

# Psychological Immunity, Attachment, and Technology: Exploring the Influence of Technology on Attachment and Psychological Immunity of Secondary School Students

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## Abstract

Technology is influencing various domains of human life such as education. Employment, purchase behavior, psycho-social and socio-emotional engagement. Studies reveal that the use of social media has hampered and negatively influenced the social attachment among youth especially adolescents causing a sense of social isolation, dependence on virtual avatars, increased distraction, anxiety attacks, and relatively poor social connectedness. This has been found to adversely impact the social functioning and attachment of the individual which further adversely influences the Psychological Immunity.

Research has pointed out the adverse effects of technology use on the physical health and immunity of individuals by affecting vision, posture, mental health, and emotional well-being. The present study makes use of a survey research design to collect data from 300 senior secondary school students (class XI), studying in private and public schools of Delhi-NCR with the aim of exploring the adverse influences of technology on their social attachment relationships and Psychological Immunity. The participants responded on a self-developed, validated questionnaire modeled on a 5-point Likert scale.

The findings clearly indicate that students are dependent on technology often treading the thin line between optimal use and overuse. The study found the overuse of technological devices in form of tablets, smartphones, laptops, and desktops along with i-pods and smartwatches, among students owing largely to the sudden shift from offline to remote classes due to the Covid -19 pandemic. The students reported poor social connectedness and low levels of social attachment to parents and siblings among both private and

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government school students. Also, it was seen to influence and impact the Psychological Immunity of the respondents.

The study recommends the appropriate and monitored usage of technological devices among school-going adolescents, the need for training in mindfulness, and other positive behavioral management supports. It is imperative for parents and teachers to understand the emotional needs of the students and provide need-based psycho-social support and emotional care. There is also a need to connect adolescents with counseling services to facilitate the development of resilience and positive self-esteem.

**Keywords:** Adolescents, Mindfulness, Mental Health, Physical Health, Psychological Immunity, Resilience, Secondary School, Social Attachment, Social-Emotional Health, Technology

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## Introduction

### Technology, Social Media and Adolescents

The adolescents and emerging youth are constantly engaged in updating and checking their social media profiles, on various social media platforms. Day and night, one can see their eyes scanning their profile page, thumbs twiddling on the smartphone and tablet screens, while they rapidly follow and unfollow persons of interest on the world wide web. The excessive usage of social media is a great concern for parents, teachers and society as it is creating an imbalance in their social and personal lives. This lack of balance is adversely impacting their mental and emotional wellbeing (Bashir & Bhat, 2017). Social media users have increased at an alarming rate over the past few years and this population mostly comprises of adolescents and young adults who have adopted virtual mode of social communication. The use of technology especially Information and Communication Technology (ICT) devices like computers, smartphones, mobiles, laptops, are a necessity of today's era, due to rising focus on digitization and e-learning. With the onset of the pandemic, academic institutions suspended face to face classes and transitioned themselves nearly overnight to online classes and e-learning experiences for the students. Both teachers and learners grappled with myriad issues surrounding technology usage, learning new digital skills. This lack of understanding is predominantly a grave concern in the context of present younger generation, as teens and young adults spends their good amount of time in online socialization and hence are potentially experiencing a greater risk of negative effects. A number of research studies classify connection between use of social media and its undesirable outcomes like increase in anxiety, stress, depression and loneliness. The increased usage of social media by younger generation raises alarms regarding its adverse effects.

### Overview of adolescents and their development

Brown (2011, cited in Institute of Medicine and National Research Council) listed out some key psychosocial tasks linked with the adolescent stage. These include:

1. 'To stand out'—This refers to development of a unique self- identity and autonomy
2. 'To fit in'—To engage in comfortable social relationships, form affiliations and gain acceptance from peers
3. 'To measure up'—This means to develop skills, enhance abilities and competence.
4. 'To take hold'—this refers to making commitments towards particular goals, activities, and beliefs.

He stated that risk-taking behaviour among adolescents may either impede the successful achievement of these tasks or the failure to accomplish these tasks or may make them turn towards indulgence in risky behaviours as a coping mechanism.

It has been widely observed that individuals draw their 'sense of self' or in other words their self-identity from the social world in which they live, how they are perceived, liked and responded to. Thus, social connectedness, acceptance and coping ability plays a huge role in shaping one's self-identity (Eysenck, McLeod & Mathews, 1987). This is also the case with adolescents who base their self-image and sense of self on the perception and response of social members including parents, siblings and peers. Adolescents who are having secure attachments generally form a rational and autonomous self-image while those with poor attachments, form a poor self-identity and turn to risky behaviours in order to form their position in society and establish their identity through rebellious behaviour.

