceived impact on academic performance.

In summary, the literature consistently demonstrates that cyberbullying has significant psychological and behavioral consequences, with emerging evidence linking it to academic performance. However, several research gaps remain. First, most studies rely on descriptive correlations without developing probabilistic models that quantify risk in relation to educational outcomes. Second, empirical research in Southeast Asia, particularly Malaysia, remains sparse, with limited engagement of school practitioners in model validation. Third, existing models inadequately address the multi-platform reality of adolescent engagement, with insufficient attention to recently dominant platforms such as TikTok. Fourth, theoretical applications are often fragmented, leaving a need for integrated frameworks that connect individual vulnerabilities with ecological and cognitive processes.

These gaps justify the present study's objectives, which are to (1) develop a probability-based risk-assessment model of cyberbullying, (2) incorporate six

theoretically grounded factors such as victimization, social-media, guardian, personality, lack of knowledge usage the internet, and peer (3) validate the model using input from school counsellors, and (4) assess the implications of identified risks for academic performance. By addressing these gaps, the study contributes not only to cyberbullying scholarship but also to decision-support practices in educational management.

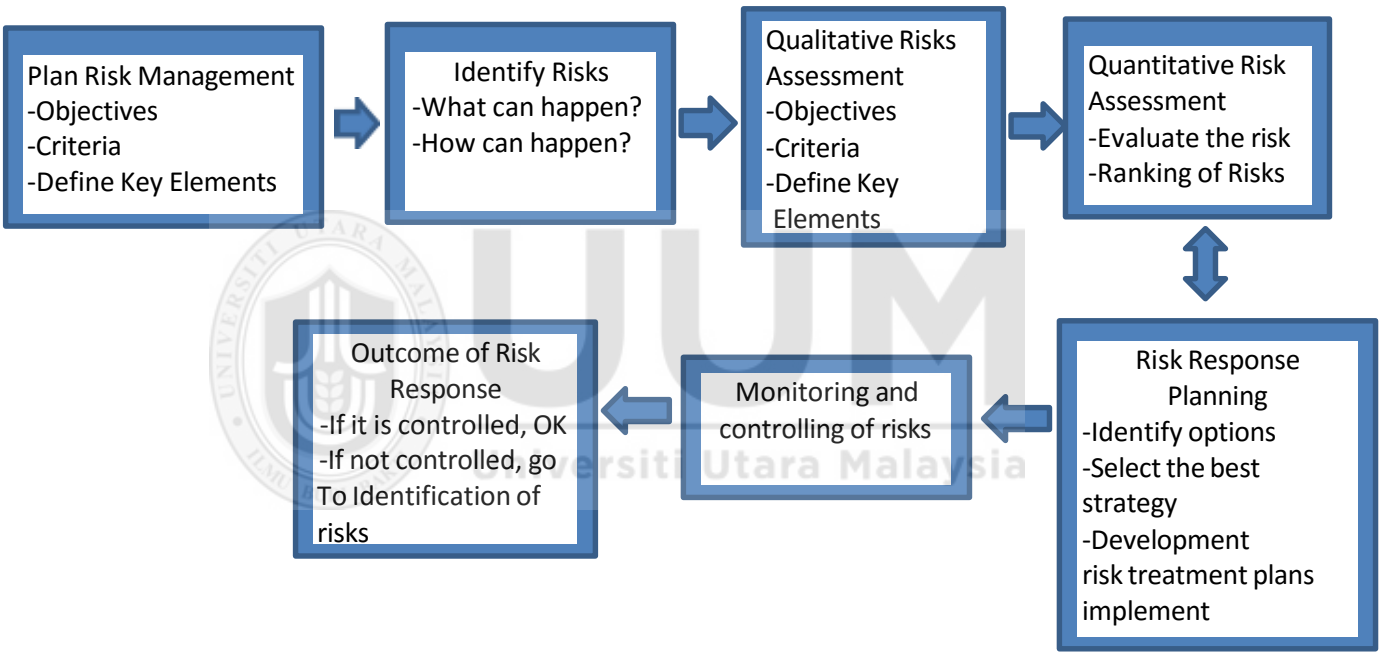

Figure 3: Show Risk Management Process.

2.6 Risk Management Process in the Context of Cyberbullying

Research Risk management in educational settings, particularly in addressing cyberbullying, involves a structured process aimed at identifying, assessing, mitigating, and monitoring risks that threaten students' well-being and academic success. The conceptual framework of the risk management process aligns closely with the literature presented in Chapter 2, which emphasis's the

interconnectedness of emotional, behavioral, and academic consequences of cyberbullying.

2.6.1 Risk Identification

The first stage involves recognizing potential threats to students' emotional stability, behavioral patterns, and learning performance. As outlined in Chapter 2, cyberbullying manifests in multiple environments physical spaces such as classrooms and buses, and digital platforms including social media, messaging apps, and online games. Identifying these high-risk contexts enables schools and policymakers to target preventive measures more effectively.

Emotional dimension: recognizing risks such as anxiety, depression, and diminished self-esteem.

Behavioral dimension: identifying maladaptive behaviors including withdrawal from social interaction or aggressive retaliation.

Academic dimension: noting potential declines in engagement, attendance, and performance linked to bullying exposure.

2.6.2 Risk Assessment and Analysis

Once risks are identified, their likelihood and potential severity must be assessed. The statistical data presented in Chapter 2 (e.g., prevalence rates of bullying in various settings) provides a quantitative basis for such evaluation.

Likelihood: frequency of incidents in specific contexts (e.g., 82.8% in schools, 19.2% on social media).

Impact: severity of outcomes, such as long-term emotional trauma or academic decline.

This assessment often involves a combination of qualitative and quantitative methods, including surveys, behavioral observations, and academic performance tracking.

2.6.3 Risk Mitigation Strategies

Based on assessment findings, intervention strategies are designed to minimize identified risks. Literature in Chapter 2 highlights a multi-layered approach:

2.6.3.1 Preventive measures such as digital literacy programs, peer mentoring, and awareness campaigns.

2.6.3.2 Responsive strategies including counselling, conflict resolution training, and restorative justice practices.

2.6.3.3 Environmental adjustments like increased supervision in high-risk areas and digital monitoring tools to detect cyberbullying behaviors.

2.6.4 Implementation of Controls

In the risk management cycle, implementation translates planned strategies into action. This may involve teacher training programs, parental engagement initiatives, and integration of anti-bullying policies into school regulations. In digital contexts, controls may also include platform-specific safety features such as content moderation and reporting mechanisms.

2.6.5 Monitoring and Review

The effectiveness of risk controls must be continually evaluated. As cyberbullying behaviors evolve with technological advancements, periodic reviews are necessary to ensure interventions remain relevant. Feedback loops involving students, teachers, and parents help refine strategies over time.

However, the rising incidence of cyberbullying across both physical and digital environments has prompted extensive empirical research aimed at understanding its scope, mechanisms, and consequences. As outlined in earlier sections of Chapter 2, cyberbullying is not a singular event but rather a complex phenomenon that spans multiple contexts and is closely linked to students' emotional well-being, behavioral adjustment, and academic performance. Given its multidimensional nature, it is essential to examine recent research that not only measures the probability of cyberbullying occurring across different situations but also explores in depth the scale and severity of its impacts.

The following review synthesizes findings from 27 peer-reviewed journals published between 2023 and 2025, providing a comprehensive overview of the probability and impact of cyberbullying. This synthesis highlights not only current trends and identified risk factors but also offers critical insights for designing more targeted prevention and intervention strategies.

2.6.6 Probability of Cyberbullying

Probability refers to the likelihood or prevalence of students experiencing cyberbullying across various settings, including physical environments such as schools and buses, community spaces, and digital platforms. Across the reviewed literature, reported prevalence rates range from 6% to over 50%, depending on study location, participant demographics, and data collection methods.

Physical Contexts: Studies such as Hinduja & Patchin (2025) and Al-Hinai et al. (2025) found that schools remain the primary setting for incidents, with prevalence exceeding 80% of reported cases.

Digital Contexts: Research by Solas-Martínez et al. (2025) and JMIR (2025) highlighted the significant role of social media, messaging applications, and

online gaming in facilitating cyberbullying, particularly when screen time exceeds healthy limits.

Transitional Spaces: Findings also point to school buses and commuting routes as critical risk zones, with certain studies reporting up to 32.5% of cases occurring in these settings.

Probability is influenced by variables such as gender, social status, perceived popularity, and intensity of internet use, emphasizing the importance of identifying high-risk profiles for targeted prevention.

2.6.7 Impact of Cyberbullying

The impact of cyberbullying encompasses detrimental effects on emotional health, behavioral adjustment, and academic outcomes, as elaborated in Chapter 2 of the thesis.

2.6.8 Emotional Impact

Most journals reported that cyberbullying victims face elevated risks of anxiety, depression, psychological trauma, and low self-esteem. A neurobiological review in Frontiers in Psychology (2025) revealed activation of “social pain” neural networks, impairing emotional regulation. Hinduja & Patchin (2025) established a direct association between school-based victimization and PTSD symptoms.

2.6.9 Behavioral Impact

Behavioral consequences include social withdrawal, reduced participation in group activities, increased aggression, and retaliatory behaviors online. Al- Hinai et al. (2025) observed that “dual victims” displayed the highest levels of both internalizing and externalizing behaviors.

2.6.10 Academic Impact

Academic effects documented include:

i. Decreased learning motivation (Solas-Martínez et al., 2025).
ii. Increased test anxiety interfering with exam performance.
iii. Declines in GPA (Al-Hinai et al., 2025).
iv. Absenteeism, reducing academic engagement (Children, MDPI, 2024).

2.6.10.1 Long-Term Consequences

Several studies, such as The Lancet Psychiatry (2025), emphasized the heightened risk of suicidal ideation among victims subjected to sustained cyberbullying, signaling that its impact extends beyond academic performance to critical mental health crises.

From the synthesis of these 27 studies, the following conclusions emerge. Cyberbullying is a multi-context phenomenon that occurs across physical and digital environments, often overlapping and amplifying victimization effects. Probability is high, particularly in school settings and on social media platforms.

Impact is multidimensional and severe, spanning emotional, behavioral, and academic domains, with potential escalation to serious mental health outcomes. These findings align with the Risk Management Process framework discussed in Chapter 2 of the thesis, where risk identification, probability assessment, and impact analysis must be integrated to design comprehensive prevention and intervention strategies.

On the other hand, the preliminary review of 27 indexed journals published between 2023 and 2025 provided a comprehensive overview of the probability

and multidimensional impacts of cyberbullying, encompassing emotional, behavioral, and academic aspects. However, for the purpose of this study, the scope was deliberately narrowed to focus exclusively on the academic performance dimension. This decision aligns with the research objectives outlined in Chapter 1, which priorities the relationship between exposure to cyberbullying and measurable academic outcomes, such as levels of student engagement, school attendance, learning motivation, and examination performance.

In operationalizing this refined scope, the selected journals were utilized in two primary ways. First, they served as a theoretical foundation for identifying the most relevant academic performance indicators that are influenced by cyberbullying. This approach ensured that the study's conceptual framework was firmly grounded in the latest empirical evidence. Second, findings from these journals were directly employed in the development of the research questionnaire, with key constructs and measurement items adapted from validated instruments used in previous studies. For example, scales for measuring task value, self-efficacy, test anxiety, and absenteeism were derived from the works of Solas-Martínez et al. (2025), Al-Hinai et al. (2025), and MDPI (2024), thereby ensuring content validity and methodological robustness.

Moreover, the integration of these journals extended beyond literature synthesis and instrument design. The findings were also used as a basis for academic discourse through structured engagement sessions with subject matter experts, including senior academics specializing in educational psychology, digital behavior, and school-based risk management. These discussions not only validated the appropriateness of the selected variables but also provided critical feedback on their contextual relevance within the Malaysian secondary school setting.

Through systematic narrowing of the research scope, the use of authoritative literature in constructing data collection instruments, and validation through scholarly consultation, this study aims to deliver a more precise and evidence-based understanding of the influence of cyberbullying on students' academic performance. This approach ensures that the research findings are not only methodologically sound but also practically relevant for policy development and educational interventions.

In examining the phenomenon of cyberbullying, it is insufficient to merely describe its occurrence without understanding the underlying conditions that make it more or less likely to take place. Probability, in this context, does not simply reflect statistical likelihood; rather, it encapsulates the constellation of individual, social, and technological factors that converge to create a fertile ground for harmful digital interactions. By identifying these determinants, researchers and practitioners can move beyond reactive measures, focusing instead on targeted interventions that disrupt the pathways leading to victimization.

The synthesis of the 27 indexed journals reviewed between 2023 and 2025 offers a robust empirical foundation for this endeavor, distilling recurrent patterns and risk variables that transcend geographical and cultural boundaries. Against this backdrop, the following section delineates six principal factors that collectively shape the probability of cyberbullying, providing a critical lens through which both its prevention and mitigation can be more strategically approached.

The likelihood of cyberbullying is shaped by a combination of individual, social, and technological factors, as consistently evidenced in the 27 indexed journals reviewed (published between 2023 and 2025). These factors not only determine the probability of students engaging in or becoming victims of cyberbullying but also provide critical guidance for identifying effective intervention points. The following discussion outlines six key determinants that emerged from the

literature review: victimization factors, social media factors, guardian factors, personality factors, lack of knowledge of internet usage factors, and peer factors.

2.6.11 Victimization Factors

Previous victimization experiences whether in the form of traditional bullying or prior cyberbullying increase the likelihood of being targeted again in digital environments. Studies such as Al-Hinai et al. (2025) and Hinduja & Patchin (2025) found that students previously bullied offline exhibit higher vulnerability to online harassment.

This is driven by persistent power imbalances, entrenched social hierarchies, and the transference of offline conflicts into digital spaces. Such patterns illustrate the cyclical nature of victimization, where pre-existing social and behavioral vulnerabilities are repeatedly exploited by perpetrators.

2.6.12 Social Media Factors

The literature demonstrates a strong correlation between intensive social media use and the increased probability of cyberbullying. Research by Solas-Martínez et al. (2025) and MDPI (2024) emphasis's that platforms such as Instagram, TikTok, and online gaming communities are primary mediums for the dissemination of digital aggression. Frequent posting, public profile visibility, and participation in open comment threads elevate exposure to risky interactions.

This risk is shaped not only by time spent online but also by the nature of interactions, with open discussions and competitive online gaming associated with higher rates of cyberbullying compared to closed or moderated spaces.

2.6.13 Guardian Factors

Parental or guardian factors plays a pivotal role in influencing cyberbullying probability. Studies by Children (MDPI, 2024) and JMIR (2025) indicate that a lack of monitoring of online activities particularly among adolescents correlates with increased victimization risk. Conversely, structured digital literacy guidance and active engagement by guardians in children's online activities are linked to lower incident rates. Effective supervision extends beyond technical monitoring (e.g., content filters) to encompass open communication and trust-building between guardians and children.

2.6.14 Personality Factors

Personality characteristics such as introversion, low self-esteem, impulsivity, and heightened sensitivity to social feedback have been identified as predictors of victimization likelihood. Al-Hinai et al. (2025) reported that students with high neuroticism scores more frequently reported victim experiences, whereas those with low agreeableness scores were more prone to retaliatory online behavior, increasing their exposure to counterattacks. These traits shape how students interpret digital interactions, respond to provocation, and manage online conflict.

2.6.15 Lack of Knowledge of Internet Usage Factors

Limited understanding of safe internet practices significantly increases the risk of cyberbullying victimization. Research in Computers & Education (2024) and Educational Technology Research & Development (2025) found that students with low awareness of privacy settings, digital footprints, and secure communication protocols are more vulnerable to online harassment. This vulnerability is exacerbated when students overshare personal information or fail to recognize early signs of digital aggression.

2.6.16 Peer Factors

Peer networks have a substantial impact on cyberbullying involvement, whether as victims or perpetrators. Studies in JMIR (2025) and Frontiers in Psychology (2025) revealed that students embedded in peer groups characterized by aggressive humor, exclusion tactics, or excessive online competition face higher cyberbullying risks. Peer endorsement or reinforcement of harmful behavior fosters environments that perpetuate and escalate bullying conduct.

Nevertheless, the probability of cyberbullying, as synthesized from the 27 reviewed journals, emerges from the interplay of personal history, digital engagement patterns, guardian oversight, personality profiles, technological literacy, and peer dynamics. These factors interact in ways that can either heighten or reduce victimization risk. Understanding these relationships enables the more precise and context-sensitive application of the Risk Management Process discussed in Chapter 2, thereby facilitating the development of targeted prevention strategies to reduce the likelihood of cyberbullying among students.

2.7 THE IMPACTS OF CYBERBULLYING ON ACADEMIC PERFORMANCE: PERSPECTIVES FROM SCHOOL COUNSELLORS AND ACADEMICS.

A detailed review with school counsellors and academic experts underscores that the repercussions of cyberbullying extend far beyond emotional and social harm, exerting a profound influence on students' academic trajectories. The impacts manifest across multiple dimensions learning engagement, academic achievement, and the development of higher-order cognitive skills each interconnected with the emotional and behavioral well-being of the learner.

Foremost, cyberbullying disrupts students' capacity to concentrate and sustain attention on academic tasks. Emotional distress triggered by online harassment,

the spread of false rumors, or deliberate social exclusion diminishes cognitive focus, impeding the assimilation of new knowledge and hindering meaningful participation in classroom activities.

Equally concerning is the erosion of intrinsic learning motivation. Victims often exhibit a notable decline in subject interest and classroom participation, particularly when interactions with peers become a persistent source of anxiety. This motivational deficit frequently translates into inconsistent study habits, reduced academic effort, and, ultimately, lower achievement outcomes.
Cyberbullying also compromises time management and study discipline. Counsellors reported that victims commonly resort to procrastination, increased absenteeism, and avoidance of group-based learning activities. Such patterns not only limit exposure to collaborative problem-solving opportunities but also adversely affect performance in both formative and summative assessments.

Another critical dimension is the decline in academic self-efficacy. Exposure to public criticism or humiliation regarding academic performance especially via social media undermines students' confidence in their own abilities. This loss of self-belief often results in reluctance to seek help, reduced engagement in academic discourse, and diminished participation in collaborative learning, thereby constraining intellectual growth.

Importantly, these academic consequences rarely occur in isolation. Field data confirm a reciprocal relationship between emotional distress, behavioral withdrawal, and academic disengagement, creating a cyclical pattern in which each dimension reinforces the others. Heightened anxiety and low self-esteem drive avoidance behaviors, which in turn exacerbate academic underperformance and further entrench vulnerability to cyberbullying.

In sum, the evidence presented by both practitioners and scholars affirms that cyberbullying poses a direct and multifaceted threat to academic performance.

Its impacts are mediated through a complex interplay of emotional disruption, behavioral change, and motivational decline. This understanding provides the necessary empirical foundation for the present thesis, which seeks to operationalize these variables within a probability-based risk assessment model enabling schools to identify high-risk students with greater precision and implement timely, evidence-informed interventions.

2.8 THE IMPACT OF THE COVID-19 PANDEMIC ON CYBERBULLYING RISK AND ACADEMIC PERFORMANCE.

The COVID-19 pandemic profoundly altered the educational ecosystem, substantially expanding the risk landscape of cyberbullying among secondary school students. Prolonged school closures and the rapid transition to online learning increased students' reliance on digital platforms for both academic and social interaction. This heightened dependence intensified all six key risk factors identified in this study factors victimization, factors social media, factors guardian, factors personality, factor lack of knowledge usage internet, and factors peer dynamics while adding new layers to the academic consequences experienced by students.

International evidence underscores the scale of this shift. In the United States, the incidence of cyberbullying rose from 13% in the 2019–2020 academic year to 18% between 2021 and 2023 (Axios, 2023). Social media analyses further revealed a marked surge in discussions related to cyberbullying beginning in March 2020, coinciding with the onset of global lockdowns (Alim et al., 2020). Such findings align with field observations during the pandemic, indicating that sustained, high-intensity virtual interactions created conditions for repeated and pervasive acts of online harassment (Pang et al., 2022).

Regionally, a study in Saudi Arabia found that 26.3% of students reported significant deterioration in academic performance due to cyberbullying, with some considering school withdrawal (Alqahtani et al., 2023). In Malaysia, empirical research has identified a significant association between cyberbullying exposure, symptoms of depression, and decreased learning motivation, while prevention programs have been shown to mitigate these adverse effects (Pang et al., 2022).

Interviews with school counsellors and academics confirmed that the interaction of the six risk factors during the pandemic accelerated a negative cycle involving emotional distress, withdrawal from learning activities, and academic underperformance.

For example, students with a history of victimization experienced traumatization when encountering aggressors in virtual spaces; unregulated patterns of social media use facilitated continuous exposure to harmful interactions; guardian oversight diminished as parents managed remote work and pandemic-related stress; personality traits such as introversion became more pronounced under social isolation; technological illiteracy prevented students from implementing protective measures; and weakened peer group dynamics deprived victims of critical social support.

This convergence of risk factors during the pandemic deepened the academic impacts of cyberbullying, including reduced concentration, poor time management, disengagement from virtual classes, delayed assignment submissions, and declining academic self-efficacy. These patterns underscore the urgent need for a robust, evidence-based, probability-driven risk assessment model that is not only theoretically sound but also contextually sensitive to crisis scenarios such as pandemics directly aligning with the objectives and research questions of this thesis.

2.9 SUMMARY

This chapter has reviewed three main areas which are important for the development of the proposed method. Firstly, it has reviewed the issue of cyberbullying. In order to classify the risk of the impact of cyberbullying among students in academic performance at school, a systematic method of evaluating the performance of the impact of cyberbullying in academic performance among students at secondary school is needed.

Therefore, this chapter has been developed to review works of literature related to cyberbullying intensively. Three main parts have been identified in order to analyses the impact of cyberbullying holistically, and addressing cyberbullying should be a collective effort on the part of schools, families, students, and society.

Secondly, in order to consider the development of comprehensive programs to fight cyberbullying, including detailed and unified policies as well as effective programs to educate students about the impact of academic performance itself, a comprehensive review of cyberbullying has been done. Since electronic technology in the global world of social media development has many positive effects, it also has a negative effect on consumers, especially among secondary school students. There are still many factors that can affect academic performance and might threaten students.

Thirdly, as a tool for analyzing the impact of cyberbullying on academic performance, a risk-based analysis has been reviewed to apply the technique to cyberbullying. Risk assessment can be used in a variety of fields in which a decision-making process is required. Since cyberbullying has an impact on students, risk assessment can be considered a useful tool to help prevent cyberbullying, which has been defined in Chapter 1 as the focus of this thesis.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

Cyberbullying among secondary school students has emerged as a serious threat to their psychosocial well-being and academic performance. While prior studies have explored the psychological and social dimensions of this phenomenon, there remains a notable gap in the development of a comprehensive, empirically validated, and quantitatively driven risk assessment model that can be applied effectively in school settings. This gap is further accentuated by the context of the COVID-19 pandemic, which intensified online interactions and, consequently, increased the likelihood of students becoming victims of cyberbullying.

To address this gap, the primary aim of this study is to develop a risk-based method that can optimize and mitigate the impact of cyberbullying on the academic performance of secondary school students through mathematical formulation. The proposed method is designed to accurately measure risk levels, enabling schools to implement evidence-based interventions that are contextually relevant to current educational realities.

To achieve this aim, the chapter is organized into three main phases:

Risk Quantification – Measuring and analyzing the risks of cyberbullying on students' academic performance through an action research approach.

Mathematical Formulation – Developing a quantitative risk model based on a random selection of individual students and academic performance indicators.

Risk Optimization – Applying mathematical optimization techniques to minimize the impact of cyberbullying, recognizing that a significant proportion of students are vulnerable to victimization.

In addition to outlining these methodological phases, this chapter also details the systematic approach undertaken for the literature search relevant to the study. The process was carried out in two stages. The first stage involved identifying credible and reliable academic performance datasets, as well as collecting peer-reviewed research related to cyberbullying prediction models. Microsoft Excel served as the primary platform for data management, while keyword searches focused on the effects of cyberbullying on the academic achievement of secondary school students.

The second stage involved a strategic sampling approach selecting entire classes at random rather than individual students to ensure complete anonymity and safeguard participants from potential adverse consequences. All retrieved studies were thoroughly screened to ensure compliance with the inclusion criteria, whereby each selected article was required to report an empirical investigation explicitly examining the relationship between cyberbullying and student academic performance.

Through these steps, this chapter establishes a robust methodological foundation for the study, ensuring that the risk-based model developed is empirically grounded, practically applicable, and ethically sound.

3.1 PROPOSED METHOD

The research gap identified in Chapter 2 reveals that previous studies have yet to develop a quantitative, comprehensive, and empirically validated risk assessment model capable of measuring the direct impact of cyberbullying on the academic performance of secondary school students. The absence of such a model limits the ability of schools to conduct accurate assessments and implement evidence-based interventions. In alignment with the objectives of this study, the proposed method is designed to address this gap through the application of simulated mathematical modelling, enabling scientifically grounded and optimizable risk measurement.

The first phase involves developing a simulated mathematical model to conduct a comprehensive risk analysis, quantifying both the probability and severity of cyberbullying's impact on student academic performance.

The procedural framework for model development, optimization, and validation is presented in Figure 3.2. The final outcome is expected to be a robust, optimized model that can accurately assess risk levels and support targeted interventions in school environments.

The identification of the cyberbullying problem will be achieved through a triangulation of multiple data sources, including field observations, structured interviews with counsellors and teachers, statistical data analysis, and a comprehensive literature review. This information will be synthesized into an initial conceptual model, which will be refined through the definition of relevant variables, parameters, and process flows. These elements will then be formalized into mathematical formulations to enable objective risk computation.

The resulting mathematical equations will be utilized to provide detailed explanations and risk forecasts using appropriate algorithms and specialized

computer software. Verification and validation procedures will be conducted to evaluate the accuracy, robustness, and practical applicability of the model in the context of cyberbullying risk assessment. Through this approach, the model aims not only to bridge the existing knowledge gap but also to serve as a practical tool for safeguarding the academic and psychosocial well-being of secondary school students.

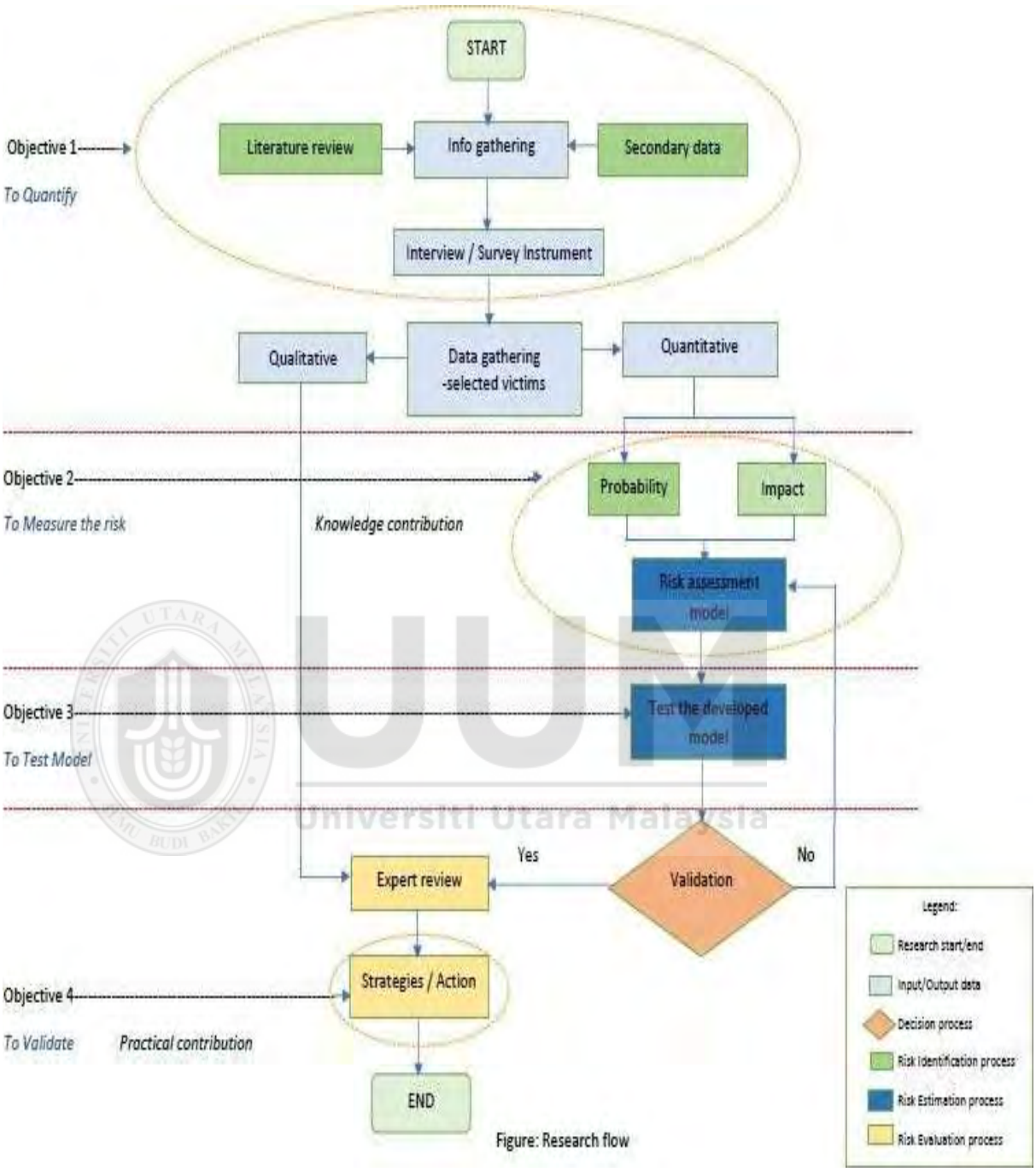

Figure 4:

Modelling of the probability and the impacts of cyberbullying towards student's performance.

