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Digital Amnesia: The Smart Phone and the Modern Indian Student

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ABSTRACT

Digital Amnesia or the 'Google Effect' is a new phenomenon. The 'Google Effect' refers to the tendency to not remember information, when it can be looked up online. Drawing on this, the term 'Digital Amnesia' was coined as part of Kaspersky, the cyber security firm's study, and refers to the "experience of forgetting information that you trust a digital device to store and remember for you". It suggests that in this age of the Internet, the reliance of technology has reached a point wherein gadgets are treated as an extension of the human brain. The presence of Internet and technology is changing the concept of memory. We choose to not remember pieces of information that is stored in our gadgets. While people may choose not to remember phone numbers or important dates, this paper also delves into the concept of memory erosion- if the reliance of technology erodes or tampers with existing memory, and the impact it has on the learning and retention abilities of students. The focus of the paper is primarily on two aspects- the prevalence of digital amnesia among students and its effect on learning. This is a trend paper that uses environmental scanning and future speculative analysis. Findings: The phenomenon is well established among the students and could be a cause for worry.

Introduction

Convergence and connectivity have become the buzzwords of today. With the all-pervasive internet spreading its tentacles through every nook and corner of the world, society has transformed into network society. The proliferation of 'connecting' technology and the increasing dependence on the cell phone that has now been dubbed as the smart phone (i.e., a cell phone with internet connection or data) has made innumerable lives much easier. Technology is convenient, fast and has made people think faster, work more efficiently and definitely smarter. Though the benefits of such a network society is numerous, the fall out of such an internet-controlled world cannot be discounted.

The ubiquitous smart phone now doubles up as the notebook, the calculator, the alarm clock, the go-to encyclopaedia, calorie counter and calendar among many. One could even say that it has now transformed into the extension of our brain., where people use it to store information that they would otherwise forget. Memories are outsourced to devices and people now do not have to worry about retrieving them, since it is just a click away. Phone numbers, birthday, appointments and schedules are available round the clock. Slowly, the devices are supplanting or replacing the average person's mental faculties. Since the device stores the information or performs the function of creating a memory or remembering a detail that otherwise a normal brain would do, the human brain may slowly become rusty. This behavioural change now has a new term- 'Digital Amnesia.' It is defined as the "forgetting of information, trusting a digital device to store it and remember it for you. "

In the early stage of research this phenomenon was first described and named by Professor Betsy Sparrow of Columbia University, Professor Jenny Liu of University of Wisconsin-Madison and Professor Daniel M. Wegner of Harvard University in their paper from July 2011. The trio had named this phenomenon as the 'Google Effect.' However later in 2015, Kaspersky Lab, based in Russia renamed the term as 'Digital Amnesia' saying that, "The results reveal that the 'Google Effect' likely

extends beyond online facts to include important personal information." Kaspersky Lab surveyed 1000 consumers ranged from age 16 to 55+ in the United States. In most cases, people could not remember important information such as telephone numbers that should have been familiar, leading to the conclusion that they forgot the information because of the ease of finding it using devices.

Studies show that that voice search is the future of technology. By the year 2020, experts believe that voice search will constitute 50% of all queries online. (Forbes, Dec 2018). Voice assistants and smart speakers such as Alexa, Siri and Google home are doing great business in the market and companies ae investing heavily in voice search optimisation and language. Generation Z (the cohort born with internet- 1995-2015) uses more voice messages than text message stop communicating between their peer groups. It is easier and more convenient than having to type, they say. Typing replaced writing by hand. Is voice now going to make writing defunct?

Reliance on computers is considered as a form of transactive memory, because people share information easily, forget what they think will be available later, and remember the location of information better than the information itself. People and their computers are becoming "interconnected systems"; the same underlying processes used in traditional transactive memory to learn who in our social networks know what is also being extended to encompass what a computer knows and how to find it.

So is digital amnesia a good or a bad thing? Some scientists believe that delegating a device with mundane facts could allow the brain store or process more important information – allowing it to use it for analytical and creative work. The idea being that instead of storing mundane information, the brain could use its cells and space for superior activities or higher functions. At the end of the spectrum, another school of thought believes in the age-old analogy that the human brain is like a car, It needs to be used constantly for optimum efficiency. A brain that is sparsely used for the purposes it's supposed to loses its cognitive edge. Cognitive scientists agree that less on the mind builds fewer neuron connections, stagnating its development, and dulling capacity.

