

Mapping Adolescent Cyberbullying in Wetland Communities: An Ecological Analysis Based on Bronfenbrenner's Theory

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Abstract

This research is important because the increasing cases of cyberbullying among adolescents, particularly vocational high school students in wetland communities, pose serious risks to their psychological Well-being and social relationships. The study aims to map the characteristics, influencing factors, and interaction patterns within adolescents' social systems in cases of cyberbullying, using Bronfenbrenner's ecological theory. A total of 798 vocational students in South Kalimantan participated in the study. Data were collected using a Likert-scale questionnaire grounded in five ecological systems, validated through expert review and Exploratory Factor Analysis (KMO > 0.5; factor loading > 0.5), with Cronbach's Alpha > 0.70. Data were analysed using SPSS 25 with descriptive, correlation, and factor analyses. The findings reveal that the microsystem, particularly peer relationships and social media interactions, is the most dominant determinant of cyberbullying behaviour in wetland communities.

Keywords: cyberbullying prevention, digital literacy education, quality education, peaceful and inclusive societies

Abstrak

Penelitian ini penting karena meningkatnya kasus cyberbullying di kalangan remaja, khususnya siswa sekolah menengah kejuruan di komunitas lahan basah, yang mengancam kesejahteraan psikologis dan hubungan sosial mereka. Penelitian ini bertujuan memetakan karakteristik, faktor-faktor yang memengaruhi, serta pola interaksi antar sistem sosial remaja dalam kasus cyberbullying berdasarkan teori ekologi Bronfenbrenner. Sebanyak 798 siswa SMK di Kalimantan Selatan menjadi responden penelitian ini. Data dikumpulkan menggunakan kuesioner berskala Likert yang disusun berdasarkan lima sistem ekologi dan divalidasi melalui uji ahli serta Exploratory Factor Analysis (KMO > 0,5; factor loading > 0,5) dengan reliabilitas Cronbach's Alpha > 0,70. Analisis data menggunakan SPSS 25 meliputi analisis deskriptif, korelasi, dan faktor. Hasil penelitian menunjukkan bahwa faktor mikrosistem, khususnya hubungan teman sebaya dan interaksi di media sosial, merupakan determinan paling dominan terhadap perilaku cyberbullying di komunitas lahan basah.

Kata kunci: pencegahan cyberbullying, pendidikan literasi digital, pendidikan berkualitas, masyarakat damai dan inklusif

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INTRODUCTION

Advancements in digital technology have drastically transformed how vocational high school students interact, learn, and build social relationships, both within and beyond the school environment (Kalantri & Rajguru, 2023; Sari et al., 2025). While digital platforms provide new spaces for creativity, collaboration, and self-expression, they also pose emerging risks, most notably cyberbullying, which often remains unnoticed or inadequately addressed by schools and families (Dumitrescu et al., 2022). For vocational students, adolescents at a formative stage of psychosocial development, cyberbullying has been linked to emotional distress, academic decline, and social withdrawal (Collantes et al., 2020; Khan & Asim, 2020; Chen et al., 2025).

Empirical data reveal the growing prevalence of cyberbullying in Indonesia, with nearly 45% of adolescents reportedly experiencing it in various forms, particularly in areas with low digital literacy and limited supervision (Ramadan et al., 2024; Wiederhold, 2024). This issue is even more critical in wetland communities such as Kalimantan Selatan, where geographical isolation, conservative cultural norms, and limited digital infrastructure exacerbate adolescent vulnerability (Arisanty & Wiradharma, 2022; Silalahi et al., 2019). Moreover, local sociocultural values that discourage open discussion of personal problems often lead to underreporting of cyberbullying incidents (Ramadhani & Raharjo, 2024).

Long-term consequences of unchecked cyberbullying include reduced digital resilience, prolonged social isolation, and decreased readiness for participation in a digital-based workforce (Wright et al., 2021; Patel & Quan-Haase, 2024). As the global economy transitions into the digital era, these effects raise serious concerns about the preparedness of vocational students to meet future professional demands requiring both digital competence and emotional maturity.

