

Empowering Digital Resilience: Bridging Knowledge Gaps in Countering Cyber Violence Against Women

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ABSTRACT:

Addressing potential pessimism surrounding “Cyber Violence against Women,” it's vital to clarify that such recognition doesn't implicate women's digital engagement. Instead, it emphasizes the need for a comprehensive approach ensuring their safety, well-being, and equitable digital participation. This study assesses college students' knowledge of cyber violence against women in Puducherry. Objectives encompass preliminary and post-assessment surveys to measure knowledge and explore associations. Utilizing a quantitative approach with a quasi-experimental design, the research involves 120 purposively and randomly sampled I-Year B. Tech students from Women's Engineering College, Puducherry.

Results from the pre-assessment survey reveal that substandard knowledge existed among 60.9% (73) of participants, average knowledge in 29.1% (35), while superior knowledge was evident among 10.1% (12) of participants. . Following the intervention, 80.9% of students demonstrated superior knowledge, 15.0% had average knowledge, and only 4.1% remained in the substandard category. The mean knowledge score increased from 1.49 ± 0.67 in the pre-test to 2.77 ± 0.51 in the post-test. A paired t-test showed a highly significant improvement ($t = 18.6, p < 0.001$), confirming the effectiveness of the intervention. Analysis of pre-test assessment reveals a need for focused intervention, leading to a meticulously organized Structured Technical Teaching Program. This program comprehensively addresses knowledge gaps, covering manifestations, consequences, prevention, and legal avenues.

Targeted modules equip participants to counteract cyber violence through engaging methods like informative sessions, discussions, case studies, and exercises. Post-assessment survey measures knowledge enhancement, while pre/post-assessment comparison offers insights into program effectiveness. The comprehensive

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paper not only presents post-survey results but also details preventive measures and remedies. Through in-depth analysis, it outlines effective strategies, legal support, and a holistic perspective on combating cyber violence. The integrated approach contributes to a safer digital space, fostering women's protection and empowerment.

Keywords: Pre and Post Assessment Survey, Structured Technical Teaching Program, Cyber Violence, Knowledge, Female students.

1. INTRODUCTION

The rapid expansion of digital technology and social networking platforms has transformed communication, education, and social interaction across the globe. While digitalization has created opportunities for learning, empowerment, and connectivity, it has simultaneously increased the risk of cyber violence, particularly against women. Cyber violence includes online harassment, cyberstalking, cyberbullying, cyber defamation, image-based abuse, identity theft, and other forms of technology-facilitated violence that negatively affect women's psychological, social, and emotional well-being.

Women and young female students are increasingly vulnerable to cyber violence due to extensive internet exposure and social media engagement. Exposure to cyber violence may result in anxiety, depression, fear, social withdrawal, reduced academic performance, and diminished digital participation. In developing countries, inadequate awareness regarding digital safety practices and limited knowledge about legal protections further increase vulnerability among women.⁷

Digital resilience refers to the ability of individuals to recognize, respond to, recover from, and adapt to online risks and cyber threats effectively. Strengthening digital resilience through educational interventions can empower women to navigate digital spaces safely and confidently. Educational programs focusing on cyber awareness, online privacy, safe digital practices, and legal literacy can play a significant role in reducing cyber violence.

Despite the increasing prevalence of cyber violence, limited studies have evaluated

structured educational interventions aimed at improving digital resilience among female college students in India. Therefore, the present study was undertaken to assess the effectiveness of a Structured Technical Teaching Program in enhancing knowledge regarding cyber violence and digital resilience among first-year engineering students in Puducherry.

Cyber violence against women has become an emerging public health and social issue in the digital era. Young women are highly exposed to online platforms for education, communication, entertainment, and professional activities, making them increasingly vulnerable to digital exploitation and cyber abuse. Lack of awareness regarding cyber safety measures, legal remedies, and preventive practices contributes significantly to the rising incidence of cyber violence.

Educational institutions play a crucial role in promoting digital literacy and resilience among students. However, there is limited evidence regarding the effectiveness of structured educational interventions addressing cyber violence among female college students. Therefore, this study was conducted to bridge the knowledge gap and enhance digital resilience through a Structured Technical Teaching Program. The current study was performed with the following objectives; To assess the pre-test level of knowledge regarding cyber violence against women among first-year B.

Tech students; To implement a Structured Technical Teaching Program on digital resilience and cyber safety; To evaluate the effectiveness of the Structured Technical Teaching Program through post-test assessment; To compare pre-test and post-test knowledge scores; To determine the association between selected

socio-demographic variables and post-test knowledge levels.