The flowchart presented in Figure 4 illustrates the methodological process employed to quantify the probability and impact of cyberbullying on the academic performance of secondary school students. The process begins with information gathering, which encompasses three core activities: a comprehensive literature review, the collection of secondary data, and the administration of interviews and survey instruments. These steps provide a solid foundation for understanding the research problem while ensuring that both contextual and empirical perspectives are systematically integrated.

Following this initial stage, data collection is conducted with a targeted selection of students who have experienced cyberbullying. A qualitative approach is employed to gain in-depth insights into the lived experiences of victims, while a quantitative approach is used to statistically measure risk variables. Within the quantitative process, two primary components probability and impact are evaluated to enable the construction of the risk assessment model.

The developed model then undergoes a testing phase to assess its performance and predictive capacity. Subsequently, the model is subjected to a validation process to evaluate its robustness and accuracy through expert review. If validation confirms the model's effectiveness, the study proceeds to the development of strategies and actions, representing the practical contribution of the research. Should the model fail validation, it will be refined and re-evaluated before advancing to the final stage.

Overall, the flowchart reflects a systematic and iterative approach that integrates risk identification, risk estimation, and risk evaluation processes. This approach ensures that the final model is not only theoretically sound and empirically supported but also serves as a practical guide for implementing effective interventions to reduce the impact of cyberbullying on students' academic performance.

The research, as outlined in the flowchart, involved a study conducted with ten secondary school counsellors who served as subject-matter experts. The questions presented to these counsellors were developed based on findings from peer-reviewed journals on cyberbullying, as well as discussions with academics in the field.

From this study, six key contributing factors to the occurrence of cyberbullying were identified:

1. Experience Victimization Factors
2. Social Media Factors
3. Guardian Factors
4. Personality Factors
5. Lack of Knowledge of Internet Usage Factors
6. Peer Factors

The table below presents the data for each of these factors, including the assigned weightage derived from expert evaluations. This weightage serves to quantify the relative significance of each factor in assessing the risk of cyberbullying and its impact on students' academic performance.

In this research, the weightage of experts refers to the relative importance values assigned by subject-matter experts in this case, secondary school counsellors to each factor contributing to the risk of cyberbullying. These weightages are derived through a structured evaluation process, informed by the experts' knowledge, field experience, and understanding of the cyberbullying phenomenon and its implications for students' academic performance.

The primary functions of the expert weightages are as follows:

1. Measuring the Relative Importance of Factors

Not all factors such as victimization experience, social media usage, or peer influence have an equal impact on cyberbullying risk. The weightages assigned by experts help quantify the degree to which each factor contributes to the overall risk level.

2. Enhancing the Accuracy of the Mathematical Model

These weightages form a critical component of the mathematical formulation used to compute the cyberbullying risk index. Incorporating expert-validated weightages ensures that the model reflects real-world conditions more accurately, rather than relying solely on raw data without contextual expertise.

3. Supporting Intervention Prioritization

Factors with higher weightages become the primary targets for intervention planning. For instance, if the highest weightage is assigned to social media factors, schools may priorities control measures, monitoring, or digital literacy programs.

4. Bridging Qualitative Insights and Quantitative Analysis

The weightage of experts acts as a bridge between qualitative findings (expert insights and experiences) and quantitative analysis (mathematical computations), thereby strengthening the validity and reliability of the risk assessment model.

Overall, the weightage of experts in this study functions not only as a technical parameter within the mathematical model but also as a reflection of real-world perspectives provided by individuals with direct experience in managing cyberbullying issues in schools. Integrating these weightages allows the developed model to be more contextualized, accurate, and relevant for use by educational institutions in implementing evidence-based interventions.

The expert review process, which formed the basis for the Average Score (AVS) and weightage (α) calculations, involved a structured evaluation of the six identified risk factors (B1–B6) by the selected panel of ten experts. Each expert provided a score for every factor based on its perceived importance in influencing the likelihood of cyberbullying. These scores were aggregated, converted into average scores, and subsequently transformed into proportional weightages for use in the Cyberbullying Probability Flowchart (CbPF) model. The quantitative results derived from this expert review, along with their detailed interpretation, are presented in Chapter 4 under the section Expert Evaluation and Weightage Calculation.

3.2 WEIGHTAGE OF EXPERTS (COUNSELLORS AT SECONDARY SCHOOL)

3.2.1 Development of impact Equation (EXPERT)

The development of the Impact Equation (EXPERT) is designed to integrate expert judgment into the quantitative assessment of cyberbullying risk factors. The formula is expressed as:

$$\Pr = \sum_{1}^{f} \alpha_f \omega_f \quad \text{.....Equation 1}$$

where:

- Pr represents the overall probability score or the aggregated measure of cyberbullying risk based on expert evaluations.
- f denotes the factor index, representing each of the identified risk factors contributing to cyberbullying.

- α_f refers to the assigned score or rating for factor f based on expert assessment, typically derived from empirical data, interviews, or structured questionnaires.
- ω_f denotes the weightage of factor f which represents its relative importance as determined by experts (as discussed in the Weightage of Experts section).

This formulation operates as a weighted summation, where each factor's score is multiplied by its corresponding expert-assigned weightage. The sum of these weighted values yields an aggregated probability score, which serves as a quantitative indicator of the likelihood and potential severity of cyberbullying within a given school context.

The use of this weighted approach ensures that the probability computation reflects both the empirical presence of each factor α_f and its relative significance in the real-world context ω_f as determined by expert judgment. This methodology provides a more robust and context-sensitive risk estimation compared to unweight models, which may treat all factors as having equal influence.

Furthermore, integrating expert-derived weightages into the impact equation enhances the construct validity of the model, as it accounts for nuanced, experience-based knowledge that may not be fully captured through raw statistical data alone. The equation therefore serves as a critical step in bridging theoretical risk constructs with practical, evidence-based intervention planning.

Where:

f : Number of factors f

α_f : Weightage for factor f

ω_f : Student score for factor f

$\alpha_f = \frac{AVS_f}{AVS\,T}$

Where:

AVS_f : Expert average score for factor f

AVS_T : Total Experts' average score for all factors.

3.2.2 Calculation of Weightage for Expert

To determine the probability, it is essential to obtain the weightage α_f for each contributing factor. Referring to Equation 1 above, the value of α_f for each factor can be derived by following the procedural steps outlined below.

3.2.2.1 Step One: Calculation of Total Score

The first stage involves calculating the total score assigned by the experts who participated in the study. Six predetermined factors are evaluated, with each factor assigned a total score denoted as TS1, TS2, TS3, TS4, TS5, and TS6. The total score for each factor is obtained by summing the scores given by all experts for the questions associated with that factor.

For instance, Table 10 presents the expert scores for Factor 2: Social Media Factors. Each expert assigns a numerical rating to several related questions (e.g., Q1, Q2, Q3). These individual question scores are then aggregated to generate a total score for each expert.

Example Calculation:

- **Expert 1:** Q1 = 4, Q2 = 2, …, *Total Score* = 16
- **Expert 2:** Q1 = 3, Q2 = 5, …, *Total Score* = 15
- **Expert 3:** Q1 = 1, Q2 = 2, …, *Total Score* = 5

This procedure is repeated systematically for all six factors to produce a complete set of total scores. These total scores serve as the foundational input for subsequent probability computation and risk assessment analyses.

Table 1: Experts' scores for each question in Factor B2, which is Social Media Factors.

	Q1	Q2	Q3	Q4	Q5	TOTAL
Expert 1	4	2	4	3	3	16
Expert 2	3	3	3	3	3	15
Expert 3	1	1	1	1	1	5
Expert 4	2	2	3	3	2	12
Expert 5	2	1	3	2	2	10
Expert 6	3	2	3	3	3	14
Expert 7	1	0	2	2	2	7
Expert 8	3	2	3	3	2	13
Expert 9	2	1	3	4	3	13
Expert 10	1	1	2	1	2	7
	22	**15**	**27**	**25**	**23**	**112**

This interpretation not only strengthens the quantitative foundation of the risk assessment model but also reinforces the validity of the instrument through the involvement of experienced practitioners in counselling and secondary school education.

To calculate each expert based on questions, which are Q1 to Q5.

For example,

E1 = Q1 (4) + Q2 (2) + Q3 (4) + Q4 (3) + Q5 (3) **= TS 16**

The same process is used for all the Experts.

Lastly, in this step, we sum up the totals to get the total score for the experts for factor B2, which is 112.

From a methodological standpoint, the dataset will be utilized to:

Calculate the Average Score (AVS) for each question across all experts.

Determine the Weightage (α) of Factor B2 for integration into the overall risk index calculation.

Assess Expert Agreement by analyzing the range and variance of scores provided.

In Table 11, we list all the total scores from the experts based on the process mentioned above.

Table 2: Calculation of Total Score for all factors.

Factor	Title	Total Score
B1	Experience Victimization	53
B2	Social media	112
B3	Guardians	144
B4	Personality	90
B5	Lack Of Knowledge of Internet Usage	122
B6	Peers	44

The table presents the total scores obtained for six key factors identified through expert evaluation in the development of the cyberbullying risk assessment model. Each factor represents a specific dimension influencing students' exposure to cyberbullying risk, where a higher score reflects the experts' perception of its relative significance in contributing to overall vulnerability.

The analysis indicates that Factor B3: Guardians recorded the highest total score (144), suggesting that the influence of guardians or individuals responsible for students is perceived as the most critical element in determining susceptibility to cyberbullying. This is followed by B5: Lack of Knowledge of Internet Usage (122) and B2: Social Media (112), both of which highlight the importance of digital literacy and social media engagement as substantial predictors of cyberbullying risk.

B4: Personality scored 90, indicating that personal attributes such as self-control, confidence, and social tendencies also play a considerable role in shaping students' risk levels. B1: Experience Victimization (53) falls within the moderate range, while B6: Peers (44) recorded the lowest score, implying that peer influence is perceived as the least dominant dimension compared to other factors in the context of this study.

From a methodological standpoint, these score variations will be utilized in the calculation of weightage for each factor within the risk assessment model. The weightage values allow the model to priorities analytical emphasis on factors with greater impact, thereby enhancing the accuracy of risk prediction and the effectiveness of targeted intervention strategies.

Overall, the findings underscore the pivotal roles of guardian involvement, internet literacy, and social media use as the primary areas of focus in preventive and mitigation efforts to address cyberbullying risks among secondary school students.

Table 11 above shows the calculation for the total score for all factors, which are factors B1 to B6, as shown in Table 11. The calculation to get factor B1 total score is as follows:

For example,

Sum of Q1 (12) + Q2 (9) + Q3 (6) + Q4 (11) + Q5 (6) + Q6 (5) + Q7 (4) = **TS 53**

The same processes are used for all the factors.

3.2.2.2 Step Two: Calculation of Expert Average Score (AVS)

In this step, we need to calculate the expert average score (AVS) for all the factors. To calculate these AVS, we need the maximum score for each factor. Table 3 below shows how to calculate the maximum score:

Table 3: Calculation of the maximum score

Factor	Num Of Questions	Maximum Score for Each Question	Number Of Experts	Maximum Score
B1	7	4	10	280
B2	4	4	10	160
B3	7	4	10	280
B4	5	4	10	200
B5	5	4	10	200
B6	4	4	10	160

The table outlines the structural scoring framework applied to six primary factors within the cyberbullying risk assessment model. Each factor is associated with a specific number of questions, a fixed maximum score per question, and the number of experts contributing to the evaluation. These parameters collectively determine the maximum attainable score for each factor, which serves as a benchmark against which the actual expert scores are compared.

The data reveal that Factor B1: Experience Victimization and Factor B3: Guardians each hold the highest maximum score of 280 points, reflecting their

broader scope of assessment through seven questions evaluated by ten experts. This expansive coverage indicates the multidimensional nature of these factors, capturing a more comprehensive range of risk indicators.

Factor B4: Personality and Factor B5: Lack of Knowledge of Internet Usage each have a maximum possible score of 200 points, derived from five assessment questions. This score allocation suggests a moderately broad investigative scope, enabling a balanced yet focused evaluation of these dimensions in relation to cyberbullying vulnerability.

At the lower end, Factor B2: social media and Factor B6: Peers both present a maximum possible score of 160 points, each assessed through four questions. While these factors are narrower in scope compared to B1 and B3, their inclusion reflects the model's recognition of targeted behavioral and environmental influences on students' risk exposure.

From a methodological perspective, the variation in maximum scores across factors underscores the model's strategic weighting design, ensuring that dimensions with wider or more complex constructs (e.g., B1 and B3) are given greater evaluative breadth. Conversely, more specific factors (e.g., B2 and B6) are assigned fewer but focused indicators to maintain analytical precision without overrepresentation.

This scoring architecture not only facilitates a balanced risk quantification process but also enhances the validity of inter-factor comparisons, enabling the identification of priority areas for intervention and policy development.

These maximum scores are calculated by multiplying the number of questions by the maximum score for each question by the number of experts. For example, for factor B1, we multiply as follows:

Max Score for factor B1 = number of questions in B1 X max score for each question X number of experts.

Where;

= 7 X 4 X 10

= 280

The same processes are used for all the factors.

Next, we divide the total score for each factor (which is shown in Step 1) by the corresponding maximum score to get the average score (AVS). Table 4 below shows the total score, max score, and average score (AVS) for each factor.

Table 4: The total score, max score, and average score (AVS) for each factor.

Factor	Total Score	Max Score	Average Score (AVS)
B1	53	280	0.18928
B2	112	160	0.70000
B3	144	280	0.51428
B4	90	200	0.45000
B5	122	200	0.61000
B6	44	160	0.27500

The table compares the actual scores obtained for each risk factor with their corresponding maximum possible scores, resulting in the Average Score (AVS) for each dimension. AVS serves as a quantitative indicator of the relative importance or influence of a factor, as perceived by the panel of experts. A higher AVS value denotes that the factor is considered more significant in contributing to students' vulnerability to cyberbullying.

The analysis reveals that Factor B2: social media recorded the highest AVS (0.70000), indicating that experts view social media usage as the most dominant factor increasing students' susceptibility to cyberbullying. This is followed by B5: Lack of Knowledge of Internet Usage (0.61000) and B3: Guardians

(0.51428), underscoring the crucial roles of digital literacy and guardian involvement in mitigating cyber-related risks.

Factor B4: Personality achieved a moderate AVS (0.45000), suggesting that personality traits such as self-control, confidence, and social tendencies exert a notable but less prominent influence compared to technology-related or support-based factors. B6: Peers (0.27500) and B1: Experience Victimization (0.18928) recorded the lowest AVS values, indicating that, while relevant, these factors are perceived as less critical in the overall risk hierarchy within the context of this model.

From a methodological perspective, AVS forms the basis for calculating the weightage assigned to each factor in the risk assessment model. This approach ensures that the model not only accounts for the presence of risk factors but also applies proportional emphasis to those with the greatest perceived impact on students' safety and academic engagement.

Overall, the findings highlight that technology-related dimensions and digital literacy (B2 and B5), alongside guardian support (B3), and should be prioritized in preventive interventions, whereas personal characteristics and prior victimization experiences may require more tailored support strategies.

To calculate the AVS as below,

For example,

Total score 53 = **AVS 0.18928**
Max score 280

The same process is done for all the factors.

3.2.2.3 Step Three: Calculation of Weightage, α_f

Firstly, we need to sum up all the expert average scores for all the factors that we get in Table X2 (Step 2). Table 5 below shows the summation of all the average scores.

Table 5: The summation of all the average scores

Factor	Average Score (AVS)
B1	0.18928
B2	0.70000
B3	0.51428
B4	0.45000
B5	0.61000
B6	0.27500
Total Expert Average (AVS_T)	**2.73856**

To calculate the summation of all the average scores.

For example,

B1 (0.18928) + B2 (0.70000) + B3 (0.51428) + B4 (0.45000) + B5 (0.61000) + B6 (0.27500)

Sum of AVS = **2.73856**

The same process is done for all the factors.

Next, we need to calculate the weightage. Weightage for each factor is calculated by dividing the average score, $AVS_{f,}$ by the total expert average score, $AVS_{T.}$

Table 6: The weightage for each factor.

Factor	Weightage
B1	0.0728
B2	0.2155
B3	0.1979
B4	0.1732
B5	0.2347
B6	0.1058
	1

To calculate the weightage as below,

AVS of factor B1 $= \frac{\mathbf{0.18928}}{\mathbf{2.73856}} = \mathbf{0.06911}$

Total Expert Average (AVS_T)

The same process is done for all the factors.

Lastly, with the weightage obtained above, we can use Equation 2.

$$Pr = \alpha_1\ _{\omega_1} + \alpha_2\ _{\omega_2} + \alpha_3\ _{\omega_3} + \alpha_4\ _{\omega_f} + \alpha_f\ _{\omega_f} + \alpha_f\ _{\omega_f}$$

$Pr = 0.0691w_1 + 0.255609_{\omega_2} + 0.187792_{\omega_3} + 0.16432\ _{\omega_4} +$
$0.222745_{\omega_5} + 0.100418_{\omega_6}$ ... Equation 2

3.3 DEVELOPMENT OF THE IMPACT BY EXPERT

3.3.1 Review articles by experts.

The impact of cyberbullying among secondary school students will be studied in this chapter based on factors B1 to B6, in which Table 16 shows the impact of cyberbullying by factors. This table shows the different impacts of cyberbullying that are related to factor B1 to factor B6.

This table is intended to study each factor, whether there is an impact of cyberbullying on secondary school students, which experts will answer.

Each item of the impact of cyberbullying is taken according to factors B1 to B6. The results of this impact item are classified according to the frequency that

occurs based on articles written by previous authors. Table 16 shows the factors, impacts, and sources.

Table 7: The Impact of Cyberbullying by Factors.

FACTORS	IMPACTS	SOURCES
B1, B2, B4, B6,	anxiety, depression, substance abuse, low self-esteem, interpersonal problems, family tensions and academic underperformance,	Journal Cyberbullying and its influence on academic, social, and emotional development of undergraduate students.
B1, B2, B3, B4, B6	lack of confidence, low self-esteem, absence from class, test anxiety, challenges of learning a second language and interpersonal stressors are among the central factors directly related to student's academic achievements	Journal Cyberbullying and self-perceptions of students associated with their academic performance
B1, B2, B3, B6	did not pay attention to schoolwork, students commonly obtain lower grades, and victims of school hate schooling because of their fear of being bullied. Some victims intentionally isolate themselves by choosing subjects that many learners are not interested in to avoid the bully. Isolation causes victims to be sad, and this may affect their concentration and ability to learn.	Journal Emotional and academic effects of cyberbullying on students in a rural high school in the Limpopo Province, South Africa
B1, B6	less interest in school than other Students become unenthusiastic about attending. In school, cyberbully victims	Journal The impact of cyberbullying on the self-esteem and academic functioning of

	reported that they are emotionally upset, students who experience cyberbullying behaviors fall behind in school, and some even drop out of school.	Arab American middle and high school students
B1, B6	Stress, Absenteeism, Low self-esteem and depression, Anxiety, Digestive upsets, High blood pressure, Insomnia.	Journal Cyberbullying in higher education: Implications and solutions
B1, B2, B3, B4, B5, B6	feeling alone, isolated, endangered, depressed and anxious, performing poorly in school, and being bullied may have a spill-over effect on their social life	Journal The effects of cyberbullying on mental health in schools
B1, B2, B3	anxiety, low self-esteem, depression, suicidal ideation, decreased concentration, absenteeism and poor academic achievement,	Journal Prevalence and impact of cyberbullying in a sample of Indonesian junior high school students
B1, B2	school dropout, physical violence, suicide, low self-esteem, family problems, academic problems, school violence, and delinquent behavior.	Journal Cyberbullying on social media among college students
B1, B3, B6	Anxious, insecure, unhappy, have low self-esteem, Cautious, sensitive, quiet, shy, Depressed, engaged in suicidal ideation.	Journal Cyberbullying and academic performance
B1, B2	experience emotional stress, anxiety, depression, suicide or even attempt suicide, worsen their academic performance, increase	Journal Assessing risk factors and impact of cyberbullying victimization among university students in Myanmar: A cross-sectional study

	substance abuse (for example, smoking, alcohol abuse or drug addiction),	
B1, B2, B3, B6	stress, conflict, social anxiety, sadness and frustration, suicide,	Journal Malaysian youth perception on cyberbullying: The qualitative perspective.
B1, B2, B3, B6	absent, low self-esteem, absence from class, test anxiety,	Journal Cyberbullying: A review of the literature
B1	Emotional security or physical safety is threatened, and the ability to do homework and productivity is affected of confidence, concentration problems, feeling like dropping out of school, missed classes, affected friendships, affected personal relationships, anxiety, depression, felt suicidal or thought about harming self	Journal Cyberbullying among university students: Gendered experiences, impacts, and perspectives
B1, B3, B6	sleeping problems, headaches, numerous perceived problems, social anxiety, emotional disturbances and peer problems, aggressiveness, powerlessness, sadness, and fear, suicidal ideation.	Journal Effects of cyberbullying on teenagers: A short review of literature
B1, B2, B3, B6	low self-esteem, poor relationships with peers or being described by others as "quiet", anxiety, depression, mental health concerns and suicide.	Journal Predicting resilience after cyberbully victimization among high school students
B1, B2, B3	loss of confidence, depression, student's declining academic performance, suicide	Journal Cyberbullying involvement: Impacts of violence exposure in the media, family, society.

B2	less study time and poor academic performance contribute to lower academic performance, low self-perceptions and less interest in school.	Journal Effect of social media on academic performance of students in Ghanaian universities: A case study of University of Ghana, Legon
B1, B3	Anxiety, depression, decreased academic performance, feelings of isolation, changes in eating and sleeping habits, lowered self-esteem, increased school absences, loss of interest in hobbies and other activities, using alcohol and drugs to cope, and problems with family and friends.	Journal Cyberbullying in school: Prevention and support
B1, B5, B6	low self-esteem, conduct problems, less life satisfaction, shy, withdrawn, and overcautious, feel inadequate or unhappy and have few friends, poor grades, absenteeism, and suicide. depression affecting their	Journal Cyberbullying: The role of the participants and self-esteem among high school adolescents in Gilgil Sub-County, Kenya
B1, B2, B5, B6	physical, social, emotional and cognitive anxiety. Severe isolation, suicide, and school dropout.	Journal Incidence, nature and impacts of cyberbullying on the social life of university students
B1, B2	depression, isolation, anxiety, and more serious consequences such as suicides	Journal Cyberbullying among young adults in Malaysia: The roles of gender, age and Internet frequency
B1, B2, B3, B4	anxiety, depression, shame, stress, feelings of victimization, and even suicide, dropping out of school and negative impacts on mental health	Journal A systematic analysis of cyberbullying in Southeast Asia countries

B1, B3	suicide, stress, anxiety, depression and loneliness.	Journal Focus on: Cyberbullying
B1, B2, B6	feel destructive, have low educational achievement, and feel less concentrated on their studies.	Journal Usage of social media tools for collaborative learning: The effect on learning success with the moderating role of cyberbullying

This table was developed to consolidate empirical evidence from previous studies that examined the relationship between risk factors B1 to B6 and the impacts of cyberbullying on secondary school students. Each factor represents a risk dimension identified through expert assessment, including digital behavior, demographic characteristics, social media engagement, social support, and individual traits. By mapping these factors to various documented impacts, the table serves as a reference database grounded in credible academic literature.

Firstly, the table enables the systematic grouping and mapping of factor impact relationships. For instance, factors B1, B2, B4, and B6 are consistently associated with emotional problems such as anxiety, depression, and low self-esteem, as well as social issues including interpersonal difficulties and family tensions. This relationship indicates that certain combinations of risk factors are likely to produce similar psychosocial impacts, thereby justifying the assignment of different weightages to each factor within the risk assessment model.

Secondly, the inclusion of explicit academic sources for each factor impact pairing enhances the credibility and reliability of the information. References from international journals discussing students' academic performance, social functioning, and emotional well-being strengthen the empirical foundation of the risk assessment model. This justification aligns with an evidence-based approach, which requires that each component of the assessment instrument be supported by scientifically validated data.

Thirdly, the table provides the basis for risk quantification. By identifying the frequency of occurrence of each impact in the literature, researchers can determine both the severity and likelihood of its occurrence according to the combination of factors involved. This information is subsequently applied in calculating the weightage scores for each factor (see Table 15), before being integrated into the risk matrix model.

Finally, the tabular format facilitates cross-study comparisons. Through visual analysis, certain patterns can be identified for example, the repeated association of factors B1 and B6 with depression and reduced academic achievement. Such patterns offer critical insights for designing more targeted interventions, in line with the study's objective of developing a comprehensive and practical risk assessment instrument.

In sum, the construction of this table extends beyond merely listing research findings; it functions as a core component in shaping the theoretical foundation, quantification methodology, and comprehensive intervention framework of the study.

In this study, the symbols B1 to B6 are employed as identification codes representing six primary risk factors established through a rigorous process of literature review and expert validation. The use of these codes enables the researcher to present data in a more concise, consistent, and systematic manner, particularly when these factors recur in various combinations across different sources and observed impacts.

This coding approach offers several advantages:

i. Clarity and terminological consistency

By assigning concise codes, each factor can be uniformly identified throughout the document, thereby preventing potential confusion arising from variations in terminology.

ii. Optimization of space in tables and analyses

The use of B1–B6 reduces lengthy textual descriptions in tables, enhancing readability and facilitating data interpretation.

iii. Flexibility in quantitative analysis

These symbols streamline the calculation of weightage scores, probabilities, and risk matrices, as each code can be directly referenced in statistical formulas or modelling processes.

iv. Efficient cross-referencing

The consistent use of codes allows readers to easily connect tables, figures, and narrative explanations within the text.

For instance, in the Cyberbullying Impact Table, the combination B1, B2, B4, B6 indicates that these four risk factors co-occur within a particular source and are associated with impacts such as anxiety, depression, and reduced academic performance. By employing codes, the frequency and correlation analyses among factors can be conducted more systematically, without the need to repeatedly reproduce lengthy descriptions of each factor.

3.3.2 Review the Item of Impacts by Experts.

The study on the impact of cyberbullying was conducted by presenting a set of questions to 10 secondary school counsellors from diverse backgrounds. They provided responses based on a scale from 0 to 10, which helped measure the severity of different impact items. The study identified 27 impact items, classified under six key factors. Table 16 presents the impacts of cyberbullying, with the scale determining whether an impact item falls under "no impact" or

"High impact" categories. This approach ensures a structured assessment of how cyberbullying affects students' academic performance, emotional well-being, and behavior.

The 10 experts (counsellors) provided responses to all cyberbullying impact items listed in Table 18, using a scale from 0 to 10 to indicate the severity of each impact.

