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DIGITAL LITERACY: A NECESSITY IN THE 21ST CENTURY FOR INDIA

Abstract. India with its rapid growth has witnessed new heights with its innovative and technical practices. It has changed the way we share and gather information before, our traditional education system has now updated with the digital world. Being digital natives it becomes important to update or upgrade oneself with digital literacy. Digital literacy has emerged as a crucial skill for individuals to navigate and thrive in this digital age. This research paper has focused on the significance of digital literacy for Modern India and discuss how they are acquiring and utilizing these skills. The study has given a digital literacy framework to get the better understanding on digital literacy skills. The questionnaire was used as data collection tool and the questions were designed as per the three different dimensions of the framework. The framework provides three interconnected and dynamic dimensions including Digital Literacy and Skills, Digital Tools & Applications and Digital Health & Wellbeing. Through a comprehensive literature review and analysis of collected primary as well as secondary data, the study concluded the key factors influencing digital literacy among Indians, including awareness and access to technology, their understanding and challenges related to it. The findings reveal that while there have been advancements in digital literacy skills; there is still some problems and challenges that should be remove and improve it so that it can provide equitable access and quality information to all. The paper concludes by emphasizing the urgent need for policy interventions and targeted initiatives to promote digital literacy among Indian natives, ensuring their future success in the globalized and technology-driven world. The digital literacy should be improved by providing the content in their local languages, launch of training programs for them and the awareness programs of cyber crimes and frauds for their digital well-being will make Indian more confident and self-reliant.

Keywords: Digital Literacy; Modern India; Technology; Education; 21st century skills.

1. INTRODUCTION

Digital literacy has become an indispensable skill for individuals in the 21st century, enabling them to effectively navigate and participate in the digital world. The British Futurelab's guide on Digital Literacy Across the Curriculum [1], p.2 defines digital literacy as having access to a wide range of activities and cultural resources that may be used to digital instruments. It is the capacity to produce and distribute meaning in a variety of forms and formats; to successfully create, collaborate, and communicate; and to understand how and when to utilize digital technology to assist these activities.

The flagship program famously known as “Digital India” Program launched in 2015 aims to transform India in a digitally empowered country. To make it successful digital literacy becomes essential for Indian citizens. National Digital Literacy Mission and Digital Saksharta Abhiyan (DISHA), Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) in 2017 [2] have

majorly contributed to its success and provided training to the citizenz in India. Innovation in technology and ICT has given a unique platform to learn and earn. Digitalization has the power to create awareness of various tools and technologies, resulting making citizens more confident and contributing to their development and growth in terms of their career, education and day-to-day lifestyle. Growing Internet Penetration, Mobile penetration, continuous improvements in broadband connections has provided Indians to grab this opportunity and make one self-more literate and more aware in this digital Era. However, there are so many challenges that are needed to be addressed so that every person can be benefitted from the all-available opportunities in the digital world.

Formulation of the problem.

India has made considerable progress in internet connection in launcing programs related to digital literacy, but a digital literacy gap remains, particularly in rural regions. Despite the government's efforts to encourage digital literacy, infrastructural challenges, language obstacles, and socioeconomic inequities impede growth. The government is concentrating on incorporating digital skills into school to better prepare future generations, yet obstacles persist in delivering effective and inclusive digital services. Understanding the current situation about the awareness of and literacy in digital terms are still required and need to be improve time to time.