2. METHODOLOGY

Structured Technical Teaching Program in enhancing digital resilience and reducing cyber violence vulnerability among women. A quasi-experimental research design with a one-group pre-test and post-test format was employed.¹⁴ This design enables the researcher to assess the impact of the intervention by comparing participants' knowledge and digital resilience levels before and after the implementation of the Structured Technical Teaching Program. The study was conducted at Women's Engineering College, Puducherry. The institution provides a structured academic environment suitable for implementing educational interventions and assessing their outcomes among engineering students. The target population comprised first-year B. Tech students enrolled at Women's Engineering College, Puducherry. First-year students were selected as they are at a formative stage of academic and digital engagement, making them suitable participants for resilience-building interventions. The total sample size for the study consisted of 120 students. The study utilized a purposive sampling technique to select participants who met the inclusion criteria. Within this selected group, participants were chosen using a simple random sampling method to ensure fairness and minimize selection bias.¹⁵ The samples were selected based on predefined inclusion criteria, such as first-year B. Tech students studying at Women's Engineering College, students willing to participate, and students available during the data collection period. Exclusion criteria included students who were absent during data collection and those unwilling to participate.

The Structured Technical Teaching Program was designed to educate participants regarding forms and types of cyber violence, digital safety practices, cyber law awareness, online privacy protection, and strategies to build digital

resilience. The program was delivered through structured sessions including lectures, discussions, and interactive learning activities.

Data were collected using pre-test and post-test assessments. A pre-test was conducted to assess baseline knowledge and digital resilience. The Structured Technical Teaching Program was subsequently implemented, followed by a post-test to evaluate its effectiveness. Data were analyzed using descriptive and inferential statistics.

Descriptive statistics included frequency, percentage distribution, mean, and standard deviation. Inferential statistics included the **paired t-test** to compare pre-test and post-test scores and the **Chi-square test** to determine the association between socio-demographic variables and post-test outcomes.

RATIONALE FOR SELECTING QUASI-EXPERIMENTAL DESIGN:

- **Real-World Complexity:** Cyber violence and digital resilience are intricate, shaped by individual attributes, prior experiences, and societal intricacies. Quasi-experiments reveal this complexity, offering a comprehensive understanding.
- **Ethical Considerations:** Random assignments can raise ethical concerns, especially in sensitive domains. Quasi-experiments respect individual autonomy as participants choose their groups, addressing ethical reservations.
- **Resource Efficiency:** Quasi-experimental design conserves resources compared to randomized trials, enabling a wide range of investigators to conduct valuable research efficiently, even with limited resources.

The Quasi -experimental design encompasses:

- a. Pre-assessment survey
- b. Structured technical teaching program
- c. Post- assessment survey

3. RESULTS

Section A: Description of the demographic variables among the college students

Table 1: Frequency and percentage-wise distribution of demographical variables among the college students (N = 120)

S.N	Socio-Demographic Variables	Frequency	Percentage
1	Age (in years)		
	18–19	52	43.3%
	19–20	58	48.3%
	21 & above	10	8.4%
2	Gender		
	Female	120	100%
	Male	0	0%
3	Educational Qualifications of Parents		
	Illiteracy	8	6.7%
	Primary education	20	16.7%
	Secondary education	34	28.3%
	Higher secondary	30	25%
	Graduate & above	28	23.3%
	Total	120	100%
4	Monthly Income of Parents (₹)		
	Below 10,000	18	15%
	10,001 – 20,000	42	35%
	20,001 – 30,000	38	31.7%
	Above 30,000	22	18.3%
5	Usage of Mobile Phone (per day)		
	Less than 2 hours	14	11.7%
	2–4 hours	46	38.3%
	4–6 hours	40	33.3%
	More than 6 hours	20	16.7%

Table 1 shows that the socio-demographic data reveal that among the 120 college students, the majority of participants, 58 (48.3%), were aged between 19–20 years, followed by 52 (43.3%) in the 17–18 years age group. All 120 (100%) respondents were female, as the study was conducted in a women's engineering college. Most students, 78 (65%), belonged to the Hindu religion, while smaller proportions were Christians and Muslims.

Regarding parental education, a considerable number had secondary (28.3%) and higher

secondary (25%) education, indicating a moderate educational background. In terms of family income, 35% belonged to the ₹10,001–20,000 income group, reflecting a predominantly middle-income status. With respect to mobile phone usage, 38.3% used mobile phones for 2–4 hours daily, showing regular digital engagement. Overall, the participants represent young, digitally active students from moderately educated and middle-income families, suitable for assessing digital resilience and cyber violence awareness.

