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Cyberbullying among University Students during the E-learning Transformation Era: The Role of the Student-Teacher Relationship and Virtual Classroom Community

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Purpose: The current study assesses cyberbullying among university students and explores the role of the student-teacher relationship and virtual classroom community.

Methods: A descriptive exploratory study on four randomly selected colleges at Damanhour University/Egypt. Participants were recruited conveniently using an equal allocation of 150 students/college (600 students). The European Cyberbullying Intervention Project Questionnaire (ECIPQ), Rovai's Classroom Community Scale (RCCS), and the Student Version of The Teacher-Student Relationship Inventory (S-STRI) were used for data collection.

Results: Low cyber victimization was reported by 66.5% of the students, while 39.8% reported low cyberaggression behaviors. The highest percent reported average virtual class connectedness (77.3%), learning experience (70.3%), and overall virtual classroom community (80.8%). Besides, highly satisfying teacher relationships (82.3%); average (38.8%) and low (35.8%) instrumental help; low conflict (68.0%); and average total teacher-student relationship (70.5%). Regression analysis revealed that the increased scores of the total teacher-student relationship scale ($p<0.05$) with its two domains [satisfaction and instrumental help ($p<0.01$)] and the total classroom community scale ($p<0.05$) with its domains [connectedness ($p<0.01$) and learning experience ($p<0.05$)] decreased the likelihood of cyber victimization and cyberaggression. However, perceived conflicting teacher relationships increased the likelihood of cyber victimization ($p<0.05$) and cyberaggression ($p<0.01$).

Conclusion: Cyberbullying is a concern among university students, and the students' perceived nature of their relationships with their teachers and sense of virtual classroom community play a pivotal role in shaping their involvement in cyberaggression and exposure to cyber victimization. Thus, developing mass media campaigns to enhance awareness about cyberbullying and cyber civility regulations is recommended.

Keywords: Cyberbullying, Cyber-Victimization, Online Learning, University Students

Introduction

Bullying is one of the aggressive behaviors that happen in an intentional and recurring style that result in feeling hurt by others [1]. Three key characteristics define bullying: a purpose to harm, repetition, and an obvious power disparity between the bully and the victim. It does not just occur between teenagers and schoolchildren but also among adults [2,3]. Bullying involves many

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forms, either verbal, physical, sexual, social, or relational actions. Most recently, cyberbullying has been described as bullying in the digital era through various aggressive online actions [4,5].

Cyberbullying is an international epidemic rapidly spreading worldwide. Although conventional forms of bullying, such as verbal or physical abuse, are marginally down, cyberbullying is on the rise and is becoming more common. Evidence shows that the global incidence of cyber victimization is rapidly rising [3-5]. Since all students use technology and are exposed to social media platforms, cyberbullying has become an urgent and prominent issue, especially during the e-learning transformation era [6]. A recent systematic review of cyberbullying discovered that it is a widespread phenomenon: cyberaggression (1%- 41%), cyber victimization (3%-72%), and overlapping between both (2.3%-16.7%) [7]. Two recent Egyptian studies also revealed that cyberbullying victimization is a widespread problem among university students in Beni-Suef (48.2%) and EL-Fayoum (27.3%) universities [8,9].

Cyberbullying can have numerous forms, such as posting images or awkward comments about others, sending threatening messages, and distributing images through websites, blogs, instant messages, chat rooms, cell phones, electronic mail, and personal profiles. Online dating abuse and cyberstalking are two recent examples of cyberbullying conduct. Cyberbullies frequently say things they would not have the guts to say in person. They experience isolation, anonymity, and disconnection because of technology. Cyberbullying seems intrusive and never-ending to the targets of it. Bullies can harm at any time or any place and frequently do so in the comfort of their own homes. As a result, cyberbullying has serious repercussions [10,11].

Evidence shows that the victims of cyberbullying experience a significant level of psychological anguish as well as behavioral issues [12]. They exhibit greater anxiety, depression, and long-term behavioral changes, including resignation and social isolation, a preponderance of obsessive tendencies with hostile attitudes and hypersensitivity, and emotions of learned helplessness and low self-esteem [13]. When students have a bad perception of their social environment and are exposed to cyberbullying by their virtual classmates, it can lead to undesirable outcomes, including social withdrawal and even dropping out [14]. Cyberbullying in higher education negatively affects institutions and their respective stakeholders. The consequences range from staff members' turnover to student suicide [15].

