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Study on Internet Usage and Cyber Security Awareness Among Degree College Students in Mumbai Region

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Abstract: *In the present scenario, modern technology has entered every nook and corner of our lives at rocket speed. People have now become used to smart phones, smart watches, surveillance cameras, smart home appliances etc. The Internet has led to a paradigm shift in our lives of people and students. The increase in internet usage has increased the risk of cybersecurity attacks this makes it necessary to provide awareness and education on cybersecurity to students who are potential targets for exploitation. The study deciphers the purpose of internet usage, the internet usage pattern and problems related to security faced while using internet. The study comprehends the degree college student's familiarity to cyber security awareness and countermeasures. A questionnaire consisting of various questions on internet usage and cybersecurity concepts was prepared. The key contribution of this paper is to create awareness and to set forth suggestion to overcome the issues to minimize the cybercrime in future.*

Keywords: Cyber Security Awareness, internet usage, Trust, Privacy, Cyber Security countermeasures

I. INTRODUCTION

Today, computers and the Internet have become critical resources in everyday work and studies, People connect with friends and family, establish business and bank online and many other services like Virtual healthcare and video call etc. Internet is an important tool in education where the Internet has become a helpful source for students to get data. Information and Communication Technology (ICT) has an increasingly important role in facilitating the educational systems. Degree college students in Mumbai are active Internet users. They depend on information seeking via the internet and spend longer hours online browsing, downloading, and uploading information via the web. Social media is allowing the users to create fake accounts, as there is no restriction for opening of accounts. As a result, students are in a vulnerable condition in which they are highly exposing themselves to online risks, such as cyber threats, bullies, and attacks in this situation.

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The study aims to understand the internet usage and cyber security awareness among degree college students in Mumbai region so as to suggest for workable benchmarks to be emulated in the cybercrime law and policies. Concrete effort is needed to comprehend the cybercrimes and cybercriminals so as to safeguard the present and future generation. The student's community need to be educated about how alert they should be while communicating online and the type of personal info that has to be shared.

The government has to frame effective stratagems to educate the youth about cyber security countermeasures thus helping them to preclude themselves from the cybercrimes and safeguarding the interests of students towards ensuring their cyber wellbeing.

II. REVIEW OF LITERATURE

Review of literature is based on the theme of study to analyse the research, gap and a brief review of studies on related areas of present study are presented below.

AmmarYassiret.al (2012) The study converses about the impact of cybercrimes on the victims and their measures to cope up with such crimes in the future and will also discuss the how network security is critically important and to prevent cyber attacks in future. The study concludes that it is essential to educate the network users about the security measures to overcome the problems while using internet.

AnimeshSarmah (2017) The paper on cybercrime and cyber laws of India highlightsthe spreadof knowledge of crimes or offences that occursdue to internet and how cyber law isleviedfor crimes and criminals.It concluded that if anyone fallsprey to cyber-attack, they should come forward and register their case in nearestpolice station, which will help the government to control the cybercrimes.

Manisha Kumbhar, Vidya Gavekar (2017) In the globalized era of online dispensationcybercrime isone of the threats in today technological world. Their research focusses on awareness of cybercrime over the social order along with victims of cybercrimeand various precautions taken by user while using internet. The study bared that the usage of internet is high among the young group and maximum hacking has befallen during online transactions.

Narmada Upadhayay, Sanjeev Guragain (2017) The study witnesses the level of internet addiction between the male and female medical students and the purpose of using internet. it reveals that internet is for studies followed by downloading movies, songs and communicating to friends. Some challenges experienced are lack of sleep due to over usage of internet, which affects

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their concentration in studies. The study clinched that the students should engage themselves in some recreational activities to overcome internet addiction and to develop physical and mental health.

Rajeev Kumar (2007) The study is based on internet used by teachers and students in engineering colleges of Punjab, Haryana and Himachal Pradesh. It analysed the frequency of internet usage, methods used for learning of internet skills, purpose of internet usage, and satisfaction level of users with the internet facilities provided in the college. The study clinched that internet is an inseparable part of today's engineering educational system and it will improve the academic activities for both the students and teachers.