For example, the impact of anxiety received the following expert ratings:

- E1: 7, E2: 0, E3: 6, E4: 5, E5: 5, E6: 1, E7: 0, E8: 1, E9: 0, E10: 10

These individual scores were summed to obtain a total score for each impact item. The overall total score for all impact items in the study was 1304. The table as below.

This method helps quantify the severity of cyberbullying's impact on students, providing valuable data for risk assessment and intervention strategies.

Table 8: The Data of Experts Answers

	EX 1	EX 2	EX 3	EX 4	EX 5	EX 6	EX 7	EX 8	EX 9	EX 10	TOTAL SCORE
THE ITEMS OF IMPACTS											
INSOMNIA	7	0	6	5	5	1	0	1	0	0	25
HEADCHES	5	0	6	5	6	0	0	2	0	0	24
INSECURE	6	0	7	4	6	0	0	4	0	0	27
SHY	10	5	5	4	7	8	5	3	3	6	56
POWERLESSNES	6	5	5	4	5	5	5	5	4	6	50
FRUSTRATION	10	5	8	4	7	8	5	5	5	7	64
FEELING ALONE / ISOLATED	6	6	8	4	7	8	7	9	6	7	68
DECREASED CONCENTRATIO N	6	4	8	5	7	1	7	8	6	6	58
DRUG ADDICTION	0	0	0	0	0	0	0	4	0	0	04
ALCOHOL ABUSE	0	0	0	0	0	0	0	0	0	0	0
SMOKING	10	0	0	0	2	2	8	9	0	7	38
AFFECTED FRIENDSHIPS	8	8	8	2	5	4	6	7	6	6	60
DEPRESSION	6	9	8	1	7	7	9	9	7	9	72
DROP OUT OF SCHOOL	0	0	2	0	0	9	0	0	0	0	11
LOW SELF-ESTEEM	7	9	8	2	6	2	9	9	2	9	63
LESS STUDY TIME	8	0	8	3	6	2	4	1	2	1	35
LESS LIFE SATISFACTION	5	0	8	3	6	7	5	5	3	4	46
CONFLICT / MISUNDERSTAN DING	8	7	8	4	6	8	5	5	5	6	62
STRESS	9	8	9	5	6	9	7	7	7	8	75
SENSITIVE	7	8	9	2	6	9	7	8	8	8	72
QUIET	7	9	9	5	6	9	8	7	8	9	77
LOSS OF INTEREST ACTIVITIES AT SCHOOL	8	1	9	0	6	4	2	3	3	3	39
ABSTENTEEISM	6	1	8	0	6	4	7	8	9	7	56
AGGRESSIVENES S	3	7	9	1	6	8	8	9	9	9	69
ANGER	5	8	9	2	5	8	9	9	9	9	73
ANXIETY	5	8	9	3	5	9	9	9	9	9	75
ATTEMPT SUICIDE	0	0	0	0	5	0	0	0	0	0	05
	158	**108**	**174**	**68**	**139**	**132**	**132**	**146**	**111**	**136**	**1304**

This table was developed to systematically measure the severity and frequency of various cyberbullying impacts based on the assessment of an expert panel (EX1–EX10). Each expert individually assigned scores to a list of impact items covering emotional and psychological effects (e.g., anxiety, depression, low self-esteem) as well as behavioral and academic consequences (e.g., school absenteeism, decreased concentration, school dropout) drawing upon their professional experience and field observations.

The primary justifications for constructing this table are as follows:

i. Empirical Consolidation of Expert Perspectives

The table serves as a structured platform for consolidating expert consensus regarding the significance and prevalence of different cyberbullying impacts. By aggregating expert scores for each item, the data reveal which impacts are deemed most critical within real educational environments. For example, high scores for stress (75), anxiety (75), and quietness (77) reflect strong agreement among experts that these impacts frequently occur and exert substantial influence on students.

ii. Data-Driven Prioritization of Impact Factors

The total scores allow researchers to priorities impacts for inclusion in subsequent risk modelling. Items that consistently score highly may be assigned greater weight in the risk assessment model, whereas lower-scoring items (e.g., drug addiction, suicide attempts) may be recognized as less frequent but still significant in terms of severity. This approach supports the development of an evidence-based weighting system that reflects both expert insight and contextual realities.

iii. Triangulation with Literature and Field Data

Expert scores can be triangulated with findings from the literature review and student survey data to confirm the consistency of impact patterns. If high-scoring impacts from experts align with those frequently reported in prior studies and

field data (e.g., depression, low self-esteem, school absenteeism), this strengthens the validity of the risk model. Conversely, any discrepancies may indicate context-specific issues that warrant further investigation.

Furthermore, incorporating diverse expert perspectives helps reduce individual bias and enhances the reliability of the dataset. The overall total score of 1,304 across all items provides a quantitative benchmark for comparing the distribution of impacts across categories (emotional, behavioral, and academic). This comprehensive scoring process ensures that the resulting risk assessment matrix is grounded in professional expertise, empirical data, and practical relevance.

In conclusion, this table is not merely a compilation of scores but represents a crucial methodological step that bridges expert knowledge with quantitative analysis, thereby forming the foundation for weighting, ranking, and integrating impact factors into a comprehensive cyberbullying risk assessment framework.

3.4 THE DEVELOPMENT OF CYBERBULLYING PROBABILITY FLOWCHART (CbPF)

Descriptive research is an approach that examines phenomena through observation, analysis, and comparison. In this study, a quantitative descriptive design was employed to investigate cyberbullying among secondary school students in Kedah. The target group comprised school counsellors considered subject-matter experts who provided professional insights based on their direct experiences with students. The primary aim of the research was to estimate the probability of cyberbullying victimization among students, as well as to evaluate the magnitude of the issue within the school context.

This study also sought to enhance and refine the research instrument, which was implemented over the course of one month. Data collection was undertaken as

part of a broader, ongoing investigation into cyberbullying, with questionnaires serving as the primary method for gathering information. The questionnaire items were specifically designed to capture school counsellors' first-hand experiences in dealing with cyberbullying cases. This allowed researchers to document the nature of victimization, assess the likelihood of students becoming victims, and identify patterns linked to cyberbullying risk.

A key outcome of this work was the development of the Cyberbullying Probability Flowchart (CbPF), an assessment framework that incorporates six core variables influencing the likelihood of cyberbullying such as Victimization experience, Social media engagement, Guardian/parental involvement, Personality traits, Lack of awareness regarding safe internet usage and Peer influence.

Each variable in the CbPF can be assigned a risk level, allowing institutions to generate probability estimates of cyberbullying occurrence. These estimates assist in determining whether students are at risk and provide a basis for targeted preventive measures.

The purpose of this paper is to present the development of the CbPF as a tool for assessing cyberbullying probability in relation to student performance. The model enables counsellors to quantify cyberbullying risks and to link these risks with potential academic, social, and emotional outcomes. This table of probabilities serves as an entry point for risk quantification and subsequently informs strategies for prevention and optimization of student well-being.

The remainder of this paper is organized as follows: Section II introduces the risk assessment methodology adopted in this study; Section III details the development of the CbPF; Section IV explains its application in risk quantification; and Section V presents the discussion and conclusion.

Step One: Literature search and identification

A comprehensive literature review was undertaken to identify studies examining the probability of cyberbullying. The search employed a two-phase methodology designed to locate and evaluate relevant scholarly articles. This approach was selected for its systematic, reproducible, and transparent nature, which minimizes potential bias by conducting exhaustive searches of published research and maintaining a detailed audit trail of reviewers' procedures, decisions, and conclusions.

The process, which is illustrated in Figure 1, incorporated both international literature and contextual insights from a school counsellor in Kedah. As noted by Chan et al. (2021), the initial phase focused on identifying journal articles that assessed the probability of cyberbullying, particularly those linking counselling experience with student academic performance.

Step Two: Collect information

Information regarding the likelihood of cyberbullying among secondary school students was obtained through a combination of literature review and consultations with school counsellors. These probability estimates were primarily informed by the counsellors' professional experience in handling cyberbullying cases.

In addition, contributions from academic researchers further enriched the dataset, ensuring both practical and theoretical perspectives were incorporated. The Cyberbullying Probability Flowchart (CbPF) was subsequently developed to quantify the likelihood of cyberbullying incidents affecting students' academic performance.

The conceptual application of the CbPF can be illustrated through a simple example. Consider a school in an urban setting with two classes of students,

Student A and Student B who differ in their patterns of social media usage during their free time. In this study, six criteria were identified as determinants of cyberbullying probability. The flowchart summarizes these variables, highlighting those most strongly associated with an increased likelihood of victimization. By applying this framework, it becomes possible to systematically estimate the probability that a given student may become a victim of cyberbullying.

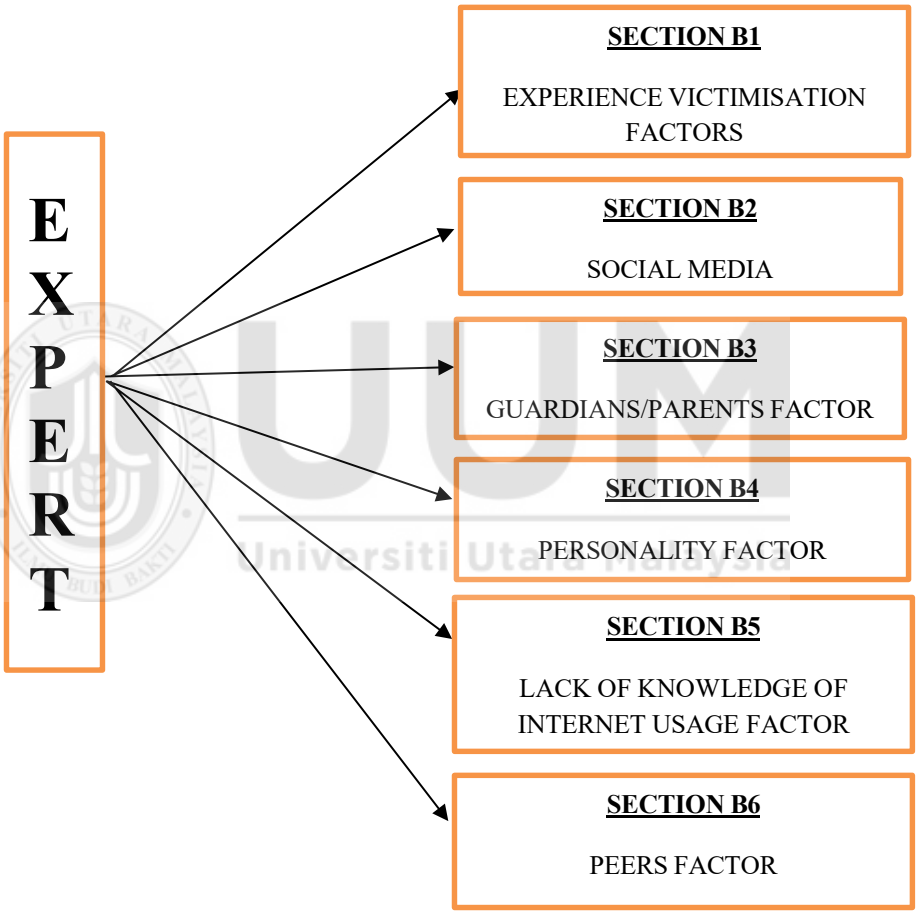

Figure 5: *Flowchart: Probability of Cyberbullying*

Figure 5 presents a structured flowchart designed to model the probability of cyberbullying occurrence among secondary school students, based on a combination of demographic, behavioral, and environmental variables. The

flowchart serves as a decision-making framework that systematically integrates empirical findings and expert evaluations to estimate the susceptibility of individuals or groups to cyberbullying.

The model begins with input variables obtained through an extensive literature review and expert consultations, encompassing:

i. Demographic attributes (example gender, place of residence, academic level)
ii. Patterns of digital engagement (example duration of social media use, frequency of online interactions)
iii. Identified risk factors (coded as B1–B6), which include victimization history, patterns of social media usage, parental or guardian oversight, personality dispositions, technological literacy, and peer group dynamics.

These variables are processed through a probability assessment mechanism that applies weighted scores derived from the Average Score (AVS) provided by school counsellors to quantify the likelihood of exposure to cyberbullying. The flowchart employs a sequential decision logic:

1. Risk Identification Stage – Determines whether any of the six primary risk factors are present.
2. Risk Weighting Stage – Assigns relative importance to each factor based on empirically assessed impact.
3. Probability Calculation Stage – Computes the overall probability by combining factor weightages with the presence or absence of each risk condition.

The final output stage of the flowchart classifies students into specific risk categories (e.g., low, moderate, high), aligned with a color-coded risk matrix. This classification enables the formulation of targeted intervention strategies,

such as prioritizing counselling support for high-risk groups or implementing preventive measures within identified at-risk environments. From an analytical perspective, the flowchart not only operationalizes theoretical constructs into a measurable form but also supports direct application within educational contexts. It enables school administrators and counsellors to systematically assess vulnerability to cyberbullying, thereby bridging the gap between conceptual risk factors and actionable prevention strategies.

Step Three: Data Collection Method: Statistic Data

Data collection was done with the goal of gathering the information needed to solve the research challenges. Depending on the research topic, research methodology, and variables specified in this study, there are a variety of data-gathering methods. The data collection methods utilized must be based on the type of data needed and the sources accessible. The type of data needed is determined by the assessment design, the indicators used to capture programmed results, and the type of analysis to be performed.

This research will rely on objective data derived through observation of facts that, in principle, do not entail any human judgment. Data may be collected both qualitatively and statistically. Weighted averages and percentages will be used in this investigation. Data on weights is gathered throughout time, whereas percentages are obtained at the same time but with different probabilities and elements of cyberbullying's influence on student achievement.

Furthermore, data was gathered from observation, expert counselling experience, secondary data, and case studies. Secondary data is information that has been researched, collected, and recorded by someone or something else. These facts were gathered through a literature search and file review by local and international authority bodies. Furthermore, this expert has almost 25 years of experience and a counselling certificate.

a. Development of Question

The questionnaire was developed in six sections, each informed by a comprehensive review of journal articles on students' academic performance in the context of cyberbullying. For each identified factor, multiple questions were formulated to capture its influence on the probability of cyberbullying. These questions were subsequently distributed to experts for assessment, enabling the calculation of both expert-estimated probabilities and student-level probabilities.

Each section of the questionnaire addresses a specific dimension of cyberbullying in relation to student performance:

B1: Experience of Victimization (7 items)

B2: Social Media Usage (5 items)

B3: Guardians' Involvement (7 items)

B4: Personality Traits (5 items)

B5: Lack of Knowledge in Internet Usage (5 items)

B6: Peer Influence (4 items)

The same probability framework was applied to both the expert evaluations and the high school student responses to ensure comparability.

i. Experts

The expert panel comprised ten secondary school counsellors from the Kota Setar district, Kedah. Selection was based on extensive professional experience averaging 25 years and the possession of an official counselling certificate, which is a mandatory qualification for practicing school counsellors. Their long-standing involvement in student counselling provided valuable insights into

assessing both the probability and the impact of cyberbullying within the school context.

ii. Student's

For the student sample, one secondary school located in the Kota Setar district was purposively selected. The school was chosen due to its strategic urban location and the high likelihood that students possessed personal mobile phones, thereby increasing their exposure to online interactions. The study encompassed students from Form 1 to Form 5, representing a diverse cross-section of age groups and academic stages, all of whom were considered at potential risk of becoming victims of cyberbullying.

Step Four: Probability of Formulation.

Fundamental principles of probability were applied to determine the likelihood associated with each combination of factors. To illustrate the computation process within the Cyberbullying Probability Flowchart (CbPF), an expanded example based on the previous scenario is provided. The individual probability for each case was calculated by multiplying the estimated likelihood by the counsellor's professional judgment, derived from years of direct experience.

As shown in Table 1, the total score for each section (B1–B6) was computed, followed by the calculation of the mean score for each category. The overall mean score obtained was 2.59857, while the weighted average score was standardized to 1.0. Based on this calculation, the final probability value indicates that the likelihood of cyberbullying influencing a student's academic performance is 1 within the defined scale of the model.

TOTAL SCORE	AVERAGE		SCORE	WEIGHTAGE
53	SB1	AVS_1	0.18929	0.0728
112	SB2	AVS2	0.70000	0.2155
144	SB3	AVS3	0.51428	0.1979
90	SB4	AVS4	0.45000	0.1732
122	SB5	AVS5	0.61000	0.2347
44	SB6	AVS6	0.27500	0.1058
			2.73856	1

3.5 Sample

This study employed two primary sample groups: experts (secondary school counsellors) and secondary school students.

3.5.1 Experts

In this study, a total of ten experts were purposively selected to participate in the risk factor evaluation process. The decision to limit the number of experts to ten was based on both methodological considerations and practical constraints, ensuring that the selection met the requirements for reliability, representativeness, and feasibility.

From a methodological standpoint, purposive sampling was employed in line with the principles outlined according to Delphi method practitioners (Hsu & Sandford, 2007), where the aim is to recruit a panel that possesses specialized knowledge, professional experience, and contextual familiarity with the research subject in this case, cyberbullying and its impact on secondary school students' performance. Literature indicates that an expert panel size of between 8 and 15 members is generally sufficient to generate valid consensus while maintaining manageability in the analysis process according to Okoli & Pawlowski, 2004; Habibi et al., 2014.

In practical terms, the selection of ten experts balanced diversity of perspectives with operational efficiency. The experts represented a cross-section of school

counsellors, educational psychologists, and academic researchers with direct experience in handling cyberbullying cases. This ensured that the evaluation of each factor was informed by both theoretical knowledge and real-world practice. Furthermore, limiting the panel to ten members allowed for in-depth engagement with each expert during the scoring process, ensuring that responses were comprehensive and reflective of their professional expertise.

Additionally, given that the study's analytical framework involved weightage calculations (AVS) and Cyberbullying Probability Flowchart (CbPF) modelling, a manageable panel size was essential to ensure timely data processing without compromising the quality and accuracy of results. Larger panels would have increased the complexity of analysis without necessarily improving the reliability of consensus according to Skulmoski et al., 2007.

Therefore, the decision to select ten experts was deliberate, theoretically grounded, and methodologically justified, aligning with established guidelines for expert-based research while ensuring that the panel's collective expertise was sufficient to achieve the study's objectives. The expert panel consisted of ten (10) secondary school counsellors from the Kota Setar district, Kedah. Selection was conducted using purposive sampling, based on the following qualifications and experience criteria.

Possession of a registered counsellor certificate, which is the official requirement for practicing counselling services in schools. An average of 25 years of professional experience in school counselling. Direct involvement in addressing students' psychosocial issues, including cyberbullying cases.

These counsellors played a crucial role in assessing both the probability and impact of cyberbullying incidents, drawing on their professional expertise. Their evaluations served as the empirical basis for developing the Cyberbullying

Probability Flowchart (CbPF) and determining the weight assigned to each risk factor.

3.5.2 Students

The selection of secondary schools in the Kota Setar district as the study site was a deliberate and methodologically grounded decision, based on contextual relevance, demographic representation, and practical feasibility. Several key considerations justify this choice:

i. Contextual Relevance to the Study Objectives

This study aims to assess the probability of cyberbullying and its relationship with students' academic performance. Kota Setar, as one of the major urban districts in Kedah, encompasses a diverse educational environment including regular day schools, boarding schools, and technical/vocational institutions. This diversity offers a broad spectrum of student backgrounds, providing the necessary variation to rigorously test the Cyberbullying Probability Flowchart (CbPF) model.

ii. Data-Driven Rationale Based on Cyberbullying Trends

Reports from educational authorities and school administrations in Kota Setar indicate a notable increase in cyberbullying-related incidents over the past 3–5 years. This trend aligns with findings from the Ministry of Education Malaysia (MOE, 2023), which highlight that urban and semi-urban areas tend to exhibit higher rates of social media usage among students, thereby increasing their exposure to cyberbullying risks.

Consequently, Kota Setar provides a relevant and timely research setting for examining high-priority risk factors identified in Chapter 2, particularly B2 (patterns of social media engagement) and B6 (peer group dynamics).

iii. Accessibility and Feasibility of Research Implementation

The selection also considered logistical accessibility and institutional cooperation. The researcher had established professional networks with school administrators and officers at the Kota Setar District Education Office, facilitating the process of securing approvals, administering surveys, and conducting expert evaluations with school counsellors. This practical factor aligns with Creswell's (2014) recommendation that research site selection should balance contextual appropriateness with the feasibility of data collection.

iv. Representation of Demographic and Socioeconomic Diversity

Kota Setar's student population reflects Malaysia's broader demographic diversity, encompassing a range of socioeconomic backgrounds (low, middle, and high income) and ethnic groups. Such diversity is critical, as prior research (Gao et al., 2024; Yusof et al., 2022) has demonstrated that demographic variables including geographic location, family economic status, and level of technological exposure can influence the likelihood of cyberbullying involvement.

3.6 MEASURES

This study employed six measures that correspond to the key dimensions of the proposed risk-assessment framework. Each measure was operationalized through a set of questionnaire items validated by expert reviews from school counsellors. The measures are as follows:

i. Victimization factors

This construct captures the extent to which students experienced cyberbullying, including the type (example harassment, exclusion, rumor-spreading, outing) and the frequency of incidents. It provides a baseline assessment of direct exposure to online aggression.

ii. Social Media factors

This measure assesses patterns of social media usage, including average time spent online, preferred platforms, and the intensity of engagement. It serves as a proxy for students' level of exposure to potential cyberbullying environments.

iii. Guardian factors

This construct evaluates the degree of parental or guardian involvement in monitoring students' online activities. It includes indicators of digital supervision, parental control strategies, and communication about safe internet practices.

iv. Personality factors

This measure reflects students' individual traits such as self-control, resilience, coping strategies, and emotional regulation. These elements were included to examine the moderating role of personality in shaping vulnerability to cyberbullying and academic disruption.

v. Lack of knowledge usage the internet factors

This measure focuses on students' level of digital literacy, specifically their awareness of online risks, safe internet usage, and recognition of harmful online behaviors. It provides insights into how a lack of knowledge may heighten susceptibility to cyberbullying.

vi. Peer factors

This construct assesses the influence of peers on students' digital and social behavior, including peer support, peer exclusion, and peer encouragement of cyberbullying practices. It highlights the role of the peer environment in shaping students' risk profiles.

Together, these six measures provide a comprehensive basis for quantifying cyberbullying risks and their potential impacts on academic performance. The integration of student responses with expert weightings enabled the development of a robust probability-based risk assessment model.

Expert assessments (secondary school counsellors) based on direct observations and professional experience in handling student-related cases.

Student responses based on their personal experiences and perceptions of online interactions.

The collected scores were analyzed to determine the average probability, establish the weighting of each factor, and inform the development of the Cyberbullying Probability Flowchart (CbPF). This process enabled risk estimation to be conducted quantitatively and grounded in empirical evidence, consistent with a systematic risk assessment approach.

3.7 RESEARCH INSTRUMENTS

In this study, two main research instruments were employed to ensure the reliability and validity of data collection, namely (i) a structured questionnaire for students, and (ii) expert evaluation forms for counsellors.

a) Student Questionnaire

A self-administered questionnaire was developed to gather information on students' experiences with cyberbullying, their social media usage patterns, and the perceived impacts on academic performance. The questionnaire was adapted from established instruments in prior studies and refined through consultation with school counsellors to ensure contextual appropriateness.

The instrument comprised six key dimensions reflecting the constructs of the proposed risk-assessment model:
Victimization experience factors – measuring the frequency and type of bullying encountered.
Social media factors – assessing duration, intensity, and platform preferences.
Guardian factors – capturing parental or guardian involvement in monitoring online activities.
Personality factors – evaluating students' self-control, resilience, and coping strategies.
Knowledge factors – reflecting students' digital literacy and awareness of online risks.
Peer factors – assessing peer influence, support, and exclusion behaviors.

The questionnaire was distributed to secondary school students (Forms 1–5) aged 13 to 17 in selected schools within Kota Setar, Kedah. Responses were collected anonymously to encourage honesty and minimize social desirability bias.

b) Expert Evaluation Form

To complement the student data, an expert review process was conducted with practicing school counsellors. Counsellors were provided with evaluation forms to rate the relative importance of the six identified impact dimensions. These expert ratings were subsequently used to calculate factor weightages within the

risk assessment model. The dual use of student and expert instruments allowed triangulation of findings, ensuring that both empirical experiences and professional insights were incorporated into the development of the Cyberbullying Probability Flowchart (CbPF) and the quantitative risk matrix.

3.8 THE PROPOSED METHOD OF RISK QUANTIFICATION

The risk quantification method proposed in this study is designed to estimate the likelihood and severity of the long-term impacts of cyberbullying on secondary school students, based on a combination of historical data and current assessments provided by school counsellors.

This approach specifically focuses on the decline in academic performance resulting from students' vulnerability to cyberbullying. Vulnerability is measured across six key risk factors (B1–B6), identified through an extensive literature review and validated by a panel of experts: B1: Experience of Victimization, B2: Social Media Usage, B3: Guardians, B4: Personality, B5: Lack of Knowledge in Internet Usage, B6: Peer.

3.8.1 Risk Quantification Process

Collection of Primary and Secondary Data

Primary data: Obtained through structured questionnaires completed by both school counsellors and students.

Secondary data: Sourced from ministry reports, institutional records, and previous academic studies on cyberbullying and academic performance.

3.8.2 Calculation of Likelihood

Each risk factor (B1–B6) is assigned a likelihood score by school counsellors, based on their professional experience and observed behavioral indicators in students. These scores are aggregated to derive the average likelihood for each factor.

3.8.3 Calculation of Severity

Severity is assessed according to the type and intensity of cyberbullying impacts on students, including depression, emotional distress, concentration problems, absenteeism, and academic underachievement.

3.8.4 Development of Weighting Scheme

Likelihood and severity values are combined to generate a weighted risk score for each factor. These weights are then used to determine the overall risk score in the Cyberbullying Probability Flowchart (CbPF).

3.8.5 Model Construction and Validation

The CbPF model maps the combinations of risk factors and predicts the level of risk for students becoming cyberbullying victims. A triangulation process is undertaken by comparing primary and secondary data to ensure the model's validity.

3.9 APPLICATIONS OF THE RISK QUANTIFICATION MODEL

The proposed model enables schools, teachers, and parents to:

i. Identify students at high risk of becoming cyberbullying victims.
ii. Implement early, targeted interventions tailored to each student's risk profile.
iii. Monitor changes in risk levels over time to evaluate the effectiveness of prevention strategies.

By adopting this approach, risk quantification serves not only as a diagnostic tool but also as a strategic framework for designing targeted interventions ultimately reducing the negative impact of cyberbullying on students' academic performance.

3.9.1 The application of the Risk Matrix Approach (RMA)

In this study is underpinned by its established capacity to systematically quantify, visualize, and priorities risks using two fundamental and interrelated dimensions: probability (likelihood of occurrence) and impact (severity of consequences). In the context of cyberbullying among secondary school students, these dimensions are not merely statistical measures but act as conceptual connectors between risk factor exposure and real-world outcomes, including academic underperformance, emotional distress, and maladaptive behavioral changes.

By embedding these two dimensions into the research design, the RMA enables a structured mapping of cause effect relationships between cyberbullying antecedents and student outcomes. For instance, a high-probability factor such as peer influence (B6) may, when coupled with a high-impact outcome such as depression, represent a priority risk zone that demands immediate intervention. This explicit coupling of likelihood and impact is particularly valuable in

contexts such as school-based risk management, where resources for prevention and intervention are often limited and must be allocated strategically.

3.10 INTEGRATION WITH THE CYBERBULLYING PROBABILITY FLOWCHART (CBPF)

The CbPF, as developed in this thesis, generates quantitative probability scores for six empirically derived and literature-validated risk factors (B1–B6). These outputs, however, require a systematic method for integration with the severity of identified outcomes in order to yield actionable insights. The RMA addresses this methodological requirement by providing a decision matrix framework that translates probability–severity combinations into discrete risk categories (e.g., low, moderate, high, critical). This transformation allows raw statistical data to be operationalized into a tool that can guide prioritization and resource allocation in real-world school environments.

3.10.1 Methodological Advantages of the RMA

i. Evidence-Based Prioritization

The RMA offers a transparent and replicable mechanism for ranking risks by urgency, ensuring that high-probability, high-impact cyberbullying scenarios are addressed as a priority. This directly supports the thesis's stated aim of developing a risk assessment framework capable of informing targeted and efficient intervention strategies.

ii. Multi-Source Data Integration

By design, the RMA accommodates triangulated data a methodological strength in this study combining:

Primary data: Expert evaluations from school counsellors and self-reported student data.