The COVID-19 pandemic impacts all aspects of social life, involving the educational sphere. Since the students' previous familiarity with the learning environment has changed to a virtual classroom, a recent teaching-learning model refers to network-based learning, tele-learning, web-based learning, or e-learning. It may provide more opportunities for cyberbullying behavior and can affect the classroom climate that reflects the norms, expectations, and values that enhance the student's sense of social, emotional, and physical safety in school life [16-18]. This context creates great challenges for teachers in different educational institutions. They must be able to explore the associated changes in the student's behavior in this digital age besides guaranteeing their safety in this precarious virtual classes environment [16,19].

Student-teacher relationships also significantly influence bullying-related behaviors [20]. Literature highlights its importance in predicting involvement in different bullying roles [21,22]. Positive interactions with teachers allow the students to internalize a decent relational model that can shape other contexts and relationships, such as with peers [20,22]. Such a good relationship frequently correlates with prosocial and less aggressive behaviors and, more broadly, may foster a favorable learning environment in the classroom [20]. Cyberbullying needs critical attention where the educational sector plays a paramount role, especially during the e-learning transformation era. It can be modified using a hybrid strategy combining policy, technology, and non-technology-based solutions [23]. In addition to developing social competencies and knowledge, fostering attitudes and awareness of the potential repercussions of cyberbullying, cultivating social responsibility and enhancing the classroom climate, and developing strategies for constructive online communication [24]. A crucial step is fostering an atmosphere of online civility through establishing and putting cyber-civility regulations and standards into practice [25].

The magnitude of the study

This study is one of the pioneer studies in Egypt that handled this rising epidemic of cyberbullying (both cyber victimization and aggression) during the e-learning transformation era and COVID-19-related life changes. Thus, it provides valuable knowledge that can aid in developing targeted awareness programs about cyber-civility strategies to reduce this rising problem. Therefore, this study aimed to assess cyberbullying among university students and explore the role of the student-teacher relationship and virtual classroom environment.

Research questions

- What are the students' self-reported levels of cyberbullying (victimization & aggression)?

- What is the extent of the students' perceived virtual classroom community?
- What is the nature of the students' perceived relationship with teachers?
- How do the virtual classroom community and student-teacher relationship affect cyber victimization and aggression?
- Are there other factors affecting cyber victimization and aggression?

Methods

1. Study design

A descriptive exploratory research design was employed.

2. Participants and Setting

Participants were recruited from the four randomly selected colleges at Damanhour University/Egypt: theoretical colleges (Education and Art) and practical colleges (Nursing, Science). All the students who enrolled in the selected colleges were invited to participate in the study, both genders and were willing to contribute. A convenient sample of 600 students was included in the study using an equal allocation of 150 students from each college.

The sampling size was determined using the Steven K. Thompson formula [26] based on the average number of students in the four colleges in the academic year 2021-2022. Besides, recent evidence shows that the average proportion of cyberbullying among Egyptian university students ranges from 27.3 to 48.2 percent [8,9]. These results minimally in 533 required students, then they were upgraded to 600 to compensate for possible nonresponse.

$$n = \frac{[N \times p\,(1-p)]}{[[N-1 \times (\frac{d^2}{z^2})] + p\,(1-p)]}$$

n: Sample size (533), N: population size (≈20000), Z: Confidence level at 95.0% (1.96 Z score), d: Error proportion (0.05), and p: Probability (50%).

3. Questionnaire development

It incorporated the following parts.

Part I: Personal characteristics

Age, gender, academic year, residence, and perceived income level. Besides, awareness that bullying is punishable by law, regular accessibility of the internet, and health-related data such as chronic disease diagnosis and mental or psychological health problems.

Part II: European Cyberbullying Intervention Project Questionnaire (ECIPO)

It was adapted from Del Rey et al. [27] and Ortega-Ruiz et al. [28] studies that aimed to investigate the validity and cross-cultural robustness of the ECIPO. It is a self-reported measure comprised of 22 items with two domains: cyber victimization (11 items) and cyberaggression (11 items). Items were weighted on a Likert-type scale with five responses ranging from (0 = never, 1 = once or twice, 2 = once or twice a month, 3 = once a week, 4 = more than once a week) in the previous two months. The total score was calculated separately for cyberbullying and cyberaggression (0-22). Higher scores signified a higher level of the respective subscale that was further leveled as never (0), low (1-7), moderate (8-14), and high (15-22).

