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A STUDY ON SCREEN TIME MANAGEMENT AMONG TECHNOLOGY STUDENTS – STRATEGIES AND SOLUTIONS

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ABSTRACT

Nowadays, Screen time is a factor that is inclusive in an individual's daily routine. Students who are aware and have knowledge about the effects of excessive screen time, make efforts to control it and protect their eyes. Here, the major issue is that there is no such software that helps to manage screen time for devices like laptops/Computers. Students from technology backgrounds like CS, IT, and other related fields often face issues of high screen time. The purpose of this research is to provide a core solution for this problem. A survey was carried out by using convenience and stratified sampling methods among technology students to gather primary data through which the findings were drawn. The researchers found that this problem prevails among students. Lack of solemnity to some extent may be to blame. However, software has been made and it was also used by students which provided some positive results.

Keywords: Screen time, electronic screen devices used, Tech students, regular breaks.

INTRODUCTION

As everyone is constantly evolving in the digital age, whether on a computer, smartphone, television, or video game console, the display screen has long been associated with modernity. There are many types of screens associated with numerous devices but the negative effects of these developments on individuals physical and mental health are barely considered by people.

The same is applied to Tech Students. Students who learn to apply practical problem-solving solutions through the means of coding and other Information Technology (IT) means can be considered Tech Students. A person pursuing a career in the field of technology may find themselves spending a lot of time using their computer and other devices which involves usage of display screens which increases their screen time. Students studying computer science and information technology, or any other related course spend a long time on these devices, which has a significant negative impact on their eye health. Unknowingly concentrating on a screen for hours can have a drastic effect on individual's eyesight. Especially post Covid-19 the world has become closer to the digital world and the dominance of the technology field has increased. According to a survey, internet usage has increased by 50-70%. The most recent data available clearly says that the average person spends 6 hours and 58 minutes per day on a screen connected to the Internet.

Along with this expanding usage, a great number of people pursuing their career in the field of technology, learning its implementations and applications. Tech professionals tend to spend more of their time in front of their screen which is on average 9 hours a day. Awareness and the priority to be concerned about their screen time is somehow lacking in these students and they keep ignoring the warning symptoms like irritated or red eyes, eye strain, blurred vision, and many more.

LITERATURE REVIEW

Blum-Ross, A. and S. Livingstone (2016) evaluated the connection between families and the screen time of their children. It states various facts which are worth noting. According to it, parents are only given advice on the harm of digital devices and lack emphasis on the learning and creating qualities they offer. Also, they stated different approaches and strategies to manage their children's screen time which is through technical filters but mostly by

communicative approaches. It is important how the children use the devices and parents must consider where and how the device is used.

Sheri Madigan, Department of Psychology, University of Calgary, Canada researched on the association between increasing screen time and children's performance and growth. The study had the contribution of 2441 mothers whose children of the age range 24-60 months. It concluded that the kids with higher screen time had a poor performance on the development assessment test. The research also provides recommendations to have controlled screen time and increase the kid's development. It says it is important for children to observe and learn things from their surroundings and it should be kept positive and active, higher screen time is a representation factor of distraction and their development also.

In **May 2016, John Rooksby, Parvin Asadzadeh, Mattias Rost, Alistair Morrison, and Matthew Chalmers** researched and developed an application that enables users to trace screen time on devices like mobile and computers. This applies interface integrates screen time from multiple devices. Users were interested in just tracing screen time but very few wanted to quantify personal screen time. This tracing just helped to collect data for the personal interest of users. Although this research achieved some objectives like increasing productivity, creating discipline and reducing the use of devices.

In **June 2020, Brenda K Wiederhold** conducted research that studied screen time among children. According to the researcher, adult's technological advancements enable them to work but children use screens without any cause. Covid-19 has already impacted screen time and over the years it has doubled. It has caused detrimental effects. Although in many cases it might be necessary for education, social interaction or distraction and entertainment even helps adults to work.