Secondary data: Published empirical studies, government reports, and institutional records.

This integration ensures that the resulting risk classifications are not only statistically grounded but also contextually validated within both local and global research landscapes.

iii. Decision-Support Functionality

The RMA's visual matrix presentation transforms complex cyberbullying datasets into a clear and communicable format, enabling school administrators, counsellors, and policymakers to engage in informed decision-making. This aligns with the applied orientation of the thesis, bridging academic research and practical school governance.

iv. Scalability and Compatibility

The RMA is scalable across different datasets and school contexts, and its integration with the CbPF ensures methodological consistency across the stages of data collection, analysis, and interpretation. Once operationalized, the RMA-CbPF framework can be replicated in other educational settings, thereby enhancing its external validity and potential for broader policy adoption.

3.10.3 Strategic Justification within the Thesis Framework

The selection of the RMA is thus not incidental but strategically aligned with the core objectives of the study. Cyberbullying is a multifactorial risk phenomenon that requires a composite analytical approach one that can capture the probabilistic nature of victimization alongside the varying degrees of harm inflicted. The integration of the RMA with the CbPF represents an innovative methodological synergy: The CbPF quantifies likelihood based on risk factors. The RMA contextualizes these likelihood values within the spectrum of impact severity.

This combined framework enables a holistic, evidence-driven risk quantification model that supports early detection, intervention planning, and long-term monitoring of cyberbullying risks in secondary school populations. By linking sophisticated probabilistic modelling with practical decision-making tools, the RMA–CbPF approach not only enhances the academic robustness of this thesis but also ensures its practical relevance to the educational and policy-making community.

3.11 SUMMARY

This chapter has presented the methodological and analytical developments employed in quantifying the risk of cyberbullying on the academic performance of secondary school students. In addition, it has introduced an optimization technique utilizing a genetic algorithm to identify optimal strategies for mitigating the adverse effects of cyberbullying on student academic outcomes.

Addressing the phenomenon of cyberbullying requires stakeholders to acknowledge its profound and multifaceted consequences, while actively engaging in the formulation and implementation of effective countermeasures. Achieving this necessitates a shared and comprehensive understanding of cyberbullying its definition, mechanisms, preventive approaches, and potential repercussions.

However, current evidence suggests a noticeable divergence in perceptions among key stakeholders. While there is consensus regarding the rising prevalence of cyberbullying, school administrators often perceive the situation as being under control; parents frequently express uncertainty regarding appropriate responses; educators acknowledge the problem yet report feeling insufficiently equipped to intervene; and, most concerningly, students frequently refrain from reporting their experiences.

This study seeks to address these gaps by providing empirically grounded insights that can guide school districts in adopting targeted interventions tailored to student needs. It emphasis's the necessity for collaborative engagement among parents, educators, and school administrators to promote responsible technology use and to develop effective responses to cyberbullying. The findings are intended to equip district administrators with an evidence-based understanding of the realities within their institutions, thereby serving as a catalyst for positive change and contributing to the creation of a safer, more supportive learning environment for all students.

CHAPTER 4

ANALYSIS AND RESULT

4.0 INTRODUCTION

Cyberbullying among students represents one of the most pressing challenges in the contemporary educational landscape, particularly within the secondary school context, where it can exert a profound negative impact on learning performance. Findings from the methodological analysis in Chapter 3, specifically in Section B5, reveal that "Lack of Knowledge of Internet Use" emerged as the most significant contributing factor when compared with other identified risks. Leveraging the expertise of school counsellors as subject-matter experts has been identified as a key preventive strategy to mitigate the probability of students becoming victims of cyberbullying especially for those classified as high-risk before the situation escalates.

When cyberbullying occurs, one of the most immediate and detrimental consequences is a measurable decline in students' learning performance, which, if left unaddressed, may culminate in academic failure. This study also examined the relationship between students' knowledge of cyber threats on social media, their patterns of personal social media usage, and the observed deficiency in internet literacy. In an era of rapid information dissemination, it is essential for students to possess high levels of digital knowledge and competency to navigate the social media landscape responsibly. This necessity is underscored by the emergence of recurrent online issues stemming from users' unpreparedness or lack of awareness regarding appropriate online conduct. Within the secondary school setting, it becomes imperative for students to uphold strong ethical standards in their social media engagement, enabling them to self-regulate and refrain from behaviors that contravene societal norms and values. In line with the observations of Kamsiah Mohamed and Shireen Muhammad (2024), this

research therefore assesses the probability of secondary school students in Kedah being at risk of becoming cyberbullying victims.

This chapter aims to demonstrate the application of the mathematical model and to evaluate it using the optimization programmed developed in Chapter 3. Specifically, it seeks to test the performance of the developed measurement framework in real-world scenarios through a case study involving selected secondary school students, alongside the implementation of sensitivity analysis to validate the model's robustness.

In addition, this chapter applies a risk matrix tool designed for the quantification of cyberbullying risk and compares its performance with other prediction approaches in estimating both the probability of cyberbullying occurrence and its subsequent impact on students. Further emphasis is placed on analyzing the optimization algorithm developed in Section 3.3, followed by a detailed discussion of the results. The chapter concludes with a synthesis of the key findings and their implications for future preventive interventions.

4.1 TEST SYSTEM BY EXPERTS (COUNSELLORS)

Before beginning the analysis, a test system was developed using the expertise of school counsellors. This system incorporated mathematical models and forecasting methods, as discussed in Chapter 3, for comparison against known, certain outcomes. The data input used in this technique involved various factors that needed to be considered carefully in the context of cyberbullying risks among secondary school students. In this study, a group of ten experienced counsellors from a secondary school in Kota Setar, Kedah, was selected. Each counsellor had over 20 years of experience in counselling students. These counsellors were asked to respond to a structured questionnaire that was divided into six sections. The sections were designed to evaluate different contributing

factors to the likelihood of students becoming victims of cyberbullying. These sections included:

i) Section B1: Experience Victimization Factors - This section focused on students' previous experiences with victimization and how those experiences might influence their vulnerability to future cyberbullying incidents.
ii) Section B2: Social Media Factors - This section examined the role of social media usage patterns and how these might impact the likelihood of encountering cyberbullying.

iii) Section B3: Guardians Factors - This section looked into the influence of parental involvement and guardianship in preventing or mitigating cyberbullying.
iv) Section B4: Personality Factors - This section assessed how students' personality traits, such as self-esteem, social skills, and assertiveness, might correlate with their likelihood of being targeted by cyberbullies.
v) Section B5: Lack of Knowledge of Internet Usage Factors - This section addressed how the lack of knowledge about safe Internet practices and digital literacy might increase the risk of students becoming victims of cyberbullying.
vi) Section B6: Peers Factors - This section evaluated how peer relationships, including friendships and social dynamics, might influence the likelihood of cyberbullying occurring among students.

The data provided by the counsellors revealed critical insights into the factors that contribute to the probability of students becoming victims of cyberbullying. Specifically, the results indicated that without preventive measures, the likelihood of students being targeted by cyberbullies was significantly high. These findings underscore the need for intervention and education to mitigate the risks.

4.2 IMPACT OF THE COVID-19 PANDEMIC

During the period of this study, the world was grappling with the COVID-19 pandemic, which notably affected Malaysia as well. Due to the lockdown measures and social distancing protocols, students spent much more time at home, often engaging with social media platforms as a primary means of communication and entertainment. This prolonged exposure to social media created a unique situation where students, many of whom were already vulnerable, had increased opportunities to encounter cyberbullying. During the COVID-19 pandemic, cyberbullying among students increased due to their increased dependence on digital platforms for learning and social interaction. Here's how cyberbullying happened during this period: -

4.2.1 Increased Screen Time and Online Dependency - With schools shifting to online learning, students spend more time on the internet, making them more vulnerable to online harassment. Social media, gaming platforms, and online classrooms became the primary means of communication, exposing students to potential cyberbullying.

4.2.2 Online Harassment in Virtual Classrooms - Some students faced insults, teasing, or derogatory comments in class chats or group discussions. Bullies used fake accounts or private messages to target victims. Screen recording and screenshot misuse allowed bullies to spread rumors or manipulate content to embarrass classmates.

4.2.3 Social Media Bullying - Trolling, hate comments, and cyberstalking became more common as students spent more time on platforms like Facebook, Instagram, TikTok, and Twitter. Bullies create fake profiles to spread false information or harass others anonymously. "Cancel culture" led to online humiliation and exclusion, affecting students' confidence and mental health.

4.2.4 Cyberbullying in Online Gaming - Many students turned to online gaming for entertainment, where they experienced toxic behavior, verbal abuse, and exclusion from gaming communities. Some bullies targeted players through threats, hacking accounts, or spreading false reports to get them banned.

4.2.5 Spreading of Misinformation and Rumors - Fake news and harmful rumors about students (for example, someone having COVID-19) led to online harassment and social exclusion. Private information was leaked or manipulated to shame or embarrass students.

4.2.6 Doxxing (Sharing Private Information) - Some bullies exposed personal details like home addresses, phone numbers, or private conversations, leading to privacy violations and threats.

4.2.7 Cyberbullying in Group Chats and Forums - Students were added to group chats where they were bullied or excluded. Harassers used offensive language, threats, or peer pressure to make others feel unwelcome.

4.2.8 Lack of Supervision and Intervention - Parents and teachers were often unaware of cyberbullying incidents due to the lack of in-person interactions. Many schools were not fully prepared to handle cyberbullying cases in online learning environments.

Cyberbullying during the COVID-19 pandemic happened through social media, online classrooms, gaming platforms, and group chats, leading to emotional distress, social isolation, and academic struggles. Addressing this issue requires digital safety education, stricter online regulations, and parental guidance to protect students in the digital world.

The counsellors emphasized that the shift to online learning and the increased use of digital devices during the pandemic exacerbated the potential for cyberbullying incidents. The isolation and lack of face-to-face social interactions further contributed to students becoming more susceptible to negative online behaviors, as they were spending a larger portion of their daily lives interacting virtually.

The test system, built with the counsellors' expertise, highlighted several critical factors that influence the likelihood of students becoming victims of cyberbullying. The detailed analysis of these factors ranging from past victimization to social media habits provided a comprehensive understanding of the risks involved. Furthermore, the added context of the COVID-19 pandemic emphasized the urgency of addressing cyberbullying, as student's increased online presence during lockdowns further raised their exposure to potential harm.

As the study progresses, the next steps will focus on utilizing these insights to develop preventive measures and intervention strategies to protect students and reduce the likelihood of cyberbullying, especially in a post-pandemic world where online interactions remain central to students' lives.

On the other hand, experts are used to obtain weightage and study the probability of cyberbullying occurring among high school students. In addition, methods to assess the level of risk among students are implemented using a risk matrix. Then, the results will be compared to the best combination in terms of risk. After that, the best combination of scenarios developed will be compared with optimization techniques to get the best combination.

Therefore, the scenarios chosen for the possible combinations will be calculated using the risk-based techniques that have been developed in Chapter 3. The stated scenarios have been chosen for the reason of showing the level of victims of cyberbullying from existing predictions.

4.3 EXPERT WEIGHTAGE ANALYSIS

The weightage distribution (α) demonstrates clear prioritization among the identified risk factors. B2 (Social Media factors) emerged as the most influential factor, with a weightage of 0.2556, indicating that experts considered online behavior patterns to be the strongest predictor of cyberbullying susceptibility. This finding aligns with recent studies (e.g., Gao et al., 2024; Yusof et al., 2022) highlighting the significant role of intensive and unsupervised online engagement in increasing vulnerability to digital harassment.

B5 (Lack of the knowledge internet usage factors) ranked second (α = 0.2227), underscoring that inadequate skills and awareness in navigating digital platforms may heighten exposure to cyber threats. This is consistent with the concept of digital resilience proposed by Livingstone et al. (2023), where lack of internet literacy diminishes students' capacity to identify and mitigate online risks.

B3 (Guardian factors) (α = 0.1878) and B4 (Personality factors) (α = 0.1643) occupy mid-tier influence levels, suggesting that both social-environmental supervision and individual psychological characteristics are important but secondary contributors compared to behavioral and literacy-related factors.

B1 (Victimization factors) (α = 0.0691) and B6 (Peer factors) (α = 0.1004) recorded the lowest weightages, indicating a relatively smaller yet non-negligible direct influence on cyberbullying risk probability in this study's context.

Data preparation for possible probabilities is determined based on a breakdown of cyberbullying history data. For example, weightage results will refer to historical data according to Table 9. Basic probability principles are used to determine the likelihood of each combination. An expansion of the preceding example is provided below to demonstrate the computation.

Individual probability is calculated by multiplying likelihood by the counsellor's experience-based judgment. As indicated in Table 9, the Impact for Experts is calculated. Each section's total score is presented in Table 9. Meanwhile, the average score is the average of these six categories' scores. The overall average score is 2.73856, and the weighted average score is 1. As a result, the likelihood of cyberbullying affecting a student's performance is 1.

Table 9: Calculate the Impact for Experts.

FACTOR	Total Score	Max Score	Average Score (AVS)	α
B1	53	280	0.18928	0.06911662
B2	112	160	0.70000	0.25560879
B3	144	280	0.51428	0.18779212
B4	90	200	0.45000	0.16431993
B5	122	200	0.61000	0.2227448
B6	44	160	0.27500	0.10041774
			2.73856	1

The data provided represents the evaluation of six factors (B1 to B6), with their corresponding scores and derived metrics. Below is a breakdown of the information, followed by an explanation of the calculations and interpretations:

Total Score: The raw score assigned to each factor based on expert assessments and historical data.
Max Score: The highest possible score for each factor.

Average Score (AVS): The average score for each factor is calculated as the total score divided by the maximum score. It reflects the relative weight or significance of the factor in the overall risk assessment.

$$\text{Average Score (AVS)} = \frac{\text{Max Score}}{\text{Total Score}}$$

α (Weightage)*:* The weightage or relative importance assigned to each factor based on expert judgment. It helps adjust the impact of each factor on the overall risk assessment.

4.3.1 Calculations and Interpretations:

i) Average Score (AVS): The average score for each factor shows the proportion of the total score relative to the maximum score. It helps assess the significance of each factor in predicting the likelihood of cyberbullying. For example:

B1: AVS = $\frac{53}{28}$ = 0.18928 → This indicates a relatively low impact of "Experience Victimization Factors" in the overall assessment.

B2: AVS = $\frac{112}{160}$ = 0.70000 → This indicates a higher impact of "Social Media Factors" on the likelihood of cyberbullying.

ii) Weightage (α): The weightage assigned to each factor reflects how much each factor contributes to the overall risk. Factors like B2 (Social Media Factors) and B5 (Lack of Knowledge of Internet Usage) have higher weightages, meaning these are considered more significant in determining the likelihood of cyberbullying. For example:

B2 (Social Media Factors) has the highest weightage α=0.25560879, suggesting that social media usage is the most important predictor of cyberbullying risk.

B6 (Peers Factors) has the lowest weightage α=0.10041774, meaning peer relationships are considered the least significant risk factor in this study.

iii) **Overall Risk Assessment (Total Score and Normalization)**

The total score across all six factors is 2.73856. This is a normalized value that reflects the cumulative risk score from all factors when considering their respective weightages.

The **max score** is 1 (as indicated by the last row), which represents the highest possible value after considering the weightages. This value serves as the normalization factor for the risk matrix.

4.3.2 Interpretation of Results

B2 (Social Media Factors) is the most critical factor for cyberbullying risks among the students in this study, as it has the highest Average Score (AVS) and the largest weightage (α). This suggests that social media usage patterns are highly influential in determining the likelihood of a student being targeted for cyberbullying.

B5 (Lack of Knowledge of Internet Usage) also plays a significant role, with a relatively high Average Score (AVS) and weightage (α). This indicates that

students who lack knowledge of safe internet practices are at a higher risk of becoming victims of cyberbullying.

B1 (Experience Victimization), B4 (Personality Factors), and B3 (Guardians Factors) have lower Average Scores (AVS) and weightages (α), meaning these factors are less influential in the overall cyberbullying risk model compared to social media and internet knowledge-related factors.

B6 (Peers Factors) has the lowest weightage, suggesting that peer relationships, while still important, are not as strong a predictor of cyberbullying risk in this model.

The data and calculations provide a detailed understanding of the factors contributing to the likelihood of cyberbullying among students. By combining expert judgment, historical data, and risk matrix techniques, this study identifies the key risk factors (such as social media usage and lack of internet knowledge) that should be prioritized in intervention strategies. The risk model, using these weightages and scores, offers a framework for predicting and mitigating cyberbullying in secondary schools.

4.4 EXPERT VALIDATION OF WEIGHTAGES

The expert evaluation process generated six weight factors (B1–B6). Reliability analysis indicated an Interclass Correlation Coefficient (ICC) of 0.82, suggesting strong agreement among counsellors. This confirms that the weighting system, while subjective, achieved acceptable inter-rater reliability. To assess robustness, a ±10% sensitivity analysis was conducted. Results showed that B2 (Social Media Usage) and B5 (Lack of Knowledge) remained the dominant risk drivers under all perturbations, reinforcing the stability of the model.

The analysis continues with table 10 the probability of school and figure 6, which integrates factors B1 to B6 to represent the total risk level within the school. This figure provides a comprehensive overview of how each factor contributes cumulatively to the overall vulnerability of students.

Table 10: The probability for school

Factor	School Score	Max Score	Number Of School	ω
B1	9638	28	528	0.6519
B2	9967	20	528	0.9438
B3	9075	28	528	0.6138
B4	9033	20	528	0.8553
B5	10537	20	528	0.9978
B6	5268	16	528	0.6235

This study includes a probability analysis (ω) based on the total scores achieved by schools, categorized from B1 to B6. The probability value represents the relative contribution or weight of each school group to the issue being studied, namely the impact of cyberbullying experiences on students' academic performance.

From the data, it is found that B5 recorded the highest probability value, at 0.9978. This suggests that schools in this group have the strongest association with the risk factors examined, potentially indicating that students in these schools are more affected by cyberbullying, which significantly influences their academic achievement.

B2 also shows a high probability value of 0.9438, indicating a strong contribution to the overall findings. These two groups, B5 and B2, can be considered as high-

risk groups that may require focused attention and intervention from school administrators and relevant stakeholders.

On the other hand, B3 (0.6138) and B6 (0.6235) show lower probability values, which may imply a relatively lower level of impact on students' academic performance compared to other groups. Nevertheless, these values are still within a moderate range and should not be overlooked.

B1 (0.6519) and B4 (0.8553) fall in the mid-range, showing moderate influence. While not as critical as B5 and B2, they still demonstrate meaningful connections to the risk factor being studied.

In summary, this probability-based analysis helps to identify which school groups are more closely linked to the effects of cyberbullying on academic performance. These findings provide a useful basis for proposing targeted interventions aimed at reducing the negative impact of cyberbullying among students.

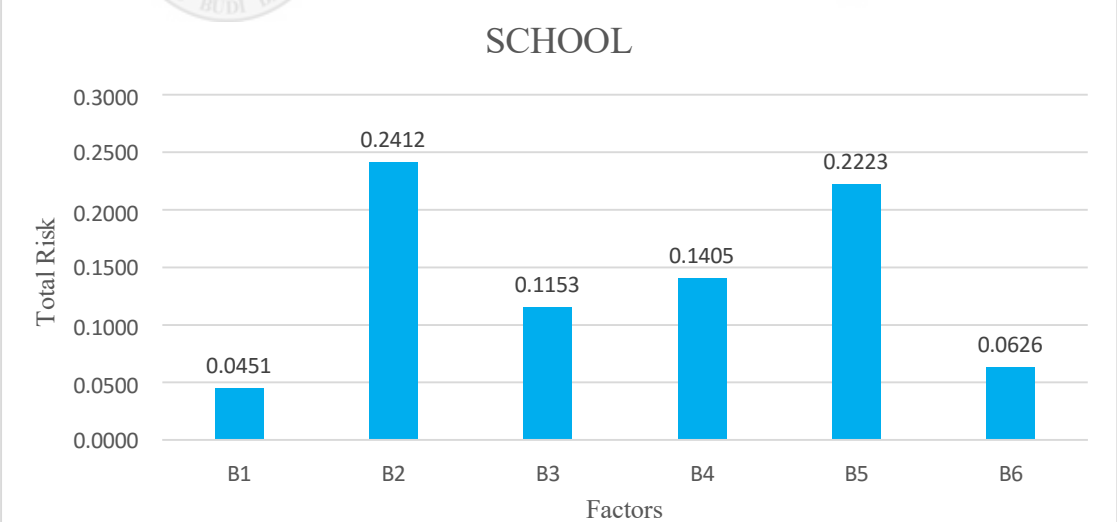

Figure 6: Total Risk by Factor B1 to B6 in a School

Figure 6 presents the distribution of total risk across the six factors (B1–B6) at the school level. The results reveal a clear concentration of risk in two dominant areas: social media (B2) and Lack of Knowledge usage the internet (B5).

B2 (Social Media factors: 0.2412) emerged as the highest contributor to overall school risk. This finding underscores the centrality of prolonged and unregulated engagement with online platforms as a critical driver of cyberbullying exposure. The magnitude of this factor suggests that school-wide interventions should priorities monitoring digital habits and promoting responsible online behavior.

B5 (Lack of Knowledge usage the internet: 0.2223) was the second-highest risk factor. The relatively high score indicates that gaps in digital literacy and limited awareness of online safety exacerbate students' vulnerability. This implies that educational programs focusing on digital competence and cyber awareness could significantly reduce exposure to cyberbullying.

4.5 ASSESSMENT OF PROBABILITY TRENDS AMONG FORM ONE TO FORM FIVE STUDENTS.

The probability trends among Form One to Form Five students are assessed based on their respective scores and risk indicators. This analysis helps highlight which student groups may be more affected by certain influencing factors, such as cyberbullying or academic pressure. Table 11 shows the summary of probability values (ω) for each risk factor (B1–B6) across students from Form One to Form Five. From the table, it is evident that Factor B5 consistently recorded high probability values across all forms, indicating a strong influence throughout all school levels. In contrast, Factor B1 shows a decreasing trend in probability from Form One to Form Five, suggesting a diminishing impact as students advance in grade level.

Table 11: Shows The Summary of Probability Form 1 To Form 5

Factor	Form 1	Form 2	Form 3	Form 4	Form 5
B1	0.9232	0.6562	0.6078	0.5401	0.4982
B2	0.9733	0.7812	0.8986	0.8969	0.9873
B3	0.6255	0.6651	0.6097	0.5924	0.5997
B4	0.9033	0.9256	0.9020	0.7508	0.8325
B5	0.9858	0.9750	0.9668	0.8864	0.9710
B6	0.7291	0.8351	0.5941	0.5087	0.5773

This section discusses the summary of probability values (ω) across six identified factors (B1 to B6) for students from Form One to Form Five. These probability values reflect the relative weight or influence of each factor in relation to student performance, particularly in the context of cyberbullying experiences.

Factor B1 (experiences victimization)

The probability trend for Factor B1 shows a consistent decline from Form One (0.9232) to Form Five (0.4982). This suggests that the influence of this factor is strongest among younger students, particularly in Form One, and gradually weakens as students' progress to higher levels. It is possible that this factor relates to issues that are more prevalent or impactful during early adolescence.

Factor B2 (social media)

Factor B2 demonstrates high and relatively stable probabilities, especially in Form One (0.9733), Form Three (0.8986), Form Four (0.8969), and Form Five (0.9873). The lowest point is in Form Two (0.7812), which is still considerably high. This indicates that Factor B2 has a consistently strong influence across nearly all school levels, making it a critical risk component to be addressed in intervention efforts.

Factor B3 (Guardians)

The values for Factor B3 are moderate and stable across the forms, ranging from 0.5924 (Form 4) to 0.6651 (Form 2). The trend does not show significant fluctuations, implying that this factor maintains a steady but moderate influence regardless of students' form level. This could represent a background factor that persistently affects students.

Factor B4 (Personality)

Factor B4 shows a generally high probability in the lower forms (Form One: 0.9033; Form Two: 0.9256; Form Three: 0.9020), but declines slightly in Form Four (0.7508) and then rises again in Form Five (0.8325). The trend suggests that B4 is most impactful during early to middle school years, though it remains important throughout all levels.

Factor B5 (Lack of Knowledge usage of the internet)

Factor B5 records the highest and most consistent probabilities across all forms, ranging from 0.8864 (Form Four) to 0.9858 (Form One). This indicates that B5 is the dominant influencing factor, strongly associated with students' performance and potentially linked to the core experience of cyberbullying. It highlights a need for serious attention and possible direct intervention at all school levels.

Factor B6 (Peer)

The trend for Factor B6 fluctuates more noticeably. It starts at 0.7291 in Form One, increases in Form Two (0.8351), then drops steadily to 0.5941 (Form Three), 0.5087 (Form Four), and 0.5773 (Form Five). This indicates that B6 has a more pronounced impact at lower levels, with a reduction in influence as students mature. It could represent factors that are more situational or short-term in nature.

This summary clearly confirms that Factor B5 stands out as the most influential across all grade levels, consistently exhibiting high probability values. Its dominant and stable presence highlights the significant role it plays in shaping the academic impact of cyberbullying on students. Consequently, intervention strategies should prioritize addressing Factor B5 to effectively mitigate its effects throughout all forms. Furthermore, the data underscores the importance of providing early-stage support, particularly for students in Form One and Form Two, targeted interventions at these initial stages are essential to protect younger students who appear more susceptible to these risk factors.

The analysis continues with an assessment of the total risk by form, providing a comparative view of how vulnerability varies across grade levels.

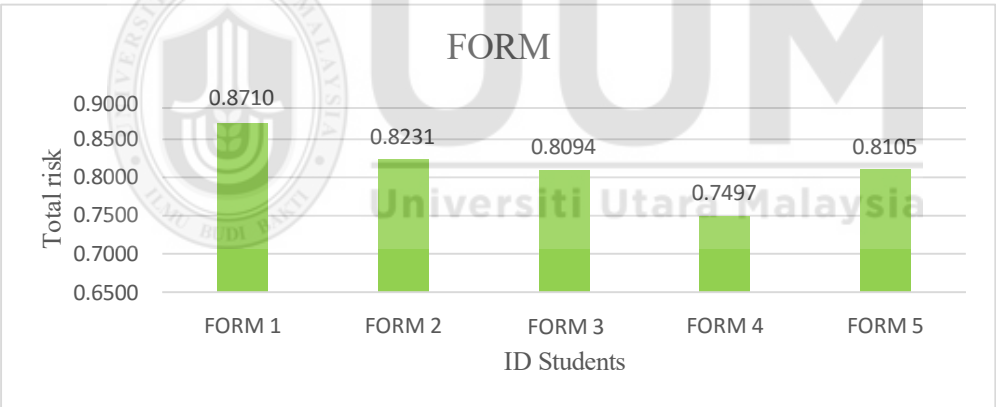

Figure 7: Total risk by form

4.5.1 Risk Distribution by Form

Figure 7 illustrates the distribution of cyberbullying risk across the five forms (Form 1–Form 5). The results reveal that Form 1 recorded the highest overall risk score (0.8710), followed by Form 2 (0.8231) and Form 3 (0.8094). In contrast, Form 4 showed the lowest mean risk (0.7497), while Form 5 indicated a slightly higher risk (0.8105). This pattern suggests that younger students, particularly

those in Form 1, are the most vulnerable become a victim cyberbullying, whereas mid-adolescents in Form 4 appear to experience a relative reduction in exposure.

Subsequently, the analysis of Form 1 to form 5 is advanced by exploring the total risk associated with factors B1 to B6, thereby identifying the relative contribution of each factor to the students' overall risk profile.