#### Development of Psychological Immunity

Gupta and Nebhinani (2020) made an attempt to understand why some children, adolescents and young adults were unable to bear the simple remarks made by parents, teachers or friends (such as 'focus on your studies', 'now no movies, till you score well', with an intention not to hurt, rather towards their betterment in terms of academic achievement or social competence), why they face difficulty in regulating their emotions, why they are unable to show age-appropriately response and why they are found engaged in impulsive, risky behaviours? They found their answers in the term "Psychological Immunity (PI)". It is a kind of immunity which protects the human from the changes at the psychological level such as daily stressors, worries and tensions?

#### The current study

Based on the above arguments, the following objectives and hypothesis have been drawn:

**Objective-1:** To find out the hours of technological device usage among senior secondary students (class XI) on a daily basis (in terms of hours spent).

**RQ:** What is the duration of technological device usage among senior secondary students (class XI) on a daily basis (in terms of hours spent)?

**Objective-2:** To explore and understand the usage of social media among senior secondary students (class XI).

**Ho:** What social media platforms are commonly used by senior secondary students (class XI)?

**Objective-3:** To study the PI among secondary school students (class XI) using PICI inventory and find out the influence of gender.

**Ho:** There is no significant effect of gender on the PI among secondary school students. (class XI).

**Objective-4:** To explore the impact of technology on physical and mental health issues among Senior Secondary School students (class XI) due to overuse of technology

**RQ:** What is the impact of technology on physical and mental health issues among Senior Secondary School students (class XI) due to overuse of technology?

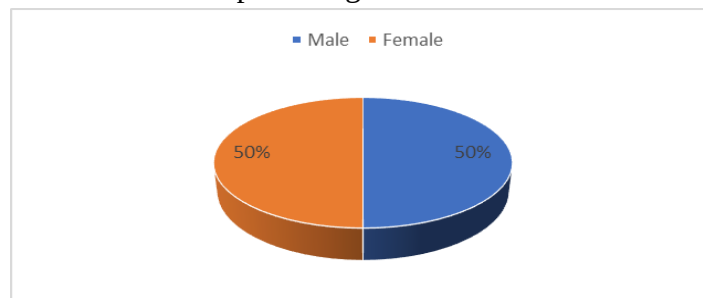
**Objective-5:** To explore the impact of technology on social connectedness among secondary school students (class XI).

**Ho5:** What is the impact of technology on social connectedness among secondary school students (class XI).

### Research methodology

#### Participants

The sample comprised of 300 secondary school students studying in both private and public schools situated within Delhi-NCR selected randomly using computerized randomization method. The figure below shows the percentage of male and female students.



**Fig. 1.**

Percentage of male and female senior secondary school students

The figure clearly reveals that the percentage of female and male students is 50% each. Hence 150 girls and 150 boys studying in class XI were selected for the present study using random sampling method.

**Table 1**

Private and Public Senior Secondary School details situated in Delhi NCR

| Private senior secondary schools | Govt senior secondary schools |
|----------------------------------|-------------------------------|
| 5                                | 5                             |

#### Research Tools used

The researchers used 4 research tools as follows:

- Tool-1: Self-designed questionnaire on usage of technology among senior secondary school students (based on nature of device and time spent daily).
- Tool-2: Self-designed questionnaire to study impact of technology on mental health, eye health and physical health.

- Tool-3: Understanding the PI among senior secondary school students using the PICI checklist (Olah, 2006; 2010) (permission was received from Author for using it in English language).
- Tool-4: Self designed questionnaire to study social connectedness among senior secondary school students due to usage of technology.

#### Procedure followed

The private (government unaided) and public (government aided) schools located in Delhi-NCR were selected as per the computer-generated randomization list. The selected schools were approached and the nature of study along with its aims and objectives was explained to the Heads/Principals of the schools. The class XI standard students were then approached and a total 30 students were randomly selected from each school, comprising of both genders. The informed consent was obtained from the class teacher of the respective classes. It was assured that the data collected for the study would be kept strictly confidential and the results obtained would be used for academic purposes only. No personal or school related identifying information would be shared with anyone. The researcher administered the four research tools (hard copies) to the selected participants and resolved any query raised by them. The time taken to fill the tools ranged from 20-55 minutes in total. The filled questionnaire was collected back. The data was then coded and cleaned, missing values were removed and the raw data was entered in excel sheets. The statistical analysis using both descriptive and inferential statistics was done.

