



Technostress and Nomophobia Among Digital Natives: An Analysis in the Context of Students of Higher Education in India

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ABSTRACT

Digital education has gained its popularity after the Covid 19 pandemic and is gradually becoming an inevitable means of education at all levels especially in the higher education. The extensive and unavoidable digitalisation of education and a deeper penetration of social media in the life of learners resulted in some undesirable but inevitable effect such as technostress and nomophobia among learners. Even though the students in higher education depend on their smartphones for their academics, they lack the much desirable digital literacy and it leads to technostress while compelled to use latest technology. At the same time, the over-dependence on social media for communication and interactions, which is not technology-intensive, leads to addiction to smartphone called nomophobia. Studies revealed that both are hindrances to learning and affect the psychological well-being and academic performance of students. The paper explores this new concern and tries to identify the possible solutions so that it will not hinder the learning but lead to responsible use of digital gadgets for learning as well as social interactions especially among children in the higher education institutions, where digital learning is inevitable.

Keywords: Technostress, nomophobia, digital literacy, digital natives, higher education.

Introduction

Smartphones have become a part and parcel of individuals' life and the number of smartphone subscriptions has crossed six million in 2021 and is forecasted to cross seven billion by 2025 and India is one of the top three countries in terms of the number of users (O'Dea, 2021). The 6th global smartphone users survey conducted by the mobile ecosystem forum revealed that in the year 2020, more young people of the age group 16-24 are the predominant users of smartphones (Betti, 2020). This trend was not new, a similar trend has been seen in the use of mobile internet too. Mobile Internet Report of 2017 prepared by The Internet and Mobile Association of India (IAMAI) also revealed that youngsters between the age group 15-24 are the predominant users of the internet (IMAI, 2017). Similarly, the internet penetration in rural India is growing at a faster pace and the digital divide between urban and rural India is almost nil according to a report published by the association. (IMAI, 2019). These reports point out that the young generation is using smartphones and mobile internet more than any other age group in India. This demography also reveals that college-going students and young professionals are having more mobile technology dependency, which is a consequence of smartphone ownership and associated empowerment of an individual (Jarvenpaa & Lang, 2005). The widespread use of smartphones among the young adults reveals its potential as a means for learning and social interactions.

Digitalisation of Education

The academic activities of the entire world took an unexpected and unprepared turn during the year 2020 owing to the Covid-19 pandemic; the schools and colleges shifted to e-learning (Li & Lalani, 2020; Dhawan, 2020). The uncertainty of face-to-face teaching and the fear of losing academic sessions pushed the entire academic system to continue their academic endeavours on a digital and online mode. The hybrid learning

environments which can take up both synchronous and asynchronous forms (Coogle & Floyd, 2015) mandates the provision of quality education to all students in virtual mode irrespective of the students' demographics. Virtual learning is promising with provisions for learning at any time and from anywhere following individual learning styles (Cojocariu, Lazar, Nedeff, & Lazar, 2014) without worrying much about the strict and rigid schedules of educational institutions. The digital gadgets, especially smart phones and the high-speed internet has become more pocket friendly during the last few years as technology advanced. Covid pandemic paved the way for digital learning as an alternative learning mode to face-to-face interaction. Both these factors contributed a lot in the exponential growth of gadget dependency among children especially those in higher education. The digital screen time of learners has increased exponentially due to the pandemic induced virtual learning environment (Wong, et al., 2021). The post-pandemic era has not discarded the digital gadgets or digital learning, but continued its use acknowledging its potential as a powerful learning and social interaction tool.