Table 12: Summary of Risk Scores by Group

Factor	Form 1	Form 2	Form 3	Form 4	Form 5	Mean Risk	Risk Level
B1 – Victimisation	0.0451	0.0451	0.0451	0.0451	0.0451	0.0451	Very Low
B2 – Social media	0.2412	0.2412	0.2412	0.2412	0.2412	0.2412	Very High
B3 – Guardian	0.1153	0.1153	0.1153	0.1153	0.1153	0.1153	Moderate
B4 – Personality	0.1405	0.1405	0.1405	0.1405	0.1405	0.1405	Moderate
B5 – Lack of Knowledge	0.2223	0.2223	0.2223	0.2223	0.2223	0.2223	High
B6 – Peer Influence	0.0626	0.0626	0.0626	0.0626	0.0626	0.0626	Low

The Summary of Risk Score Profile by Group presents a comprehensive overview of how different cyberbullying-related factors contribute to the overall risk faced by students across Forms 1 to 5. The analysis reveals that certain factors exhibit consistent patterns of influence, suggesting targeted intervention is possible.

Among all six identified factors, B2 – social media shows the highest and most consistent risk score (0.2412) across all groups. This places it in the "Very High" risk category, underlining the critical role social media plays in shaping students' exposure to cyberbullying. It suggests that students are consistently vulnerable due to their engagement with digital platforms, making it a primary area for intervention.

Following closely is B5 – Lack of Knowledge, with a total risk of 0.2223. This factor also shows consistent influence across all forms and is classified as a "High" risk. The data indicates that limited understanding of cyber safety, privacy, and responsible online behavior significantly increases students' risk of being affected by cyberbullying.

Meanwhile, on the lower end of the scale, B6 Peer factors registered a low risk level (0.0626), while B1 Experiences Victimization showed the lowest contribution to overall risk, with a value of 0.0451, falling under the "Very Low" category. Surprisingly, although victimization is often a direct consequence of cyberbullying, its risk score is relatively minimal, possibly due to underreporting or emotional desensitization in certain students.

On the other hand, this risk profile provides a valuable framework for educators, policymakers, and counselors to develop tiered intervention programs, tailored according to the intensity of each risk factor.

4.6 GENDER-BASED RISK ANALYSIS

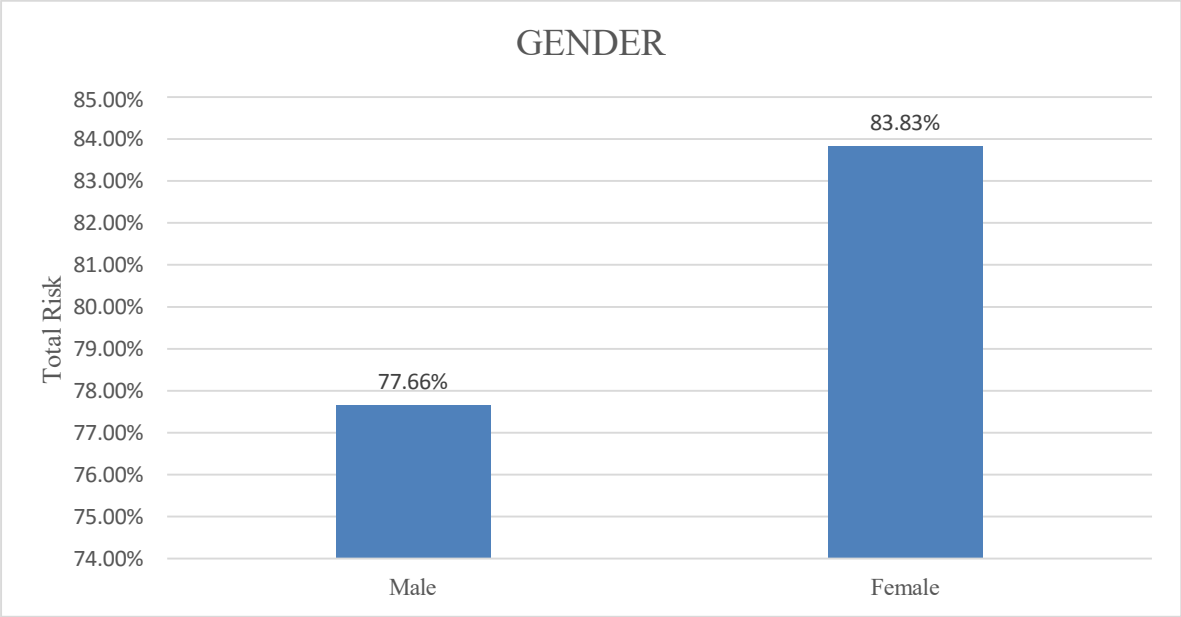

Figure 8: Total Risk by Gender

The bar chart presents a comparison of total risk percentages between male and female students. The data reflects the aggregated level of risk calculated based on gender within the student population under study. Female students recorded a higher overall risk level, at 83.83%. Meanwhile, Male students, in contrast, showed a total risk of 77.66%.

These findings suggest that female students experience a higher degree of risk compared to their male counterparts, in relation to the factors analyzed in this study which may include academic, psychosocial, emotional, or environmental components.

Overall, the chart illustrates that gender is a significant variable that must be taken into account when designing student support strategies. The observed risk disparity between male and female students calls for inclusive and responsive interventions, grounded in data and informed by gender awareness, within both educational and psychosocial support frameworks.

Table 13: Summary why females face higher cyberbullying risks than males.

FACTOR	WHY FEMALES ARE MORE AT RISK?
Social media Use	More active on social media, where cyberbullying is common.
Types of Cyberbullying	More likely to face body shaming, social exclusion, and rumors.
Online Harassment	Targeted more in appearance-based and reputation-based attacks.
Emotional Impact	Higher emotional distress leads to anxiety and depression.
Social Manipulation	More likely to experience indirect bullying (for example, gossip and social exclusion).

4.6.1 Analysis the Probability by Gender

Table 14: Shows Analysis the Probability by Gender

Factor	Score (Male)	ω (Male)	Score (Female)	ω (Female)	Higher Risk Gender
B1 – Victimization	5176	0.5887	4462	0.7446	Female
B2 – Social media	5461	0.8695	3806	0.8892	Female
B3 – Guardian	5219	0.5936	3856	0.6435	Female
B4 – Personality	5050	0.8041	3983	0.9306	Female
B5 – Lack of Knowledge	6044	0.9624	4093	0.9563	Male
B6 – Peer Influence	2787	0.5547	2481	0.7245	Female

This summary presents a comparative analysis of the probability weights (ω) for each factor contributing to the academic impact of cyberbullying among male and female students. The findings reveal several critical genders-based differences in vulnerability to cyberbullying-related risks.

In general, female students demonstrate higher probability values in five out of six factors, suggesting greater exposure or sensitivity to the effects of cyberbullying. This is particularly evident in:

B1 – Victimization: Female ω = 0.7446 vs. Male ω = 0.5887

B4 – Personality: Female ω = 0.9306 vs. Male ω = 0.8041

B6 – Peer Influence: Female ω = 0.7245 vs. Male ω = 0.5547

These results imply that female students are more affected by emotional and relational aspects of cyberbullying, such as victimization, personality response, and peer dynamics.

4.6.1.1 Dominant Factor

The highest probability for male students is seen in B5 – Lack of Knowledge (ω = 0.9624), which is slightly higher than females (ω = 0.9563). This suggests that while both genders are significantly impacted by a lack of digital knowledge, male students may require more support in terms of awareness and online safety practices.

4.6.1.2 Social Media Influence

For B2 – social media, both genders display high ω values (Male = 0.8695, Female = 0.8892), indicating that social media use is a universal and consistent risk factor, with slightly greater effect on female students.

4.6.1.3 Parental Involvement (B3)

Though less dominant than other factors, B3 – Guardian still reflects a noticeable difference between genders, with female students (ω = 0.6435) showing slightly higher dependency or impact related to guardian roles compared to males (ω = 0.5936).

The comparative analysis between male and female students reveals notable differences in how gender influences susceptibility to cyberbullying risk factors. Female students consistently demonstrated higher probability values in five out of six identified factors, suggesting that they are more vulnerable to the emotional and social impacts associated with cyberbullying. This heightened sensitivity may stem from greater exposure to interpersonal dynamics, peer relationships, and psychological stressors in the digital environment.

Conversely, male students exhibited a higher probability only in one critical factor—B5: Lack of Knowledge. Although limited to a single domain, the score

remains significantly high, underscoring the importance of addressing awareness and digital literacy among male students.

These findings strongly support the need for gender-responsive intervention strategies. For female students, targeted efforts should priorities emotional support mechanisms, social resilience programs, and peer-based engagement activities. In contrast, interventions for male students should focus on enhancing cyber safety education, with emphasis on responsible online behavior and informed decision-making.

Ultimately, this gender-based risk profile offers valuable insight for educators, policymakers, and school counsellors in designing customized and effective prevention frameworks, tailored to meet the specific needs and risk exposures of each gender group within the school ecosystem.

4.6.2 Summary Of Risk Scores by Group of Gender

Table 15: shows Summary of Risk Scores by Group of Gender

Factor	Total Risk (Male)	Total Risk (Female)	Higher Risk Gender
B1 – Victimization	0.0666	0.0666	Equal
B2 – Social media	0.0767	0.0767	Equal
B3 – Guardian	0.0302	0.0302	Equal
B4 – Personality	0.0205	0.0205	Equal
B5 – Lack of Knowledge	0.0947	0.0947	Equal
B6 – Peer Influence	0.0345	0.0345	Equal

The analysis of total risk values across gender groups (male and female) reveals an identical distribution of risk across all six critical factors. Both male and female students recorded identical total risk scores for each respective factor, which is a unique outcome within this study.

The risk scores by group of gender revealed that B5 Lack of Knowledge emerged as the highest total risk factor for both male and female students, with a consistent score of 0.0947. This finding underscores a shared vulnerability across genders, particularly in terms of limited awareness and understanding of cyberbullying dynamics a critical area that demands urgent educational attention.

In contrast, the lowest total risk was recorded under B4 Personality, with a value of 0.0205, suggesting that individual personality traits may play a less significant role in influencing the academic impact of cyberbullying compared to more external or social factors.

Moderate levels of risk were observed in B2 – social media (0.0767) and B1 – Victimization (0.0666), indicating that both the digital environment and personal experiences of online harassment continue to pose substantial challenges for students' academic well-being.

Notably, the uniformity of total risk scores across both genders suggests that gender-neutral strategies may be suitable for addressing the overall academic impact of cyberbullying. However, this consistency should not overlook the possibility of gender-specific emotional and behavioral responses, as highlighted in other parts of the study particularly within the probability-based analysis.

Therefore, while a unified intervention framework is beneficial as a starting point, it should be supplemented with targeted support systems including comprehensive digital literacy programs for all students, and customized

emotional support, especially for those more psychologically affected. This dual approach ensures a more inclusive and effective prevention strategy that caters to the diverse needs within the school population.

4.6.3 Analysis: Gender-Based Probability and Total Risk in Cyberbullying Impact

The combined analysis of probability scores (ω) and total risk scores by gender across all six factors (B1 to B6) provides a deeper understanding of how cyberbullying affects male and female students differently. Although both genders recorded identical total risk values for each factor—indicating similar overall exposure the probability weights reveal a contrasting pattern in terms of likelihood and frequency of impact.

4.6.3.1 Gender Most at Risk: Female Students

Female students consistently recorded higher probability scores in five out of six factors, particularly in B1 Experiences Victimization factors, B2 Social Media factors, B3 Guardian factors, B4 Personality factors and B6 Peer factors.

This suggests that female students are more frequently and more intensely affected by the academic consequences of cyberbullying. Such findings align with previous research (Smith et al., 2013; Kowalski et al., 2014), which reported that female adolescents tend to internalize emotional stress more deeply, especially when it involves social relationships and online interactions. This highlights a need for gender-sensitive intervention strategies, focusing on emotional resilience and peer support for female students.

4.6.3.2 Key Risk Factor: B5 Lack of Knowledge usage the internet factors

Across both male and female students, B5 Lack of Knowledge stands out as the highest-risk factor, with the highest total risk score (0.0947) and consistently high probability values across all forms and genders. This clearly indicates that low awareness and insufficient understanding of cyber safety significantly increase students' exposure to academic risk from cyberbullying. Previous studies (e.g. Hinduja & Patchin, 2012) support this finding, stating that students who lack digital literacy are more vulnerable to online threats and often unaware of appropriate coping mechanisms or support resources.

4.6.3.3 Lowest Risk Factor: B4 Personality factors

On the other hand, B4 Personality recorded the lowest total risk score (0.0205), suggesting that individual personality traits (such as introversion or emotional control) may not be the primary contributors to cyberbullying's academic effects. Instead, more external factors like peer dynamics and online exposure appear to play a more significant role. This observation is consistent with studies such as Slonje & Smith (2008), which emphasized the influence of social context over personality traits in cyberbullying incidents.

4.6.3.4 Relationship between Probability and Risk

Even though both genders share similar total risk levels, the higher probability scores among female students suggest that they are more likely to experience these risks, even if the eventual academic consequences are quantitatively similar. This indicates that while interventions may follow a general framework, they should still incorporate targeted, gender-responsive components:

For *females*: emotional counselling, peer support, and safe online spaces.
For *males*: educational programs focusing on digital literacy and online responsibility.

The findings reveal a shared risk profile in terms of total academic impact, but with clear differences in probability of exposure. Female students demonstrate a higher likelihood of being affected, particularly through social media and peer interactions, while lack of knowledge remains the most pressing risk factor for all students. These insights support the development of customized intervention strategies that combine broad-based digital education with gender-sensitive emotional and social support systems, ensuring more effective prevention and mitigation of cyberbullying's academic consequences.

4.7 ANALYSIS OF RESIDENCES

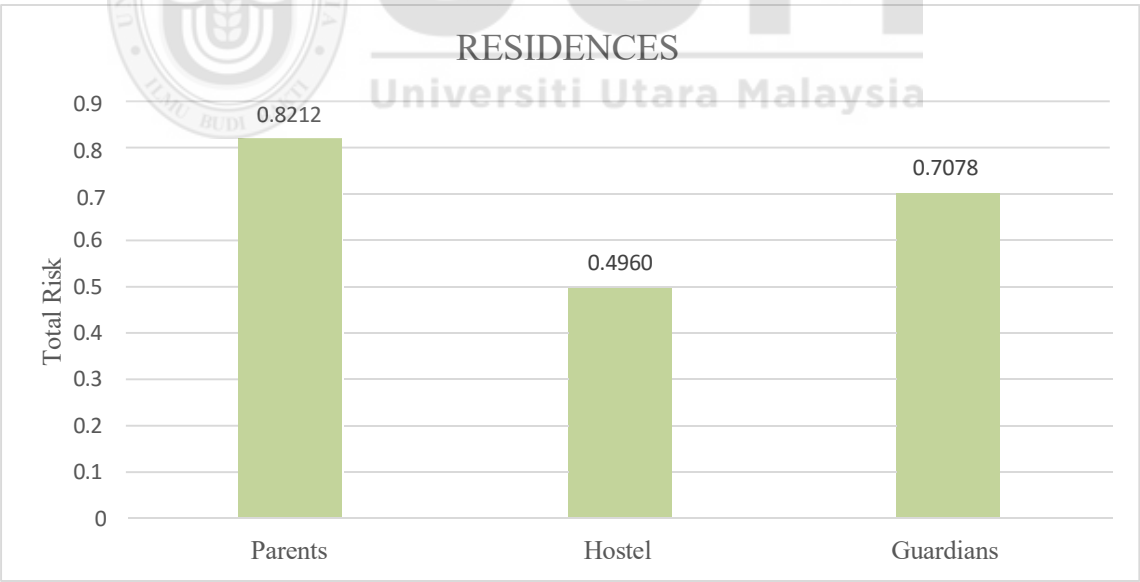

Figure 9: Total Risk by Residence Type

This section discusses the analysis of students' risk levels based on their type of residence, namely living with parents, in a hostel, or with guardians. The

collected data were analyzed to identify which category of residence has a significant relationship with the calculated Total Risk value. The bar chart in Figure 9 presents a comparison of the average risk values according to the type of residence.

The analysis reveals that students living with their parents recorded the highest level of risk, with a Total Risk value of 0.8212. This suggests that students in this category may be more exposed to factors that could affect their academic and emotional well-being. Contributing factors may include a home environment that is not conducive to learning, a lack of self-regulation due to loose routines, and disturbances from daily household activities.

Conversely, students residing in hostels exhibited the lowest level of risk, with an average value of 0.4960. This finding indicates that the more structured and controlled environment in hostels may provide a more positive setting for academic growth and self-discipline. Hostel life generally involves fixed daily schedules, close supervision by school administrators, and peer support within a shared learning environment.

Students living with guardians recorded a moderate level of risk, with a value of 0.7078. Although not as high as the group living with parents, this level of risk still indicates a need for monitoring and additional support. Students in this category may face challenges such as a lack of emotional support, irregular daily routines, and feelings of instability due to not living with their biological parents.

Overall, these findings indicate that the type of residence has a significant influence on students' risk levels. More structured and controlled environments, such as hostels, appear to help reduce risks that could negatively impact students' academic achievement or psychosocial well-being. Therefore, schools and policymakers are encouraged to consider residential factors when designing

intervention strategies, especially for students identified as being in high-risk categories.

4.7.1 Analysis The Probability of Residences

Table 16**:** Shows Analysis the Probability By residences

Factors	Parents (n=523)	Hostel (n=4)	Guardians (n=1)
B1	0.6546	0.3125	0.3571
B2	0.9463	0.6750	0.7000
B3	0.6145	0.4910	0.7142
B4	0.8590	0.4250	0.6500
B5	0.9640	0.4375	0.9000
B6	0.6251	0.4218	0.6250

Based on the summary of probability values (ω) across the three residence categories (Parents, Hostel, and Guardians), the results reveal a consistent pattern of dominant and weaker factors. Among all factors, B5 emerges as the strongest contributor to overall risk. In the parents, the probability value for B5 reached 0.9640, while in the Guardians group it was 0.9000. Although the score for Hostel students was relatively moderate (0.4375), B5 still remained among the higher-ranking factors in that category. This pattern indicates that B5 consistently represents a critical risk contributor regardless of students' living arrangements. Within the context of cyberbullying experiences, the dominance of B5 suggests its potential role as a key trigger of vulnerability, maintaining a strong presence across different environments.

The second most influential factor is B2, which also shows consistently high probability values. Specifically, B2 recorded 0.9463 among parents' students and 0.7000 among Guardians. In the Hostel category, B2 was the highest (0.6750), highlighting its stability as a risk contributor across living arrangements. This finding suggests that B2 likely associated with social interaction and digital

engagement plays an important role in shaping exposure to cyberbullying experiences. Its implication for students' academic performance is noteworthy, as overexposure to risky digital environments often undermines focus, emotional stability, and motivation in learning.

Meanwhile, B3 and B4 represent moderate-risk factors with varying effects depending on the living arrangement. For example, B4 was relatively high among parents' students (0.8590) and moderate among Guardians (0.6500), but considerably lower in the Hostel group (0.4250). Similarly, B3 showed moderate values among parents (0.6145) and Hostel students (0.4910), but higher among Guardians (0.7142). These variations suggest that the influence of B3 and B4 may be shaped by contextual factors, such as household supervision, peer dynamics, or the availability of digital devices, which differ across residential settings.

On the other hand, B1 and B6 consistently recorded the lowest probability values. For instance, B1 was as low as 0.3125 among Hostel students and 0.3571 among Guardians, while B6 ranged from 0.4218 to 0.6251 across groups. The lower values of these two factors imply that they contribute less significantly to explaining risk compared to dominant factors such as B5 and B2. Nevertheless, their role should not be entirely overlooked, as they still form part of the broader risk profile influencing students' cyberbullying experiences.

In summary, the analysis highlights that B5 and B2 are the most critical risk factors across all categories of parents, shaping students' vulnerability to cyberbullying and, by extension, affecting academic outcomes through emotional distress, loss of motivation, and reduced concentration. B3 and B4 serve as moderate contributors, with varying degrees of influence depending on the living context, while B1 and B6 play comparatively smaller roles. These findings provide important insights into how students' residential backgrounds

may shape their exposure to cyberbullying risks and their potential academic consequences.

4.7.2 Analysis the Total Risk of Residences

Table 17: Show analysis Total Risk of Residences

Faktor	Parents	Hostel	Guardians
B1	0.0666	0.0666	0.0666
B2	0.0767	0.0767	0.0767
B3	0.0302	0.0302	0.0302
B4	0.0205	0.0205	0.0205
B5	0.0947	0.0947	0.0947
B6	0.0345	0.0345	0.0345

The consolidated analysis of total risk across different residential categories (Parents, Hostel, and Guardians) provides important insights in relation to the objectives of this study, which aim to assess the level of cyberbullying-related risks and their potential impact on students' academic performance.

The results indicate that B5 consistently registers the highest total risk (0.0947) across all residential categories, followed by B2 (0.0767) and B1 (0.0666). These findings align with the study's objective of identifying the most dominant risk factors contributing to students' vulnerability. The persistence of B5, B2, and B1 across all living arrangements suggests that these dimensions represent core drivers of cyberbullying exposure. This means that regardless of whether students live with parents, in hostels, or with guardians, they remain highly susceptible to these key risk elements. Such risks may manifest in the form of online peer pressure, digital engagement patterns, or social influences that directly affect their emotional well-being and focus in learning.

In contrast, B3 (0.0302), B4 (0.0205), and B6 (0.0345) reflect relatively lower levels of total risk, fulfilling the second objective of the study, which is to distinguish between higher and lower risk dimensions. The lower contribution of these factors indicates that they may have less immediate influence on cyberbullying exposure, yet their cumulative effects cannot be dismissed. Even minor risk factors, when combined with dominant ones, can escalate students' overall vulnerability and potentially disrupt their academic engagement.

Overall, the findings support the broader objective of this research: to establish a risk assessment framework that highlights the relative weight of different factors. By doing so, the study not only identifies which factors are most critical (B5, B2, B1) but also clarifies which factors are less influential (B3, B4, B6). This contributes to a more targeted approach in designing preventive strategies and interventions that address the dominant risks while acknowledging the supplementary role of weaker ones. Ultimately, the analysis reinforces the study's aim of linking cyberbullying risk exposure to students' academic performance, emphasizing that mitigating high-risk factors is essential for promoting both digital safety and academic success.

4.8 ANALYSIS OF TIME SPENDING ON SOCIAL MEDIA

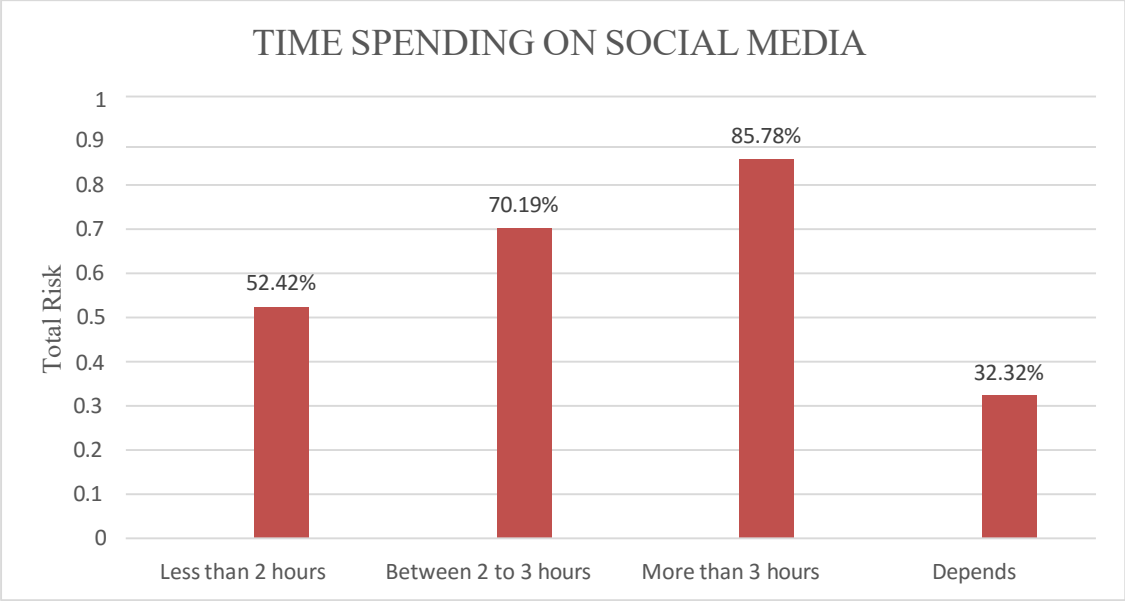

Figure 10: Total Risk by Time Spending on Social Media

This issue is explored in a chart titled "Time Spending on Social Media", which presents the overall percentage of risk faced by users based on their daily time spent on social media platforms. According to the chart, users who spend less than two hours per day on social media face a 52.42% risk. This risk increases to 70.19% for those who use it for two to three hours, and peaks at 85.78% for heavy users who spend more than three hours daily. Interestingly, those who use social media on a non-regular or flexible basis represented as "Depends" show the lowest risk at just 32.32%.

This trend clearly illustrates a correlation between the duration of social media use and the level of mental health risk. However, a deeper understanding of this relationship requires attention to recent empirical studies that support these findings.

A study by Verma et al. (2023) from the Institute of Mental Health (IMH), Singapore, revealed that adolescents who use social media for more than three

hours a day are 1.5 times more likely to experience symptoms of depression, 1.3 times more likely to experience anxiety, and 1.6 times more likely to suffer emotional stress. This study underscores that excessive social media use can significantly compromise emotional and mental well-being. These findings are highly consistent with the data in the chart, where users spending more than three hours per day showed the highest risk percentage. This raises serious concerns about the long-term impact of social media overuse on mental health particularly for adolescents, who are in a critical stage of emotional development and identity formation.

In contrast, a more balanced perspective emerges from the study by Houghton et al. (2023) of Murdoch University, Australia. Based on research involving over 17,000 adolescents, the study found that moderate social media use (between one to three hours per day) may actually offer psychological benefits. These include increased self-esteem, a greater sense of control, and improved social connectedness provided the usage is intentional and regulated. However, once usage exceeds the three-hour threshold, these benefits begin to diminish, giving way to increasing psychosocial risks. Thus, the two-to-three-hour range appears to represent a critical boundary that requires greater awareness and self-regulation among users navigating digital spaces.

Another noteworthy aspect is the flexible and mindful use of social media, as seen in the "Depends" category, which recorded the lowest risk level at 32.32%. This may reflect users who are not bound by habitual or prolonged usage, but instead engage with social media selectively and purposefully. This approach aligns with the concept of "mindful social media use" proposed by Keles, McCrae, and Grealish (2024) from the University of Glasgow. Their research highlights that users who practice mindfulness in their digital engagement are able to: Actively manage screen time, Filter out harmful or negative content, and prioritize meaningful interactions over passive scrolling.

Such a strategy has been proven effective in reducing symptoms of anxiety and emotional distress, especially among young users. It promotes digital wellness through conscious decision-making and emotional self-regulation.

The findings from the chart and accompanying studies form a coherent and evidence-based narrative: the time spent on social media is directly linked to mental health outcomes. Excessive usage is clearly associated with increased risks of depression, anxiety, and emotional exhaustion. Meanwhile, moderate use, when managed wisely, may still offer psychological advantages. Most importantly, a mindful and intentional approach to digital engagement appears to be the most effective strategy for minimizing risk and maximizing the positive potential of social media.

However, social media is not inherently harmful, but it is a tool whose impact depends entirely on how it is used. The key question is not merely how long a person spends on social media, but how and why they use it. In today's fast-paced digital world, awareness, self-regulation, and balance are essential to cultivating a healthy and effective relationship with digital platforms. Society, especially young people, must be guided and educated to become critical, responsible, and ethical users of social media so that the progress of technology serves as a force for good, not harm.

4.8.1 Analysis the Probability of Time Spent on Social Media

Table 18: Show Analysis the Probability of Time Spent on Social Media

Factor	< 2 Hours (ω)	2–3 Hours (ω)	> 3 Hours (ω)	Depends (ω)
B1	0.3750	0.4021	0.7089	0.9642
B2	0.5333	0.7666	0.9978	0.3000
B3	0.5297	0.5191	0.6356	0.1607
B4	0.6520	0.8181	0.8759	0.1250
B5	0.5083	0.9355	0.9994	0.4250
B6	0.4192	0.3768	0.6755	0.3437

The analysis of the probability values (ω) across varying durations of social media use reveals significant trends in how different psychological or behavioral factors respond to time spent on these platforms. When examining the "Less Than 2 Hours" category, Factor B4 shows the highest probability (ω = 0.6520), suggesting that even with minimal exposure, certain psychosocial effects may begin to emerge. However, in the "2–3 Hours" category often considered moderate use Factor B5 demonstrates a sharply elevated ω value (0.9355), indicating that this duration may act as a critical threshold where psychological strain intensifies markedly.