Analysis of recent studies and publications. The study examined the relationship between digitalization and new venture internationalization, revealing that weak digital infrastructure and institutional voids enhance the positive correlation. It provides a theoretical understanding of the linkage and suggests complementary roles for domestic growth and internationalization [3]. Digital technology prepares students for lifelong learning by providing a virtual world and allowing them to access digital knowledge according to their learning styles. The digital classroom uses electronic devices and software to enhance learning efficiency and track progress. Modern technologies also aid in decision-making in areas like climate change, biodiversity protection, and disaster resilience, promoting economic and social growth [4]. The study aimed to identify factors affecting digital literacy and online risk in Indonesian children during the Covid-19 pandemic. The study suggests that parents, teachers, and children should provide positive support and guidance for children using the internet. Future research should consider various education levels and digital devices to better understand the impact of digital literacy on online risk [5]. The research was done on pre-service teachers revealed issues related to digital literacy, self-evaluation of digital skills using text editors, spreadsheets, and presentation software, and experiences with e-learning, including online classes, internet searches, paid courses, and informal study groups [6]. The study reveals how the Covid-19 pandemic has forced the education sector to transition to online learning, forcing teachers and students to acquire digital skills. This has led to a digital skills gap among facilitators and learners [7]. The study reveals that central Indian dental students are keen on incorporating digital technology into their dental curriculum. Despite not being formally included in the curriculum, students find social media helpful for professional course studies. It may be beneficial to propose learning materials that allow access through smartphones for both teaching and learning [8]. Adequate digital literacy among healthcare providers and users is important for successful adoption and evolution of various innovations in medical field. This, combined with improved health literacy, can lead to superior healthcare services and overall population well-being [9]. The impact of gamified problem-solving environments on students' perceived problem-solving skills suggests that these environments can enhance creativity and management of learning. However, it acknowledges limitations like factor convergent validity and being limited to education students. The study emphasizes the importance of efficient learning environments that encourage creative problem-solving using digital tools, as it may correlate with actual creative performance [10].

International institutions such as the United Nations and the European Union have acknowledged digitalization has potential to address global concerns. For example, the United Nations' Sustainable Development Goals, notably SDGs 9 and 11, stress the importance of digital technology in infrastructure development and sustainable cities. The International Telecommunication Union has aggressively promoted digital inclusion and the development of ICT infrastructure in underdeveloped nations. By embracing these foreign viewpoints, we may obtain significant insights into the strategic implications of digitalization and its capacity to create sustainable development [11]. Digital Learning Training Programs are important in closing the digital gap and empowering neglected rural communities. Infrastructural concerns, infrequent courses, and a lack of desire are major challenges for trainees. Trainers confront obstacles as a result of understaffing and limited resources. District managers suffer with job pressure and disinterest. A multifaceted strategy is required to boost training programs [12].

The aim of the study: The study aims to assess the current level of digital literacy among Indian students and identifies the challenges and barriers to digital literacy development.

2. RESEARCH METHODOLOGY

The study followed Descriptive Research Design approach to understand the digital literacy skills of Indian Students. The study is mainly based on primary data. For the study a structured questionnaire was prepared as a data collection tool by using google forms and shared as per the convenience via online platforms. The questionnaire was designed to gather information about their digital literacy skills, access and use of technology and perception of digital literacy education. 140 responses were received out of which 112 responses were considered for the study. A framework was developed to understand the digital literacy concept. The gathered data was analyzed with the help of MS Excel 2016 and IBM SPSS Statistics 23 including frequencies and percentages.

2.1. Digital Literacy Framework

The research study have given a digital literacy framework to get the understanding of it. In this research digital literacy means **the ability to effectively use, navigate, understand, respond and utilize digital tools and technologies while considering digital health and well-being as priority.**

The framework has three dimensions to understand digital literacy in better way with it interconnected and dynamic approach. The following are the 3 dimensions of the framework:

- Knowledge and Skill,
- Digital Tools and Applications,
- Digital Health and wellbeing.

Where,

- **Knowledge and Skills** means the cognitive abilities that are the base for digital literacy. It includes information and communication literacy in a digital age.
- **Digital Tools and Application** means operational, functional and technical skills.
- **Digital Health and Wellbeing** means the healthy digital habits to promote overall health

of a person as well as online safety and security.