Today, the average urban college- goer in Indian has a smart phone. He/she uses the smart phone for most of his daily activities- from waking up in the morning, to commuting to college, to take notes and pictures of class timetable and to communicate with peers and teachers. While the smart phone may be a great aid for the student, this paper studies if the smart phone is causing digital amnesia among the students.

As part of their academic rigour, students are expected to submit assignments, term papers and sit for university exams twice a year. This paper studies if the over reliance on technology has impeded the students, for instance from learning the spellings of words(since spell checks are available on all phones/laptops), reduced speed in doing basic mathematical calculations (since the calculator is available on the phone) and in general made them remember fewer phone numbers of their loved ones and other information that they may consider vital. This paper seeks to answer if the students feel the pinch of the absence of the phone, especially during the university exams when they are not permitted to carry phones and are expected to answer from memory and if this has affected their academic performance in any way

Literature Review

Scientific research in this field is still nascent. However, the credit for coining this term goes to the Russia based cyber security firm and research lab called Kaspersky lab that commissioned Opinion Matters, a research organization to conduct a study in 2015. This study sought to uncover "just how far this reliance on technology has come and the impact on peoples' daily lives."

The study, which surveyed over 6,000 consumers, discovered a direct link between "the availability of data at the click of a button and a failure to commit that data to memory." The research found that many people struggle to recall memories and simple information they entrust to their devices, including the phone numbers of partners and parents. Based on these findings Kaspersky Lab coined the term

"Digital Amnesia" – the experience of forgetting information you trust a digital device to store and remember for you.

The key findings of the Kaspersky study are as follows: Across the U.S., an overwhelming number of consumers admit their dependency on the Internet and devices as a tool for remembering. The results show that almost all (91.2%) of those surveyed agreed that they use the Internet as an online extension of their brain, with little variation across genders and age

groups studied (for example: 89.9% of men and 92.6% of women). Almost half (44.0%) also admitted that their smartphone serves as their memory and everything they need to know or recall is on it.

In addition, an interesting finding was that more than half of American adult consumers could phone the house they lived in aged 15, but not their siblings, friends or neighbours–without first looking up the number. They could, however, recall their partners (69.7%), children (34%), and place of work (45.4%).

The study also showed that only one in three U.S. consumers always memorizes or notes down something they consider important. Also, most are happy to risk forgetting information they can easily find– or find again–online, reinforcing other studies that show how the Internet is transforming the way we search for and remember facts.

However, despite this growing reliance on connected devices as the keepers of our memories and knowledge, the study found that consumers across the United States are failing to adequately protect them with IT security. Smartphones and tablets are particularly poorly secured and women secure everything less than men, a finding consistent with previous Kaspersky lab studies.

Without a doubt technology has transformed our lives and has also seemingly altered the way our brains work," said Nancy Dennis, Penn State associate professor of psychology. "However, that's not necessarily a bad thing."

According to Dennis, the reliance on handheld devices to store and remember such information as phone numbers, dates and passwords is helping by freeing the brain to enable it to hold more lasting memories, engage in analytical thinking and partake in the creative process.

Mike McNeese, former senior associate dean of Penn State's College of Information Sciences and Technology and director of the Multi-disciplinary Initiatives and Naturalistic Decision Systems Lab, agrees that creating a solid lasting memory trace is more than just memorizing phone numbers.

"In today's society, where we have Twitter, Facebook and other social networking technologies, memory becomes a social cognitive phenomenon in which our technological devices allow us to be more highly coupled with friends, family and colleagues," said McNeese. "As a result, we engage information processing in ways we didn't have before the advent of cell phones. Through interaction with others, we exercise our brains and those memories have more meaning and become constructed and encoded in our minds."

Though research articles on the phenomena are still up and coming, a recent proliferation of articles on new media such as, "Are Smartphones Making Us Dumber?" by Katherine Ellison for and, "Is Your Smartphone Making You Fat and Lazy?" by seem to suggest that the dependence on smartphones and other digital devices is not aiding mental functioning, but rather, is having a negative impact on our ability to think, remember, pay attention, and regulate emotion. Some stories have even made the claim that modern connectedness is "rewiring our brains" to constantly crave instant gratification, and that this threat to our society is "almost as important as climate change. Is this another case of the older generation blaming the modern one for being corrupt and not "as good as the old times", a common trip of nostalgia, one has to wait and see.