Saroj Mehta &Vikram Singh (2013) The study is based on analysis of knowledge and awareness about cyber laws in the Indian society. The study reveals that there is a significant difference between the awareness level of male and female users of internet services, thus males and employed users are more aware about cyber laws. The government should also conduct programs to educate the general public about cybercrime and cyber law

Sreehari Abinath (2018) The paper accentuates on the level of awareness towards cybercrime among the college students, various safety measures taken up by the government to edify the students about cybercrime and the ways to prevent it. It is concluded that most of internet users are aware about cyber law and cybercrime such as hacking, virus attacks, credit/debit card frauds but they do not come forward to give complaints against cybercrimes.

Vineyard Chaturvedi (2018) The study attempts to analyse reasons for customers not preferring electronic banking. It further tries to comprehend various cybercrimes with respect to digital banking operations. It is concluded that users of digital banking are aware of cybercrimes and they are also taking many cautionary measures to avert cybercrimes.

III. SIGNIFICANCE OF THE STUDY

Students are the prime patrons of internet services provided by the telecom sector. In the extant scenario students are updating their knowledge and refining technical skills with the help of internet. Internet has become a part of day-to-day activities for students. Increase in Usage of internet has led to upsurge in various types of cybercrime activities. The threats of virtual world are increasing at distressing rate each day with different type of victims. Thus, there is a need to explore the cybercrime, cyber security awareness among the masses, as the number of phishing, computer viruses, incidents of theft, hacking are escalating day by day.

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In today's arena educational institutions are the platform to create awareness about cybercrime and cyber law among the students. This study would also help the government to realize the importance of incorporating cyber awareness programmes in regular curriculum of every college. In this paper, attempt has been made to study the usage pattern of internet and awareness about cybercrime and cyber law degree college students in Mumbai region.

IV. OBJECTIVES OF THE STUDY

- To understand Demographic profile of the selected degree college students in Mumbai region
- To decipher the purpose of internet usage & problems related to security faced while using internet by the respondent
- To study the internet usage pattern of the respondents
- To comprehend the familiarity to cyber security awareness and counter measures among the respondents
- To find the relation between internet usage and current academic course enrolled& cybersecurity awareness and year of current academic course
- To create awareness and provide suggestion on cybercrime, cybersecurity and cyber law to minimize the crimes in future.

V. RESEARCH HYPOTHESES

- $\mathbf{H_{01}}$ – There is no significant relation between internet usage and current academic course enrolled
- $\mathbf{H_{02}}$ - There is no significant relation between cybersecurity awareness and year of current academic course

VI. OVERVIEW OF MUMBAI REGION

Mumbai, also known as Bombay, the city of seven islands, the capital city of Maharashtra and the financial capital of India. It is one of the world's largest and most bewildering cities, full of colour, vibrancy and noise. It is India's edifying capital and the fourth most populous megacity in the world, with more than 20 million occupants sprawled across its seven islets. Fashion, Film, Nightlife, Bazaars and Industries; amidst all this, Mumbai is a great centre for education too.

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Apart from being a commercial and trade mega polis, Mumbai has prodigious institutes and Universities, which makes it the best place to study. It is home to more than 80 Universities and Research institutes students can pursue quality education in all fields and according to their peculiar interests. Technological advancement has impacted millions of students in Mumbai. The students are addicted to their devices (phones, tablets, computers) thus are being exposed to cybercrimes owing to the ease of access and anonymity that internet offers. Cybercrime towards students included their accounts being hacked, cyberbullying, being threatened online, harassment by strangers and even receiving pornographic content.

VII. SCOPE OF THE STUDY

The present study was an attempt to find out the pattern of internet usage, awareness about cybersecurity among degree college students in Mumbai region. The study attempts to focus on provides the cyber related crime and cyber laws in India. The study aims to awareness to students those who are studying degree college students in Mumbai region in order to help them not be the victim of cybercrime. The study is to analyses the student's internet usage and awareness about cybercrime countermeasures. The study will help the educational institutions to organise awareness programs about cybercrime, cybersecurity and cyber law to minimize the crimes in future. It will also serve as an important conduit for policymakers to understand the current pattern of cybercrime and acumens in cyber law.

VIII. LIMITATIONS OF THE STUDY

- There was a paucity of time, the study has been completed within a very short period of time.
- The study is restricted to degree college students in Mumbai region only.
- The sampling size used for study is small, the larger size could have generated more accurate results.
- The conclusions drawn from the study are applicable only to the area studied may vary with regard to other areas.