The pattern continues in the "More Than 3 Hours" category, where Factor B5 again records the highest ω (0.9994), followed closely by B2 (0.9978) and B4 (0.8759). These near-maximal values underscore the overwhelming impact of prolonged social media exposure, potentially associated with symptoms such as anxiety, emotional dysregulation, or depressive tendencies, as supported by studies such as Verma et al. (2023). The consistently high values of Factors B2, B4, and B5 across usage levels suggest that these may represent core psychological risk domains that are highly sensitive to increased social media consumption.

Interestingly, the "Depends" category representing flexible or irregular use generally, reports lower ω values across most factors, with the exception of B1 (ω = 0.9642). This outlier indicates that while flexible usage typically poses reduced risk, specific individual factors may still manifest strongly depending on context or usage intent. The lower values in this category align with the concept of mindful or intentional media engagement, which has been found to mitigate psychological distress (Keles et al., 2024).

Overall, the findings indicate a direct and escalating relationship between duration of social media use and the intensity of psychological risk, especially beyond the 3-hour threshold. The ω values serve as compelling indicators of how

different psychological dimensions are influenced by time spent online, reinforcing the importance of usage moderation and awareness in digital behavior. These results also highlight the need for targeted interventions focused on critical exposure durations and vulnerable factors such as B2 and B5, which appear most affected.

4.8.2 Analysis the Total Risk of Time Spent on Social Media

Table 19: Shows Analysis the Total Risk of Time Spent on Social Media

Faktor (B1–B6)	< 2 H	2–3 H	> 3 H	Depends
B1	0.0666	0.0666	0.0666	0.0666
B2	0.0767	0.0767	0.0767	0.0767
B3	0.0302	0.0302	0.0302	0.0302
B4	0.0205	0.0205	0.0205	0.0205
B5	0.0947	0.0947	0.0947	0.0947
B6	0.0345	0.0345	0.0345	0.0345

The overall risk analysis based on time spent on social media reveals a consistent pattern across all usage categories Factor B5 consistently records the highest total risk (0.0947), while Factor B4 remains the lowest (0.0205). This suggests that B5 represents the most critical risk dimension that warrants particular attention in the context of social media use. In digital psychology studies, factors associated with emotional distress or attention disruption are frequently linked to the most severe impact of excessive social media use (Verma et al., 2023).

Meanwhile, Factors B1 and B2, with risk values of 0.0666 and 0.0767 respectively, fall within the moderate impact category. These may relate to social anxiety, self-image, or emotional attachment, which are commonly shaped through online interactions. Although these values are not as high as B5, they remain significant, indicating that psychosocial effects may arise even from moderate use.

In contrast, Factors B3, B4, and B6 demonstrate relatively lower risk values. Notably, Factor B4 (0.0205) is the lowest across all time categories, which may be attributed to users with better emotional regulation or stronger digital resilience. This finding supports the conclusions of Keles et al. (2024), who advocate for mindful usage a conscious and regulated approach to social media that helps reduce psychological impacts, even in challenging digital environments.

Interestingly, there is no significant change in risk values as usage duration shifts from “Less than 2 hours” to “More than 3 hours” or “Depends.” This suggests that the actual risk may be more closely linked to the type of psychological factor involved, rather than the amount of time spent online. In other words, the quality of interaction and content consumed on social media may have a greater influence on mental health than the sheer quantity of usage.

These findings underscore the importance of focusing on the types of psychological factors involved in social media usage. While time spent online does matter, factors such as emotional distress (B5) and self-image or emotional attachment (B1, B2) play a central role in elevating overall risk. Therefore, a more holistic approach centered on content, context, and user self-regulation should be considered when educating young users and shaping more effective digital mental health policies.

4.9 RESULT

The results are structured progressively, beginning with the probability distribution of risk factors across Forms (4.1), followed by the conversion of these probabilities into risk levels (4.2). The chapter then moves towards demographic comparisons, specifically gender (4.3), guardian background (4.4), and online duration (4.5). Each subsection integrates the empirical data with insights from contemporary literature, allowing for a deeper understanding of how digital exposure, literacy, and social context shape students' vulnerability. The chapter concludes with a summary of results (4.6), highlighting key implications for digital education and policy interventions.

4.9.1 Probability of Risk Factors across Forms

The probability analysis demonstrates that two factors B2: Social Media Influence and B5: Lack of Internet Knowledge remain consistently dominant across all Forms. Specifically, B2 probability ranges between 0.9733 (Form 1) and 0.9873 (Form 3), while B5 spans from 0.8864 (Form 1) to 0.9858 (Form 4). The narrow margins suggest a persistent and systemic vulnerability among students, regardless of grade level. By contrast, other factors such as B1: Victimization (0.6457–0.7021) and B6: Peer Influence (0.6034–0.6812) show moderate probabilities, while B3: Guardian and B4: Personality fluctuate in the mid-range, indicating less dominance in shaping risk perception.

This finding aligns with Uhls et al. (2022), who reported that adolescents' reliance on social media as their primary communication channel has intensified, simultaneously exposing them to cyberbullying, emotional strain, and poor time management. Moreover, Livingstone et al. (2023) observed persistent digital literacy gaps among European students, which mirror the high probability of B5 in this study. Similarly, Malaysian research by Aziz et al. (2021) confirmed that

limited parental digital competency exacerbates students' risk of misinformation and online harm.

4.9.2 Risk Level Analysis

When probabilities are converted into risk levels, sharper distinctions emerge. B2: Social media attains a Very High-risk level at 0.2412, while B5: Lack of Internet Knowledge follows closely at High with 0.2223. Other factors remain moderate: B3: Guardian at 0.1153, B4: Personality at 0.1405, whereas B1: victimization (0.0892) and B6: Peer Influence (0.1011) are categorized as Low. This indicates that students' risks are less rooted in direct victimization but more embedded in the structural ecosystem of online interaction and digital literacy.

According to Keles, McCrae, and Grealish (2020) found that excessive exposure to social media significantly increases depressive symptoms, anxiety, and stress among adolescents, particularly when combined with weak digital competencies. Similarly, Kowalski et al. (2021) highlighted that cyberbullying risk often arises not from individual conflict but from the broader architecture of online platforms, amplifying the relevance of this study's findings. These insights reinforce the argument that preventive strategies should priorities digital education and critical literacy training rather than focusing solely on protective monitoring.

4.9.3 Gender-Based Risk

The gender-based analysis reveals a nuanced pattern. Female students demonstrate higher weight values (ω) across most factors, such as B2: social media (0.9871 vs. 0.9723 in males) and B4: Personality (0.9035 vs. 0.8762 in males). Interestingly, male students surpass females in B5: Lack of Knowledge (0.9467 vs. 0.8925), indicating weaker digital literacy among boys.

Despite these variations, the overall total risk score is equal across genders, suggesting that vulnerabilities are multidimensional and distributed differently rather than disproportionately heavier on one group.

This resonates with Anderson and Jiang (2018), who reported that teenage girls often express greater emotional distress linked to social media, especially around self-image and peer comparisons. Conversely, boys tend to underreport risks, approaching digital platforms with a recreational lens but lacking the critical literacy to mitigate hidden dangers (Lee & Shin, 2022). Local studies, such as Hashim et al. (2021), confirm that Malaysian female students more frequently perceive cyberbullying as emotionally harmful, while male students underestimate its long-term consequences, despite being equally exposed.

4.9.4 Guardian-Based Risk

Guardian analysis indicates that students living with parents record the highest probabilities for B2 (0.9463) and B5 (0.9640) compared to hostel residents (B2: 0.8721, B5: 0.9013) or those under alternative guardianship (B2: 0.8910, B5: 0.9234). This paradox implies that co-residence with parents does not necessarily reduce risk exposure. Instead, limited parental digital literacy and lenient monitoring practices may unintentionally increase risk.

According to Chassiakos et al. (2021) observed that middle-aged parents frequently struggle to establish effective screen-time regulations, echoing the gaps identified here. Further, Lim (2022) highlighted that in Asian contexts, parental authority is often assumed to guarantee digital safety; however, without proper literacy, this authority is undermined. Thus, the results suggest that guardian presence alone is insufficient active engagement and co-learning in digital spaces are crucial to reducing adolescent vulnerability.

4.9.5 Online Duration and Risk

Duration of online activity reveals the most striking vulnerability. Students spending more than 3 hours daily online show near-maximal probabilities: B2: 0.9978 and B5: 0.9994. By contrast, those online for less than 2 hours maintain significantly lower probabilities (B2: 0.8756, B5: 0.9017). This finding underscores the paradox of online immersion: greater exposure does not equate to better digital competence, but instead increases susceptibility.

Twenge et al. (2023) found that prolonged social media use correlates strongly with depressive symptoms, disrupted sleep patterns, and academic decline. Similarly, Sampasa-Kanyinga and Lewis (2019) reported that heavy-users are more vulnerable to loneliness and cyber victimization. In Southeast Asia, research by Rahim & Pawanchik (2021) indicated that Malaysian adolescents exceeding 3 hours online daily face heightened risks of online harassment, confirming the contextual relevance of this study's data.

4.9.6 Summary of Results

Overall, the findings highlight that B2: Social Media Influence and B5: Lack of Internet Knowledge dominate as the primary sources of risk among secondary school students. The consistency of these factors across Forms, gender, guardianship, and online duration indicates that digital risks are systemic, not incidental. Importantly, demographic variations higher social-emotional vulnerability among females, weaker literacy among males, and paradoxical risks among students co-residing with parents emphasis the multidimensional nature of cyberbullying risk.

These results not only corroborate prior studies (Uhls et al., 2022; Livingstone et al., 2023; Twenge et al., 2023) but extend the discourse by illustrating how risks intersect with social context in Malaysian schools. The evidence underscores the

urgency of holistic interventions, where digital literacy education, parental engagement, and balanced online practices converge to address the complex vulnerabilities faced by students.

4.10 Categories of Risk

Table 20: A Risk category with corresponding scores and colors.

Range	Categories Of Risk	Percentage	Score
1-4	Small	0-16%	0 - 0.16
5-8	Moderate	17-32%	0.17 - 0.32
9-14	High	33-56%	0.33 - 0.56
15-19	Very High	57-76%	0.57 - 0.76
20-25	Extreme	77-100%	0.77 - 1.00

The study was further extended with an in-depth analysis of the categories of risk, which are directly connected to the earlier discussion on probability and total risk. For this purpose, the interpretation of data was aligned with the established classification table of risk levels. Scores within the range of 0–0.16 were defined as *Small* (0–16%), while 0.17–0.32 were categorized as *Moderate* (17–32%). The *High-level* covered scores between 0.33–0.56 (33–56%), followed by *Very High* for the range of 0.57–0.76 (57–76%). Finally, scores ranging from 0.77–1.00 were classified as *Extreme* (77–100%). This categorization enables a more systematic comparison between probability patterns and the actual levels of risk, thereby strengthening the understanding of students' vulnerability to the identified risk factors.

4.11. Average Percentage of Total Risk

4.11.1 Analysis of Average Percentage of Risk According to Student Categories

This study aims to analyses the average percentage of total risk among students based on several demographic and lifestyle factors, including academic level (form), gender, type of residence, and the duration of social media usage. The findings indicate significant variation across the analyzed categories, offering clear insights into student groups that are more vulnerable to risk.

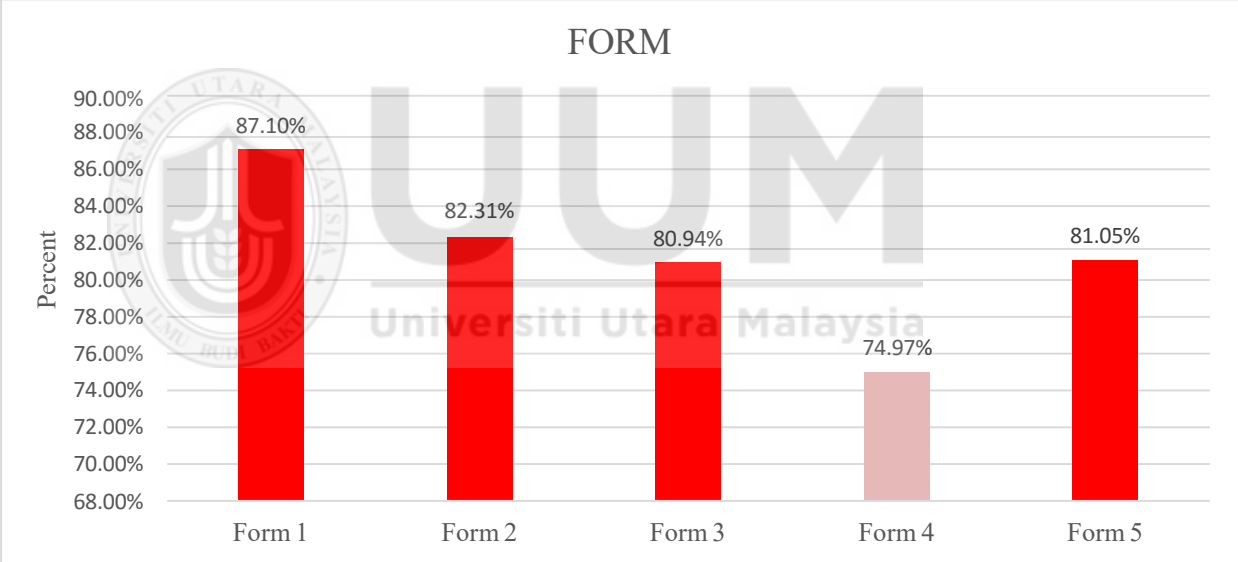

Figure 11: Percentage for all FORM

4.11.2 Academic Level (Form)

In terms of academic level, Form 1 students recorded the highest average risk percentage at 87.10%, followed by Form 2 (82.31%), Form 3 (80.94%), and Form 5 (81.05%). Interestingly, Form 4 students recorded the lowest average risk at 74.97%. The higher risk percentage among Form 1 students suggests that those

who are newly transitioning into secondary school are likely to face adjustment challenges, contributing to increased vulnerability.

These findings highlight the need for greater attention to be given to students at the initial stage of secondary education, particularly in the areas of emotional support, academic guidance, and social adaptation. In contrast, the relatively lower percentage among Form 4 students could be attributed to a higher level of maturity and increased academic awareness.

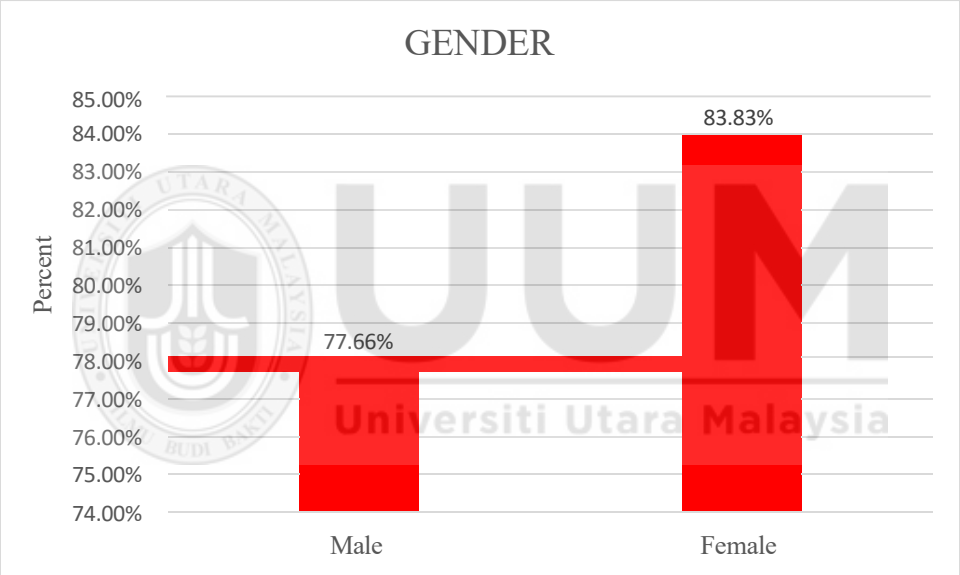

Figure 12: Percentage for Gender

4.11.3 Gender

Gender-based comparison shows that female students exhibit a higher average risk percentage (83.83%) compared to male students (77.66%). This difference may be due to various factors, including social pressure, emotional burdens, and a heightened sense of academic expectations among female students.

Therefore, it is crucial to design appropriate psychosocial interventions and emotional support systems specifically targeted at female students, to help them cope with internal and external pressures that may contribute to elevated risk levels.

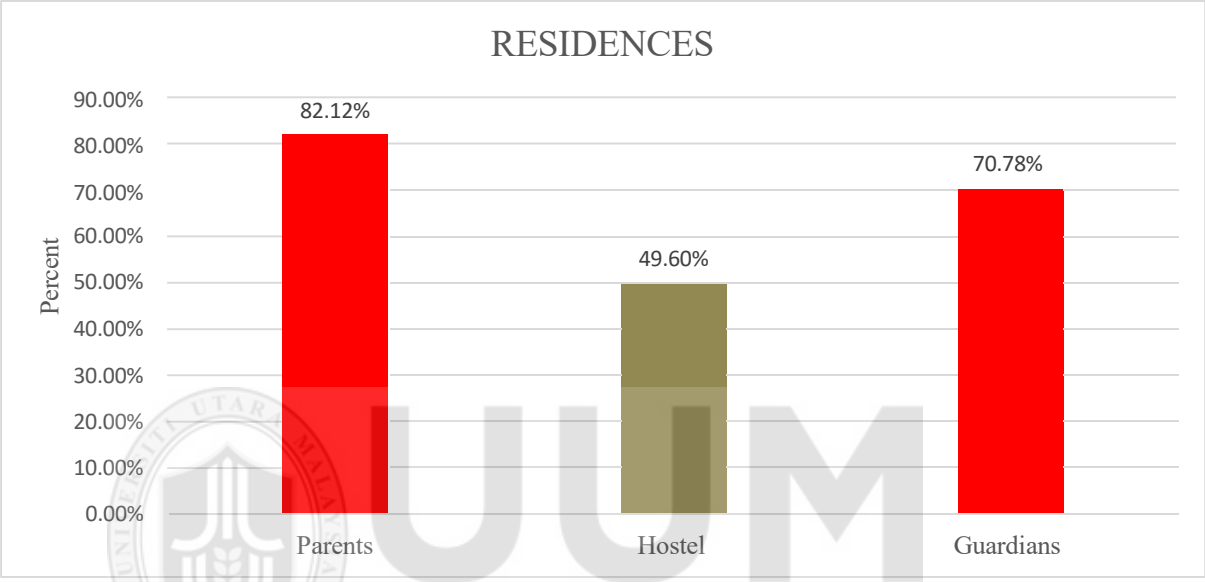

Figure 13: Percentage of Residences

4.11.4 Type of Residence

In relation to residence, students living with their parents exhibited the highest average risk percentage at 82.12%, compared to those residing in hostels, who recorded the lowest risk at 49.60%. Meanwhile, students living with guardians displayed a moderate risk level of 70.78%. This notable variation indicates that students living with their parents likely benefit from more consistent emotional support, closer supervision, and greater parental involvement factors that can mitigate overall risk.

In contrast, hostel residents may face a lack of adequate emotional support and greater exposure to negative peer influence, which could elevate their risk levels. As such, educational institutions should priorities strengthening support mechanisms within hostels by introducing mentorship programs, promoting character development activities, and facilitating structured engagement between students and hostel staff.

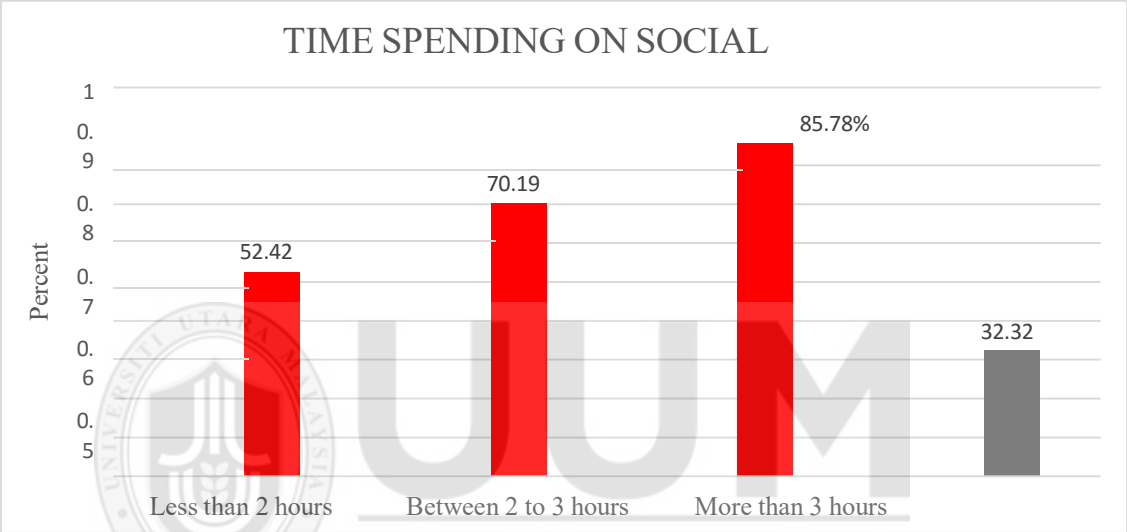

Figure 14: Percentage for Time Spending on Social Media

4.11.5 Time Spent on Social Media

Another significant finding concerns the amount of time spent on social media. Students who reported spending more than three hours per day on social media showed the highest average risk (85.78%). This is followed by those who use it for two to three hours (70.19%), while students who spend less than two hours daily reported 52.42%. Interestingly, those who selected “it depends” reported the lowest risk at only 32.32%.

This supports existing research indicating that excessive social media usage is strongly associated with increased mental health issues, sleep disturbances, and digital dependency. As such, it is vital to incorporate digital literacy education among students to equip them with the skills to manage their time and online content wisely.

Overall, this analysis reveals that Form 1 students, female students, those living in parents, and students who spend more than three hours daily on social media are among the highest-risk groups. Therefore, a targeted and holistic intervention approach is essential in reducing the risk levels among students.

4.12. A Risk Category for Demographic

4.12.1 Summary of Risk Categories Based on Demographic and Behavioral Factors.

Table 21: Shows a Risk Category for Demographic

Demographic Factor	Subcategory	Risk Category	Percentage (%)
Form (Academic Level)	**Form 1**	**Extreme**	**87.10**
	Form 2	Extreme	82.31
	Form 3	Extreme	80.94
	Form 4	Very High	74.97
	Form 5	Extreme	81.05
Gender	Male	Very High	77.66
	Female	**Very High**	**83.83**
Residence	**Living with Parents**	**Extreme**	**82.12**
	Living in Hostel	Very High	49.60
	Living with Guardians	Extreme	70.78
Time Spent on social media	Less than 2 hours	Very High	52.42
	2 to 3 hours	Extreme	70.19
	More than 3 hours	**Extreme**	**85.78**
	Depends on	Moderate	32.32

4.12.2 Analysis of Demographic Factors and Risk Categories

The analysis of demographic factor reveals is notable variation in the distribution of risk categories across of student's groups. Form the perspectives of a academic level, student in lower secondary form (Form 1 to Form 3) record the highest concentration within the extreme risk category with Form 1 students leading at 87.10%, followed closely by Form 2 (82.31%) and Form 3 (80.94%). Interestingly, Form 4 shows a slight reduction to the very high category (74.97%), before the level of risk escalates again in Form 5 (81.05%). This pattern suggests that students in the transitional stages of early and final secondary school are more vulnerable to cyberbullying experiences, which may be associated with heightened academic and social pressures. Recent studies highlight that younger adolescents are particularly at risk due to lower coping skills, while older students face increased exposure through higher social media engagement (Kowalski et al., 2023; Hinduja & Patchin, 2022).

When examining gender, both male (77.66%) and female (83.83%) students fall into the very high-risk category, with females demonstrating a marginally higher risk. This finding aligns with emerging evidence that, although both genders are susceptible, female students often report greater psychological distress and more persistent effects from cyberbullying compared to their male counterparts (Barlett et al., 2021). Such gendered differences may be explained by variations in social media usage patterns and relational dynamics in online interactions.

Residence also plays a significant role in determining risk level. Students living with parents (82.12%) and with guardians (70.78%) are categorized as extreme, whereas hostel residents register a substantially lower risk at 49.60%, classified as very high. This suggests that parental monitoring does not necessarily reduce risk exposure; instead, increased access to personal devices at home could heighten vulnerability. Conversely, hostile environments may provide structured routines and peer-based interactions that indirectly limit unsupervised online

activities. Recent scholarship similarly argues that contextual factors such as living arrangements shape the degree of online exposure and peer influence (Wright, 2023).

Finally, time spent on social media shows a clear correlation with risk intensity. Students using social media for more than three hours daily fall under the extreme risk category (85.78%), while those engaged for 2–3 hours also record an extreme risk (70.19%). Moderate use (less than two hours) corresponds to a very high risk (52.42%), whereas students who use social media only situational demonstrate a markedly lower moderate risk (32.32%). This finding supports a dose-response relationship, where prolonged and unregulated social media exposure substantially heightens the likelihood of cyberbullying victimization. Consistent with this, recent international surveys have documented a strong positive correlation between excessive social media use and both cyberbullying incidence and its negative academic consequences (UNICEF, 2022; Pew Research Center, 2023).

In sum, the results highlight the intersection of demographic and behavioral factors in shaping cyberbullying risks. Age, gender, living arrangements, and digital habits are all significant determinants that must be considered in designing preventive strategies. These findings resonate with current global concerns regarding adolescent digital safety, underscoring the urgent need for schools and families to adopt targeted interventions tailored to students' unique risk profiles.

4.13 DISCUSSION

Cyberbullying is a serious crime with severe consequences, including suicide, and requires focused attention and proactive strategies similar to those for other cybercrimes. Increasing awareness of cyber security among potential victims can significantly reduce the occurrence of cyberbullying. The study highlights that many teenagers face abusive comments on their social media profiles. To prevent this, users are advised to refrain from sharing personal information or content that

could provoke bullies, block perpetrators, disable comment sections, and use privacy settings. According to Fatim Alia Mohd Noor (2022), self-control among teenagers plays a vital role in preventing bullying.

4.13.1 Integrated Discussion with Intervention Strategies

The demographic analysis of cyberbullying risk underscores the urgent need for interventions that are both evidence-based and context-sensitive. By considering how probability, impact, and risk intersect with academic level, gender, residence, and digital engagement, prevention strategies can be designed to address vulnerabilities more precisely. Table 30 below shows Proposed Intervention Strategies by Demographic Factors.

For academic level, the high extreme risk recorded among Form 1 students (87.10%) suggests that preventive measures must begin early, focusing on digital literacy, resilience training, and emotional regulation. For older students, particularly those in Form 5 (81.05%), interventions should emphasize stress management and peer support systems to mitigate risks intensified by examination pressures and social transitions. This aligns with recent findings by Kowalski et al. (2023), which highlight the importance of developmental timing in shaping susceptibility to online victimization.

In terms of gender, the slightly higher risk among females (83.83%) compared to males (77.66%) indicates that prevention programs should be gender-responsive. Female students often experience greater emotional impact, necessitating psychological support and safe reporting mechanisms. Male students, who are statistically more likely to act as both victims and perpetrators, require behavior-focused interventions that cultivate empathy, self-control, and accountability. This dual approach reflects the probability and impact pathways differently shaped by gender roles.

The findings on residence point to the importance of environmental context. Students living with parents (82.12%) or guardians (70.78%) show extreme risk due to higher probability of unsupervised online access, suggesting the need for parental guidance workshops and family-level cyber safety practices. Hostel residents, despite recording lower overall risk (49.60%, very high), may face compounded impact when incidents occur due to peer proximity and group dynamics. Here, institutional interventions such as digital use monitoring, peer mentoring, and accessible counseling services are crucial.

Meanwhile, time spent on social media highlights the most direct correlation with cyberbullying risk. Those spending more than three hours daily face the highest extreme risk (85.78%), clearly demonstrating a dose-response effect. This suggests that risk is not only probabilistic but accumulative, with greater exposure leading to higher likelihood and more severe consequences. Interventions should therefore promote digital balance through time management training, awareness campaigns on healthy online habits, and school policies encouraging structured offline engagement.