Part III: Rovai's Classroom Community Scale (RCCS)

It was originally developed by Rovai [29] to assess the students' perceived sense of classroom community in the virtual environment. It was further validated by Ahmady et al. [30], who revealed higher reliability for the overall scale, connectedness, and learning subscales (α = 0.87, 0.86, and 0.85). It consisted of 20 items distributed over two subscales: connectedness (10 items) and learning (10 items). Five-point Likert-type items ranged from strongly agree (0) to strongly disagree (4). The overall score was calculated (0-80), where higher scores reflected a better sense of virtual classroom community that was further leveled as poor (0-26), average (27-53), and good (54- 80). The subscales scores were also calculated (0-40), where a higher score reflected a better level of the respective domain.

Part IV: Student Version of the Teacher-Student Relationship Inventory (S-TSRI)

It was adapted from Ang et al. [31] study that aimed to develop and validate the Teacher-Student Relationship Inventory (TSRI) from students' perspective. It incorporated 14 items over three subscales: satisfaction (5 items), Instrumental help (5 items), and conflict (4 items). Items were rated on a 5-point scale: almost never true (1), seldom true (2), sometimes true (3), often true (4), and almost always true (5). The overall score was calculated (14-70), where a higher score indicated a better student-teacher relationship that was further leveled as poor (14-33), average (34-53), and good (54-70). The subscales scores were also calculated where higher scores reflected a better level of the respective domain, except for the conflict domain, the higher scores reflected conflicting student-teacher relationships.

4. Questionnaire validity and reliability

The researchers translated the scales into Arabic with another researcher's back translation (Arabic to English) to guarantee their accuracy. Six experts in the field evaluated the content validity of the questionnaire. The Content Validity Index per item level (I-CVI) ranged from 0.8 to 1.0, and the overall scale (S-CVI) was 0.91. The internal consistency reliability of the questionnaire was assured using "Cronbach's α coefficient," which disclosed a satisfactory level: part II ($\alpha = 0.861$), part III ($\alpha = 0.827$), and part IV ($\alpha = 0.902$).

5. Administrative design

An official letter for study conduction was directed from the Dean of the nursing college to the Dean of Damanhour University. After approval, the necessary official approval to conduct the study was obtained from the designated colleges after explaining the purpose of the study.

6. Pilot study

Afterward, the questionnaire was pre-tested on 10% of the university students who were later dismissed from the main study. It was executed before data collection to review the feasibility, duration, cost, and adverse events of a full-scale research project and to enhance the study design.

7. Data collection

The researchers designed a digital self-administered constructed questionnaire using Microsoft Team forms. We invited undergraduate students enrolled in Damanhour University to participate in the study. They were invited via emails and official university platforms on social media profiles (WhatsApp and Facebook). Consequently, the online questionnaire was available from February 1st to March 30th, 2022. Reminder messages were sent twice a week to those who did not respond for three consecutive weeks.

8. Ethical Considerations

The study's ethical approval was gained from the research ethics committee of the Faculty of Nursing, Damanhour University (No. 22-1-202252e). The data were anonymously collected, kept confidential, and used for research purposes only. The consent form explained the background of the study, outlined the confidentiality procedures, and explained how the participant was free to withdraw from the survey at any time. It appeared on the very first screen of the survey. The participant read through the consent form and had to click 'I agree' to continue participating in the survey or 'I disagree' to withdraw from the survey. There were no identifying demographic questions asked to ensure confidentiality. Thus, there is no way for the researcher to identify who participated in the survey as it was all done anonymously online. The survey was distributed through an anonymous survey link with no identifying information, such as email addresses, to be collected.