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IX. RESEARCH METHODOLOGY

Data collection

Primary data - Data collection tools include both quantitative and qualitative instruments. A well-structured questionnaire was designed (pre-tested and validated) in a way to satisfy the requirement of study. Personal interviews and discussions have also been adhered too.

Table 1: Sections of the Questionnaire

Section	Title
Section A	Demographic profile of the selected degree college students in Mumbai region
Section B	Purpose of internet usage & problems related to security faced while using internet
Section C	Internet usage pattern
Section D	Cybersecurity awareness

- **Secondary data -** The secondary data was collected from reports, books, journals, bulletins, and other sources like online articles and newspapers, interviews on different national news channels, various published and unpublished literature and websites.
- **Statistical tools used -** The data was analysed using MS-Excel, sorting, merging, and aggregating. Statistical tools such as tables, bar graphs, pie charts, averages, percentages, etc. have been used to analyse the collected data. Hypothesis was tested using ANOVA (Analysis of variance) test.
- **Sampling design: -**
- **Sampling method:** Snow ball sampling
- **Area of sampling:** Degree college students in Mumbai region
- **Sample size:** 100 respondents surveyed through questionnaire
- **Pilot study**
- A pilot study was conducted for a sample of 10 respondents i.e., 10% of the sample size taken for the study. For post pilot study necessary modifications were made to satisfy the objectives of study.
- **The survey outreach-** Through WhatsApp and Personal contacts.

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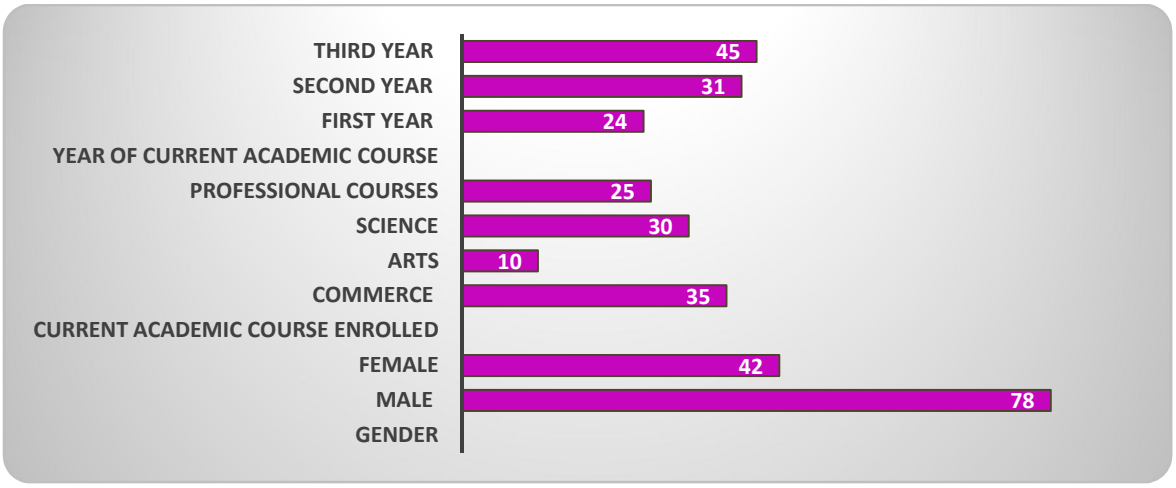
X. DATA ANALYSIS AND INTERPRETATION

DEMOGRAPHIC PROFILE:

The demographic profile assisted to evaluate the general characteristics of selected degree college students with respect to i.e., gender, Current academic course enrolled, and Year of Current academic course taken into consideration.

Graph. 1- Demographic profile of the selected degree college students in Mumbai region



Source- Primary data

Interpretation

In the above graph, it was observed that, majority i.e., 78 respondents were males, while the remaining 42 respondents were female. With respect to Current academic course enrolled, it was observed that a majority counts i.e., 35 respondents belong to commerce course, 30 respondents to science, 25 respondents enrolled to professional course and 10 respondents enrolled to Arts.

The Year of Current academic course revealed that, 24 respondents were from first year, 31 respondents from second year and 45 respondents from third year

XI. PURPOSE OF INTERNET USAGE AND PROBLEMS RELATED TO SECURITY FACED WHILE USING INTERNET

It assists to understand the degree college student's purpose of Internet usage and the hitches related to security met while using internet.