Despite the growing body of literature on cyberbullying, most prior studies have focused narrowly on individual psychological or behavioural aspects. Few have analysed cyberbullying through a multi-systemic perspective that captures the interaction among adolescents' social environments, especially in underrepresented settings such as wetland communities. Consequently, the ecological dynamics influencing digital aggression in these unique socio-geographical contexts remain poorly understood.

This study introduces an ecology-based mapping model of adolescent cyberbullying using Bronfenbrenner's Ecological Systems Theory to examine how five nested systems, the microsystem, mesosystem, exosystem, macrosystem, and chronosystem, interact to shape cyberbullying behaviours. Unlike previous research, this study integrates quantitative ecological mapping with the contextual characteristics of wetland communities, providing an innovative framework for understanding and preventing cyberbullying that aligns with local culture and community structures.

By analysing the interplay among ecological systems, this research offers both practical and theoretical contributions: practically, by informing the design of culturally relevant digital literacy and prevention programs; and theoretically, by reinforcing the ecological model as a comprehensive framework for studying digital behaviours within socio-environmental contexts (Lee et al., 2021; Patel & Quan-Haase, 2024).

This study aims to map and analyse the phenomenon of cyberbullying among vocational students residing in wetland communities, using Bronfenbrenner's ecological systems theory as the primary conceptual framework. The research focuses on students' involvement as both perpetrators and victims within digital social networks influenced by



the dynamics of ecological systems from the microsystem to the chronosystem. Specifically, the objectives of this study include:

1. To describe the characteristics of cyberbullying among vocational students based on the five ecological systems of Bronfenbrenner, namely: the microsystem (direct relationships with peers and teachers), mesosystem (interactions between family and school), exosystem (influence of policies and media), macrosystem (cultural values and social norms), and chronosystem (social change due to technological development), through percentage-based analysis of response distributions on each sub-variable indicator.
2. To identify the dominant factors influencing cyberbullying, by applying factor analysis to determine which ecological system contributes most significantly to the emergence of digital bullying behaviours in the school and community environments of vocational students.
3. To analyse the relationships among the ecological systems, using a correlational approach to map the interconnections and interactions between the systems (micro, meso, exo, macro, and chronosystem) that shape the dynamics of cyberbullying behaviour among vocational students in wetland communities.

To formulate an ecology-based cyberbullying prevention strategy, through a narrative review of quantitative research findings and supporting literature, with the aim of producing a collaborative intervention model involving schools, families, and communities that is relevant to the socio-cultural context of wetland communities.

Although research on cyberbullying has grown substantially, most prior studies have focused narrowly on individual psychological or behavioural dimensions. Few have explored this phenomenon through a multi-systemic lens that considers the complex interactions between adolescents and their social environments. This gap becomes more pronounced in underrepresented contexts such as wetland communities, where social, cultural, and geographical factors uniquely shape adolescents' digital behaviours. The lack of studies addressing these ecological dynamics results in a limited, fragmented understanding of how social systems contribute to digital aggression in these environments. Therefore, a comprehensive investigation that captures the interrelations among adolescents' ecological systems is urgently needed to understand how contextual and environmental factors influence cyberbullying behaviour.

This study introduces a novel ecological mapping approach grounded in Bronfenbrenner's Ecological Systems Theory to identify and analyse how five interrelated systems, microsystem, mesosystem, exosystem, macrosystem, and chronosystem, jointly shape cyberbullying behaviours among vocational students in wetland communities. The innovation of this study lies in integrating quantitative ecological mapping with the socio-cultural characteristics of local communities. This approach not only extends the application of ecological theory to the study of digital behaviour but also produces a context-sensitive intervention model that involves schools, families, and communities. Hence, this research provides theoretical contributions by reinforcing the ecological model as a comprehensive framework for understanding digital aggression and practical implications for designing culturally relevant and sustainable cyberbullying prevention strategies within wetland-based societies.



METHODS

Design

This study employed a quantitative correlational design with a cross-sectional survey approach to examine the characteristics, influencing factors, patterns of inter-system interactions, and mitigation strategies of cyberbullying among adolescents in wetland communities. The research focused on the five core systems in Bronfenbrenner's ecological theory: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem.