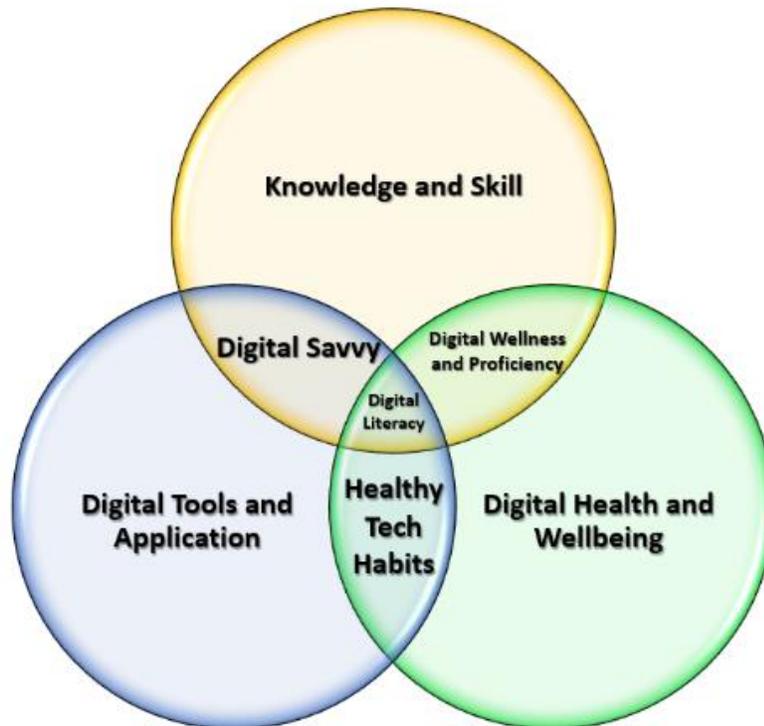


Figure 1. Digital Literacy Empowerment

Key characteristics of this framework:

The framework provides a broad range of aspects on digital literacy that includes not only cognitive but also practical and personal dimensions. It is a holistic, dynamic and interconnected approach. The three dimensions of the given framework are interdependent and adaptable to the ever-evolving landscape of digital technologies and their impact on society. By developing Digital Literacy Mastery, individuals can improve the skills and knowledge necessary to navigate the digital world confidently, responsibly and ethically. The framework was designed with the help of study “*Can we teach digital natives digital literacy*” [13].

3. RESEARCH RESULTS

3.1. Demographic Details

Demographic details of the respective participants are given in the Table 1. All the participants (N=112) are from the 5 different states in India. Most of the respondents are from Uttar Pradesh (50%) and least from Delhi (7.1%). Respondents are from various locations, there are 20.5% respondents from rural areas, 23.2% from semi – urban areas and highest 56.3 % from urban areas. Most of the respondents are graduates 36.6%, shows people have good education status in India as there are 23.2% are the researchers. 58.9% respondents are using Internet for Education purposes and 33.39% are using for education and entertainment both.

Table 1

Demographics of Participants (N = 112)

Variables	Labels	Frequency	Percentage
Gender	Male	64	57.1
	Female	48	42.9
Age	16-25	61	54.5
	26-35	43	38.4
	36-45	6	5.4
	46-55	1	1.8
	56 or Above	Nil	Nil
State/UN	Uttar Pradesh	56	50
	Madhya Pradesh Uttarakhand	18	16.1
	Delhi	17	15.2
	Maharashtra	8	7.1
Location	Rural Area	23	20.5
	Semi - Urban Area	26	23.2
	Urban Area	63	56.3
Education Level	Up to 10th	2	1.8
	12th	14	12.5
	Graduation	41	36.6
	Post-Graduation	37	33.0
	Ph.D.	18	16.1
Role/Status	Student	72	64.3
	Researcher	26	23.2
	Government Employee	1	.9
	Private Employee	1	.9
	Self - Employed	12	10.7
Family Income (Monthly in Rs.)	0 - 10000	4	3.6
	10001 - 25000	40	35.7
	25001 - 50000	57	50.9
	50001 - 100000	5	4.5
	More Than 100000	6	5.4
Using Mobile Network	4G	76	67.9
	5G	36	32.1
Primary Purpose of Using Internet	Education	66	58.9
	Entertainment	6	5.4
	Education and Entertainment Both	38	33.9
	Business & Office work	2	1.8