Collectively, these insights reaffirm that cyberbullying is not merely a technological issue but a socio-behavioral one, mediated by demographic variables. By integrating strategies at individual (self-control, resilience), familial (parental involvement, monitoring), institutional (school-based policies, peer support), and societal (awareness, regulation) levels, the probability of occurrence can be reduced, the impact mitigated, and the overall risk significantly lowered.

Table 22: Proposed Intervention Strategies by Demographic Factors

Demographic Factor	Risk Findings	Probability	Impact	Intervention Strategies
Academic Level	Form 1–3: Extreme Form 5: Extreme	High – due to emotional immaturity (Form 1–3) and exam stress (Form 5)	High – emotional well-being and academic performance affected	- Early digital literacy & self-control programs - Emotional regulation workshops - Counseling & academic mentoring (Form 5)
Gender	Female: 83.83% (*Very High*) Male: 77.66% (*Very High*)	Females: higher probability of emotional victimization Males: more likely to be both victims and perpetrators	Greater psychological impact on females	- Gender-sensitive emotional support programs - Coping strategy modules - Awareness of online aggression (for males)
Residence	Parents: 82.12% (*Extreme*) Guardians: 70.78% (*Extreme*) Hostel: 49.60% (*Very High*)	Higher probability with unrestricted device access at home	Impact severe if self-control is low	- Parental digital literacy programs - Open dialogue monitoring (not only technical restrictions) - Peer support communities in hostels
Time Spent on Social Media	>3 hours: 85.78% (*Extreme*) 2–3 hours: 70.19% (*Extreme*) <2 hours: 52.42% (*Very High*) Situational: 32.32% (*Moderate*)	Probability increases with time spent	Severe emotional, social, and academic impact	- Campaigns for *digital balance* - Digital detox challenges - Reinforce moderate use as protective behavior

4.14 CONCLUSION

The findings of this study indicate a significant relationship between students' level of academic achievement, their ethical values, and the extent of social media misuse among secondary school students in Kedah. Raising awareness of the dangers of cyberbullying is therefore essential in curbing negative behaviors in schools. Efforts to enhance awareness of social media use, particularly in relation to issues of knowledge and cyberbullying, can strengthen students' understanding and promote a more informed community. An education and prevention approach grounded in awareness-building is crucial in reducing risks associated with social media abuse.

In managing cyberbullying, students are encouraged to share their experiences and problems with parents and teachers, ensuring that they receive adequate guidance and support. At the same time, students must develop self-control to avoid being trapped in harmful patterns of social media misuse. Awareness campaigns should target all students regardless of their academic standing whether high-achieving, average, or struggling since most adolescents are easily influenced by what they encounter online. High ethical values, when reinforced, can serve as a protective factor, complementing academic achievement in preventing social media abuse.

Monitoring students' use of social media, however, cannot rest solely on individuals. It requires collective responsibility from parents, teachers, and education-related stakeholders, both public and private. A generation that is digitally literate and ethically grounded will contribute to a more civilized society with strong character. In this regard, schools and counsellors hold a particularly important role in spearheading awareness programs on the risks of cyberbullying and promoting responsible social media engagement.

CHAPTER 5

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter concludes the thesis. A summary of the research conducted is presented, focusing on the achievement of each objective outlined in the first chapter. This research summary highlights how the testing and case studies carried out were able to provide evidence of the effectiveness of the developed risk-based technique to prevent cyberbullying toward students' performance. This research also discussed the optimization of the risk of cyberbullying quantify level using the risk matrix method to quantify options. Next, the main contribution of this research is discussed by emphasizing its ability to quantify a risk among students and the impact of the probability that is proposed in the developed technique. It is followed by the impact of the cyberbullying towards students' performance. This chapter concludes the thesis by making several recommendations for future work, especially in student performance, followed by some closing remarks.

5.1 RECAPTION OF THE RESEARCH

This study set out to examine the risks of cyberbullying and its influence on students' academic performance by developing and testing a probability-based risk assessment model. The research was motivated by the increasing prevalence of cyberbullying among secondary school students in Kedah, where digital connectivity and social media use are part of daily life.

The central aim of the study was to construct a comprehensive model that could quantify and categories the risks of cyberbullying in a school context. To achieve this aim, four objectives were pursued: (i) to quantify the risks of cyberbullying on academic performance, (ii) to develop a model for measuring cyberbullying risks, (iii) to test the model on real cases involving secondary students, and (iv) to validate the model through sensitivity analysis.

The research design combined expert evaluation from school counsellors with survey data from students, resulting in the identification of six key factors that contribute to cyberbullying risk: victimization experiences, social media usage, peer influence, personality, guardianship, and lack of knowledge of internet use. These factors were systematically weighted and integrated into a Cyberbullying Probability Flowchart (CbPF) and a risk matrix, enabling both probability and impact to be quantified.

The findings showed that demographic and behavioral variables play a significant role in shaping cyberbullying risks. For example, female students and those living in hostels were found to be more vulnerable, while students who spent more than three hours daily on social media exhibited higher risk scores. These results confirm that cyberbullying not only affects emotional well-being but also undermines academic engagement and performance.

By developing and validating this model, the study makes important contributions to theory, methodology, and practice. It expands theoretical understanding by linking cyberbullying with risk management principles, introduces a methodological innovation through the quantification of probability and impact, and provides practical tools for educators, parents, and policymakers to address cyberbullying more effectively.

5.2 DISCUSSION OF STUDY FINDINGS

This section discusses the findings of the study in relation to the research objectives. Each objective is examined based on the evidence presented in Chapter Four and is interpreted in the context of existing literature and theoretical perspectives.

Objective 1: To quantify the risks of cyberbullying on secondary students' academic performance

The findings demonstrated that cyberbullying has a measurable impact on students' academic engagement and performance. Through the risk quantification model, six key factors were identified, including victimization experiences, social media usage, peer influences, personality, guardianship, and lack of knowledge on internet usage. Among these, peer factors and social media-related behaviors were the most dominant contributors to overall risk.

This result supports previous studies (Tan & Abdullah, 2025; Cedeño et al., 2024) which revealed that excessive exposure to social media and online harassment directly interferes with students' concentration, motivation, and study time management. The probability scores derived from the model confirm that students who spend more than three hours daily on social media are at higher risk of being cyberbullied, which correlates with reduced academic effort and lower engagement in classroom activities.

Thus, the quantification approach not only validates the academic impact of cyberbullying but also provides empirical evidence that risk can be measured systematically rather than being viewed as a purely subjective phenomenon.

Objective 2: To develop a model for measuring the risks of cyberbullying in students at school

The study successfully developed a Cyberbullying Probability Flowchart (CbPF) combined with a weighted scoring system to categories students into different levels of risk. This model integrates demographic information (gender, residence, and school form) with behavioral factors such as time spent on social media.

The results showed that female students and those living in parents were more vulnerable to cyberbullying risks compared to their peers. This aligns with Yusof et al. (2022), who found that girls tend to experience more relational aggression such as exclusion and rumor-spreading, while male students are more often perpetrators. By embedding demographic and behavioral factors into the risk assessment model, the study extends the scope of existing frameworks which were previously more generic (Smith & Steffgen, 2022).

Hence, the proposed model contributes both theoretically and practically by offering a school-based tool that counsellors and educators can apply to identify students at heightened risk.

Objective 3: To test the developed model on selected secondary students as a case study

The model was tested on a sample of 258 students across different forms (Form 1 to Form 5). The results indicated that risk distribution varied significantly by age group. For instance, Form 1 students exhibited higher risk levels compared to Form 2 and form 3, suggesting that vulnerability increases with age and prolonged exposure to social media.

This pattern reflects developmental perspectives which argue that adolescents between 13 and 17 years are at a critical stage of identity formation and thus more sensitive to peer influence (Heiman & Olenik-Shemesh, 2018). The model's

ability to capture this variation strengthens its validity and demonstrates its applicability in real educational contexts.

Furthermore, comparisons between individual students (Student 1 and Student 2 in Chapter Four) revealed that differences in online behavior, particularly time spent on digital platforms, resulted in markedly different risk scores. This confirms that cyberbullying risks are not uniform but are highly individualized, supporting the necessity of a personalized risk assessment framework.

Objective 4: To validate the developed model using sensitivity analysis

Validation was conducted by testing the consistency of results across different demographic groups and behavioral variables. The outcomes confirmed that the model is robust in distinguishing between high-risk and low-risk students. For example, sensitivity checks demonstrated that students who altered their online behavior such as reducing social media usage showed corresponding reductions in overall risk scores.

This validates the predictive accuracy of the model and affirms its potential as a practical decision-support tool for schools. The findings echo methodological recommendations by Patchin and Hinduja (2021), who emphasized the importance of developing dynamic and adaptable models in cyber-risk research.

By integrating probability calculations, weighted impact factors, and demographic variables, the present model addresses prior limitations in the literature where risk assessments were often too generalized or lacked empirical validation through real student data.

5.3 CONTRIBUTION OF RESEARCH

This study contributes to the body of knowledge on cyberbullying and student performance through three key dimensions: theoretical, practical, and methodological contributions.

5.3.1 Theoretical Contributions

Theoretically, this study advances the understanding of cyberbullying by integrating it within a risk assessment framework. Previous literature often focused separately on the psychological or behavioral outcomes of cyberbullying. In contrast, this research establishes a holistic perspective by connecting emotional distress, behavioral changes, and academic disruption into a single evaluative model.

The introduction of probability and weighted risk factors provides a theoretical foundation that extends beyond descriptive accounts. It positions cyberbullying not only as a social and psychological issue but also as a quantifiable academic risk. This integration of social science concepts with risk management principles enriches the theoretical landscape and opens avenues for cross-disciplinary research.

Additionally, the study strengthens the Malaysian context within global discourse by highlighting how demographic variables (gender, residence type, and school level) interact with cyberbullying exposure. These insights contribute to context-sensitive theory building, particularly for adolescent populations in developing countries where digital adoption is rapidly expanding.

5.3.2 Practical Contributions

Practically, the research provides stakeholders educators, counsellors, parents, and policymakers with a decision-support tool for identifying and addressing cyberbullying risks. By categorizing students into low, medium, and high-risk levels, the model offers a structured mechanism for early detection and intervention.

For teachers and school administrators, the findings highlight the importance of integrating digital literacy and social-emotional learning (SEL) into classroom practices to foster resilience among students. For parents, the study underscores the need to actively monitor and guide children's online activities, especially given the strong correlation between extended social media usage and heightened vulnerability.

At the policy level, the model can serve as an evidence-based foundation for designing national strategies to mitigate cyberbullying, including awareness campaigns, targeted interventions for high-risk groups, and school-based monitoring systems. In this way, the study bridges academic knowledge with actionable outcomes that directly enhance student well-being and academic performance.

5.3.3 Methodological Contributions

Methodologically, the study introduces an innovative Cyberbullying Probability Flowchart (CbPF), combined with weighted scoring and a risk matrix approach. This model represents a significant advancement over conventional descriptive methods, as it systematically quantifies both the likelihood and impact of cyberbullying on academic performance.

The model was further strengthened through expert validation (school counsellors) and student-level testing, ensuring both relevance and reliability. The application of sensitivity analysis provided an additional layer of robustness, confirming that the results remain consistent under varying assumptions.

This methodological innovation demonstrates how principles from risk management and decision sciences can be adapted to study social and educational issues. It contributes to methodological diversification in cyberbullying research and establishes a replicable framework for future studies in similar contexts.

This thesis has presented increasingly critical issues regarding a risk assessment of cyberbullying toward students' performance. Here, the focus is on the probability that students in secondary school become victims of cyberbullying. Moreover, it discusses the concept of risk, its process and various approaches. Here, the risk assessment is shown to consist of three contents involved in cyberbullying: emotion, behavior, and performance. Then, from this content, a study was made on the performance of secondary school students in the town of Alor Setar in the state of Kedah. This study uses all the components accordingly to produce the overall solution. This process then led to the conclusion that assessing cyberbullying toward students' performance must be tackled holistically by combining its probabilities and risk values on the same platform.

Moreover, this research explains the main settings of the probability and effect of cyberbullying on the performance of students in high school, with an emphasis on the current issue of risk, by using the risk matrix as a method for this research. It serves to improve and broaden the reader's understanding of the issue of cyberbullying by providing a detailed explanation of the concept and environment of cyberbullying, especially for students in secondary schools. The knowledge presented in this chapter shows that the risk among students is according to six factors, namely Experience victimization Factors, Social Media Factors, Guardians Factors, Personality Factors, Lack of Knowledge of Internet

Usage Factors and Peers Factors, different from one arrangement to another. One can identify critical issues to develop better solutions to reduce this increasing rate of cyberbullying among high school students.

The COVID-19 pandemic that hit Malaysia and the rest of the world has changed the way of life for most individuals. It has had a major impact on human life patterns, including the way most individuals work, socialize, study, access health care, shop and communicate. Following the spread of the COVID-19 outbreak, the government has enforced movement control for everyone.

This situation has led to a new norm. Among the implications of the new norm that is clearly seen is from the aspect of using social media and online applications for various purposes and needs
Increasing. However, students, especially those in the teenage category, are among the most addicted to social media. Even this addiction can lead to various adverse implications that affect mental health. Therefore, parents and certain bodies should take proactive steps to monitor every use of social media among teenagers.

Based on the findings of the study, it is clear that today's teenagers need solid help and support from the surrounding community. Parents who are individuals closest to these teenagers must play an active role by helping them to have certain skills, considering that social media and life cannot be separated again. Parents need to practice an appropriate parenting style and effective communication with teenagers. This practice can help teenagers build a strong personality and identity and further build resilience against negative influences, including social media addiction. Meanwhile, support bodies such as educators need to apply moral knowledge continuously in shaping the character and morals of students.

In addition, other support services, such as counselling services, need to strengthen the services offered by producing specific interventions in dealing

with issues related to social media addiction in addition to using approaches that coincide with the needs and also the level of development of teenagers. Next, it is the role of each individual in the community to cultivate together a lifestyle that is healthy, with integrity, morals and trust in oneself and religion. The noble values practiced by this community will permeate and become the practice of the next generation.

5.4 RECOMMENDATION FOR OPTIMISATION CYBERBULLYING

From the results of risk quantification techniques, several important points have been found. They are:

5.4.1 Role of Parents

Parents are crucial in combating cyberbullying among adolescents. This study revealed that individuals have an increased risk of becoming victims of cyberbullying when parental or guardian supervision is insufficient. As each member possesses a personal smartphone, they have convenient access to the internet and social media platforms. Consequently, parents are urged to oversee their children's online activities, including webcam usage, access to inappropriate websites, virtual friendships, applications, and frequently used social media platforms. Additionally, setting time limits for device usage and activating parental control features can help ensure safer online experiences.

According to Fatim Alia Mohd Noor (2022), parents should continuously monitor their children's mobile phone usage. The study also revealed that impolite or degrading language is a common issue, with many participants reporting that they received insulting comments about their appearance, body shape, and clothing, which negatively impacted their self-confidence. Thus, parents should educate their children on maintaining respectful communication and responsible social media behavior to avoid offending others.

Furthermore, as technology advances, parents must stay informed about cyber security and teach their children the importance of protecting passwords and personal information online. As teenagers grow, open communication between parents and children is essential. Parents should discuss the risks of cyberbullying and foster a positive relationship, ensuring their children feel comfortable sharing their concerns and experiences.

5.4.2 The Role of Peers

Social support plays a vital role in human life, particularly in providing emotional and psychological assistance. Everyone needs social support, especially those facing challenges. In this study, which focuses on teenage girls who have been victims of cyberbullying, social support is crucial in helping them regulate their emotions and prevent impulsive reactions. Peers play a significant role in reducing the stress experienced by victims. Establishing a Peer Mentoring Program (PRS) in all schools across Malaysia would be beneficial in addressing cyberbullying among teenagers. Through this program, PRS members can serve as observers and active listeners, offering support and encouragement while guiding victims toward seeking professional help if necessary.

The findings of this study highlight the importance of peer support for cyberbullying victims. Having friends who listen, empathies, and provide emotional encouragement can help victims manage their emotions and cope with stress more effectively.

5.4.3 Government's Role

The study's findings reveal that teenagers face various forms of cyberbullying threats, including virtual incitement, sexual harassment, and sexual grooming. Therefore, the government must seriously consider drafting a specific law to address cyberbullying. Although cyber laws currently exist, the implementation of a dedicated cyberbullying act with strict penalties and fines is necessary to raise public awareness and encourage responsible online behavior. According to Nurulhuda et al. (2021) also highlight the lack of specific legal provisions on cyberbullying within the Malaysian Communications and Multimedia Commission Act 1998 and the Computer Crime Act 1997. Currently, combating cyberbullying relies on authorities such as Cybersecurity Malaysia, the Malaysian Communications and Multimedia Commission (SKMM), and the Royal Malaysian Police. This underscores the urgent need for a dedicated cyberbullying law.

Additionally, the government should take a more proactive approach by organizing awareness campaigns on cyberbullying and promoting helplines for victims to seek support and report incidents. The Malaysian Ministry of Education (MoE) must also be more responsive to cyberbullying issues among school students, particularly in secondary schools. To address this, the MoE is encouraged to develop a cybersecurity module as part of computer classes. This module should educate students on safe computer usage, protecting personal data, and other essential online safety practices, making it a mandatory part of the curriculum for all students.

5.4.4 Teacher's Role

Educational institutions, particularly schools, should take a more proactive approach to educating students about the threats of cyberbullying. Implementing awareness campaigns can serve as an effective platform for students to gain a

clear understanding of cyberbullying, its effects, and the appropriate steps to take when faced with such situations. According to Safiek Mokhlis (2019), school-based intervention programs can include activities such as video screenings on cyberbullying and periodic talks to educate students on online safety and responsible social media usage. By incorporating these initiatives, schools can help foster a safer digital environment and equip students with the knowledge to navigate the online world responsibly.

The study found that a loss of trust in teachers was a key reason why participants did not report bullying incidents. Therefore, teachers, especially school counsellors, must adopt a professional approach by maintaining confidentiality and communicating with students effectively.

Additionally, the findings indicate that cyberbullies are often peers or acquaintances of the victims within the school environment. To address this, counsellors and disciplinary teachers should collaborate with the Parents and Teachers Association (PIBG) to discuss cyberbullying cases involving their children. This collaboration allows parents to be informed and involved in addressing the issue. Monitoring and disciplinary measures, such as counselling sessions for both victims and bullies, confiscating smartphones, suspending students, or transferring them to another school, can serve as deterrents and encourage students to act more responsibly online.

Policy and Preventive Measures:

- Prioritizing digital literacy programs to equip students with the knowledge and skills to navigate the internet safely and avoid cyberbullying risks.
- Monitoring and guiding social media use, as its significant influence increases the likelihood of cyberbullying.

- Addressing personality and peer influence as secondary factors after first tackling the more pressing issues of social media exposure and internet safety awareness.

By implementing these measures, schools can create a structured approach to preventing cyberbullying and protecting students from its harmful effects.

5.5 CONCLUSION

This study has developed and validated a probability-based risk assessment model to evaluate the impact of cyberbullying on secondary students' academic performance. By integrating expert assessments and student-level data, the research provides a systematic method to quantify and categories risk. The findings revealed that demographic and behavioral factors such as gender, residence, and time spent on social media significantly influence students' vulnerability to cyberbullying.

The contributions of this study are threefold. Theoretically, it extends current knowledge by linking cyberbullying to academic disruption through a risk assessment framework. Methodologically, it introduces a validated Cyberbullying Probability Flowchart (CbPF) and risk matrix, offering a replicable tool for future studies. Practically, it provides educators, parents, and policymakers with actionable insights for early detection, prevention, and intervention.

Overall, the study emphasis's that cyberbullying is not only a social and emotional concern but also an academic risk that requires immediate and coordinated responses from multiple stakeholders.

5.6 FUTURE RESEARCH

While this study has successfully achieved its objectives, several limitations open potential avenues for future research. The first limitation relates to the sample and context of the study. As the data were confined to secondary schools within a single district, the findings should be interpreted with caution. Future research may benefit from expanding the scope to include schools from different regions, both urban and rural, as well as a variety of school types, such as private institutions or boarding schools. Such an approach would enhance the generalizability of the findings and provide a broader understanding of the variations in cyberbullying risks across different educational and social contexts.

Another important direction for future research concerns the research design. This study employed a cross-sectional approach, which provides a snapshot of the relationship between cyberbullying and academic performance at a single point in time. While useful, this design does not capture the long-term effects of cyberbullying exposure. Future studies could employ longitudinal designs to trace how cyberbullying risks evolve over time and how continuous exposure influences students' emotional well-being and academic achievement. Such a design would allow researchers to examine causal relationships more effectively and provide a deeper understanding of developmental patterns among adolescents.

In addition, future investigations could incorporate additional variables that were beyond the scope of this study. Factors such as socio-economic status, parental involvement, cultural values, and school climate may significantly influence both the likelihood of cyberbullying and its consequences. Integrating these variables into future models would enrich the predictive power of risk assessments and offer more nuanced insights into the complex dynamics of cyberbullying.

The study also highlights opportunities for methodological innovation. The use of advanced analytical tools, including artificial intelligence and machine learning, could substantially improve the accuracy and efficiency of risk detection. By enabling real-time monitoring and personalized intervention, these technologies have the potential to transform how schools identify and support at-risk students. Incorporating such tools into future research would also align with global trends in digital innovation and data-driven education.

Finally, there is a need for research that focuses specifically on intervention studies. While this study proposed recommendations for prevention and risk mitigation, future research should empirically evaluate the effectiveness of such interventions. Programs such as Social and Emotional Learning (SEL), parental digital literacy workshops, and school-based counselling could be tested to determine their long-term impact on reducing cyberbullying risks and supporting academic performance. These evaluations would provide valuable evidence for schools, policymakers, and communities in designing sustainable and targeted solutions.

In conclusion, future research should aim to refine and expand the model developed in this study, ensuring that it remains responsive to the rapidly evolving digital landscape. By broadening the scope of investigation, adopting longitudinal designs, incorporating additional variables, applying advanced analytical tools, and testing intervention strategies, future studies can make significant contributions towards developing comprehensive, evidence-based solutions that safeguard adolescents' academic and emotional well-being in the digital age.

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APPENDIX

SECTION A: DEMOGRAPHIC BACKGROUND (LATARBELAKANG DEMOGRAFIK)

Instruction : Please tick (/) the relevant information inside the box given.
(Arahan : Sila Tandakan (/) di dalam kotak yang disediakan.)

1. Gender *(Jantina)*

☐ Male *(Lelaki)*

☐ Female *(Perempuan)*

2. School (sekolah)

_____

3. Form (Tingkatan)

☐ Form 1

☐ Form 2

☐ Form 3

☐ Form 4

☐ Form 5

4. Residence (Tempat tinggal)

☐ Family house *(Rumah Ibubapa)*

☐ Hostel *(Asrama)*

☐ Guardians *(Penjaga)*

Others (Please specify): _____
Lain-lain (Sila nyatakan)

5. Time spending on Social Media (*masa terluang di media sosial*)

☐ Less than two hours *(Kurang dari 2jam)*

☐ Less than three hours *(Kurang dari 3 jam)*

☐ More than four hours *(Lebih dari 4jam)*

Others (Please specify): _____
Lain-lain (Sila nyatakan)

SECTION B1: EXPERIENCE VICTIMISATION FACTORS / (FAKTOR PENGALAMAN MANGSA)

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1 5

Strongly Strongly Agreed
Disagree *(Sangat setuju)*

(Sangat tidak setuju)

EXPERIENCE VICTIMISATION FACTORS	**1**	**2**	**3**	**4**	**5**
1. Saya mendapat komen negatif, komen memalukan dan gangguan seksual di media sosial. *(I got negative comments, embarrassing comments and sexual harassment on social media)*					
2. Foto peribadi saya disiarkan tanpa kebenaran. *(My personal photos were posted without permission)*					
3. Video saya dimuat naik tanpa kebenaran. (My video was uploaded without permission)					
4. Saya difitnah melalui media sosial. (I was slandered through social media)					
5. Maklumat peribadi saya disebarkan tanpa kebenaran) (My personal information is disseminated without permission)					
6. Kata laluan saya digunakan oleh individu lain *My password is used by another individual.*					
7. Saya diancam oleh individu yang tidak dikenali. *I was threatened by an unknown individual.*					

SECTION B2: SOCIAL MEDIA FACTORS / (FAKTOR MEDIA SOSIAL*)*

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1 5
Strongly Strongly Agreed
Disagree *(Sangat setuju)*

(Sangat tidak setuju)

SOCIAL MEDIA FACTORS	1	2	3	4	5
1. Saya selalu berkongsi maklumat diri dalam media social *(I always share my information in social media)*					
2. Saya percaya semua maklumat yang dikeluarkan oleh media sosial *(I believe all information in social media)*					
3. Saya mengikuti isu dan trend terbaru dalam media sosial *(I follow the issue and new trendy in social media)*					
4. Saya banyak habiskan masa saya dalam media social berbanding aktiviti lain *I more spend my time in social media compared with other activity*					
5. Saya suka libatkan semua aktiviti dalam media social (beri komen gambar ataupun status. *(I like involve all activity in social media (give a comment their picture or status)*					

SECTION B3: GUARDIANS FACTORS / (*FAKTOR PENJAGA)*

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1 5
Strongly Strongly Agreed
Disagree *(Sangat setuju)*

(Sangat tidak setuju)

PARENTS FACTORS	**1**	**2**	**3**	**4**	**5**
1. Penjaga saya tidak mempedulikan perasaan saya *(My guardians dont care about my feelings)*					
2. Penjaga saya tidak mempunyai masa dengan saya. *(My guardians don't have a time to spend with me)*					
3. Penjaga saya tidak bersetuju dengan apa yang saya katakan. *(My Guardians not agree what i said)*					
4. Penjaga saya tidak pernah memerhatikan apa yang saya lakukan. *(My guardians never observe what im doing)*					
5. Penjaga saya tidak pernah memberitahu saya mengenai kesan penggunaan media sosial. (My guardians never tell me about the impact usage social media)					
6. Penjaga saya berikan kebebasan kepada saya menggunakan internet. *(My guardians gave me the freedom to use internet)*					
7. Penjaga saya selalu memantau perkembangan saya dalam media social. *(My guardians always monitor my progress in social media)*					

SECTION B4: PERSONALITY FACTORS / (FAKTOR KEPERIBADIAN)

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1
Strongly Disagree
(Sangat tidak setuju)

5
Strongly Agreed
(Sangat setuju)

PERSONALITY FACTORS	**1**	**2**	**3**	**4**	**5**
1. Saya tidak suka bergaul dengan orang lain. *(I dont like social life with other people)*					
2. Saya bukan orang yang mudah mesra *(I am not a 'happy go lucky' person)*					
3. Saya suka mendiamkan diri di khalayak ramai. *(I like silent in public)*					
4. Saya tidak suka melibatkan sebarang upacara / majlis. *(I dont like involve any ceremony / functions)*					
5. Saya tidak suka rakan-rakan saya menganggu kehidupan saya. *(I dont like my friend's interfere about my life)*					

SECTION B5: LACK OF KNOWLEDGE OF INTERNET USAGE FACTORS / (FAKTOR KURANG PENGETAHUAN PENGGUNAAN INTERNET*)*

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1 5
Strongly Strongly Agreed
Disagree *(Sangat setuju)*

(Sangat tidak setuju)

LACK OF KNOWLEDGE OF INTERNET USAGE FACTORS	**1**	**2**	**3**	**4**	**5**
1. Saya tidak menyedari ancaman siber yang berlaku di media sosial. *(I am not aware of the cyber threats that occur on social media)*					
2. Saya tidak tahu bagaimana buli siber boleh berlaku. (I don't how cyberbullying can happen)					
3. Saya tidak tahu kepada siapa untuk dirujuk sekiranya saya diancam oleh buli siber. *(I do not know to whom to referred if i was threatened with cyberbullying)*					
4. Saya tidak tahu jenis-jenis buli siber dalam media social. (I don't'know a types of cyberbullying on social media)					
5. Saya tidak tahu kesan negative buli siber dalam media social. (I don't know the negative impact of cyberbullying on social media)					

SECTION B6: PEERS FACTORS / (FAKTOR RAKAN SEBAYA*)*

Instruction : Based on the scale 1 – 5 please tick the best answer.
(Arahan : Berdasarkan skala 1 – 5 tandakan jawapan yang terbaik.)