Maria Wimber of the University of Birmingham in the UK, opines that, "past research has repeatedly demonstrated that actively recalling information is a very efficient way to create a permanent memory. In contrast, passively repeating information (e.g. by repeatedly looking it up on the Internet) does not create a solid, lasting memory trace in the same way," said

While Kaspersky Lab's study mostly focussed on the United States, a new research led by Professor Charles Spence of Oxford University has reaffirmed the same; that digital amnesia exists and is probably here to stay, given that our reliance on technology has only been increasing. This study was conducted on 2000 adult participants in the UK states that more than half of the population suffers from digital amnesia due to our over-reliance on smart phones to store our memories. The study found that the length of time memories stay fresh in the mind correlates with the number of senses used when creating them.

In another study conducted by researchers at Swiss Tropical and Public Health Institute (Swiss TPH), it has been found that increasing exposure to mobile devices negatively affects the figural memory of adolescents. Figural memory, is the memory

that helps us make sense of images, patterns and shapes, is located in the right hemisphere of the brain. Hence, teenagers, who hold their phone next to their right ear, are the most affected.

The researchers, who did this study on 700 teenagers, claim that a young developing brain is more susceptible to phone-wave-induced changes up to 15 years of age. They found that on an average, a teen is exposed to 858 mJ/kg of radiation per day when their average call time is 10.6 minutes. While this study looks at the effect of actual radiation on the brains of teenagers, the research papers does acknowledge the prevalence of digital amnesia, a more behavioural phenomena among the young.

Recently the study 'The influence of smart phone over-dependence on the recall of basic mathematics among mathematics education students in a Nigerian university' by Abel Okoh Agbo-Egwu, Joshua Abah Abah , Paul Igber Anyagh from the Department of Science Education, University of Agriculture, Makurdi, Benue State, Nigeria attempted to demonstrate the impact of over-dependence on digital communication gadgets on students' memory efficiency in mathematics. It found that the pattern of students' ability to recall basic mathematical facts, theorems, axioms, and formula indicated a negative influence of smartphone over-dependence on simple recall. The participants of this study accepted that over-reliance on the Internet for simple recall poses a great threat to the future of mathematical prowess. The findings of this study clearly supported the outcome of the Kaspersky Lab (2015) survey in affirming that mathematics education students tend to rely heavily on the Internet and Internet-enabled devices such as smartphones to connect them to the vast repository of knowledge, anywhere anytime and that there is indeed a waning desire to properly commit learning to memory due to the ubiquity of smartphones and their ever-present internet connectivity. T

Research Questions

The study seeks to find answers to the following questions:

1. What is the percentage of digital dependence among students of University of Bangalore?
2. Are students aware of digital amnesia, and what percentage are affected by it?
3. How does the ubiquity of smart phones affect the academic abilities of students of Bangalore University?

Research Design/Methodology

A simple survey was designed to study the prevalence of digital dependence and digital amnesia among the students of Bangalore University. Students currently pursuing their arts, science or commerce degree were used to perform this study. The population of the study comprises of 550 undergraduate students chosen through random sampling. The choice of the students was along the reasoning that most of them in this age group (18-21) possess a smart phone, (since Bangalore is a busy urban hub), are independent in their academic work, have a huge load of academic work to turn in and yet not very far from their secondary school backgrounds where basic academic concepts were explicitly learnt.

Findings and Discussion

For the purpose of the study, 550 students were surveyed. The students surveyed were between the ages of 18-22 and this was their demographic distribution.

Age

Age	Distribution (in %)
18	19.2
19	27.1
20	29.1
21	15.4
22	9.2

The predominant age group thus interviewed were between the age of 18-20, indicating that they were college students-distributed from 1st, 2nd and 3rd year. This demographic was chosen, since they have access to technology, are familiar with technology and are currently pursuing higher education. The students were randomly selected across the three years and from different educational streams.