3.2. Digital Literacy Frameworks Questions and Analysis

There are three categories based on the three different dimensions of digital literacy framework. Table 2. is showing categories as, Category 1 for Digital Literacy and skills, category 2 for digital tools and applications and category 3 for digital health and wellbeing.

There are 30 total questions related to the theme and framework from which Category 1 holds 15 questions, category 2 holds 10 questions and category 3 holds 5 questions.

Table 2

Statement Questions Based on Digital Literacy Dimensions Framework

Statement Questions Based on Digital Literacy Dimensions Framework Categories		
Category 1 Digital Literacy and Skills	Category 2 Digital Tools and Applications	Category 3 Digital Health and Wellbeing
<p>Question 12: How often do you use a computer or tablet for educational purposes?</p> <p>Question 13: How often do you use the internet for educational purposes?</p> <p>Question 14: Do you feel confident in your ability to use digital devices and navigate the internet?</p> <p>Question 15: How comfortable are you with using digital tools for learning?</p> <p>Question 17: Has digitalization influenced your interest in reading and learning?</p> <p>Question 18: Have digital tools and resources improved your language skills?</p> <p>Question 19: Do you believe that digitalization has positively impacted the overall literacy rate in India?</p> <p>Question 20: Have you observed changes in literacy rates in your community due to digitalization?</p> <p>Question 21: Have you used e-learning platforms for educational purposes?</p> <p>Question 22: How has e learning affected your access to educational materials?</p> <p>Question 23: Do you think e learning can help improve the literacy rate in India?</p> <p>Question 27: Do you believe that traditional literacy (reading and writing) is still important in the digital age?</p> <p>Question 28: Does the availability of digital content make it easier to learn and practice traditional literacy skills?</p> <p>Question 29: How would you rate the quality of online educational content available in India?</p> <p>Question 30: There are some specific areas where the quality of online educational content can be improved.</p>	<p>Question 8: Do you own a smartphone?</p> <p>Question 9: Which mobile network are you using?</p> <p>Question 10: Do you have regular access to the internet?</p> <p>Question 11: What is the primary purpose of your internet usage?</p> <p>Question 16: Are you aware of government initiatives to promote digital literacy in India?</p> <p>Question 24: Are you aware of government schemes aimed at promoting digital literacy and education in India?</p> <p>Question 25: Do you think government policies have effectively boosted digital literacy and education in India?</p> <p>Question 26: Do you think the digital divide in India is affecting literacy rates?</p> <p>Question 31: Do you think socioeconomic factors affect one's ability to access digital resources for learning?</p> <p>Question 32: Have you observed disparities in digital literacy and educational opportunities based on income?</p>	<p>Question 33: Do You Use Social Media Daily?</p> <p>Question 34: Have you ever been scammed online?</p> <p>Question 35: Do you use strong, unique passwords for your online accounts?</p> <p>Question 36: Do you believe that excessive screen time can negatively impact your physical and mental health?</p> <p>Question 37: Have you taken steps to reduce your screen time or improve your digital habits?</p>