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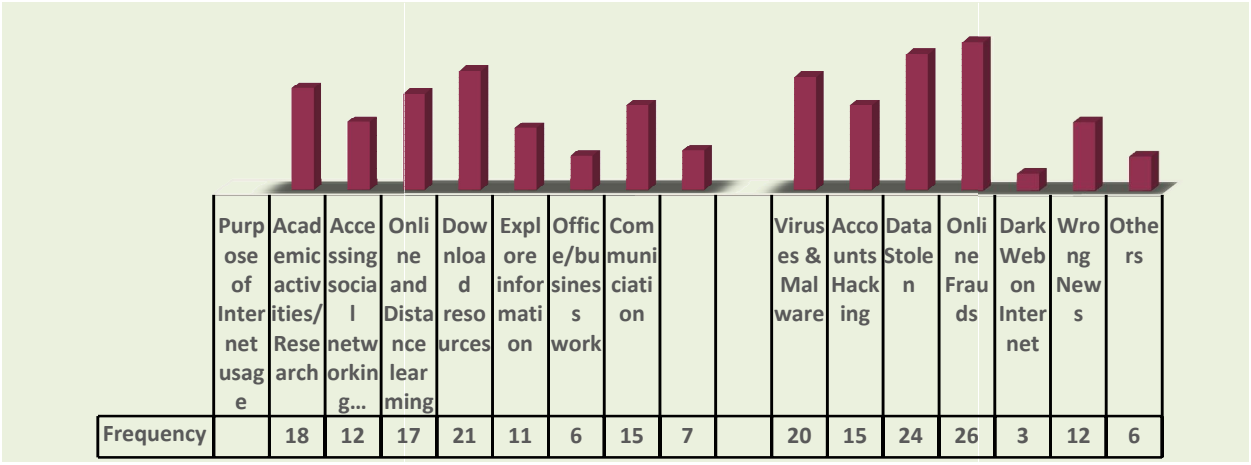
Graph. 2- Purpose of Internet usage and Problems related to security faced while using Internet



Source- Primary data

Interpretation

The above graph focuses on purpose of internet usage and problems related to security faced while using Internet

With respect to Purpose of Internet usage if is highlighted that 18 respondents use if for academic activities/research, 12 respondents for accessing social networking sites/surfing, 17 respondents for online and distance learning, 21 respondents use internet for downloading resources,11 respondents used for Exploring information, 6 respondents for their Office/business work, 15 respondents used it for communication purpose, while 7 respondents used for others activities such as E-banking/E-payments etc.

Problems related to security faced by degree college students while using internet revealed that 20 respondents faced viruses & malware issues, 15 respondents were victim to account hacking, 24 respondents confronted to data stolen issue, 26 respondents were duped to online frauds, 3 respondents were defied to dark web on internet, 12 respondents were affected by spread of wrong News and 6 respondents faced issues on other subjects.

XII. USAGE PATTERN OF INTERNET

It reveals various factors that helps to understand the degree college student's usage pattern of internet with respect to device used for internet connection, type internet connection used, internet browser used regularly by them, most used search engine of the students and number of hours internet used in a day.

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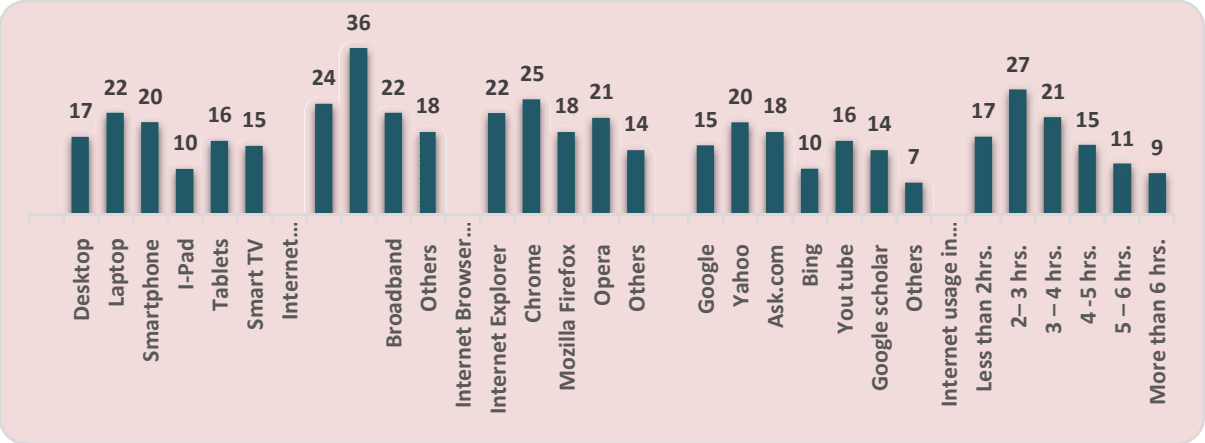
Graph. 3- Usage pattern of internet