This design was employed to comprehensively analyse the phenomenon of cyberbullying among adolescents in wetland communities. The study first explored the characteristics of cyberbullying by examining the percentage distribution and response tendencies of participants across each aspect of Bronfenbrenner's ecological systems through descriptive analysis. It then identified the dominant factors influencing cyberbullying using exploratory factor analysis (EFA) to determine which ecological dimensions contributed most significantly to the emergence of digital aggression. Furthermore, the research investigated the interrelationships among the five ecological dimensions: microsystem, mesosystem, exosystem, macrosystem, and chronosystem through Pearson correlation analysis to reveal patterns of interaction across systems. Finally, the study formulated ecology-based mitigation strategies derived from a narrative interpretation of the quantitative findings, emphasising how intersystem interactions and individual responses collectively shape the dynamics of cyberbullying in wetland community environments.

A total of 798 vocational students from wetland community areas participated in this study. The research instrument was a closed-ended questionnaire using a 5-point Likert scale, which had been validated. The collected data were analysed using SPSS version 25 with descriptive statistics, factor analysis, and correlation techniques, supported by contextual narrative interpretations of the statistical findings.

Participants

Participants in this study were adolescents from State Vocational High Schools located in wetland areas of South Kalimantan, Indonesia. A total of 798 respondents participated in the survey, comprising vocational students from several educational institutions situated in geographically wetland environments, namely SMK Negeri 2 Banjarmasin, SMK Negeri 2 Pelaihari, and SMK Negeri 1 Sungai Tabuk. The sampling technique used was random-purposive sampling, selecting participants based on specific criteria: being active vocational students, residing in wetland community areas, having access to social media, and having direct or indirect experience with cyberbullying.

The participants' ages ranged from 15 to 18, with the majority being students in grades 11 and 12. Gender representation was relatively balanced, reflecting the demographic characteristics of vocational high school students. Respondents voluntarily completed a needs assessment and perception questionnaire on cyberbullying, based on Bronfenbrenner's ecological systems theory, which includes five main systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Additional inclusion criteria required participants to have a contextual understanding of social media use and to be willing to provide honest responses through a validated online survey.



Instruments

Data collection was conducted using the Cyberbullying Needs Assessment Instrument at the Vocational High School level, based on Bronfenbrenner's Ecological Theory, developed by the research team. This instrument consists of 150 statement items representing the five ecological systems according to Bronfenbrenner: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Instrument development began with 200 initial items derived from a literature review and the social context of wetland communities, which were subsequently refined through content validation and field testing.

Content validity was assessed by two experts in the fields of guidance and counseling and educational evaluation, and the validation results confirmed that 150 items were appropriate for use. Instrument reliability was assessed using Cronbach's Alpha, yielding a value of 0.89, indicating very high internal consistency and meeting the standard reliability criterion, as values approaching 1 indicate good reliability.

Each ecological system consists of several key indicators, including:

1. Microsystem: student interactions with peers and teacher supervision of online activities.
2. Mesosystem: the relationship between family and school, as well as peer support.
3. Exosystem: the influence of school policy and exposure to media and technology.
4. Macrosystem: social norms and cultural values within the wetland community.
5. Chronosystem: the impact of technological change on social interactions and long-term Wellbeing.

The instrument was presented in the form of a closed-ended questionnaire using a 5-point Likert scale: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1).

Examples of statements in the instrument include:

1. "I believe that social media influences students' behaviour in cyberbullying." (Exosystem)
2. "I receive support from friends when experiencing cyberbullying." (Mesosystem)
3. "The prevailing social norms at my school help reduce cyberbullying." (Macrosystem)
4. "Cyberbullying affects my self-confidence and academic performance." (Chronosystem)

This instrument was designed to capture the experiences of vocational high school adolescents as perpetrators, victims, or bystanders of cyberbullying and to comprehensively map the social dynamics involved in the phenomenon within wetland community settings.

Data Analysis

This study employed a descriptive quantitative approach without hypothesis testing. The instrument used was a five-point Likert scale questionnaire developed based on Bronfenbrenner's ecological theory, encompassing five system aspects: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. The instrument underwent expert content validation and empirical testing for validity and reliability, using item-total correlations and Cronbach's alpha.