In **2021, E Neophytou, LA Manwell and R Eikelboom** gave conceptual and experimental evidence that chronic sensory stimulation due to excessive exposure to screen time may affect brain development in negative ways. Excessive smartphone use may increase the risk of cognitive, behavioural, and emotional disorders in adolescents and young adults which also has the potential to increase the risk of early-onset dementia in late adulthood. This scoping review assessed the relationships between excessive screen time and (i) neurodegeneration, (ii) mental health, (iii) substance use disorders, (iv) learning and memory, and (v) neurodevelopment.

On **22 April 2010, Cambridge University Press** published a study online which highlights the global health challenge of rising obesity rates and emphasizes that sedentary behaviours, like screen time, are as influential as physical activity on BMI. It underscores the need to examine how sedentary behaviour affects diverse groups, including the elderly and those with disabilities, with socio-economic factors potentially exacerbating health disparities. The research suggests that addressing sedentary activities alongside promoting physical activity is crucial for effective obesity interventions, focusing on BMI and screen time in Australian adults aged 45 and above while considering various factors.

RESEARCH GAP

The available literature suggests different comparisons between child behaviour and screen time where screen time is at risk for affecting an individual's mental health and eyes, which majorly increased during COVID-19 due to online schools and lectures. Some research studies the physical health of an individual. Some research also covers different fields of students and even professions with this field as an exception and during inclusion it becomes general. However, it does not provide any core solution for it and only focuses on studying eye defects and screen time. The researchers aim to study screen time management among tech students specifically, as they have more screen time compared to other students and there is no available research for students in this field with respect to screen time. This research will fill this gap and give suggestions and precautions suitable for it.

NEED OF THE STUDY

Screen Time is a very common concern among students nowadays. People usually do not prioritise their eye health. Many students and working professionals in the technology field face many such issues because of higher

screen time but they are not concerned about it. Several hours of screen time is part of their daily routine as their profession demands long hours at the screen. There is a need to understand the importance of managing their screen time. It is also essential to create awareness about this issue and find feasible solutions before it becomes a long-term problem for their eyesight.

RESEARCH OBJECTIVES:

1. To identify the intensity of screen time among technology students and its contributing factors based on -

a) Daily usage of devices for an average number of hours

b) Usage of Device till late night

c) The major reason of higher screen time

2. To identify precautions taken by technology students to reduce screen time and their awareness of the issue.
3. To provide recommendations and solutions for defending and maintaining eye health.
4. To highlight the significance and need to introduce screen time management systems along with vision care facilities for students.

LIMITATIONS OF THE STUDY

1. The study is restricted to Degree College Students pursuing undergraduate courses like Bachelor of Science (Information Technology), Bachelor of Science (Computer Science) and Bachelor of Science (Data Science)
2. Due to students pursuing undergraduate courses the study is restricted between age groups 17 to 22.
3. The study is restricted to colleges in Thane City, Mumbai City and Mumbai Suburban Region.
4. The study is conducted within two months, due to this the research is time constrained.
5. The software as a solution is of a primitive type.
6. The software is only runnable on Windows OS
7. The solution has control access to the user at a certain extent.

RESEARCH METHODOLOGY:

- **Primary Data –** First-in-hand data was collected through responses to a questionnaire consisting of a list of questions in the form of Google Forms.
- **Secondary Data –** Research papers and Articles were referred by researchers for study and literature review.

RESEARCH DESIGN:

- **Sample Unit –** Degree College Students pursuing undergraduate programmes.
- **Sample Size –** 301 responses for the study survey and 30 responses for the software survey.
- **Sample Technique –** Convenience and Stratified Sampling Method.