#### Results

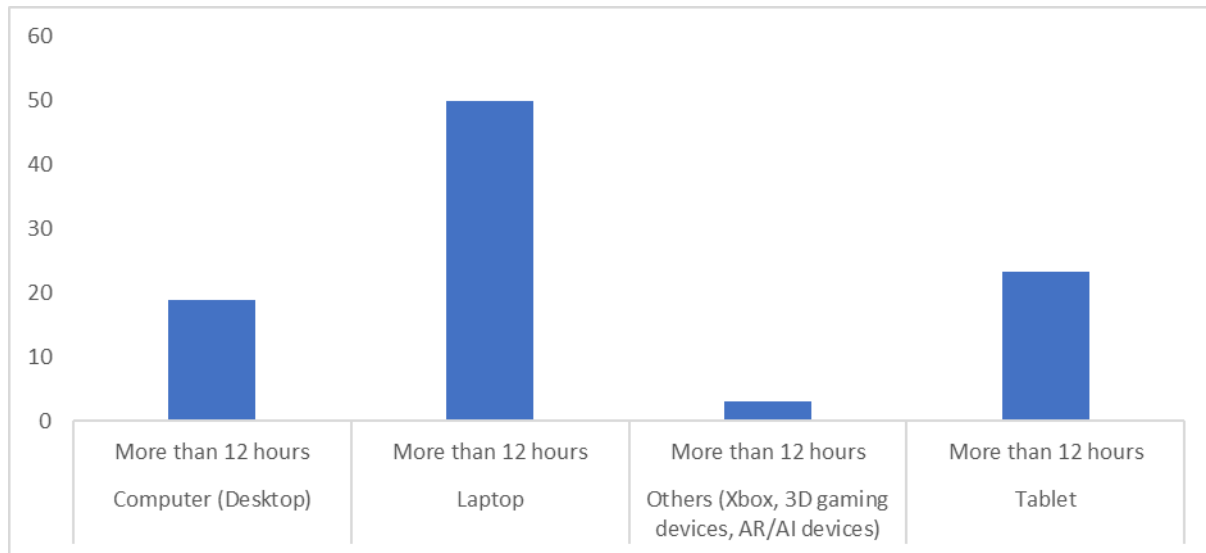
To find out the hours of technological device usage among senior secondary students on a daily basis (in terms of hours spent):

**Table 2**

Type of technological device and time spent (hrs.) daily by senior secondary school students

| Type of Device     | Hours spent (Daily basis) | Number of students | Percentage (%) |
|--------------------|---------------------------|--------------------|----------------|
| Smart phone        | More than 12 hours        | 190                | 63.33          |
|                    | Less than 12 hours        | 110                | 36.66          |
|                    | No usage                  | 0                  | 0              |
| Tablet             | More than 12 hours        | 70                 | 23.33          |
|                    | Less than 12 hours        | 90                 | 30             |
|                    | No usage                  | 140                | 46.66          |
| Computer (Desktop) | More than 12 hours        | 57                 | 19             |
|                    | Less than 12 hours        | 200                | 66.66          |
|                    | No usage                  | 43                 | 14.33          |
| Laptop             | More than 12 hours        | 150                | 50             |
|                    | Less than 12 hours        | 120                | 40             |
|                    | No usage                  | 30                 | 10             |
| Others (Xbox, 3D   | More than 12 hours        | 10                 | 3              |

|                                |                    |     |     |
|--------------------------------|--------------------|-----|-----|
| gaming devices, AR/AI devices) | Less than 12 hours | 2   | 0.6 |
|                                | No usage           | 288 | 96  |