Table -2: Frequency and percentage-wise distribution of pre-test level of knowledge regarding the college students (N=120)

Knowledge tiers	Frequency (%)	Percentage
Substandard knowledge	73	60.9%
Average knowledge	35	29.1%
Superior knowledge	12	10.1%
Total	120	100%

Table No.2: The above table shows that the majority of respondents (60.9%) had substandard knowledge, followed by 29.1% with average knowledge, and only 10.1%

demonstrated superior knowledge. This indicates that most participants have inadequate knowledge levels, highlighting the need for educational interventions.

Table 3: Frequency and percentage-wise distribution of posttest level of knowledge regarding the college students (N=120)

Knowledge tiers	Frequency	Percentage (%)
Substandard knowledge	5	4.1%
Average knowledge	18	15.0%
Superior knowledge	97	80.9%
Total	120	100%

Table 3 reveals that a large majority of respondents, 97 (80.9%), possessed superior knowledge, while 18 (15.0%) had average knowledge, and only 5 (4.1%) exhibited substandard knowledge in the post-test assessment.

regarding cyber violence and digital resilience following the Structured Technical Teaching Program. The proportion of respondents with superior knowledge was substantially higher than those with average and substandard knowledge levels.

The findings indicate that most participants demonstrated a high level of knowledge

METAMORPHOSIS OF KNOWLEDGE- A COMPARATIVE EXAMINATION

Table -4: Comparison of Pre- and Post-Assessment Knowledge Levels of the college students (N = 120)

Knowledge tiers	Pre-assessment survey (%)	Post-assessment survey (%)	Comparison (%)	Knowledge: Increased/ Decreased
Substandard knowledge	73 (60.9%)	5(4.1%)	-56.8%	Decreased
Average knowledge	35(29.1%)	18 (15.0%)	-14.1%	Decreased
Superior knowledge	12 (10.1%)	97(80.9%)	+70.8%	Increased

Table -4: The comparison between pre-assessment and post-assessment knowledge

The proportion of participants with **substandard knowledge** decreased markedly from 60.9% (73 respondents) in the pre-assessment to 4.1% (5 respondents) in the post-assessment, reflecting a reduction of 56.8%. Similarly, those with **average knowledge** declined from 29.1% (35 respondents) to 15.0% (18 respondents), showing a decrease of 14.1%.

In contrast, the percentage of respondents with **superior knowledge** increased substantially from 10.1% (12 respondents) before the assessment to 80.9% (97 respondents) after the

levels clear and significant improvement among the respondents.

assessment, indicating a remarkable improvement of 70.8%.

Overall, these findings demonstrate that there was a significant shift from lower to higher knowledge levels following the intervention. The decrease in substandard and average knowledge, along with the substantial increase in superior knowledge, suggests that the educational program or intervention was highly effective in enhancing the knowledge of the study participants.

Table 5: Comparison of Pre-test and Post-test Mean and Standard Deviation (N = 120)

Assessment	Mean	Standard Deviation
Pre-test Level	1.49	0.67
Post-test Level	2.77	0.51

Table -5 reveals that the mean score increased from 1.49 in the pre-test to 2.77 in the post-test, indicating improved knowledge after the

intervention. The standard deviation decreased from 0.67 to 0.51, showing more consistency in post-test scores.

Table : 6-Comparison of Pre-test and Post-test Knowledge Scores with Mean, Standard Deviation, Paired 't' Value, and Level of Significance (N = 120)

Variable	Mean	Standard Deviation	T – Value	p- value	Significance
Pre-test Score	1.49	0.67	-	-	-
Post-test Score	2.77	0.51	18.6	0.0001	0.05 Highly significant

Table :6 shows that, A paired t-test was used to compare pre-test and post-test knowledge scores. The results showed a statistically significant increase in knowledge scores from pre-test (Mean = 1.49, SD = 0.67) to post-test (Mean = 2.77, SD = 0.51), with a t-value of 18.6 and p-value < 0.001. The findings indicate that the intervention was **highly effective**, as there was a **statistically significant improvement** in knowledge scores at the **p < 0.05 level**. The post-test mean score (2.77 ± 0.51) was significantly higher than the pre-test mean score (1.49 ± 0.67). The mean difference was 1.28,

with a t-value of 18.6 and $p < 0.001$, indicating a highly significant improvement.

4. RESEARCH DISCUSSION

The present study entitled "**Empowering Digital Resilience: Bridging Knowledge Gaps in Countering Cyber Violence Against Women**" demonstrated that the Structured Technical Teaching Program was highly effective in improving knowledge regarding cyber violence, digital safety practices, and digital resilience among female engineering students. A significant increase in post-test

knowledge scores was observed when compared to pre-test scores.