9. Statistical Analysis

The data was coded and entered in the "Statistical Package of Social Sciences" "SPSS Inc; version 24; IBM Corp., Armonk, NY, USA". After data entry, it was explored to detect any error; then, it was analyzed by the same program for presenting frequency tables with percentages. Qualitative data was shown as numbers and percentages, while quantitative data were represented as mean/SD. Spearman correlation (r) was executed to guarantee the strength of a linear relationship between ordinal variables, and a t-test was performed to evaluate multiple linear regressions. Two linear regression models were utilized to investigate the factors affecting cyber victimization and cyberaggression. Both models were assessed for potential multi-collinearity using the Variance Inflation Factor (VIF < 10), and the adjusted R^2 value determined their goodness of fit. The Tolerance level ($1 - R^2$) was set at 0.50 or more to ensure that none of the independent variables can be predicted by the others in the model. The Quantile-Quantile (Q-Q) plot we used to ensure that the models' residuals were normally distributed, while a scatter plot was used to ensure the linear relationship between factors involved in each model and either cyber victimization or cyberaggression. The Durbin-Watson test was also employed to ensure the independence of residuals/observations or to exclude autocorrelation. Moreover, homoscedasticity was judged using a scatter plot of residuals versus predicted values to confirm the absence of a clear pattern in the distribution. The results were considered statistically significant at $p \leq 0.05$.

Results

1. Personal characteristics of the students

Table 1 displays that 45.5% of the students aged between 20-21 years, 51.0% were females, and 40.2% were enrolled in the first academic year. More than half (56.5%) were rural residents, and 48.8% had enough income for basic needs. In addition, 82.8% of them used the internet regularly, and 80.8% did not know bullying is punishable by law. Finally, 69.7% of the students did not have physical or psychological health problems.

Table 1. Distribution of the Students According to Their Personal Characteristics (*N*=600)

Items	n	%
Age (Years)		
18-19	228	38.0
20-21	273	45.5
22-23	99	16.5
Gender		
Male	294	49.0
Female	306	51.0
Academic year		
First	241	40.2
Second	143	23.8
Third	117	19.5
Fourth	99	16.5
Residence		
Rural	339	56.5
Urban	261	43.5
Perceived income level		
Enough for basic needs	293	48.8
Enough for basic and secondary needs	191	31.8
Enough and save.	91	15.2
Not enough	25	4.2
Having regular internet access		
Yes	497	82.8
No	103	17.2
Knowing that bullying is punishable by law		
Yes	115	19.2
No	485	80.8
Having a physical or psychological health problem		
Yes	182	30.3
No	418	69.7

Table 2. Mean Scores of The Cyber Victimization and Cyberaggression Items (European Cyberbullying Intervention Project Questionnaire (ECIPQ) scale)

Items	Mean ± SD
Cyber victimization	
- Personal online exposure to nasty things and/or names	0.41 ± 0.03
- Public online exposure to nasty things	0.50 ± 0.02
- Exposure to online threatening	0.23 ± 0.02
- Hacking account and stealing personal information	0.23 ± 0.01
- Hacking account by someone who pretends as the owner	0.19 ± 0.01
- Online posting of personal information by someone	0.15 ± 0.01
- Online posting of embarrassing videos or pictures	0.13 ± 0.01
- Manipulation of posted pictures or videos by someone	0.06 ± 0.01
- Being excluded from online social networks or chat rooms	0.38 ± 0.01
- Spreading of online rumors	0.06 ± 0.02
Cyberaggression	
- Saying nasty things or names to others	0.09 ± 0.01
- Saying nasty things about others	0.13 ± 0.01
- Threatening someone	0.04 ± 0.02
- Hacking into someone's account and stealing his personal information	0.06 ± 0.01
- Hacking into someone's account and pretending to be him	0.03 ± 0.03
- Creating a fake account pretending to be someone else	0.10 ± 0.01
- Online posting of personal information about someone	0.05 ± 0.01
- Online posting of embarrassing videos or pictures of someone	0.04 ± 0.01
- Manipulation of online posted pictures or videos of another person	0.02 ± 0.01
- Excluding someone from a social network or chat room	0.32 ± 0.02
- Spreading online rumors about someone	0.02 ± 0.01

2. Scale items mean scores and total scores of all the studied variables

Table 2 illustrates that the highest mean score items of cyber victimization were being exposed to nasty things and names personally 0.41 ± 0.03, or in public 0.50 ± 0.02, and being excluded or ignored by others on social networking sites and chat rooms 0.38 ± 0.01. Regarding the cyberaggression items, the highest mean score items were ignoring others on social networking sites and chat rooms 0.32 ± 0.02, saying nasty things and names about others 0.13 ± 0.01, and creating a fake account pretending to be someone else 0.10 ± 0.01.