Source- Primary data

Interpretation

The above chart divulges the usage pattern of internet of selected degree college students.

With respect to device used for internet connection it is revealed the 17 respondents used desktop, 22 respondents use Laptop, 20 respondents connected to internet with Smartphone, 10 respondents had I-Pad for internet access, 16 respondents link with tablets to connect with internet whereas 15 respondents get allied to internet through Smart TV.

Type of internet connection used highlighted that 24 respondents used wireless connections, 36 respondents used cell phone networks,22 respondents used broadband while 18 respondents used others.

In connection to type of internet browser used regularly 22respondentsadapted to Internet Explorer, 25 respondents are comfortable with chrome, 18 respondents use MozillaFirefox, 21 respondents accustomed to opera and 14respondents use other mode.

In relation to most used search engine retort that 15 respondents use Google, 20 respondents frequently use Yahoo, 18 respondents are very convenient to use Ask.com, 10 respondents use Bing, 16 respondents usually use you tube, 14 respondents use Google scholar and 7 respondents other search engine.

In terms of Internet usage in a day highlighted that 17 respondents use internet for less than 2hours a day, 27 respondents are of the view that they use internet for at least 2 to 3 hours a day, 21 respondents replied as they used internet for 3 to 4 hours a day, 15 respondents retorted to internet use for 4 to 5 hours a day, 11 respondents were of the opinion that they use internet for about 5 to 6 hours a day and 9 respondents use internet for about more than 6 hours.

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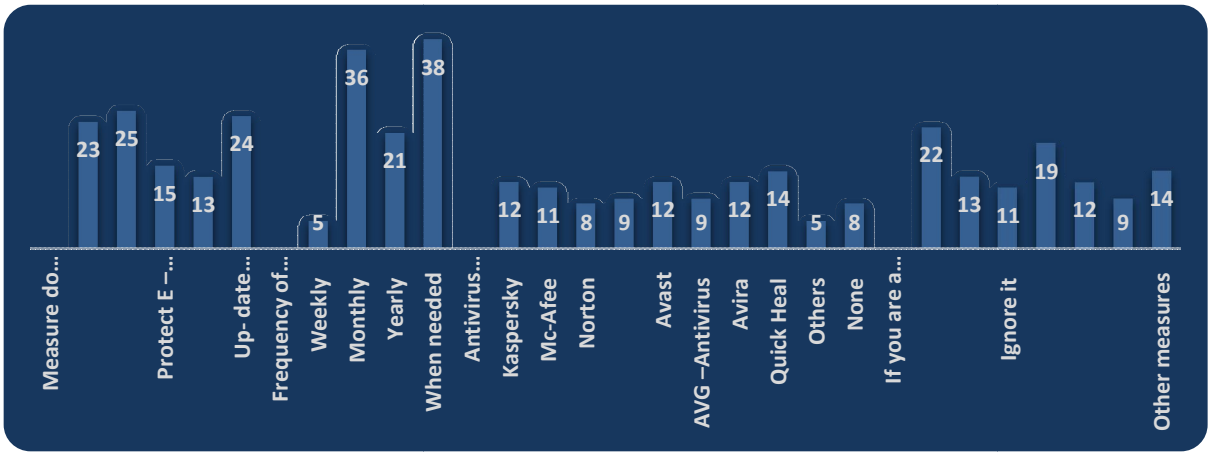
XIII. KNOWLEDGE OF CYBERSECURITY COUNTERMEASURES

In order to gain insight on degree college students knowledge related to cyber security counter measures the parameter such as measure used to protect the system, frequency of changing the computer / mail password, use of Antivirus software, and view on how will one respond if they are a victim to cybercrime.