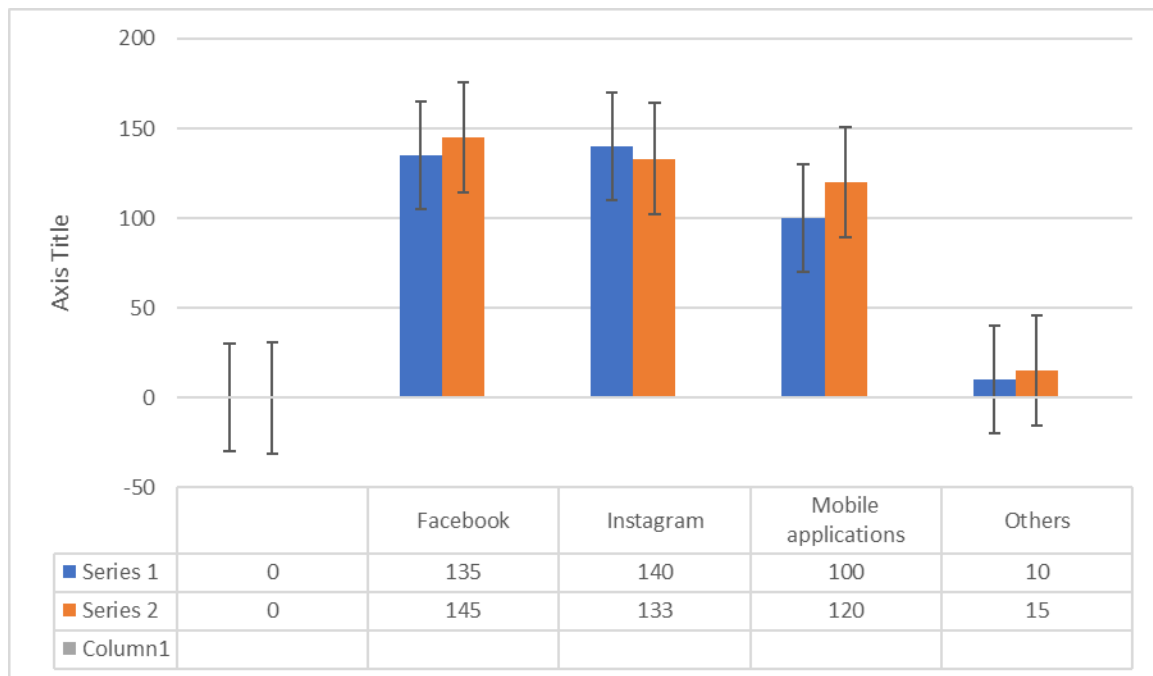
**Fig. 2.**

#### Technological usage patterns among senior secondary school students

The smartphone was used by maximum number of participants for more than 12 hours daily (63%), followed by laptop, tablet, desktop and other AR devices. This can be understood as smartphones and laptops being handy, portable and highly useful to access e-learning as well as e-chatting services. The onset of the pandemic has forced a sudden transition from traditional mode to online mode, where students are dependent on mobile smart technologies to access their online classes and learning resources. This has also resulted in a sharp spike in usage of such technological devices among young students especially those in secondary and senior secondary levels. Social media has been a major game changer by helping people to connect with each other virtually but this has resulted in poor social interactions, creating technology-addiction, loss of social skills due to reduction in face to face communication (Harding, 2018).

To explore and understand the usage of social media among the students

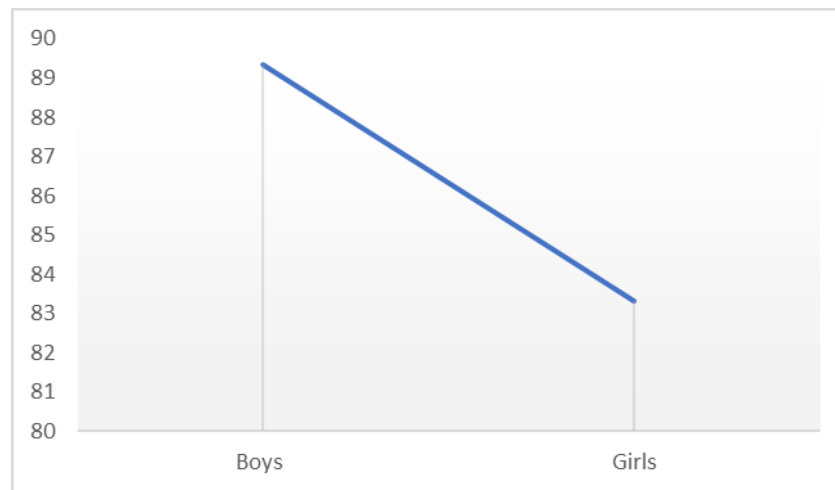
The graph below represents the usage of social media among the adolescents. The usage pattern is divided into: a) type of social media used and b) nature or purpose of usage. The graph represents the usage of various social media sites shows among adolescents (both girls and boys) such as Facebook, Instagram, and mobile based applications (Takatak, Moj) and others (Youtube shorts, Bumble, Tinder).

**Fig. 3.**

Social media usage among senior secondary school students according to gender

From the graph its very clear that more boys (145) use Facebook compared to girls (135), however girls lead the usage of Instagram (140) compared to boys (133), while only 100 users among girls and 120 users among male respondents were reported who use other mobile applications for social media as is evident from the results obtained from the survey study. The error bars used in the graph represent the standard deviation of the data set.