Stream	Distribution (in %)
Arts	57.9
Science	15.3
Commerce	9.6
Engineering	11.4
Others	5.8

99.2% of the students surveyed responded saying they own a smart phone (a phone with internet connection and 97.1% use it for academic purposes. But to illustrate how exactly they use it for academic purposes, the following table can be studied.

Purpose	Distribution in %
Browsing for information	87.2
Taking pictures of notes	63.8
Discussion groups or forums	49
Taking notes	46.4
Calendar	28.3

Though it is no surprise that students largely use their phone to browse content and search for more information on the subjects they study for personal and research purposes, what is interesting is the use of phone (an overwhelming 63.8%) for taking pictures of notes.

Taking down notes in class through traditional pen and paper seems passé.. Students either type notes on the phone and easier still prefer taking pictures of notes that others may have written, that the teachers provide or that which is written on the blackboard.

According to advertising gurus, the world is moving towards voice searches and voice assistants – a trend perhaps observed in the increasing popularity and usage of Alexa, Siri and Google Home. The young are also said to prefer voice messaging over texting, again indicating a trend that actual writing in the traditional sense or typing may also slowly ebbing away.

Medium preference for sending messages	Distribution (in %)
Text messages	77.5
Both equally	21
Voice	1.5

Among our respondents, it is apparent that voice messaging has not taken over texts, but there is a shift that is under the works. A sizeable percentage uses both equally and could indicate early trends in voice messages gaining precedence. The growth of voice messaging means that typing/writing would go out of fashion.

Storing of information for recall	Distribution (in %)
In a notebook	41.4
In my phone	40.3
In my mind	15.6

Adding to the fact that the phone now plays a ubiquitous presence in our lives, this question clearly demonstrates that the phone is also being used as a repository to store vital information., much like an extension of the brain. While pen and paper are still common, relying only on the mind to remember and recollect information is diminishing in value. As a species have, we stopped trusting our brain, or are our brains overworked and perhaps overloaded with a deluge of information that they don't have the necessary capacity anymore?

Our respondents were further asked, when they were asked to recall a particular fact or posed with a question, who do they turn to?

Source of recall	Distribution (in %)
Search online	66.1
Recall from the mind	22.2
Ask a friend	7

A majority said that they would look it up online, while a minority said that would try and remember from their mind. This demonstrates that the phone is being used an extension of the brain, to store and remember information for the said individual.

Having established that the phone is an important part of an individual's life., and that its used to store important information, the respondents were then quizzed on how losing their phone would make them feel.

Feeling if phone gets lost	Distribution (in %)
Panic	41.5
Sadness	30.3

Most of the respondents reported feeling panic if they lose their phones, since their phone is the repository of all vital information and others attributed to a feeling of sadness since phone also contain important memories in the form of images. This further establishes the fact that the smart phone of today serves as a second brain- it stores information and memory.

Next, the respondents were quizzed on their memory levels now. (after the advent of their phone.)

Purpose	Distribution in %
Cannot remember phone numbers	69.8%
Don't bother to remember facts knowing its available online	64.2%
Except exams, search online	44.8
PPts make presentations easier	41.6
Rely on technology for birthday reminders	29%

This table clearly shows that the human memory is atrophying while our gadgets become memory repositories. Respondents agreed that they didn't bother remembering phone numbers or any vital information anymore since they are just a click away. Academic informant needn't be memorized anymore and the reliance on gadgets is affecting the recall of personal information too.

To further distil the hypothesis, the respondents were asked a more specific question. They were asked if they used the phone to remember information or perform a task that we would previously make their brain do.

Phone is replacing the brain	Distribution (in %)
Agree	39.7
Neutral	31.4
Strongly agree	13.2
Disagree	11.5
Strongly disagree	4.2

Respondents are aware of the fact that the phone may slowly be performing the functions of their brain.

They are also of the opinion that delegating the phone with preforming some of their tasks that were previously done by the brain frees their brain for others things to concentrate on. The results of this study show ambivalence. Respondents are on the fence- while a huge percentage are connived that this could free the brain of mundane tasks and be used for higher purposes, many are sitting on the fence or disagreement perhaps because they aren't sure yet of what the brain could possibly be used for. Lack of clarity in this area could suggest why there is ambivalence over the issue.