India, as a nation, initiated its National e-Governance Plan (NeGP) in the year 2006 paved the way of computerisation of different government departments (Ministry of Communication, 2010) in an expedite mode, which later paved the way for digital India programme with a focus of digital empowerment of nation through development of digital infrastructure, digitally transformed services to citizen and digital empowerment of citizen (Digital India, n.d.). Upgradation of digital infrastructure and better availability and stability of internet opened the scope of online learning in India even after the end of compulsory virtual learning era associated with the pandemic. Now, both the learner and the teacher depend on digital means for knowledge accumulation as well as dissemination. The education 4.0 learning taxonomy outlines the skills, attitudes, and values that are much required for young learners to be successful in the present world by learning and mastering those abilities which are unlikely to be replaced by technology (Elhussein, Leopold, Silva, & Zahidi, 2023). Along with acquisition of global citizenship skills, creativity skills and interpersonal skills, the technological skill development is also required for better adaptation; such as artificial intelligence and robotics. In Indian context, the Education 4.0 India is about solving the critical problem of poor learning outcome among children (World Economic Forum, 2022). A solution to this concern is to make quality learning material available for larger mass through digital medium. The aim of Education 4.0 India is to make Indian student ready to fulfil the job demands of the current century. We can see that the nation is gradually embracing digitalisation in all domains, including education. The digital divide among Indian students plays a detrimental role in digital education. The India inequality report on digital divide mentioned that only 31% of rural population has access to internet (Oxfam India, 2022). Similar digital divide exists across gender, caste, socio economic background etc. of the citizen. Similarly, the report highlights that there is a dearth of digital literacy among people of the nation. At the same time, there is a rapid penetration and increase in the possession of smart phones by people, to meet the requirements of digitalisation, especially by students for online learning. A report by the Mint mentioned that around 79% of Indian students are using smartphones for their education needs (Ahaskar, 2020). Here we can see that there is dichotomy; one side, we are pushing for digitalisation and the number of smartphones increasing while on the other, our digital literacy is less and digital divide is more. In case of students, this dichotomy can play havoc; one side it will lead to the irresponsible overuse of mobile devices merely as a gadget to stay connected with friends and for entertainment purpose and consequent addiction to mobile phones and on the other, a mental stress, that develop due to the lack of competency and digital literacy to use the digital devices effectively for academic purpose. These two silent phenomena; the Technostress which is the inability or lack of competence of an individual to cope up with the latest technology (Brod, 1984) or the stress associated while shifting from the traditional work habits to more technology-intensive work habits (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008) and nomophobia which is the fear of an individual to live "without access to a working cell phone" (Merriam-Webster, n.d.) or the "fear of being detached from mobile phone connectivity" (Bhattacharya, Bashar, Srivastava, & Singh, 2019), which is nothing but a kind of addiction are the unintended but inevitable products of digital education.

Technostress among learners

Indian higher education system is now dependent on technology. From admission till the declaration of result, the process has been digitalised and the students need to supply information in digital form in many instances. Similarly, the learning has been moved more towards blended mode, mandating the availability of gadgets and basic digital literacy among learners. Many a times, learning tasks become technology intensive and those who are not having the desirable technological skills would certainly face anxiety, fear, aversion and similar feelings while using technology for learning.

Stress, that is associated with the use of technology is called as technostress and is usually causes due to the inability of an individual to cope up with the rapid changes that are taking place in the technological world (Şahin & Çoklar, 2009). The increased demand to use technology in academic sphere might lead students in higher education into a stressful condition, characterised by technology overload or technology invasion, especially when they lack digital literacy and the basic competencies to adapt to the changing and challenging world of technology. Craig Brod defined technostress as the inability of an individual to cope up with the newer technologies in a healthy way (Brod, 1984). Later, another study explained technostress as a response of an individual in the form of fear, anxiety etc. while using computer technology and finally ending with a

psychological and emotional aversion to learn or use the technology (Wang, Shu, & Tu, 2008). Most of these studies defined or looked technostress among employees working in different organisations, where there was an increase of demand for use of technology in the workplace. The trend, we can observe now in education sector of India, especially higher education, since we have embraced technology for learning very recently, that too without much preparation.

Since the first quarter of 2020, the higher education system in India has shifted totally from conventional face-to-face mode to remote learning with an enhanced dependency on mobile technology. The “India Lockdown Learning” report published by *Vidyaasarathi* revealed that only 17% of students in India have a computer to attend an online class whereas 79% of students are having access to a smartphone (Ahaskar, 2020). The majority of the students are using smartphones and the purpose of these phones before the pandemic might be for casual browsing, gaming or social networking along with the usual utilities of a basic phone. It was not much used for educational purposes since the education was in face-to-face mode. Now the entire scenario has been changed and students need to depend only on their smartphones for their learning needs. They need to use technology for their entire learning task, right from admission, through attending classes and completing assignments to writing examinations (Upadhyaya & Vrinda, 2021). Digital literacy among a majority of learners is still not conducive to meet the demands of virtual classrooms and virtual learning environments. The latest Learning Management Systems (LMS) demands students to develop ICT skills (Upadhyaya & Vrinda, 2021). The majority of the students, especially girls and rural students, would find it difficult to cope-up with the required ICT skill and ultimately result in technostress. The frequent changes and complex nature of ICT enabled learning (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008) and the increase in workload and learning tasks associated with ICT based learning could trigger technostress among learners.