The responses by female students in the present study shows that social media was commonly used to follow social trends, staying abreast with recent fashion hacks, dressing styles and cooking tips on Instagram, Facebook etc., while the male respondents revealed that they spent more time on Facebook browsing for stories on cricket, sports and other latest trends. Both genders also mentioned that Facebook also provided them a forum to become members of educational groups and learning communities, while mobile applications were mostly used for making social media reels, short videos and entertainment.

**Fig. 4.**

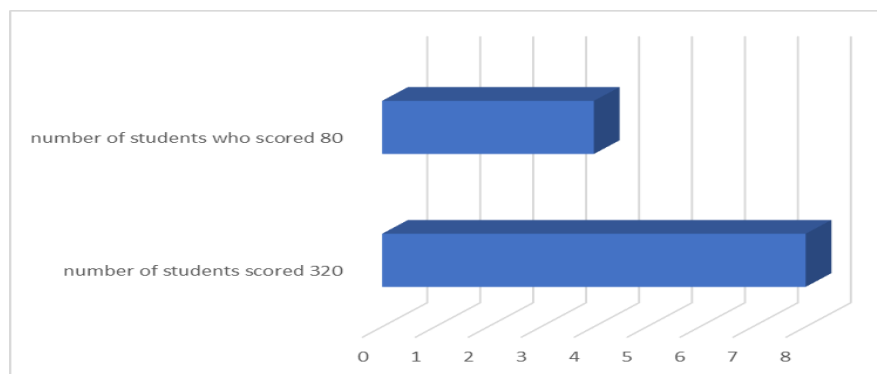
Mean scores of secondary school students (boys and girls)

The social media usage was analyzed using descriptive statistics for both genders and it was found that the mean score (M) of girls is 83.33, SE = 38.44, Median=100, SD=66.58. For the boys, mean score (M) is 89.33, SE=37.35, Median=120, SD=64.70.

To study the Psychological immunity (PI) among secondary school students using PICI inventory and find out the influence of gender and type of school.

| Mean   | SE   | SD    | Min. score | Max score |
|--------|------|-------|------------|-----------|
| 243.94 | 2.09 | 36.21 | 80         | 320       |

According to the PICI, respondents who score low are having low Psychological Immunity while those who score high are having higher psychological immunity. The figure below shows the number of students who scored the maximum (score =320) and minimum (score=80).

**Fig. 5.**

Students of senior secondary school who scored maximum and minimum on PICI.



The statistically derived norms set for the categorization of PI is as follows:

- 287-320: Very high
- 249-286: High
- 171-248: average
- 133-170: Low
- 80-132: very low

As per the collected data for the present study, 12 out of 300 students reported very high PI.

**Table 3**

Comparison of the PICI scores of male and female senior secondary school students on the basis of gender

|                   | <b>Two-Sample t-Test (Assuming Equal Variances)</b> |             |             |          |             |          |
|-------------------|-----------------------------------------------------|-------------|-------------|----------|-------------|----------|
| <b>Comparison</b> | <b>mean</b>                                         | <b>(SD)</b> | <b>(SE)</b> | <b>t</b> | <b>(df)</b> | <b>P</b> |
| <b>Boys</b>       | 242.26                                              | 38.86       | 3.18        | 0.85     | (296)       | .395     |
| <b>Girls</b>      | 245.83                                              | 33.40       | 2.73        |          |             |          |

The 150 girl students who participated in this study ( $M = 245.83$ ,  $SD = 33.40$ ) did not demonstrate much difference in their PICI scores compared to the 150 boy participants ( $M = 242.26$ ,  $SD = 38.86$ ). There was no significant difference on the basis of gender,  $t(296) = -0.85$ ,  $p = .395$ . Hence the null hypothesis stands accepted.