Prior to analysis, assumption tests were conducted, including normality and linearity checks, to ensure the data were appropriate for statistical analysis. The data were analysed descriptively by presenting frequency distributions, percentages, mean scores,



and categorised response tendencies for each indicator. Data from 798 vocational students in wetland communities were processed using IBM SPSS Statistics 25 for Windows.

The analysis results are presented in descriptive statistical tables, including respondent response categories for each ecological system. The findings revealed dominant perceptions of cyberbullying issues in the exosystem and chronosystem domains, with deeper interpretations based on the highest and lowest average tendencies observed in each aspect.

RESULTS AND DISCUSSION

This study employed a descriptive quantitative design with four main objectives: (1) to analyze the characteristics of cyberbullying based on the percentage distribution of respondent scores across Bronfenbrenner's ecological systems (2) to identify the dominant factors influencing the occurrence of cyberbullying among adolescents in wetland communities using exploratory factor analysis (3) to examine the interrelationships among ecological systems through Pearson correlation analysis and (4) to formulate ecological-based mitigation strategies derived from patterns of system interaction and student response dynamics.

The prerequisite tests for advanced statistical analysis confirmed that the data met the fundamental assumptions. The residual normality test using the Kolmogorov-Smirnov method yielded an Asymp. Sig. Value of 0.663 ($p > 0.05$), indicating normally distributed residuals. The linearity test showed a Deviation from Linearity F value of 1.676 with a significance level of 0.99 ($p > 0.05$), suggesting that the relationships among variables were linear. Furthermore, multicollinearity tests revealed that all tolerance values were above 0.10 and all Variance Inflation Factors (VIFs) were below 10.00, indicating the absence of multicollinearity.

First, descriptive analysis of cyberbullying tendencies based on ecological systems revealed that the exosystem had the highest percentage score (22.01%), followed by the microsystem (21.59%) and mesosystem (19.29%). Meanwhile, the chronosystem and macrosystem scored 19.08% and 18.03%, respectively. These findings indicate that external school policies and technological exposure (exosystem), along with direct social interactions (microsystem), significantly shape cyberbullying dynamics in vocational high schools within wetland communities.

Table 1.
Descriptive Analysis of Cyberbullying Characteristics

Ecological Aspect	Mean Score	Percentage (%)	Dominant Interpretation
Microsystem	103	21.59	Highest level of direct interaction related to cyberbullying in school-based social media within wetland communities.
Mesosystem	92	19.29	Moderate connection between family and school support is observed in wetland communities.
Exosystem	105	22.01	Strong influence from policies and external technological environments outside of school.



Ecological Aspect	Mean Score	Percentage (%)	Dominant Interpretation
Macrosystem	86	18.03	Social norms and cultural values show moderate influence.
Chronosystem	91	19.08	Considerable influence of time and technological change.
Total	477	100	

Secondly, the Exploratory Factor Analysis (EFA) conducted to assess the structural validity of the ecological framework revealed five primary factors, corresponding to the five dimensions of Bronfenbrenner's ecological theory. Each factor yielded an eigenvalue greater than 1 and factor loadings above 0.40, indicating adequate construct validity. The microsystem emerged as the most dominant factor, with an average Likert score of 4.25, highlighting its significant direct influence on cyberbullying behaviour, particularly through intensive interactions with peers and teachers on social media platforms.