DATA ANALYSIS AND INTERPRETATION:

1. COLLEGE AREA

Thane City	Mumbai Suburban	Mumbai City	Total
87	108	106	301

2. Gender

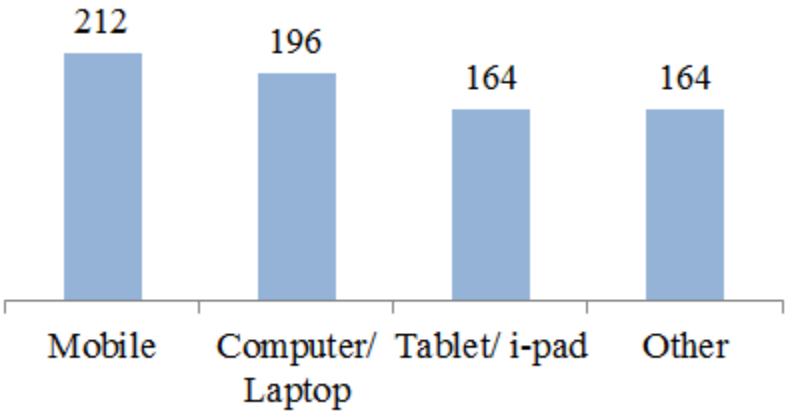
Male	Female	Total
171	130	301

3. Course Pursued

B.Sc. (IT)	B.Sc. (CS)	B.Sc. (DS)	Total
76	180	45	301

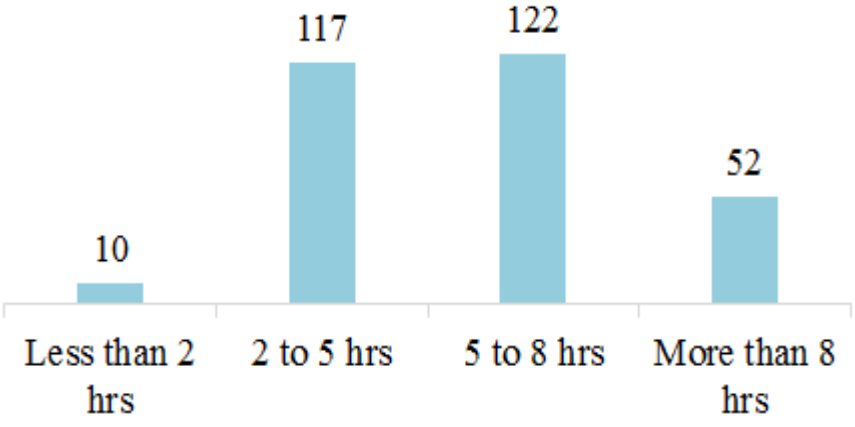
4. Most Used Electronic Screen Devices Among Students

Devices used	Rankings
Mobile	1st
Computer / Laptop	2nd
Tablet / i-pad	3rd
Other	4th



Interpretation – The above chart shows the most used screen devices at each ranking. Here mobile is the most used device, Computer/Laptop, then Tablets/I-pad and other devices are least used among students. For 1st place, 212 respondents selected Mobile, for 2nd place 196 respondents selected Computer/Laptop, for 3rd place 164 students selected Tablet/iPad and even for 4th place same number of students selected other devices.

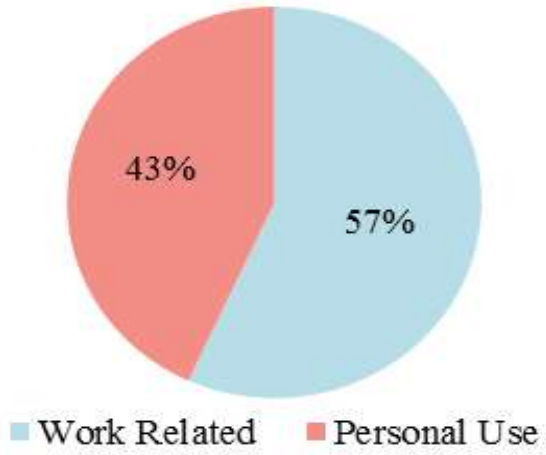
5. AVERAGE SCREEN TIME PER DAY



Interpretation – In the above chart, only 3.7% (10) respondents have screen time of less than 2 hours per day, which extends to 17.3% (52) respondents having screen time of more than 8 hours, then 39% (117) of the respondents have screen time between 2 to 5 hours per day and lastly 40% (122) respondents have screen time between 5 to 8 hours.