The findings of the present study are consistent with those reported by **Henry and Powell**, who emphasized that educational interventions and awareness programmes significantly improved women's understanding of online harassment, cyberstalking, and digital safety measures. Their study highlighted the importance of knowledge-based interventions in reducing vulnerability to cyber violence. Similarly, **Livingstone et al.** reported that digital literacy and resilience-building programmes enhanced participants' ability to identify online risks and adopt safer online behaviours. The improvement in knowledge observed in the present study supports their findings that educational programmes are effective tools for strengthening digital resilience. The present findings are also in agreement with the study conducted by **Hinduja and Patchin**, which found that cyber safety education significantly increased awareness of cyberbullying, reporting mechanisms, and online protective behaviours among students. The authors concluded that structured educational interventions can empower young people to navigate digital environments more safely.¹⁹

Furthermore, the results are supported by the findings of **Powell and Henry**, who reported that awareness programmes focusing on technology-facilitated violence against women improved participants' knowledge regarding legal protections, privacy management, and help-seeking behaviours. Similar improvements were observed among the participants in the present study following the Structured Technical Teaching Program. Therefore, the findings of the present study corroborate existing evidence that structured educational interventions are effective in enhancing knowledge, promoting cyber safety awareness, and strengthening digital resilience among women. The significant improvement in post-test scores observed in the current study reinforces the need for regular cyber violence prevention education among college students.

The present study demonstrated that the Structured Technical Teaching Program significantly improved knowledge regarding cyber violence and digital resilience among female engineering students. Before the intervention, the majority of participants possessed inadequate knowledge regarding forms of cyber violence, preventive measures, and legal remedies. Similar findings have been reported in previous studies, which identified limited cyber safety awareness among young women and college students. Following the educational intervention, a substantial increase in superior knowledge levels was observed among participants. The post-test results revealed that 80.9% of respondents achieved superior knowledge compared to only 10.1% during the pre-test. The paired t-test analysis demonstrated a statistically significant improvement in knowledge scores ($t = 18.6, p < 0.001$), indicating the effectiveness of the Structured Technical Teaching Program. The findings suggest that structured educational interventions can effectively strengthen digital resilience and empower women to identify, prevent, and respond to cyber threats. Interactive teaching strategies such as case discussions, demonstrations, and awareness sessions contributed to active participation and better understanding among students. The study also highlights the importance of integrating cyber safety education into academic curricula to promote responsible digital engagement and protect women from online abuse. Strengthening digital literacy and awareness programmes can contribute to safer online environments and improved psychological well-being among women.

5. CONCLUSION:

The present study concluded that the Structured Technical Teaching Program was highly effective in improving knowledge regarding cyber violence and enhancing digital resilience among female engineering students in Puducherry. The findings revealed a substantial increase in post-test knowledge scores when compared to pre-test scores, indicating that the educational intervention significantly

strengthened participants' awareness of cyber violence, preventive strategies, digital safety practices, and legal remedies.

Before the intervention, the majority of participants demonstrated inadequate knowledge regarding cyber violence against women. However, following the implementation of the Structured Technical Teaching Program, a remarkable improvement was observed, with most participants achieving **superior** knowledge levels. The statistically significant difference between pre-test and post-test scores confirms the effectiveness of the intervention in promoting digital resilience and responsible online behavior. The study highlights the growing need for structured cyber safety education among young women, particularly in educational institutions where digital engagement is high. Educational interventions focusing on digital literacy, online safety, cyber law awareness, and resilience-building strategies can empower women to recognize, prevent, and effectively respond to cyber threats and online harassment. Furthermore, the study emphasizes that combating cyber violence against women requires a multidisciplinary and collaborative approach involving educational institutions, healthcare professionals, policymakers, cybersecurity experts, and legal authorities. Strengthening awareness programs and integrating cyber safety education into academic curricula can contribute significantly to creating safer and more inclusive digital environments.

In conclusion, empowering women through digital resilience and cyber safety education is essential for ensuring secure digital participation,

protecting mental and social well-being, and promoting gender equality in the digital era.

6. LIMITATIONS OF THE STUDY

1. The study was conducted among a limited sample of female engineering students; therefore, the findings cannot be generalized to all women or student populations.
2. The study was confined to a single educational institution in Puducherry, which may limit the external validity of the results.
3. A one-group pre-test and post-test design was used without a control group, making it difficult to attribute all improvements solely to the Structured Teaching Programme.
4. Data were collected using self-administered questionnaires, which may be subject to response bias and social desirability bias.
5. The study assessed knowledge immediately after the intervention and did not evaluate long-term retention of knowledge or sustained digital resilience.
6. The research focused primarily on knowledge enhancement and did not assess actual behavioral changes, online safety practices, or experiences of cyber violence over time.
7. The rapidly evolving nature of digital technologies and cyber threats may affect the long-term relevance of the educational content provided.
8. Factors such as prior exposure to cyber safety information, media influence, and personal experiences with cyber violence were not fully controlled during the study.

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