Table 3 shows that the lowest mean value for connectedness items was 2.64 ± 0.76 for not feeling a spirit of community in the class, whereas the highest mean value was 3.58 ± 1.07 for feeling confident with receiving support from others. Moreover, the lowest mean value for the learning items was 2.5 ± 0.97 for feeling hard to get help when having a question while the highest mean value was 3.66 ± 0.74 for receiving timely feedback.

Table 4 represents that the highest mean value for satisfaction items was 4.17 ± 1.33 for the item "Like the teacher," while the highest mean value for instrumental help items was 3.18 ± 0.35 for "When needing help, it is likely to go to the teacher." However, the highest mean value for the conflict items was 2.20 ± 0.34: "Cannot wait for this year to be over because lack of desire to be with this teacher again."

Table 5 reveals that 66.5% of the students reported low cyber victimization, while 39.8% reported being involved in low cyberaggression behaviors. The highest percent of the students had average scores of classroom connectedness (77.3%), learning experience (70.3%), and overall RCCS (80.8%). Moreover, most (82.3%) of the students had good satisfaction levels, perceived

Table 3. Mean Scores of the Rovai's Classroom Community Scale (RCCS) Items

Items	Mean ± SD
Connectedness items - The student's feelings……	
- Students in this class care about each other	3.41 ± 1.02
- Connected to others in this class	3.32 ± 0.98
- Not having a spirit of community	2.64 ± 0.76
- This class is like a family	3.23 ± 1.13
- Isolated in this class	2.63 ± 0.81
- Trust others in this class	3.47 ± 0.55
- Being able to rely on others in this class	3.08 ± 1.04
- Members of this class are dependent	3.49 ± 1.33
- Uncertain about others in this class	2.78 ± 0.65
- Confident in receiving support from others	3.58 ± 1.07
Learning items - The student's experience……	
- Being encouraged to ask questions	3.35 ± 1.44
- Hardness to get help when having a question	2.50 ± 0.97
- Receiving timely feedback	3.66 ± 0.74
- Uneasy to reveal gaps in understanding	3.34 ± 1.23
- Reluctant to speak openly	3.10 ± 1.01
- This class results in only modest learning	2.89 ± 0.73
- Other students do not offer help to learn	2.65 ± 0.47
- Given opportunities to gain experience	3.55 ± 1.02
- The educational needs are not being met	2.90 ± 0.48
- This class does not encourage the desire to learn	2.85 ± 0.27

Table 4. Mean Scores of the Student Version of The Teacher-Student Relationship Inventory (S-TSRI) Items

Items	Mean ± SD
Satisfaction	
- Enjoying attendance of this teacher's class.	3.86 ± 1.09
- Having a positive relationship with the teacher	4.03 ± 2.10
- Feel missing if the teacher retires or leaves the school	4.01 ± 1.61
- Feel happy with the teacher relationship.	4.09 ± 0.92
- Like the teacher.	4.17 ± 1.33
Instrumental help	
- When having a home problem, it is possible to ask for help from the teacher	2.45 ± 0.74
- Sharing personal life issues with the teacher.	2.13 ± 0.65
- When needing help, it is likely to go to the teacher.	3.18 ± 0.35
- Discuss personal feelings and thoughts with the teacher	2.66 ± 0.41
- Depending on the teacher for advice.	3.03 ± 0.64
Conflict	
- The teacher can be the source of frustration many times	2.01 ± 0.27
- Cannot wait for this year to be over because lack of desire to be with this teacher again.	2.20 ± 0.34
- Feeling more relief if the teacher is absent	2.16 ± 0.18
- Enjoying class more if another replaces this teacher	2.17 ± 0.34

Table 5. Distribution of the Studied Students According to Total Scores of The Studied Variable (*N*=600)

Items	n	%
Cyber victimization		
Never	201	33.5
Low	399	66.5
Cyberaggression		
Never	361	60.2
Low	239	39.8
Total RCCS Score†		
Good	88	14.7
Average	485	80.8
Poor	27	4.5
Connectedness scale		
Good	83	13.8
Average	464	77.3
Poor	53	8.9
Learning scale		
Good	147	24.5
Average	422	70.3
Poor	31	5.2
Total S-STRI Score‡		
Good	113	18.8
Average	423	70.5
Poor	64	10.8
Satisfaction		
High	493	82.2
Average	89	14.8
Low	18	3.0
Instrumental help		
High	152	25.4
Average	233	38.8
Low	215	35.8
Conflict		
High	79	13.2
Average	113	18.8
Low	408	68.0

†Rovai's Classroom Community
‡Student Version of The Teacher-Student Relationship Inventory

average (38.8%) and poor (35.8%) instrumental help, and 68.0% perceived poor conflict level; meanwhile, average total S-TSRI was reported by 70.5% of them.