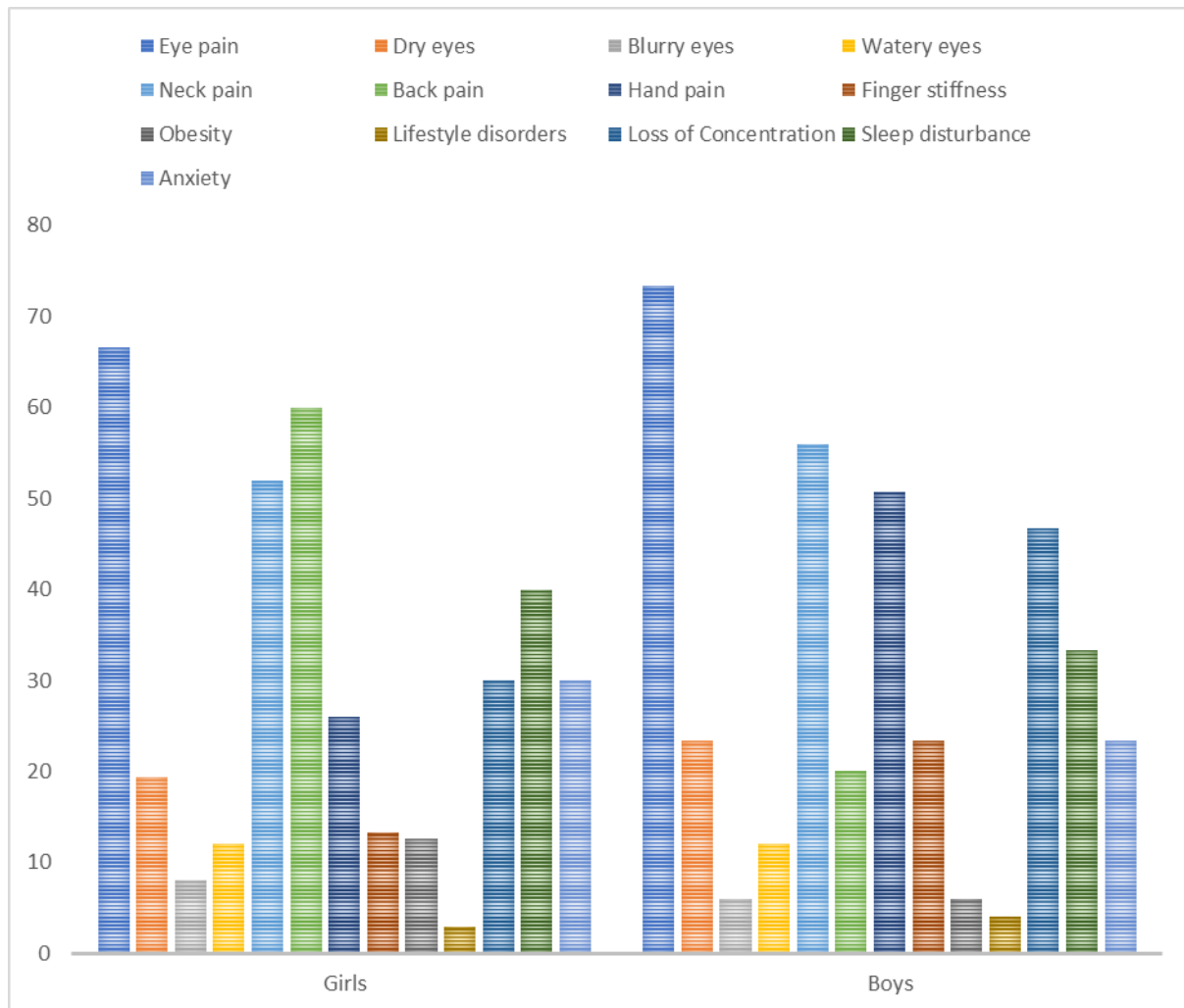
To explore the impact of technology on physical and mental health issues among Senior Secondary School students due to overuse of technology

**Table 4**

Physical health issues faced by secondary school students due to overuse of technology

| <b>Physical health issues</b> |                     | <b>Girls</b> |          | <b>Boys</b> |          |
|-------------------------------|---------------------|--------------|----------|-------------|----------|
| <b>Eye Health Issues</b>      |                     | <b>n1</b>    | <b>%</b> | <b>n2</b>   | <b>%</b> |
|                               | Eye pain, headache  | 100          | 66.66    | 110         | 73.33    |
|                               | Dry eyes            | 29           | 19.33    | 35          | 23.33    |
|                               | Blurry eyes         | 12           | 8        | 10          | 6        |
|                               | Watery eyes         | 18           | 12       | 18          | 12       |
| <b>Body Pain</b>              | Neck pain           | 78           | 52       | 84          | 56       |
|                               | Back pain           | 90           | 60       | 30          | 20       |
|                               | Hand pain           | 39           | 26       | 76          | 50.66    |
|                               | Finger stiffness    | 20           | 13.33    | 35          | 23.33    |
|                               | Obesity             | 19           | 12.60    | 10          | 6        |
|                               | Lifestyle disorders | 5            | 3        | 6           | 4        |

|                             |                       |    |    |    |       |
|-----------------------------|-----------------------|----|----|----|-------|
| <b>Mental health Issues</b> | Loss of Concentration | 45 | 30 | 70 | 46.66 |
|                             | Sleep disturbance     | 60 | 40 | 50 | 33.33 |
|                             | Anxiety               | 45 | 30 | 35 | 23.33 |