3.3. Digital Literacy and Skills (Category 1)

Digital literacy and skills are very important for today's environment. As we see the technology adaption rate is very high, people are having smartphones, using 4G & 5G networks. 79.5% of the respondents are using computer or tablet for educational purposes on daily basis with 91.1% are using internet for educational purposes on daily basis. 91.1% participants are being able to use digital devices and navigate internet while only 8% are facing issues. 38.4% respondents are very comfortable, 39.3% are comfortable 21.4% are neutral while 0.9% uncomfortable in using digital tools for learning. With a majority of 98.2% respondents said digitalization has positively influenced for their interest in reading and learning. 97.3% respondents are favoring that digital tools and resources has improved their language skills. 92.9% respondents believe digitalization has positive impact on literacy skills in India while 5.4% respondents are not sure and 1.8% respondents do not believe. 97.3% respondents have observed changes in literacy rates in their community due to digitalization while 2.7% responded no. 94.6% respondents are aware of and using e-learning online platforms. In Table 3. Showing E-learning affected respondents access to educational materials with 53.6% are Greatly Improved and access to educational materials and significantly improved with e-learning. While 3.4% respondents do not use e-learning for accessing educational materials.

Table 3

Selected Options	Frequencies	Percentage
1. Greatly Improved: My access to educational materials has significantly improved with e-learning.	60	53.6
2. Somewhat Improved: E-learning has moderately improved my access to educational materials.	44	39.3
3. No Significant Change: E-learning has had little impact on my access to educational materials.	2	1.8
4. Somewhat Hindered: E-learning has somewhat hindered my access to educational materials	1	.9
5. Greatly Hindered: My access to educational materials has significantly worsened with e-learning.	1	.9
6. Not Applicable: I do not use e-learning for accessing educational materials.	4	3.6
Total	112	100

95.5% respondents believe e-learning can improve literacy skills in India but on the other hand 96.4% also favoring that traditional literacy (reading & writing) is still important in the digital age. 84.8% respondents said the availability of digital content make it easier to learn and practice traditional literacy skills. 31.3% chosen Excellent, 44.6% chosen Good, 17.0% chosen average and 7.1% chosen poor quality of online educational content available in India. 9.8% respondents are strongly agree with that there are some specific areas where the quality of online educational content can be improved while 77.7% agreed, 2.7% remain neutral, 4.5% disagreed and 5.4%

strongly disagreed with it.

3.4. Digital Tools and Applications (Category 2)

There are 96.4% participants are having their own smartphones from which 67.9% are using 4G network and 32.1% are using 5G networks. 96.4% respondents uses internet in regular mode while 3.6% do not use internet in regular mode. 58.9% respondents use internet primarily for education purposes, 5.4% for entertainment, 33.9% for Educational and Entertainment both and 1.8% for Business and office purposes. 86.6% respondents are aware of government initiatives to promote digital literacy in India, while 4.5% are not aware of and 8.9% cannot say anything about government initiatives. 88.4% participants are aware of government schemes to promote digital literacy and Education while 11.6% have not aware of such schemes. 92.0% respondents believe various government policies are effectively boosting digital literacy skills and education in India. 87.5% participants believe that digital divide in India is affecting digital Literacy skills. 85.7% respondents' thinks socioeconomic factors are also affecting the ability to access digital resources for learning in India. 83.9% respondents observed that disparities in digital literacy and educational opportunities based on income or social status.

3.5. Digital Health and Wellbeing (Category 3)

Most of us are using so many digital gadgets. Excessive use of the screen and other digital platforms affects us physically as well as mentally so in that context it becomes necessarily important to care about one self. Digital health and well-being becomes important in the digital age. In this category, we have designed five questions for the respondents. In the analysis of this section, we have found that 87.5% respondents use social media on daily basis while 12.5% are not using social media daily. There are so many online scams are happening nowadays, 12.5% respondents have scammed online while 87.5% have not ever scammed online. This shows majority of the respondents are aware of online scams and frauds. For online safety of their accounts 96.4% respondents use strong and unique passwords. 94.6% respondents believe that excessive screen time can negatively affect your physical and mental health. 92.9% respondents taken steps to reduce your screen time or improve your digital habits while 7.1% respondents are not taking steps for their digital well-being due to some reasons.