3. Linear regression analysis of the factors affecting cyber victimization and cyberaggression

Model 1 in table 6 depicts the high significance of the model ($F = 13.87$, $p < .001$), which explains 67.0% of the variation in cy-

ber victimization (R^2 = .67). It explained that the increasing levels of students' perceived satisfaction with their teachers relationship (B = -0.34, p < 0.01), virtual classroom connectedness (B = -0.31, p < 0.01), total S-STRI scores (B = -0.30, p < 0.05), instrumental help by teachers (B = -0.28, p < 0.01), learning experience (B = -0.23, p < 0.05), and total RCCS (B = -0.20, p < 0.05) decrease the likelihood of cyber victimization. However, having physical or psychological health problems (B = 0.24, p < 0.05) and regular internet access (B = 0.22, p < 0.05), female gender (B = 0.27, p < 0.05), conflicting teacher relationship (B = 0.20, p < 0.05), and lower age (B = 0.17, p < 0.05) increase the likelihood of cyber victimization.

Model 2 in Table 6 portrays the high significance of the model (F = 11.78, p = < .001), which explains 59.0% of the variation in cyberaggression (R^2 = .59). It revealed that higher scores of the total S-STRI score (B = -0.40, p < 0.01), classroom connectedness (B = -0.31, p < 0.01), instrumental help by teachers (B = -0.28, p < 0.05), knowing that bullying is punishable by law (B = -0.26, p < 0.05), total RCCS scores (B = -0.24, p < 0.05), learning experience and satisfying teacher relationship (B = -0.20, p < 0.05) decrease the likelihood of cyberaggression. However, conflicting teacher relationship (B = 0.30, p < 0.01), having regular internet access (B = 0.27, p < 0.05), experiencing cyber victimization (B = 0.25, p < 0.05), higher age (B = 0.20, p < 0.05), male gender (B = 0.17, p < 0.05) increase the likelihood of cyberaggression.

Discussion

The current study revealed that almost two-thirds (66.5%) of the students were victims of cyberbullying, mainly through personal or public exposure to nasty things and/or names and exclusion by others on social networking sites and chat rooms. More-

Table 6. Multiple Linear Regression Models for Cyber Victimization and Cyberaggression

Model 1: Cyber victimization	Unstandardized Coefficients	Standardized Coefficients		
	B	β	T	p
Connectedness	-0.31	.26	6.22	< .001**
Learning	-0.23	.20	3.10	.025*
Total RCCS† score	-0.20	-.14	2.58	.035*
Satisfaction	-0.34	.29	6.00	< .001**
Instrument help	-0.28	.19	2.66	.014*
Conflict	0.20	.15	3.71	.029*
Total S-TSRI‡ score	-0.30	.23	5.70	.019**
Having regular Internet access	0.22	.17	4.10	.038*
Lower age	0.17	.11	3.46	.032*
Female gender	0.27	.19	3.19	.040*
Having a physical or psychological health problem	0.24	.19	4.36	< .001**
Model significance	R^2 (.67)	F (13.87)	p (< .001**)	
Model 2: Cyberaggression	Unstandardized Coefficients	Standardized Coefficients		
	B	β	T	p
Connectedness	-0.31	.25	6.00	< .001**
Learning	-0.20	.16	2.45	.015*
Total RCCS score	-0.23	.18	2.77	.023*
Satisfaction	-0.20	.27	2.90	.013*
Instrument help	-0.28	.19	2.66	.011*
Conflict	0.30	.25	5.89	< .001**
Total S-STRI score	-0.40	.30	6.09	< .001**
Increased age	0.20	.10	2.46	.034*
Male gender	0.17	.09	2.19	.018*
Knowing that bullying is punishable by law	-0.26	.18	3.16	.021*
Having regular internet access	0.27	.20	3.77	< .028*
Cyber victimization	0.25	.18	3.44	< .017*
Model significance	R^2 (.59)	F (11.78)	p (< .001**)	

†Rovai's Classroom Community; ‡Student Version of The Teacher-Student Relationship Inventory; *p < 0.05; **p < 0.01

over, nearly two-fifths (39.8%) of the students were cyberbullies. The frequently reported bullying behaviors were ignoring others on social networking sites and chat rooms, saying nasty things and names about others, and creating a fake account pretending to be someone else. Besides, being exposed to cyber victimization proved to increase the likelihood of involvement on cyberaggression behaviors. Therefore, the victims of cyberbullying have a higher tendency to cyberbully others, which necessitates urgent action to cut down on this rising phenomenon.