Graph. 4- Knowledge of cybersecurity countermeasures



Source- Primary data

Interpretation

The above chart discloses the knowledge of cybersecurity countermeasures among selected degree college students.

With regard to measure used to protect the system revealed that 23 respondents make use of strong Password, 25 respondents secure the system by using Virus software, 15 respondents Protect through E – identity, 13 respondents by mean of Secure – Wireless network and 24 respondents by Up- dating their operating system

In connection to frequency of changing the computer / mail password highlighted that 5 respondents change their password weekly, whereas 36 respondents change monthly,21 respondents change their password once in a year and 38 respondents said they usually change the password as and when it is needed.

Type of Antivirus software used revealed that 12 respondents use Kaspersky, 11 respondents use Mc-Afee, 8 respondents use Norton, 9 respondents use Microsoft defender, 12 respondents use Avast, 9 respondents are used to AVG –Antivirus, 12 respondents are equipped with Avira, 14 respondents use Quick Heal, 5 respondents used other type of antivirus whereas and 8 respondents do not use any.

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In relation to the question, if you are a victim to cybercrime, how will you respond to it stated that22 respondents will immediately inform the police, 13 respondents would like to react on own initiative, 11 respondents just wanted to ignore it, 19 respondents will inform their parents about it, 12 respondents are comfortable to inform their friends and relatives, 9 respondents may directly inform to advocate and take help while 14 respondents would opt for other measures.

XIV. HYPOTHESES TESTING

Hypothesis of study was validated with the help of one-way ANOVA test

I. Internet usage and current academic course enrolled

In order to examine relationship between cyber security awareness and current academic course enrolled, the hypothesis proposed as:

H_{01}- There is no significant relation between internet usage and current academic course enrolled.

H_{a1}- There is significant relation between internet usage and current academic course enrolled

The below table represents data of Internet usage and current academic course enrolled

Table 2- Internet usage and current academic course enrolled

Internet usage	**Current academic course enrolled**				**Total**
	Commerce	**Arts**	**Science**	**Professional courses**	
Academic activities/Research	7	2	5	4	**18**
Accessing social networking sites/surfing	3	1	3	5	**12**
Online and Distance learning	9	1	4	3	**17**
Download resources	6	2	8	5	**21**
Explore information	7	1	3	4	**15**
Office/business work	2	1	2	1	**6**
Communications	5	1	3	2	**11**
Others E-Support activities	3	1	2	1	**7**
Total	**35**	**10**	**30**	**25**	**100**

Source- Primary data

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Table 3- One way ANOVA test, using F distribution of Internet usage and current academic course enrolled

Source	DF	Sum of Square	Mean Square	F Statistic	P-value
Groups (between groups)	3	65.8438	21.9479	6.876	**0.001297**
Error (within groups)	28	89.375	3.192		
Total	31	155.2188	5.0071		

Source- Computed from primary data. (Level of significance 0.05)

Interpretation

One Way ANOVA test, using F distribution degree of freedom (3,28) (right tailed)

1.Since p-value<α, H0 is rejected.

2. P-value equals 0.00129711, [p(x ≤ F) = 0.998703]. It means that the chance of type1 error (rejecting a correct H0) is small: 0.001297 (0.13%). The smaller the p-value the stronger it supports H1

3. The test statistics F equals 6.87599, which is not in the 95% region of acceptance: [-∞: 2.9467]

INTERNET USAGE AND YEAR OF CURRENT ACADEMIC COURSE

In order to examine relationship between cybersecurity awareness and year of current academic course the hypothesis proposed as:

H_{02} - There is no significant relation between cybersecurity awareness and year of current academic course

H_{a2}–There is significant relation between cybersecurity awareness and year of current academic course

The table below represents the data of cyber security awareness and year of current academic course

Table 4 - Cyber security awareness and year of current academic course

Cybersecurity awareness	Year of Current academic course			Total
	First year	Second year	Third Year	
Awareness about cybercrime	9	6	8	**23**
Familiarity to cyber law	2	4	4	**10**
Password strength	4	4	6	**14**

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Secure Configuration	3	2	4	**9**
Protection of devices	3	6	8	**17**
Installation of antivirus	1	4	8	**13**
Privacy settings	2	5	7	**14**
Total	**24**	**31**	**45**	**100**

Source- primary data

Table - One way ANOVA test, using F distribution of Cyber security awareness and year of current academic course