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

In India, there are people from different cultures, socioeconomic backgrounds having different resources and materials. Literacy in terms of digital age goes with the effective and efficient access and use of the digital technologies. Though people have different income levels, still they have now adopted smartphones for their daily purposes. It has become the very basic device, which is helping them to use technology, to access the various applications, to find out different educational and e-learning materials. Smart Gadgets like smartphone, tablets, personal computers and access of good Internet network are playing major role in making nation Digitally Literate. Education and Entertainments both are the sectors are that people are using and accessing via internet. They are sharing their knowledge, cultural beliefs and other information via online platforms. Digital Infrastructure development can be the main lead in boosting digital literacy among citizens.

The challenges and barriers are also there disclosed by our respondents like limited access to

internet, authentic content availability, lack of awareness of various schemes and programs, lack of technical supports, distractions, language barriers, accessibility issues, high data cost and lack of devices. These issues are also need to be addressed by the Private and Public authorities in India.

Further, the same framework can be used in the different states of India to understand the status of digital literacy level and can improvise the policies, can launch new programs to create more awareness. There is a need to invest in infrastructure and make it more powerful, subsidies internet cost specially for educational purposes, who can't afford the devices make it affordable, awareness campaigns to promote digital literacy, save citizens from various online frauds and crimes. There should be various training programs for the teachers as well as students and other people. Public – Private Partnership can be more effective. As we are aware of this very famous slogan “*Padhega India Tabhi to Badhega India*”. Researches and Evaluations are very important to make the goals and objectives successful. There is a need to boost learning opportunities and this can be possible with digital technology and its access to everyone. Digital Learning requires good digital infrastructure, digital tools, devices and gadgets, awareness, knowledge and trainings to all citizens of all age group. In this way, India can contribute more to its nation and world as well.

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ЦИФРОВА ГРАМОТІСТЬ: КЛЮЧОВА ПОТРЕБА РОЗВИТКУ ІНДІЇ У ХХІ СТОЛІТТІ

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Анотація. Індія, яка стрімко розвивається, досягла нових висот завдяки своїм інноваційним та технічним практикам. Це змінило методи збору інформації та обміну нею, а наша традиційна система освіти тепер адаптувалась до цифрового світу. Оскільки ми є «цифровими аборигенами», нам стає важливо оновлювати або вдосконалювати свою цифрову грамотність. Цифрова грамотність стала вирішальною навичкою для людей, щоб орієнтуватися і процвітати в цифрову епоху. Дослідження зосереджено на визначенні значення цифрової грамотності для сучасної Індії та обговоренні шляхів набуття та використання таких навичок. Крім цього представлено рамку цифрової грамотності для кращого розуміння навичок цифрової грамотності. Анкета була використана як інструмент збору даних, а запитання були розроблені відповідно до трьох взаємопов'язаних та динамічних вимірів рамки: цифрової грамотності та навичок, цифрових інструментів та додатків, а також цифрового здоров'я та благополуччя. Завдяки всебічному огляду літератури та аналізу зібраних первинних і вторинних даних було визначено ключові фактори, що впливають на цифрову грамотність серед індійців, зокрема обізнаність і доступ до технологій, їхнє розуміння та виклики, пов'язані з ними. Висновки показують, що, незважаючи на певний прогрес у розвитку навичок цифрової грамотності, все ще існують певні проблеми та виклики, які необхідно усунути та вдосконалити, щоб забезпечити рівний доступ та якісну інформацію для всіх. У висновку підкреслюється нагальна потреба в політичних втручаннях і цілеспрямованих ініціативах для просування цифрової грамотності серед корінних жителів Індії, що забезпечить їхній майбутній успіх у глобалізованому і технологічно розвиненому світі. Цифрову грамотність слід підвищувати шляхом надання контенту їхніми місцевими мовами, запуску навчальних програм для них, а також програм підвищення обізнаності про кіберзлочини та шахрайство, адже їхній цифровий добробут зробить індійців більш впевненими та самодостатніми.

Ключові слова: цифрова грамотність; сучасна Індія; технології; освіта; навички ХХІ століття.



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