**Fig. 4.**

Percentages of various physical health and mental health issues faced by both girls and boys (senior secondary school students) due to technology overuse

The graphical representation shows that eye pain and headache is the most commonly reported health issue among the adolescent participants in this study (girls:66.66%; boys:73.33%), followed by neck pain and stiffness (girls:52% and boys:56%) and back pain which was reported more among girls (60%) than boys (20%). The findings from the study revealed the presence of commonly reported mental health issues among the adolescent participants such as sleep disturbance among girls (40%) and boys (33%). They also had anxiety (girls:30%, boys:23.33%), had loss of concentration (girls: 30%, boys: 46.66%). They also reported presence of issues like obesity, body pain and stiffness, watery and blurry eyes and lifestyle disorders (diabetes, heart problems) due to overuse of technology. Due to

increasing social media and technology usage, the issues faced by youth are rising in complexity such as relationship issues at home and school indulgence in self-harm, episodes of anxiety, panic and lack of confidence in expressing themselves (Harding, 2018). There has been observed a steady rise in mental health concerns among young adolescents.

**Table 5**

Comparison of physical and mental health issue scores among senior secondary school students on the basis of gender

| Groups | Mean  | SD    | df | t cal | p cal | Level of significance |
|--------|-------|-------|----|-------|-------|-----------------------|
| Girls  | 38.33 | 26.65 | 22 | 0.007 | 0.99  | Not Significant       |
| Boys   | 38.25 | 7.69  |    |       |       |                       |

The t-test result showed that tcal values is 0.007 at df = 22, pcal = 0.99 > p = 0.05. Hence there is no significant difference between girls and boys studying in Class XI in schools of Delhi-NCR.

To explore the impact of technology on social connectedness among secondary school students.

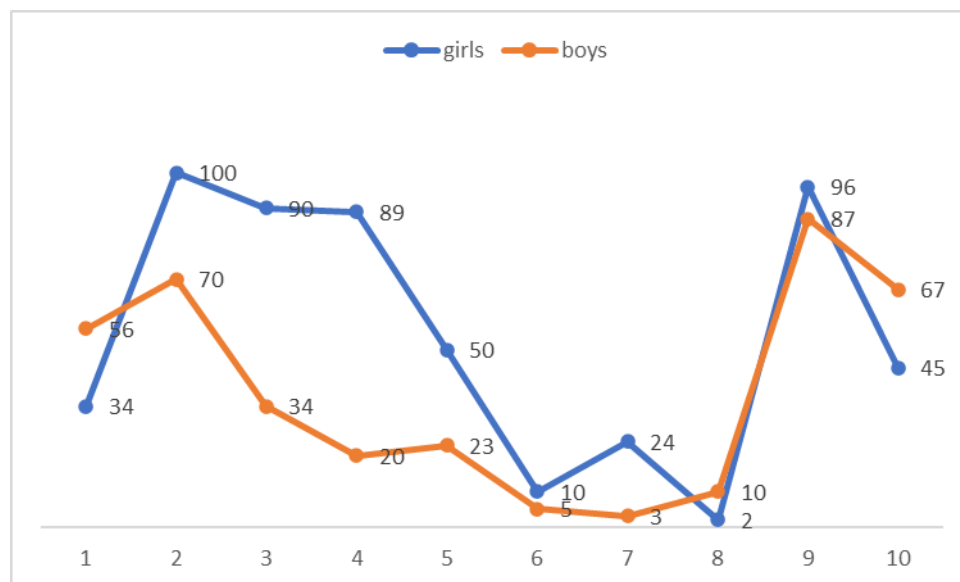
**Table 6**

Impact of technology on social connectedness among senior secondary school students

**Social connectedness Meaning Girls Boys**

| issues                             |                                                                                                                                |     |    |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----|----|
| Low levels of social communication | Involved in online chatting, texting, sending WhatsApp messages leading to poor social interaction with family, friends, peers | 34  | 56 |
| Poor social interaction            | Virtual interaction leads to poor social interaction with family, friends, peers                                               | 100 | 70 |
| Play-ground activities             | Involvement in technology use reduces going to playground                                                                      | 90  | 34 |
| Poor Body image                    | Watching social media influencers causes feeling of poor body image                                                            | 89  | 20 |
| Low Self esteem                    | Watching social media influencers causes feeling of low self esteem                                                            | 50  | 23 |
| Online harassment and bullying     | Faced incidence of online harassment and bullying in form of online posts, chats, images, mails                                | 10  | 5  |

|                                |                                                                                              |    |    |
|--------------------------------|----------------------------------------------------------------------------------------------|----|----|
| Victim of cyberattacks         | Involved in phishing attacks, password loss, social media account hacks                      | 24 | 3  |
| Dependence on virtual avatars  | Uses fake avatars within virtual worlds                                                      | 2  | 10 |
| Distraction and poor attention | Face poor attention and distractions due to repeated checking of messages, chats, and emails | 96 | 87 |
| Technology addiction           | Addicted to technology and gadgets                                                           | 45 | 67 |