Source	**DF**	**Sum of Square**	**Mean Square**	**F Statistic**	**P-value**
Groups (between groups)	2	32.6667	16.3333	4.0195	**0.03604**
Error (within groups)	18	73.1429	4.0635		
Total	20	105.8095	5.2905		

Source- Computed from primary data. (Level of significance 0.05)

Interpretation

One Way ANOVA test, using F distribution degree of freedom (2,18) (right tailed)

1. Since p-value<α, H_0 is rejected.

2. P-value equals 0.0360433, [p (x ≤ F) = 0.963957]. It means that the chance of type1 error (rejecting a correct H0) is small: 0.03604 (3.6%). The smaller the p-value the stronger it supports H1

3. The test statistics F equals 4.019531, which is not in the 95% region of acceptance: [-∞: 3.5546]

Table 6 - Summary of outcomes of ANOVA test

Hypothesis	**Null hypothesis Accepted/rejected**	**Outcomes**
H_{01}	Rejected	There is a significant relation between internet usage and current academic course enrolled
H_{02}	Rejected	There is a significant relation between cybersecurity awareness and year of current academic course

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XV. FINDINGS

A well-structured survey has been done to achieve the objectives of research.

Based on the data collected and validated, it was observed that, majority i.e., 78 respondents were males, with respect to Current academic course enrolled the majority counts i.e., 35 respondents are commerce students. The year of current academic course revealed that maximum i.e., 45 respondents were from third year.

While analysing the purpose of internet usage and problems related to security faced while using Internet highlighted that at large 21 respondents use internet for downloading resources, whereas in relation to Problems related to security faced by degree college students while using internet revealed that maximum 26 respondents were duped to online frauds.

To highlight the usage pattern of internet of selected degree college students. It was observed that majority i.e.,22 respondents use Laptop device to get connected to internet. Type of internet connection used showcased that maximum 36 respondents used cell phone networks, in connection to type of internet browser used regularly maximum 25 respondents are comfortable with chrome, in relation to most used search engine retort that 20 respondents frequently use Yahoo, in terms of Internet usage in a day highlighted that maximum 27 respondents use internet for at least 2 to 3 hours a day

The knowledge of cybersecurity countermeasures among selected degree college students reflected that majority i.e., 25 respondents used virus software to protect the system. In connection to frequency of changing the computer/mail password highlighted that maximum 38 respondents usually change the password as and when it is needed. Type of Antivirus software used revealed that maximum i.e., respondents use Quick Heal. In relation to the question, if you are a victim to cybercrime, how will you respond to it revealed that majority i.e., 22 respondents would immediately inform the police.

On the basis of Hypothesis test it is proved that there is a significant relation between internet usage and current academic course enrolled and there is a significant relation betweencybersecurity awareness and year of current academic course.

XVI. SCOPE FOR FURTHER STUDY

- The scope of study can be extended outside Mumbai region.
- A bigger sample including diverse population can be studied.

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- Extensive study can be done on cybercrime and Cybersecurity.
- The study can be extended to examine internet use between rural and urban college students to find the difference in patterns of internet usage.

XVII. CONCLUSION

From the results of the survey, it can be concluded that creating cybersecurity awareness among students especially for degree college students is of great importance. The results further suggest the purpose of Internet usage is genuine but there are changes in patterns of internet usage over a period of time, students face hitches related to security while using internet that the majority of students lack an understanding of the importance of cybersecurity and counter measures.

- Academic institutions/Colleges need to hold comprehensive security awareness and training sessions regularly to promote knowledge on cybersecurity threats, including susceptibilities, attacks, and incidents, to their students to strengthen their security position.
- Along with Inert awareness methods, like email, oral presentation, newsletters, and SMS there is a need to integrate more proactive methods, such as training and expert lectures. Combination of both methods may more effective and highly recommended.
- The delivery methods for cybersecurity awareness and training programs can be video-based, text-based, or game-based, as the target here is degree college students. Security awareness must be taught to develop a sustainable cybersecurity behavior among users.
- Moreover, to spread awareness across all levels, the government should handclasp with private entities to better educate our youth masses.
- The government has to frame effective stratagems to educate the youth about cybersecurity countermeasures thus helping them to preclude themselves from the cybercrimes and safeguarding the interests of students towards ensuring their cyber wellbeing.

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