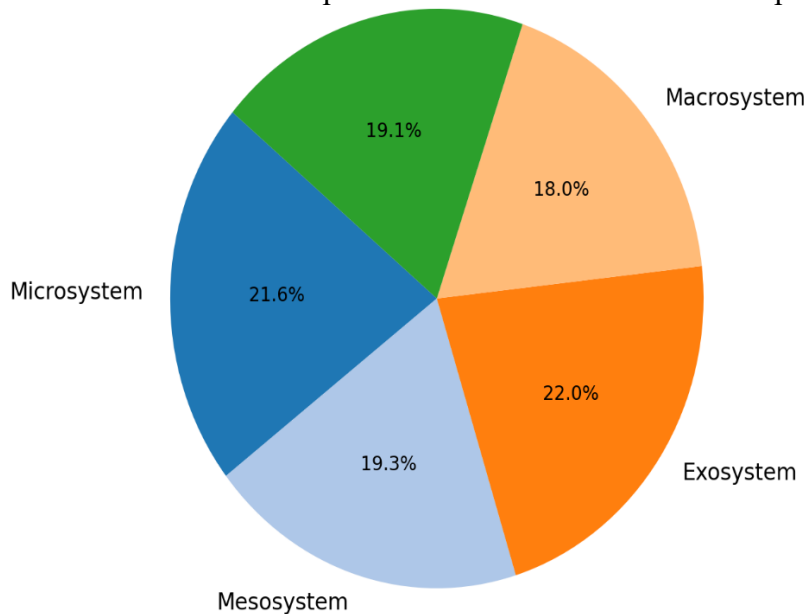


Figure 1. Distribution of Ecological Aspect Scores in the Cyberbullying Assessment

Third, the analysis of the correlation between ecological systems was conducted. The results of the Pearson correlation analysis revealed that the strongest relationship occurred between the Microsystem and the Mesosystem, with a correlation coefficient of $r = 0.71$, indicating a synergy between students' direct interactions and the support they receive from family and school. Other significant correlations were found between the Exosystem and Chronosystem ($r = 0.52$), the Macrosystem and Mesosystem ($r = 0.41$), and the Chronosystem and Macrosystem ($r = 0.32$). These findings suggest that the stronger the interaction and consistency among social systems, the greater their contribution to the formation of complex patterns of cyberbullying.

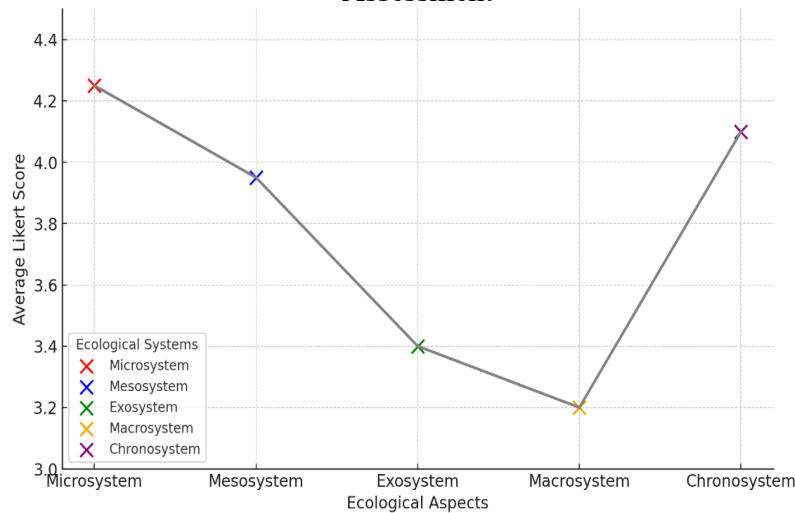
Table 2.
Ecological Aspects Analysis of Cyberbullying Among Adolescents in Wetland Communities

Ecological Aspect	Mean Likert Score	Score Interpretation	Highest Correlation Coefficient	Correlation Pair
Microsystem	4.25	Very high (dominant direct influence)	0.71	Microsystem – Mesosystem
Mesosystem	3.95	High (connection between proximal settings)	0.71	Mesosystem – Microsystem
Exosystem	3.40	Moderate (indirect institutional influence)	0.52	Exosystem – Chronosystem
Macrosystem	3.20	Fair (influence of norms and culture)	0.41	Macrosystem – Mesosystem
Chronosystem	4.10	High (influence of temporal development)	0.32	Chronosystem – Macrosystem

Fourth, the visualisation of findings in the form of average ecological aspect scores is presented in a quantitative context. The following line graph compares the average Likert scores for each ecological system. The line colours distinguish each system: red (Microsystem), blue (Mesosystem), green (Exosystem), purple (Macrosystem), and orange (Chronosystem). This graph reinforces that the Microsystem and Chronosystem are the two systems with the highest average scores, highlighting the critical roles of direct relationships and temporal development in influencing the intensity of cyberbullying among vocational students.