**Fig. 5.**

Comparison between the influence of technology on the social connectedness among senior secondary school students (boys and girls)

From the figure it is clearly seen that technology adversely impacts the social connectedness among girls and boys studying at the senior secondary level. Teenage and adolescence is a time, when there is social role redefinition as they try to adopt and fit into the roles meant for the emerging adults. They try to move away from the parental authority and adjust to new social roles defined by their peers, their gender identity and social media trends (Problems faced in adolescence and their solutions, 2019). The findings of this study indicate that both genders have become victims of cyber-attacks and online-bullying

### Discussion and Implications

Firstly, the findings of this study indicate that technology can be a boon as well as a bane. Technology has transformed human way of working and social interaction, influencing parent-child bonds, and social relationships in our daily lives. The overuse of technology results in various health issues (eye health issues, body pain and stiffness, mental health issues and other lifestyles disorders) as reported in studies (Buabass et.al. 2022; WHO, 2021;

Dienlin & Johannes, 2020). The findings concerning the use of technological devices revealed that students at secondary education level use smartphones and laptops for more than 12 hours daily, which means that most of their waking hours are spent with technology. “You will find teens staring at their phones, as they nearly walk into walls and vendors” Fidler (2016).

Secondly, the present study found that apart from technology addiction, the boys and girls studying in class XI reported low self-esteem, breakdown of face to face social interaction due to dependence on virtual forms of interaction. This has turned into a global phenomenon, as more than 50% teenagers in the United States are addicted to technology, which has reduced their attention spans, concentration and disrupted family bonding (Fidler, 2016). It makes sense when Steyer comments “argument over screen time causes daily fight at home” (cited in Fidler, 2016).

Thirdly, the present study shows that there is no significant effect of gender on the PI among senior secondary school students ( $t(296) = -0.85, p = .395$ ). The maximum score of 320 indicates high Psychological immunity (scored by 08 students) and minimum score of 80 shows low PI (scored by 04 students), while remaining students scored between the maximum and minimum scores.

Fourthly, the present study reveals that boys outnumber the use of Facebook (145) compared to girls (135), while more girls were Instagram users (140) compared to boys (133). Heavy usage of social media and mobile applications can cause distraction among students while doing homework.

### **Implications of the study**

#### **Implications for teachers and school authorities**

The findings of the present study indicate that teachers should provide group projects and tasks which promote social cohesion and intermingling of peers. The task given can be of such a nature that students find it imperative to work in groups and consult books and resource materials kept in libraries instead of depending on internet-based resources, thus, increasing social connectedness and bond formation with peers through face to face interaction. Teachers and school authorities should encourage goal formational and positive thoughts by inculcating activities based on meditation, mindfulness to help students look beyond technology and overcome its addiction.

#### **Implications for parents**

Parents can play an important role by increasing the quality time spent at home by creating opportunities such as celebrating all festivals together with family members, eating together during breakfast and dinner time, restricting the screen-time based on online class routines and homework needs. Parents also need to monitor the behaviors of their wards from time to time, especially when they are using social media in order to detect victimization due to cyber attacks and online harassment. Wherever possible parental locks and surveillance devices

should be in place in order to keep a discrete but vital check on the online behaviors of adolescents.

### Conclusion

An individual's psycho-social experiences profoundly influences one's interpersonal relationship, mental and physical health. Adolescence is a stage of increasing needs for freedom from control and parental authority, and exploration of bonds outside the traditional family unit (Guan et al., 2016). This study found how social media and technology usage patterns, nature and duration influences the physical, mental and social lives of adolescents also impugning on the Psychological Immunity. According to the World Health Organization (WHO, 2021) adolescents (10 - 19-year olds) experience various mental and behavioural disorders which accounts for suicides and illness, as a leading cause of mortality, on a global level. Thus, it is essential to have proper parameters. monitoring and mentoring mechanism in place to check the technology usage pattern and duration of adolescents. Also, it is essential to build the PI of adolescents through proper care, and development of secure attachment in order to reduce risk taking behaviours and promote mental and physical wellbeing among them.

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