Brain could be used for higher purposes	Distribution (in %)
Neutral	37.6
Agree	31.7
Disagree	19.8
Strongly agree	5.45
Strongly disagree	5.45

At this juncture, the respondents who are aware of their dependence on technology to remember information, send reminders, and carry repository of memories and notes- where then asked if this trend is cause for worry.

Dependence on technology a cause for worry	Distribution (in %)
Agree	36.3
Neutral	25.5
Strongly agree	21.1
Disagree	34.4

A sizable majority not only seems to be aware of this dependence on technology but is also worried.

Lastly the students were probed a little further on whether they are aware of the phenomena that this paper is studying that they are currently experiencing – that of their phones remembering information for them that they brain slowly forget- Digital amnesia

Most respondents hadn't heard of the term, suggesting that this phenomenon is still under study and has not gained worldwide traction.

Awareness of Digital Amnesia	Distribution (in %)
No	47.9
Yes	32.7
Not sure	19.4

Discussion

This study has attempted to demonstrate the over dependence on electronic communication gadgets for academic purposes among students and how that could lead to an erosion of memory. What may have started out as not choosing to remember information since its available at the click of a button, on personal gadgets has evolved into erosion of memory, or what is known as Digital Amnesia. Participants of this study have accepted that they don't recall information like birthdays and phone numbers that they used to remember earlier. The participants of the study also agreed that an over reliance of gadgets for simple recall may not help them in the future, especially in the domain of academic prowess, given sit in examinations require answering from recall. Students seem to be worried about this trend of dependence on the gadget- as it the loss of gadget seems to elicit extreme negative reactions such as panic and sadness. Many participants felt shattered at and at a loss when their gadget, the repository of all their favorite memories got lost.

The findings of the study clearly support the findings of Kaspersky Lab, survey (2015) suggesting that there is an increasing reliance on the internet and the smart phone to access knowledge systems. This study believes that this may be detrimental to developing actual academic rigor. There is a waning desire observed among students to recall information, since its available on a gadget at all times. This increasing dependence on the internet and smart phone to access information which we have otherwise memorized or looked for through other means demonstrates the growing impatience and need for instant gratification in this current fast paced and network society. We may be looking at a feature where we store tons of irrelevant information on the ever-growing capacities of phones, and make our human memory redundant and passive. The will to learn new pieces of information or the conscious need to make an effort to remember information may also drop. Making memories and recall are important academic and human skills and this paper aims to point out the threat of technology to it.

Recommendations

In view of the findings of the study, the following suggestions are made:

1. Though the Edu-tech industry has been extremely beneficial for students especially for remote learning and during the COVID pandemic, this paper suggests that a more measured approach must be adopted. This study believes that students must be gradually introduced to technology and discouraged where the technology is not essential. In college particularly students be encouraged to write so that they don't lose touch.
2. Technology doesn't always aid learning, sometimes it can impede it. Integration of technology in education must done with caution.
3. Students must also exercise self-regulation. To encourage this, educational institutions must conduct regular workshops and education on the impact that technology could have on memory and mind.
4. At the university level. Students must be given projects that require creativity and original thought and those which do not require material from the Internet. Higher marks must also award for those who exhibit.
5. Instead of passive note taking in class or providing students with notes, teachers must encourage students to listen in class and make their own notes.

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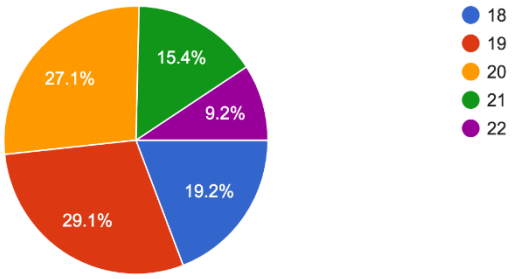
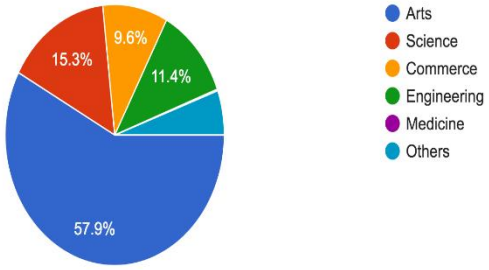
Appendix

Age ?
532 responses



Course
542 responses



1. Do you own a smart phone ?(a phone with internet connection)
546 responses