Graph 1.
Line Chart of Average Likert Scores Across Ecological Aspects in Cyberbullying Assessment



Fifth, the synthesis of these findings emphasises that effective mitigation strategies to reduce cyberbullying must focus on strengthening healthy interactions within the microsystem, such as providing digital literacy education for teachers and students, enhancing peer communication, and promoting ethical use of social media. The mesosystem approach should involve active parental engagement in monitoring and discussing students' online activities. In the exosystem context, school policies and technological literacy must be oriented toward creating a safe digital environment. Meanwhile, macrosystem- and chronosystem-based interventions should consider cultural values and digital dynamics to ensure that prevention strategies remain adaptive and contextually relevant.

This study reveals that cyberbullying among vocational students living in wetland communities is a complex phenomenon influenced by various factors within their social ecosystem (Liang et al., 2023). Utilising Bronfenbrenner's ecological theory as the conceptual framework, the analysis demonstrates that all five systems—microsystem, mesosystem, exosystem, macrosystem, and chronosystem—interact dynamically in shaping adolescents' experiences and involvement in cyberbullying behaviour (Cross et al., 2015; Savani et al., 2023).

Based on the descriptive analysis, the characteristics of cyberbullying among vocational students indicate that the microsystem has the most dominant influence. The highest average score was observed in this domain, which includes direct relationships among adolescents, their peers, teachers, and family (Lee et al., 2021; Velensia et al., 2021). This implies that adolescents' immediate environments serve as the primary setting where both positive and negative social interactions occur, including acts of cyberbullying carried out or experienced through digital media (Kapucu et al., 2021).

In addition to the microsystem, the chronosystem also exerts a strong influence, indicating that technological changes and the increasing intensity of digital media use in adolescents' lives provide substantial space for cyberbullying to occur (White et al., 2019; Zăvoianu & Sun, 2022). While some adolescents are becoming more aware of the risks in online spaces, uneven digital literacy and weak social control make them vulnerable to becoming either victims or perpetrators (Mangintir & Tresniasari, 2020).



Meanwhile, the mesosystem reflects the interconnection between key adolescent environments, such as communication between school and family in wetland communities. When these two social institutions fail to synergise in monitoring adolescents' digital behaviour, the risk of cyberbullying tends to increase (Lee et al., 2020; Lee et al., 2021). This is further exacerbated by findings from the exosystem, which show that school policies and indirect social systems are not yet optimal in protecting adolescents in digital spaces (Papamichalaki, 2021).

The macrosystem, encompassing cultural norms and social values, also plays a role in shaping the dynamics of cyberbullying. In the context of wetland communities, cultural values such as reluctance to disclose problems or fear of shaming the family often lead to underreporting of cyberbullying incidents (Ramadhani & Prastyanti, 2024; Sasson et al., 2024). This presents a unique challenge in addressing digital-based bullying cases.

Further factor analysis confirms that among the five ecological aspects, the microsystem is the most influential in shaping adolescents' engagement with cyberbullying. Peer interactions and family roles are the main driving or inhibiting forces behind the emergence of negative behaviours in digital spaces (Wright et al., 2021). This reinforces the importance of building healthy and supportive interpersonal relationships within adolescents' closest social environments.

Moreover, the correlation analysis among the ecological aspects shows that all systems are significantly interconnected. The strongest correlation was found between the microsystem and mesosystem, indicating that the strength of adolescents' immediate environments directly affects the effectiveness of interactions between systems, such as the synergy between family and school. Other correlations, such as between the exosystem and chronosystem, further support the argument that technological development and social policies must go hand in hand to protect adolescents from digital risks (Ramadan et al., 2024; Wiederhold, 2024). Thus, the interactions between systems in Bronfenbrenner's ecological theory are not isolated but mutually reinforcing in shaping the social conditions that influence students' online behaviour.

Based on the narrative interpretation of the data, strategies to address cyberbullying in wetland communities must be comprehensive and contextually relevant. In the microsystem, it is essential to provide digital literacy training and strengthen students' assertive communication skills, while actively involving teachers and parents in monitoring social media use (Liang et al., 2023). At the mesosystem level, school-family synergy programs should be optimised, such as digital parenting workshops and open communication forums (Lee et al., 2020). Within the exosystem, school policies and institutional support need to be directed toward developing reporting and support systems for cyberbullying victims (Wiederhold, 2024). In the macrosystem, local cultural values that emphasise community solidarity and social care can be leveraged to shape positive digital norms (Sasson et al., 2024). Lastly, in the chronosystem, school curricula must adapt to the evolving dynamics of technology and social media to ensure that prevention strategies remain timely and relevant (Ramadan et al., 2024).