In accordance, a recent Saudi study by Ali & Shahbuddin [32] portrayed that nearly half (49.1%) of the studied college students have been cyberbullied, and the rest (50.9%) never experienced cyberbullying. Yudes et al. [33] depicted that nearly a quarter of the studied Spanish students was involved in cyberbullying activities, where the most frequent behaviors were online insults and social exclusion. Two Egyptian studies reported that cyber victimization is prevalent among college students, especially females. The first was at El-Fayoum University by Hassan et al. [8], who showed that more than a quarter of the studied nursing and non-nursing students experienced cyberbullying. The second was by Arafa & Senosy [9], who revealed that nearly half of the students were victims of cyberbullying. Moreover, an almost equal cyber victimization percentage (66.0%) among those in the current study was reported by Lai et al. [34] among Malaysian university students.

A lower trend of cyber victimization than the current study among college students in the US was reported by Webber and Ovedovitz [35], where 4.3% reported being exposed to cyberbullying at the university level. However, 7.5% reported participation in cyberbullying behaviors using different platforms, including Facebook, Twitter, texting, email, Instagram, Snapshot, and chat rooms. Moreover, a survey conducted by Johnson et al [36] among undergraduate students in the US revealed that 73.6% reported never being victims of cyberbullying, and nearly a quarter of them reported being victims of cyberbullying. The findings also signified that most students never cyberbullied others, and a minority reported cyberbullying once a month. This lower trend can be explained by the ecological factors involved in cyberbullying that differ between and even within countries. Besides, the e-learning transformation during the COVID-19 era as both studies was conducted before the pandemic.

The current study explored that most students had an average sense of the virtual classroom community with an average sense of connectedness and learning experience. It also explored that the better the students' perceived level of virtual classroom connectedness, learning experience, and the overall virtual classroom climate, the lower the likelihood of cyber victimization and cyberaggression. Thus, the supportive virtual class environment played an essential role in protecting the students from being victims of cyberbullying or perpetrators.

In agreement, Thornberg et al. [37] showed that students are less prone to be victims or bullies than uninvolved if they pertain to a more positive, caring, and supportive class climate. Numerous studies have also shown classroom climate has a positive role in diminishing cyberbullying and victimization [38,39]. Moreover, Yang et al. [19] reported an inverse association between self-management and cyber victimization, strengthening with a more positively perceived school climate. Moreover, Aizenkot and Kashy-Rosenbaum [40] and Ferrer-Cascales et al. [41] indicated the efficacy of anti-cyberbullying intervention programs in reducing cyberbullying and victimization and improving student sense of class climate belonging. The former conducted a WhatsApp-based intervention, while the latter conducted a peer tutoring program. Therefore, the anti-cyberbullying intervention program is highly recommended to improve socio-emotional aspects in the classroom.

The present study revealed that the highest percentage of the students reported average overall student-teacher relationships with high satisfaction levels, average instrumental help, and low conflict. It also proved that the better the students' perceived quality of relationship with their teachers, sense of satisfaction, and instrumental help, the lower the likelihood of cyber victimization and cyberaggression. In converse, the higher the rate of perceived conflicting relationship with the teacher, the higher the rate of both. Henceforth, the teachers have a pivotal role in protecting students from committing or being victims of cyberbullying through the internalized values acquired by the students from their model teachers.

Conveniently, a Chinese study during COVID-19 by Ye et al. [42] demonstrated that the student-teacher relationship moderated the relationship between cyberbullying and mental health and difficulties with online learning and academic engagement. A Brazilian study by Valle et al. [43] reported that bullying had a direct negative influence on school engagement while the teacher-student relationship had a direct positive influence on school engagement. Besides, it elaborates that a good teacher-student relationship significantly mediates the adverse effect of bullying victimization and perpetration on school engagement levels. Therefore, a positive relationship between students and teachers translates into better school engagement, while a conflicting relationship translates into lower school engagement levels. Similarly, several studies demonstrate that conflicting student-teacher rela-

tionships are associated with an increased risk of bullying victimization [22,44].