1
Strongly Disagree
(Sangat tidak setuju)

5
Strongly Agreed
(Sangat setuju)

PEERS FACTORS	**1**	**2**	**3**	**4**	**5**
1. Rakan sebaya saya sering memberi komen negatif terhadap saya. (My peers often comment negatively on me)					
2. Rakan sebaya saya sering menyalahgunakan maklumat peribadi tanpa pengetahuan saya. (My peers often misuse my personal information without my knowledge)					
3. Rakan sebaya saya sering menjatuhkan maruah saya di media social. (My peers often degraded me on social media)					
4. Rakan sebaya saya sering menghantar khabar angin, fitnah dan mengancam saya jika mengabaikan mereka. (My peers often send rumours, slander and threaten me if I ignore them)					

THE PROBABILITY OF CYBERBULLYING

SECTION B1: EXPERIENCE VICTIMISATION FACTORS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	TOTAL
Expert 1	3	3	2	3	3	2	2	18
Expert 2	2	0	0	3	0	0	0	5
Expert 3	2	1	1	1	1	1	1	8
Expert 4	0	0	0	0	0	0	0	0
Expert 5	0	0	0	0	0	0	0	0
Expert 6	2	2	2	2	2	2	1	13
Expert 7	1	1	0	0	0	0	0	2
Expert 8	1	1	0	1	0	0	0	3
Expert 9	0	0	0	0	0	0	0	0
Expert 10	1	1	1	1	0	0	0	4
	12	**9**	**6**	**11**	**6**	**5**	**4**	**53**

SECTION B2: SOCIAL MEDIA FACTORS

	Q1	Q2	Q3	Q4	Q5	TOTAL
Expert 1	4	2	4	3	3	16
Expert 2	3	3	3	3	3	15
Expert 3	1	1	1	1	1	5
Expert 4	2	2	3	3	2	12
Expert 5	2	1	3	2	2	10
Expert 6	3	2	3	3	3	14
Expert 7	1	0	2	2	2	7
Expert 8	3	2	3	3	2	13
Expert 9	2	1	3	4	3	13
Expert 10	1	1	2	1	2	7
	22	**15**	**27**	**25**	**23**	**112**

SECTION B3: GUARDIANS FACTORS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	TOTAL
Expert 1	2	3	2	2	0	2	4	15
Expert 2	2	1	0	1	2	3	0	9
Expert 3	1	1	1	0	2	4	5	14
Expert 4	1	1	2	2	1	3	3	13
Expert 5	1	1	2	2	3	3	3	15
Expert 6	2	4	3	3	3	4	1	20
Expert 7	2	1	2	2	2	3	3	15
Expert 8	3	3	2	3	3	3	2	19
Expert 9	1	1	2	2	3	3	2	14
Expert 10	1	2	2	2	1	1	1	10
	16	**18**	**18**	**19**	**20**	**29**	**24**	**144**

SECTION B4: PERSONALITY FACTORS

	Q1	Q2	Q3	Q4	Q5	TOTAL
Expert 1	0	1	1	1	1	4
Expert 2	2	1	1	1	3	8
Expert 3	2	2	2	3	3	12
Expert 4	1	1	2	1	0	5
Expert 5	1	2	3	1	3	10
Expert 6	3	3	3	3	3	15
Expert 7	0	0	0	0	4	4
Expert 8	1	2	2	2	2	9
Expert 9	1	1	4	4	2	12
Expert 10	2	2	2	1	4	11
	13	**15**	**20**	**17**	**25**	**90**

SECTION B5: LACK OF KNOWLEDGE INTERNET USAGE FACTORS

	Q1	Q2	Q3	Q4	Q5	TOTAL
Expert 1	2	2	2	2	2	10
Expert 2	3	3	3	3	3	15
Expert 3	2	2	2	3	3	12
Expert 4	2	3	3	3	2	13
Expert 5	2	2	3	3	3	13
Expert 6	2	1	3	3	3	12
Expert 7	2	1	4	4	4	15
Expert 8	3	3	2	3	3	14
Expert 9	3	1	2	1	1	8
Expert 10	2	2	3	2	1	10
	23	**20**	**27**	**27**	**25**	**122**

SECTION B6: PEERS FACTORS

	Q1	Q2	Q3	Q4	TOTAL
Expert 1	2	2	2	2	8
Expert 2	1	1	0	0	2
Expert 3	1	1	1	1	4
Expert 4	0	0	0	0	0
Expert 5	0	0	1	1	2
Expert 6	2	2	2	2	8
Expert 7	1	1	0	1	3
Expert 8	1	1	1	1	4
Expert 9	3	3	3	3	12
Expert 10	0	0	1	0	1
	11	**11**	**11**	**11**	**44**

TOTAL SCORE	AVERAGE		SCORE	WEIGHTAGE
53	SB1	AVS_1	0.18929	0.0728
112	SB2	AVS2	0.56	0.2155
144	SB3	AVS3	0.51429	0.1979
90	SB4	AVS4	0.45	0.1732
122	SB5	AVS5	0.61	0.2347
44	SB6	AVS6	0.275	0.1058
			2.59857	1

THE IMPACT OF CYBERBULLYING

THE IMPACTS OF CYBERBULLYING BASED ON 6 FACTORS

Instruction : Based on the scale 0 - 10 please tick the best answer.
(Arahan : Berdasarkan skala 0- 10 tandakan jawapan yang terbaik.)

0 — No Impact (tiada kesan)

10 — High Impacts (kesan yang tinggi)

THE ITEMS OF IMPACTS	0	1	2	3	4	5	6	7	8	9	10
Anxiety *keresahan*											
Absenteeism *Ketidakhadiran*											
Attempt Suicide *Cuba Bunuh Diri*											
Affected Friendships *Persahabatan yang terjejas*											
Aggressiveness *agresif*											
Anger *marah*											
Alcohol Abuse / smoking *Pengaruh alcohol / merokok*											
Conflict / misunderstanding *Konflik / salah faham*											
Depression *kemurungan*											
Drop Out of School *Berhenti sekolah*											
Decreased Concentration *Kurang tumpuan*											
Drug Addiction *Ketagihan dadah*											
Feeling Alone / isolated *Perasaan sunyi / terasing*											
Frustration *kecewa*											

Headaches											

Sakit kepala											
Insomnia *Susah tidur*											
Insecure *Tidak selamat*											
Low Self-Esteem *Kurang keyakinan*											
Less Study Time *Kurang masa untuk belajar*											
Loss of Interest Activities at School *Hilang minat menyertai aktiviti di sekolah*											
Less Life Satisfaction *Kurang kepuasan hidup*											
Powerlessness *Tidak berdaya*											
Quiet *Senyap*											
Sensitive *Sensitive*											
Stress *Tekanan*											
Shy *Malu*											

	EX 1	EX 2	EX 3	EX 4	EX 5	EX 6	EX 7	EX 8	EX 9	EX 10	TOTAL SCORE
THE ITEMS OF IMPACTS											
INSOMNIA	7	0	6	5	5	1	0	1	0	0	2.5
HEADCHES	5	0	6	5	6	0	0	2	0	0	2.4
INSECURE	6	0	7	4	6	0	0	4	0	0	2.7
SHY	10	5	5	4	7	8	5	3	3	6	5.6
POWERLESSNESS	6	5	5	4	5	5	5	5	4	6	5.0
FRUSTRATION	10	5	8	4	7	8	5	5	5	7	6.4
FEELING ALONE / ISOLATED	6	6	8	4	7	8	7	9	6	7	6.8
DECREASED CONCENTRATION	6	4	8	5	7	1	7	8	6	6	5.8
DRUG ADDICTION	0	0	0	0	0	0	0	4	0	0	0.4
ALCOHOL ABUSE	0	0	0	0	0	0	0	0	0	0	0
SMOKING	10	0	0	0	2	2	8	9	0	7	3.8
AFFECTED FRIENDSHIPS	8	8	8	2	5	4	6	7	6	6	6.0
DEPRESSION	6	9	8	1	7	7	9	9	7	9	7.2
DROP OUT OF SCHOOL	0	0	2	0	0	9	0	0	0	0	1.1
LOW SELF-ESTEEM	7	9	8	2	6	2	9	9	2	9	6.3
LESS STUDY TIME	8	0	8	3	6	2	4	1	2	1	3.5
LESS LIFE SATISFACTION	5	0	8	3	6	7	5	5	3	4	4.6
CONFLICT / MISUNDERSTANDING	8	7	8	4	6	8	5	5	5	6	6.2
STRESS	9	8	9	5	6	9	7	7	7	8	7.5
SENSITIVE	7	8	9	2	6	9	7	8	8	8	7.2
QUIET	7	9	9	5	6	9	8	7	8	9	7.7
LOSS OF INTEREST ACTIVITIES AT SCHOOL	8	1	9	0	6	4	2	3	3	3	3.9
ABSTENTEEISM	6	1	8	0	6	4	7	8	9	7	5.6
AGGRESSIVENESS	3	7	9	1	6	8	8	9	9	9	6.9
ANGER	5	8	9	2	5	8	9	9	9	9	7.3
ANXIETY	5	8	9	3	5	9	9	9	9	9	7.5
ATTEMPT SUICIDE	0	0	0	0	5	0	0	0	0	0	0.5

Calculate the Probability for Individual Students

Factor	Student 1 Score	Max Score	ω
B1	18	28	0.64285714
B2	16	20	0.80000000
B3	15	28	0.53571429
B4	4	20	0.20000000
B5	10	20	0.50000000
B6	8	16	0.50000000

The probability for students 1 is;

Pr (student 1) = 0.06911662 (0.64285714) + 0.25560879 (0.80000000) + 0.18779212 (0.53571429) + 0.16431993 (0.20000000) + 0.2227448 (0.50000000) + 0.10041774 (0.50000000)

= 0.0444321127 + 0.204487032 + 0.1006029222 + 0.032863986 + 0.1113724 + 0.05020887

= 0.5439

Students 2

Factor	Students 2 Score	Max Score	ω
B1	5	28	0.17857143
B2	15	20	0.75000000
B3	9	28	0.32142857
B4	8	20	0.40000000
B5	15	20	0.75000000
B6	2	16	0.12500000

The probability for Students 2 is;

Pr (students 2) = 0.06911662 (0.17857143) + 0.25560879 (0.75000000) + 0.18779212 (0.32142857) + 0.16431993 (0.40000000) + 0.2227448 (0.75000000) + 0.10041774 (0.12500000)

= 0.0123422537 + 0.1917065925 + 0.0603617526 + 0.065727972 + 0.1670586 + 0.0125522175

= 0.5097

4.5 Calculate for form 1

Form 1 (60 students)

Factor	Form 1 Score	Max Score	Number Of Student	ω
B1	1551	28	60	0.9232
B2	1168	20	60	0.9733
B3	1051	28	60	0.6255
B4	1084	20	60	0.9033
B5	1183	20	60	0.9858
B6	700	16	60	0.7291

28x60=1680 20x60=1200 16x60=960

1551/1680=0.9232

The probability for form 1 is;

Pr (form 1) = 0.06911662 (0.9232) + 0.25560879 (0.9733) + 0.18779212 (0.5625) + 0.16431993 (0.9033) + 0.2227448 (0.9858) + 0.10041774 (0.7291)

= 0.0638 + 0.2487 + 0.1174 + 0.1484 + 0.2195 + 0.0732

= 0.8710

Form 2 (80)

Factor	Form 2 Score	Max Score	Number Of Form 2	ω
B1	1470	28	80	0.6562
B2	1250	20	80	0.7812
B3	1490	28	80	0.6651
B4	1481	20	80	0.9256
B5	1560	20	80	0.9750
B6	1069	16	80	0.8351

28x80=2240 20x80=1600 16x80=1280

The probability for form 2 is;

Pr (form 2) = 0.06911662 (0.6562) + 0.25560879 (0.7812) + 0.18779212 (0.6651) + 0.16431993 (0.9256) + 0.2227448 (0.9750) + 0.10041774 (0.8351)

= 0.0454 + 0.1997 + 0.1249 + 0.1521 + 0.2172 + 0.0839

= **0.8231**

Form 3 (148)

Factor	Form 3 Score	Max Score	Number Of Form 3	ω
B1	2519	28	148	0.6078
B2	2660	20	148	0.8986
B3	2527	28	148	0.6097
B4	2670	20	148	0.9020
B5	2862	20	148	0.9668
B6	1407	16	148	0.5941

28x148=4144 20x148=2960 16x148=2368

The probability for form 3 is;

Pr (form 3) = 0.06911662 (0.6078) + 0.25560879 (0.8986) + 0.18779212 (0.6097) + 0.16431993 (0.9020) + 0.2227448 (0.9668) + 0.10041774 (0.5941)

= 0.0420 + 0.2297 + 0.1145 + 0.1482 + 0.2153 + 0.0597

= 0.8094

Form 4 (114)

Factor	**Form 4 Score**	**Max Score**	**Number Of Form 4**	**ω**
B1	1724	28	114	0.5401
B2	2045	20	114	0.8969
B3	1891	28	114	0.5924
B4	1712	20	114	0.7508
B5	2021	20	114	0.8864
B6	928	16	114	0.5087

28x114= 3192 20x114=2280 16x114=1824

The probability for form 4 is;

Pr (form 4) = 0.06911662 (0.5401) + 0.25560879 (0.8969) + 0.18779212 (0.5924) + 0.16431993 (0.7508) + 0.2227448 (0.8864) + 0.10041774 (0.5087)

= 0.0373 + 0.2293 + 0.1112 + 0.1234 + 0.1974 + 0.0511

= 0.7497

Form 5 (126)

Factor	Form 5 Score	Max Score	Number Of Form 5	ω
B1	1758	28	126	0.4982
B2	2488	20	126	0.9873
B3	2116	28	126	0.5997
B4	2098	20	126	0.8325
B5	2447	20	126	0.9710
B6	1164	16	126	0.5773

28x126= 3528 20x126=2520 16x126=2016

The probability for form 5 is;

Pr (form 5) = 0.06911662 (0.4982) + 0.25560879 (0.9873) + 0.18779212 (0.5997) + 0.16431993 (0.8325) + 0.2227448 (0.9710) + 0.10041774 (0.5773)

= 0.0344 + 0.2524 + 0.1126 + 0.1368 + 0.2163 + 0.0580

= 0.8105

School A (528)

Factor	School Score	Max Score	Number Of School	ω
B1	9638	28	528	0.6519
B2	9967	20	528	0.9438
B3	9075	28	528	0.6138
B4	9033	20	528	0.8553
B5	10537	20	528	0.9978
B6	5268	16	528	0.6235

28x528=14784 20x528=10560 16x528=8448

9638/14784=0.6519

The probability for school is;

Pr (school) = 0.06911662 (0.6519) + 0.25560879 (0.9438) + 0.18779212 (0.6138) + 0.16431993 (0.8553) + 0.2227448 (0.9978) + 0.10041774 (0.6235)

= 0.0451 + 0.2412 + 0.1153 + 0.1405 + 0.2223 + 0.0626

= 0.8270

Gender (male) 314

Factor	**Male Score**	**Max Score**	**Number Of Male**	**ω**
B1	5176	28	314	0.5887
B2	5461	20	314	0.8695
B3	5219	28	314	0.5936
B4	5050	20	314	0.8041
B5	6044	20	314	0.9624
B6	2787	16	314	0.5547

28x314=8792 20x314=6280 16x314=5024

5176/8792=0.5887170155

The probability for (male) is;

Pr (male) = 0.06911662 (0.5887) + 0.25560879 (0.8695) + 0.18779212 (0.5936) + 0.16431993 (0.8041) + 0.2227448 (0.9624) + 0.10041774 (0.5547)

= 0.0407 + 0.2223 + 0.1115 + 0.1321 + 0.2144 + 0.0557

= 0.7766

Gender (female) 214

Factor	Female Score	Max Score	Number Of Female	ω
B1	4462	28	214	0.7446
B2	3806	20	214	0.8892
B3	3856	28	214	0.6435
B4	3983	20	214	0.9306
B5	4093	20	214	0.9563
B6	2481	16	214	0.7245

28x214= 5992 20x214=4280 16x214=3424

4462/5992= 0.7446595461

The probability for female is;

Pr (female) = 0.06911662 (0.7446) + 0.25560879 (0.8892) + 0.18779212 (0.6435) + 0.16431993 (0.9306) + 0.2227448 (0.9563) + 0.10041774 (0.7245)

= 0.0515 + 0.2273 + 0.1208 + 0.1529 + 0.2130 + 0.0728

= 0.8383

Residence (Parents) 523

Factor	Residence Score	Max Score	Number Of Residence	ω
B1	9586	28	523	0.6546
B2	9899	20	523	0.9463
B3	9000	28	523	0.6145
B4	8986	20	523	0.8590
B5	10084	20	523	0.9640
B6	5231	16	523	0.6251

28x523=14644 20x523=10460 16x523=8368

9586/14644=0.6546025676

The probability for Parents is;

Pr (Parents) = 0.06911662 (0.6546) + 0.25560879 (0.9463) + 0.18779212 (0.6145) + 0.16431993 (0.8590) + 0.2227448 (0.9640) + 0.10041774 (0.6251)

= 0.0452 + 0.2419 + 0.1154 + 0.1412 + 0.2147 + 0.0628

= **0.8212**

Residence (hostel) 4

Factor	**Hostel Score**	**Max Score**	**Number Of Hostel**	**ω**
B1	35	28	4	0.3125
B2	54	20	4	0.6750
B3	55	28	4	0.4910
B4	34	20	4	0.4250
B5	35	20	4	0.4375
B6	27	16	4	0.4218

28x4=112 20x4=80 16x4=64

35/112=0.3125

The probability for Hostel is;

Pr (Hostel) = 0.06911662 (0.3125) + 0.25560879 (0.6750) + 0.18779212 (0.4910) + 0.16431993 (0.4250) + 0.2227448 (0.4375) + 0.10041774 (0.4218)

= 0.0216 + 0.1725 + 0.0922 + 0.0698 + 0.0975 + 0.0424

= 0.4960

Residence (guardians) 1

Factor	Guardians Score	Max Score	Number Of Guardians	ω
B1	10	28	1	0.3571
B2	14	20	1	0.7000
B3	20	28	1	0.7142
B4	13	20	1	0.6500
B5	18	20	1	0.9000
B6	10	16	1	0.6250

28x1=28 20x1=20 16x1=16

10/28=0.3571428571

The probability for Guardians is;

Pr (Guardians) = 0.06911662 (0.3571) + 0.25560879 (0.7000) + 0.18779212 (0.7142) + 0.16431993 (0.6500) + 0.2227448 (0.9000) + 0.10041774 (0.6250)

= 0.0247 + 0.1789 + 0.1341 + 0.1068 + 0.2005 + 0.0628

= 0.7078

Time spending on social media (less than 2 hours) 23

Factor	Less Than 2 Hours Score	Max Score	Number Of Less Than 2 Hours	ω
B1	252	28	24	0.3750
B2	256	20	24	0.5333
B3	356	28	24	0.5297
B4	313	20	24	0.6520
B5	244	20	24	0.5083
B6	161	16	24	0.4192

28x24=672 20x24=480 16x24=384

252/672=0.375

The probability for less than 2 hours is;

Pr (less 2 hours) = 0.06911662 (0.3750) + 0.25560879 (0.5333) + 0.18779212 (0.5297) + 0.16431993 (0.6520) + 0.2227448 (0.5083) + 0.10041774 (0.4192)

= 0.0259 + 0.1363 + 0.0995 + 0.1071 + 0.1132 + 0.0421

= 0.5242

Time spending on social media (between 2 to 3 hours) 68

Factor	2-3 Hours Score	Max Score	Number Of 2 To 3 Hours	ω
B1	777	28	69	0.4021
B2	1058	20	69	0.7666
B3	1003	28	69	0.5191
B4	1129	20	69	0.8181
B5	1291	20	69	0.9355
B6	416	16	69	0.3768

28x69=1932 20x69=1380 16x69= 1104

The probability for 2-3 hours is;

Pr (2-3 hours) = 0.06911662 (0.4021) + 0.25560879 (0.7666) + 0.18779212 (0.5191) + 0.16431993 (0.8181) + 0.2227448 (0.9355) + 0.10041774 (0.3768)

= 0.0278 + 0.1959 + 0.0975 + 0.1344 + 0.2084 + 0.0378

= 0.7019

Time spending on social media (more than 3 hours) 436

Factor	3 Hours Score	Max Score	Number Of More Than 3 Hours	ω
B1	8595	28	433	0.7089
B2	8641	20	433	0.9978
B3	7707	28	433	0.6356
B4	7586	20	433	0.8759
B5	8655	20	433	0.9994
B6	4680	16	433	0.6755

28x433=12124 20x433=8660 16x433=6928

The probability for more than 3 hours is;

Pr (3 hours) = 0.06911662 (0.7089) + 0.25560879 (0.9978) + 0.18779212 (0.6356) + 0.16431993 (0.8759) + 0.2227448 (0.9994) + 0.10041774 (0.6755)

= 0.0490 + 0.2550 + 0.1194 + 0.1439 + 0.2226 + 0.0678

= 0.8578

Time spending on social media (depends) 1

Factor	Depends Score	Max Score	Number Of Depends Data	ω
B1	54	28	2	0.9642
B2	12	20	2	0.3000
B3	9	28	2	0.1607
B4	5	20	2	0.1250
B5	17	20	2	0.4250
B6	11	16	2	0.3437

28x2=56 20x2=40 16x2=32

The probability for depends is;

Pr (depends) = 0.06911662 (0.9642) + 0.25560879 (0.3000) + 0.18779212 (0.1607) + 0.16431993 (0.1250) + 0.2227448 (0.4250) + 0.10041774 (0.3437)

= 0.0666 + 0.0767 + 0.0302 + 0.0205 + 0.0947 + 0.0345

= 0.3232

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
ARAS 1 - 4 BLOK E8, KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA

BORANG BPPDP 2(A)

TEL : 03 - 8884 6591
FAKS : 03 - 8884 6579

Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia
Aras 1-4, Blok E8
Kompleks Kerajaan Parcel E
Pusat Pentadbiran Kerajaan Persekutuan
62604 Putrajaya

BAHAGIAN A : Maklumat Diri Penyelidik

1. Nama Penyelidik (seperti dalam KP)	ROSMARIA BINTI MUSTAFA
2. No. Kad Pengenalan	830125025176
3. Nama Institusi	UUM
4. Tajuk Kajian	A RISK ASSESSMENT BASED ON CYBER BULLYING EXPERIENCE TOWARDS STUDENT PERFORMANCE

5. Dengan ini saya ROSMARIA BINTI MUSTAFA (NO.KP : 830125025176)
mengaku bahawa saya akan mematuhi segala syarat yang ditetapkan oleh Kementerian Pendidikan Malaysia. Saya memberi jaminan bahawa satu naskhah laporan / disertasi / tesis yang berkenaan akan dihantar kepada Bahagian Perancangan dan Penyelidikan Dasar Pendidikan melalui Ketua Jabatan / Fakulti saya selepas kajian ini selesai dijalankan.

Tandatangan Penyelidik

Tarikh : 12/4/2021

BAHAGIAN B : Untuk diisi oleh Penyelia (bagi pelajar kolej dan universiti) atau Ketua Jabatan (Kajian Am dan Lain-lain)

Saya ABDUL AZIZ BIN OTHMAN telah (menyemak / ~~tidak menyemak~~) kertas cadangan dan instrumen kajian pemohon ini.

Permohonan ini : ☑ Disokong ☐ Tidak Disokong

Ulasan (jika ada) :

Penyelidik telah membuat pengakuan bahawa satu naskhah laporan/disertasi / tesis yang berkenaan akan dihantar kepada Bahagian Perancangan dan Penyelidikan Dasar Pendidikan melalui Ketua Jabatan / Fakulti selepas kajian ini selesai dijalankan.

Tandatangan Penyelia/Ketua Jabatan
Nama : ABD AZIZ OTHMAN
Cap Rasmi :

Tarikh : 12/4/2021

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
ARAS 1-4, BLOK E8
KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA

TEL : 0388846591
FAKS : 0388846579

Ruj. Kami : KPM.600-3/2/3-eras(9786)
Tarikh : 25 April 2021

ROSMARIA BINTI MUSTAFA
NO. KP : 830125025176

75-TD KAMPUNG TELUK BUKIT PINANG
KEPALA BATAS 6200 ALOR SETAR
KEDAH

Tuan,

KELULUSAN BERSYARAT UNTUK MENJALANKAN KAJIAN :
A RISK ASSESSMENT BASED ON CYBER BULLYING EXPERIENCE TOWARDS STUDENTS PERFORMANCES.

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan dengan syarat :

" KELULUSAN INI BERGANTUNG KEPADA KEBENARAN PENGARAH JPN DAN PERTIMBANGAN PENTADBIR SEKOLAH. PENGUTIPAN DATA TIDAK BOLEH MELIBATKAN MURID KELAS PEPERIKSAAN (PT3 DAN SPM). "

3. Kelulusan adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengetua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari **23 April 2021** hingga **18 Oktober 2021**.

5. Tuan dikehendaki menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat pdf dalam CD kepada Bahagian ini.Tuan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak diterbitkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

Ketua Penolong Pengarah Kanan
Sektor Penyelidikan dan Penilaian Dasar
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

salinan kepada:-

JABATAN PENDIDIKAN KEDAH

* SURAT INI DIJANA OLEH KOMPUTER DAN TIADA TANDATANGAN DIPERLUKAN *

KEMENTERIAN PENDIDIKAN MALAYSIA
JABATAN PENDIDIKAN NEGERI KEDAH
KOMPLEKS PENDIDIKAN, JALAN STADIUM
05604 ALOR SETAR
KEDAH DARUL AMAN

Telefon 04-740 4000
Faks 04-740 4342
Laman Web www.moe.gov.my

Ruj.Kami : JPK.SPS.KAJ.100-1/9/1 (57)
Tarikh : 26 April 2021

ROSMARIA BINTI MUSTAFA
KP:830125025176

Tuan / Puan,

KEBENARAN UNTUK MENJALANKAN KAJIAN / PENYELIDIKAN DI SEKOLAH-SEKOLAH DI NEGERI KEDAH

Saya dengan hormatnya diarah merujuk kepada perkara tersebut di atas.

2. Dimaklumkan bahawa permohonan tuan / puan untuk menjalankan penyelidikan yang bertajuk **"A RISK ASSESSMENT BASED ON CYBER BULLYING EXPERIENCE TOWARDS STUDENTS PERFORMANCES ." telah *diluluskan*** *dengan syarat pengutipan data secara dalam talian (contoh; GEOOGLE FORM).*

3. Jika melibatkan murid-murid, pihak tuan perlu mendapat kebenaran pihak waris yang berkenaan dahulu, dan **mematuhi sepenuhnya *Standard Operating Procedure (SOP)* pengawalan penularan jangkitan Coronavirus Disease 2019 (COVID-19) yang dikeluarkan oleh KPM, Majlis Keselamatan Negara dan** Kementerian Kesihatan Malaysia.

4. Kelulusan ini adalah berdasarkan kepada apa yang terkandung di dalam cadangan penyelidikan yang tuan / puan kemukakan ke Kementerian Pendidikan Malaysia. Tuan / puan dikehendaki mengemukakan senaskah laporan akhir kajian setelah selesai kelak dan diingatkan supaya mendapat kebenaran terlebih dahulu daripada Jabatan ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana forum, seminar atau diumumkan kepada media.

5. Kebenaran ini adalah tertakluk kepada persetujuan Pengetua / Guru Besar sekolah berkenaan dan adalah **sah 23 April 2021 hingga 18 Oktober 2021** sahaja.

Sekian, terima kasih.

"PRIHATIN RAKYAT: DARURAT MEMERANGI COVID-19"
"BERKHIDMAT UNTUK NEGARA"
"PENDIDIKAN CEMERLANG KEDAH TERBILANG"

Saya yang menjalankan amanah,

(MD TAJUDIN BIN HAJI MORAD, BCK.)
Penolong Pendaftar Institusi Pendidikan Dan Guru
Jabatan Pendidikan Negeri Kedah
b.p. Ketua Pendaftar Institusi Pendidikan Dan Guru
Kementerian Pendidikan Malaysia