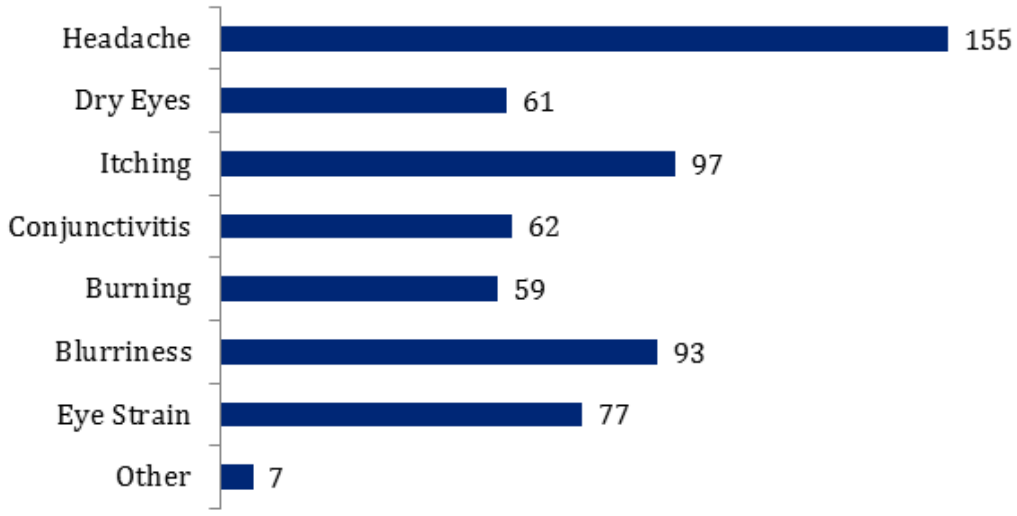
6. MAJOR REASON FOR USING DEVICES FOR MANY HOURS

Major Reason	Total
Work Related	171
Personal Use	130



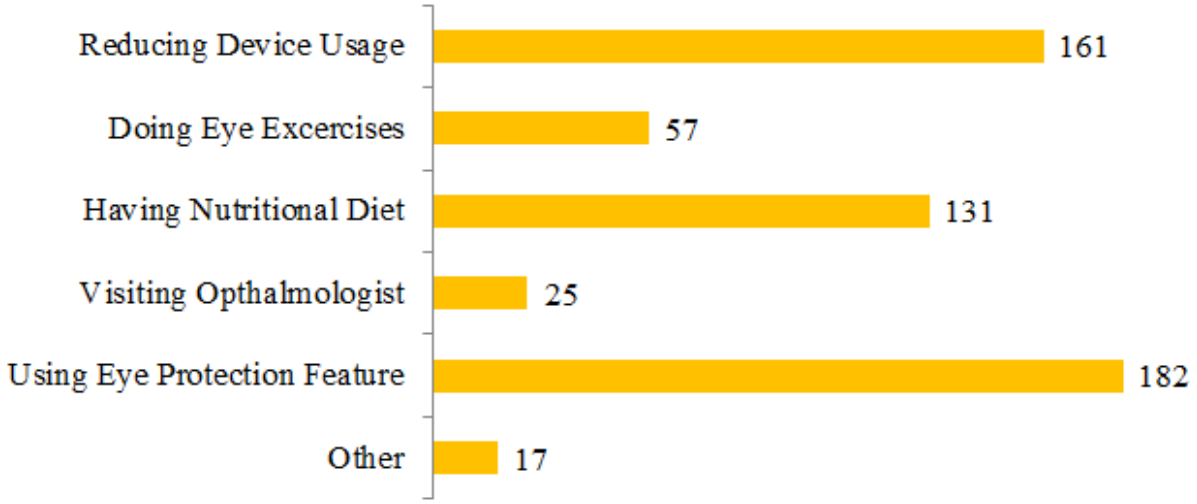
Interpretation – In the above pie diagram, it is shown that 57% (171) of students use the screen devices for Work related which means for College Related reasons like Coding, Practical's, Assignments and other College activities, whereas 43% (130) of students use screen devices for Personal Use like Entertainment, social media, Contact and many more.