Moreover, evidence about teachers' mediation interventions shows their effectiveness in decreasing cyberbullying by providing emotional warmth to support students' disengagement from online activities [45,46]. Interventions reinforcing social support can create positive relations, interpersonal skills, and prosocial behaviors that can help decrease cyberbullying [47,48]. So, the joined work of different agents (e.g., psychologists, teachers, parents, peers) should be considered to promote a positive evolution in cyberbullying prevention.

The current study explored additional factors that can affect cyberbullying. Having physical or psychological health problems, regular internet access, lower age, and female gender increased the likelihood of cyber victimization. Moreover, the likelihood of cyber aggression was increased by being exposed to cyber victimization, having regular internet access, male gender, and higher age, whereas it was decreased by being aware that bullying is punishable by law. These findings illustrate the multidimensional influences on cyberbullying as a social phenomenon while highlighting the role of laws and policies in regulating such a social disorder.

Similar findings were revealed by Zhong et al. [49], who indicated that Chinese male college students are more likely to cyberbully others. Besides, the students with regular Internet access differ significantly regarding cyberbullying. Lai et al. [34] reported a higher rate of cyber victimization among Malaysian female college students. However, no gender differences in cyber victimization rates have been reported by many studies [50,51]. These conflicting findings may be attributed to the differences in the sample size, age, socioeconomic status, and instruments used to measure cyber victimization.

Moreover, Bennett and Ramos [51] and Rezk El Khateeb et al. [52] found that adolescents commonly participate in cyberbullying behavior as both perpetrators and victims. They found that the number of cyberbullying cases and effects increased with age and a lack of knowledge Moreover, Llorent et al. [53] reported an increasing relationship between academic level and cyber victimization in high school and university adolescents. Lastly, Yudes et al. [33] depicted that cyberbullying perpetration was predicted through higher age, male gender, cyber victimization, Internet use, poor emotional regulation, and lack of parental control.

Conclusion

The current study concluded that almost two-thirds of the students reported low cyber victimization and nearly two-fifths were involved in low cyberaggression behaviors. Most students reported an average sense of the virtual class community with average connectedness and learning experience. Moreover, most students had an average relationship with their teachers, with high satisfaction, average instrumental help, and low conflict.

The likelihood of cyber victimization and aggression was significantly decreased by the perceived higher quality of the overall student-teacher relationship scale and its two domains (satisfaction and instrumental help), besides the higher perceived sense of virtual classroom climate and its domains (connectedness and learning experience). However, their likelihood was significantly increased by the students' perceived conflicting teacher relationship and having regular internet access. Moreover, the likelihood of cyber victimization increased by having physical or psychological health problems, being lower age, and being female. Finally, the likelihood of cyber aggression was increased by higher age and male gender, whereas it was decreased by knowing that bullying is punishable by law.

Thus, based on these findings, the authors suggested that the Ministry of higher education and Colleges should develop the cyberbullying policy and effectively communicate it to students and staff members; develop mass media campaigns to enhance awareness about cyberbullying, its code of conduct, law, and cyber civility regulations and standards; develop and implement internet etiquette training programs to help students discriminate between proper and improper behaviors; design and implement educational programs for staff/teachers to strengthen their relationship with students.

Strengths and limitations

This study is one of the pioneer studies in Egypt that handle cyberbullying, categorizing both cyber victimization and aggression during the e-learning transformation era. Besides, assessing the role of the virtual classroom community and the role of teachers' relationship. However, one of the limitations is that this study was conducted in one university; we recommend replicating this study in several Egyptian universities to capture a holistic picture of cyberbullying among this critical age group.

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Conflict of interest

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Author contributions

Sayed, Samiha contributed to conceptualization, methodology, writing - original draft, review & editing, and validation. AbuElEla, Lucy contributed to data curation, project administration, visualization, writing - review & editing, resources, software, and supervision. Sarhan, Ahlam contributed to project administration, writing - review & editing, investigation, resources, software, and supervision. El Demerdash, Doaa contributed to conceptualization, data curation, formal analysis, visualization, writing - review & editing, and investigation.

Data availability

Please contact the corresponding author for data availability.

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