In conclusion, addressing cyberbullying requires more than individual-level interventions; it necessitates the engagement of the entire social ecosystem that shapes adolescents' lives. This mapping provides a holistic overview that can serve as the foundation for policy development and ecologically based intervention programs aimed at creating a safe, healthy, and supportive digital environment for adolescents in wetland communities.



Implications

The findings of this study carry significant practical and theoretical implications for the prevention and management of cyberbullying among vocational students in wetland communities. The results indicate that microsystem aspects, such as relationships with peers and teachers, as well as mesosystem factors, including the interconnectedness between school and family environments, play a substantial role in shaping the dynamics of digital bullying behaviour (Lee et al., 2020; Wright et al., 2021). Therefore, intervention strategies that promote active collaboration among key stakeholders—including schools, families, and local communities are crucial (Patchin & Hinduja, 2016; Patel & Quan-Haase, 2024).

Digital literacy and character development should be integrated into school programs through training initiatives for school counsellors and peer mentors, supported by the local cultural values of wetland communities that emphasise social solidarity (Elbedour et al., 2020; Lim & Lee, 2021; Al-Mafraji, 2022). Another key implication of this study is the need for an ecological-based prevention model that ensures all systemic layers (from micro to chrono) actively contribute to creating a safe and supportive digital ecosystem that enhances students' psychosocial Wellbeing (Patel & Quan-Haase, 2024).

This research also offers a roadmap for school counselors, subject teachers, educators, and policymakers to design interventions that are contextually and culturally sensitive to the wetland community environment, making the proposed strategies more relevant, sustainable, and impactful in fostering adolescents' digital resilience over the long term (Florang, 2020; Burlet & Panahon, 2022).

Limitations and Further Research

This study has several limitations that should be considered when interpreting the findings. First, although data were successfully collected from 798 vocational students living in wetland communities, some respondents did not complete the questionnaire fully or provided neutral responses to several key items, particularly those that asked about personal experiences as perpetrators or victims of cyberbullying. This may be attributed to the sensitive nature of the topic, feelings of shame, or uncertainty about answering honestly.

Second, the quantitative descriptive design of the study limits the exploration of emotional, psychological, and narrative dimensions of adolescents' personal experiences with cyberbullying. As a result, the understanding gained tends to be generalised and lacks qualitative contextual depth.

Third, the study focused exclusively on students in vocational high schools within wetland ecosystems, without incorporating the perspectives of teachers, parents, or school administrators who are also part of Bronfenbrenner's ecological systems, particularly at the mesosystem and exosystem levels. Their absence as key informants leaves a gap in the holistic analysis of the system.

For future research, a mixed-methods approach is recommended to enrich quantitative findings through interviews or observations. Comparative studies across wetland-based schools in urban and diverse regional settings should also be conducted to explore differences in characteristics and the influence of local values on perceptions and the dynamics of cyberbullying. Moreover, future studies should consider potential moderating variables such as gender, socio-economic background, and frequency of social media use in relation to adolescents' exposure to or involvement in cyberbullying.



CONCLUSION

This study concludes that cyberbullying among vocational students living in wetland communities is a complex phenomenon influenced by various aspects of adolescents' social ecosystems, as described in Bronfenbrenner's ecological theory. The characteristics of cyberbullying behaviour are strongly reflected in the microsystem, particularly in peer relationships and social media use, which are statistically the most significant influences compared to the mesosystem, exosystem, macrosystem, and chronosystem. Interactions between systems indicate that dynamics within one system can either amplify or reduce the risk of cyberbullying. Correlation results also demonstrate positive relationships among systemic variables, reinforcing a holistic understanding of the causes and patterns of cyberbullying. Based on these findings, both preventive and remedial strategies are needed that involve all layers of the ecological system, including schools, families, communities, and educational policies. These efforts should be contextually grounded in the local wisdom of wetland communities to foster a safe and healthy digital environment for adolescents.

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