7. SYMPTOMS EXPERIENCED



Interpretation – The above bar graph shows the symptoms experienced by respondents due to excessive use of devices. Each symptom is selected out of 301 responses. Most persistent symptoms included: Headache 51.5% (155) is the most common symptom, followed by Itching 32.2% (97) and almost equable symptoms Blurriness 30.9% (93), it further continues to Eye Strain 25.6% (77), Conjunctivitis 20.6% (62), Dry Eyes 20.3% (61), Burning 19.6% (59) and lastly few respondents even experienced other symptoms 2.3% (7).

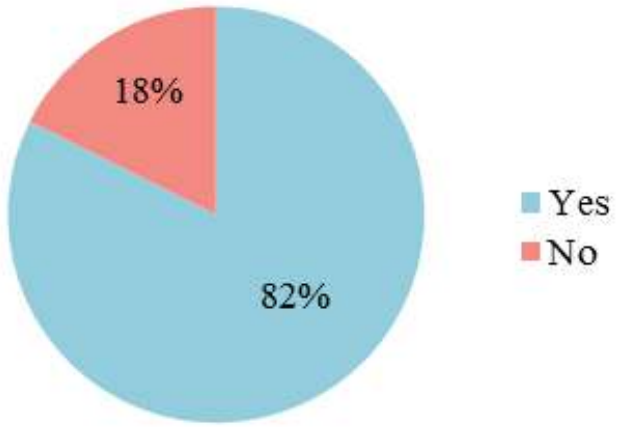
8. PRECAUTIONS TAKEN / PREFERRED TO PROTECT EYE



Interpretation – The above bar graph shows the precautions taken/preferred by students for protecting their eyes. Each precaution is selected out of 301 responses. The most frequent precautions were to use eye protection features while using the device 60.4% (182), followed by reducing the usage of the device by 53.5% (161), then having a diet beneficial for the eyes preferred by 43.5% (131), after that doing eye exercises is 19% (57), visiting ophthalmologist is only 8.3% (25) and also some other precautions 5.6% (17) are preferred by respondents for their eye health.

9. WILLING TO USE SOFTWARE

Willing to use software	Total
Yes	248
No	53



Interpretation – In the above pie diagram, 82% (248) of respondents are inclined to use the Software made by researchers to maintain their eye health whereas 18% (53) are not ready to use such software due to unknown reasons.

FINDINGS OF THE STUDY:

1. Mobile phones and laptops/computers are the two most commonly used devices among respondents where mobile and laptop occupy first and second place respectively. However, respondents who have not selected mobile as 1st preference have selected laptop/PC in 1st place. It shows that a laptop/PC is a device used for work-related purposes.
2. As per the survey conducted 5 to 8 hours is the average per day screen time among students and some of them even have more than 8 hours of screen time, which shows that 1/4th and 1/3rd of the day is spent in front of the screen.
3. Using electronic Screen Devices during night-time (after 10 pm) or till late night is a daily routine for most respondents. Late-night usage of devices has affected the eyes of respondents.
4. The eye protection feature in the device refers to modes like night mode and eye comfort mode which reduces the emission of blue light and eye strain by adjusting screen colours. Many respondents use this feature regularly or frequently while using the device.
5. College Work, Projects/Assignments and Coding are the major reasons for using devices like Mobile and laptops/Computers for the respective answered number of hours among respondents. They spend several hours per day in front of screen devices for college purposes. The remaining number of students who use devices as their 1st priority for personal use, use screen devices for work purposes as their 2nd priority. So, in both cases considerable amount of time is given for using the device for college purposes.
6. Since COVID-19 screen time has increased significantly for several reasons like online classes, and submission of projects and assignments which was less before COVID-19. However, after COVID-19 it has not been reduced as the online process of teaching, and collecting assignments became convenient and it continued to be part of the teaching approach.
7. Out of many respondents, most of them have experienced eye-related issues or symptoms. Very few of them have not experienced any kind of symptoms. The most common experienced symptoms were headache, itching and blurriness.
8. Many respondents don't wear specs or any kind of or any other kind of eye protection even after the symptoms experienced by them.
9. Majority of the respondents are aware in general of the harmful impact which these devices have on the human eye. On the other hand, they are not aware of computer vision syndrome, which is a problem caused due to prolonged computer use. They are not aware of CVS which is an issue within itself because CVS includes a combination of symptoms and has its risk factors.
10. Most respondents don't visit ophthalmologists (eye doctors) even after the symptoms experienced, which shows a lack of care for the eyes. It is a rare case among respondents to visit doctors and take prescribed medicines.
11. Many respondents are trying to take precautions as they are aware and have basic information about the impact and intensity of the symptoms experienced by them.
12. One of the striking findings was that around 1/3rd of the respondents are not making any efforts to reduce screen time while the majority are at least trying. This shows that to some extent students are not concerned about their eye health.

13. The precautions and efforts taken by respondents are just a preference about what they try to do and an attempt to regard to what extent they can make such efforts. It is because of the field they have pursued. However, they are not able to maintain consistency of such precautions. Due to this even in future in their professional life this is supposed to be the major problem which they will surely face.
14. Majority of the respondents are willing to use the software, made by researchers for the protection of their eyes to reduce screen time. It shows that to protect the eyes and manage screen time, respondents need and are ready to use such software.

SOLUTIONS:

1. Software:

Tech Students continuously use their computer devices and forget to take frequent necessary breaks to give their eyes some rest. A dedicated software to meet the same purpose has been made by researchers which can be used by anyone who wants to have control over their screen time.

Overview of the software:

The software is designed in **C++** and its main purpose is to interfere with and control computer usage. This software runs a timer and when the timer is finished the screen goes blank for a particular period which is the rest period for the user. The software ensures that the user activity is not modified or affected, and in the rest period user cannot make any interference to stop the software's functionality.

Rest time/period: The period at which the computer screen is off and inaccessible.

Activity time/period: The period before rest during which the user can continue their desired work

Features of the software:

- **Timer:** The activity time of the user can be taken every time to take breaks at regular intervals.
- **Screen lock:** The screen locks compulsorily make the user take breaks and ignore the attempting actions to clear the screen lock.
- **Customization:** The software allows the user to customize the duration of the timer.

Note: This current version of the software is only supported on Windows OS

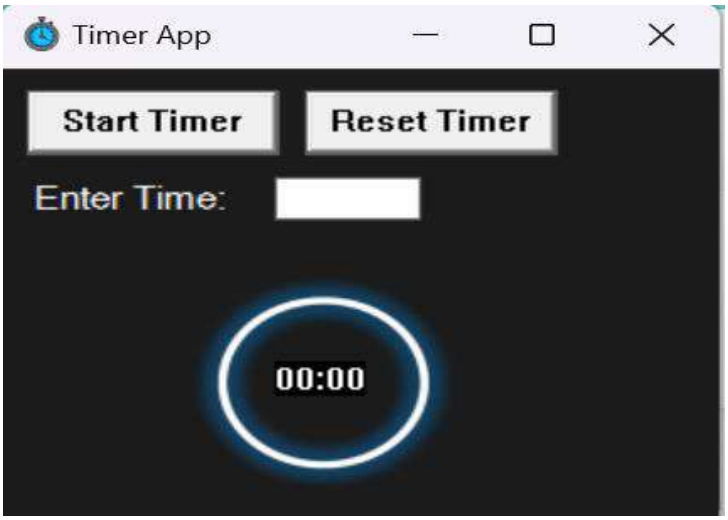
How to use the software: Here are the general steps for using the software

1. Run the .exe file and the UI of the software will appear.
2. Enter the activity time you want in minutes using the input box.
3. Click on the "Start Timer" button to start the process.
4. You can Reset the timer if you have provided some unwanted input using the "Reset Timer" button
5. Once the Timer ends, you will receive a pop stating the time for which the screen will go blank and will be inaccessible.
6. No keyboard inputs or mouse actions can deactivate the screen lock. And till the rest period ends, calm your eyes and consider giving them some rest.
7. Once the time is over, for computers give some keyboard input to turn on the monitor and for laptops press the power on button.
8. You can do the overall process again and help yourself defend your eyes.

Get the Source code and exe file here:

https://github.com/Athirstyowl/Screen-Time-Management.git

Picture of the software:



Future Enhancement of the software: This software is at its initial state and following enhancements can be considered:

- Taking customized input of the time of rest
- Statistical report of productivity overtime and screen time
- Better user interface
- More features aiming towards eye care
- Different modes for different kind of users

2. Now for making schedule and reducing screen time, the following matrix can help for deciding the usage of the device.

Matrix Chart for scheduling individual **Screen Time** and for **Deciding Priority**.

	Urgent	**Non-Urgent**
Work related	Use device for required amount of time	Allocate time
Personal use	Complete within short span of time	Avoid / reduce the usage

Explanation

The above matrix shows how an individual can decide and prioritise the work and reduce screen time. Here the vertical line represents the reason for using the device and horizontal line represents the level of urgency of the work.

1. The **1st priority** should be allocated as per the urgency of work. Here urgency involuntarily signifies the importance of work for device usage.

The priority should be determined as per the situation.

a. If the reason of using device is related to work, then student can use the device for required number of hours.

b. If the reason for using the device is for personal use, then students should complete their usage in short span of time.

2. The **3rd priority** should always be allotted if the reason for using device is for work but is not required to be completed at that moment itself then student can delegate time in future because currently it is not important.

3. The **4th priority** should be allotted if the reason for using device is personal use, (Entertainment), not in context of work and not urgent which means that it is not important then student can try to either avoid or reduce the usage of device for such reasons.

CONCLUSION

Screen time of Tech students is a complicated affair that must be acutely looked upon. This research provides an imperative solution that can be used by students. Through the software provided in the solution, students will consider taking frequent breaks to maintain their screen time on the device. Laptop and Computer are the two devices on which this software can be supported and installed. Respondents agree to the fact that they usually forget to take a break while working on a laptop/computer and this results in intense screen time. To overcome this issue, researcher's software acts as a reminder and protocol for them to take breaks and maintain their usage frequency. Along with fulfilling the user's primary objective of initiating breaks, the survey states that the software is also user-friendly and convenient for use on their respective device.

Even the available research didn't particularly focus on the screen time of technology students. Hence, this study emphasises more on such students. This helped researchers make the software more relevant for usage by students in this field. Although the survey results indicate that the break time does not create any obstacles during device usage, it is important to note that some individuals may find it challenging to take breaks while using their devices.

The major significance of the research is that the respondents who used this software felt that it can also be used by students of other fields and other regular users of laptops/computers and it need not be restricted to people who are in the technical field but whoever makes excessive of their devices. It can be implemented for any kind of work from professional to personal usage.

Benefits experienced among respondents after using the software for **1 week**.

- Helped to reduce the usage of the device for a long number of hours without taking a break.
- Increases the productivity of students as regular breaks help to maintain consistency and become more efficient.
- Generated habit for users who usually forget to take a break while using the device for many hours.
- To a certain extent, it reduced the symptoms related to eye issues as the break time provided rest to the user's eyes.

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