Studies were conducted on technostress and its influence on academic productivity (Upadhyaya & Vrinda, 2021). The influence of technostress on the overall learning effectiveness of digital natives has been studied among undergraduate students by researchers in Nigeria (Oladosu, Alasan, Ibrinke, Ajani, & Jimoh, 2020). The findings revealed that the students, even if they are digital natives, are experiencing technostress. Another study was conducted on technostress among university students (Abilleira, Rodicio-García, Ríos-de-Deus, & Mosquera-González, 2020) in Spain. The study adopted a technostress questionnaire prepared for Chinese university teachers and the tool was found to be useful among Spanish University students after making modifications. The student well-being was found to be negatively influenced by technostress as revealed by a study conducted on college students above 17 years of age using the tool developed by Ragu-Nathan et. al. in 2008 (Cherian, Pandita, & Shree, 2020). The same tool, which is called a “technostress questionnaire” has been used in many other studies, such as the “Personality and espoused cultural differences in technostress creators” (Krishnan, 2017) and “Techno-stress and productivity: survey evidence from the aviation industry” (Alam, 2016). A study has been conducted among working professionals to identify major stressors leading to technostress. The study found that work overload is one of the most dominant stressors while intrusive technology is identified as the dominant predictor of stressors (Ayyagari, Grover, & Purvis, 2011). A study conducted in China found that technostress affects the mental health and productivity of technology users (Tu, Wang, & Shu, 2005). An in-depth literature review on technostress indicated that the earlier notion about technostress as a disease has been changed and presently it is considered as an inability to adapt to changing technologies (Salazar-Concha, Ficopal-Cusí, Boada-Grau, & Camacho, 2021). The same paper has identified that most of the research in technostress has been conducted in medicine, social sciences and computer science. These studies indicates that technostress occurs due to an individual’s difficulty to cope up with the ever-evolving technology. Most of the studies use a “technostress questionnaire” and there is still a dearth of studies in the field of education especially after the fast digitalisation of learning environment during the post-pandemic era.

The author had personal experiences with learners in higher education struggling to use the latest technology for academic purpose. Even while filling an online entrance examination form or profile creation in the institutional portal, students used to commit multiple errors highlighting the absence of required technological competencies and digital literacy. This ultimately represent the possibility of having, or developing in a later stage, the technostress among learners, especially in higher education.

Nomophobia among learners

On one hand, there is stress associated with the appropriate and effective use of digital technology for learning, while on the other, the smart gadgets penetrated intricately in the personal life of an individual in a less technologically demanding way and hence in a user-friendly manner. At the same time, digitalisation of services made the necessity to have digital devices for ease of accessing them, may it be government services or e-commerce or entertainment. The smartphones are the most appropriate and easy means to avail all these facilities compared to a tablet or a laptop. With a connected smartphone, an individual can access many types of services, all sorts of information at their fingertip and above all, it helps them to get connected with others through the social media after the advent of web 1.0 and web 2.0 technologies. Smart phones are promoted by the manufacturers as lifestyle devices for sharing information and social networking (Cochrane, 2008). Now most of the present generation students are well-versed with technology and can be called “digital natives” (Prensky, 2001; Upadhyaya & Vrinda, 2021). Students are heavy users of mobile technology and are spending

more hours on their gadgets (Bhattacharya, Bashar, Srivastava, & Singh, 2019) leading to habit formation and addiction (Shambare, Rugimbana, & Zhoua, 2012) to smartphones and mobile technologies. Compared to technostress, the term “nomophobia” has a recent origin in the year 2008 and was coined in a study conducted in the UK (Bhattacharya, Bashar, Srivastava, & Singh, 2019). Adolescents were found to be more vulnerable to nomophobia (Rojas-Jara, Ramos-Vera, Pardo-González, & Henríquez-Caroca, 2018) especially due to their changing preference for digital contacts over physical contacts (as cited in Rodríguez-García, Moreno-Guerrero, & Belmonte, 2020) with other people.

This excessive use and addiction to mobile phones lead to the development of a dependence syndrome (Nikhita, Jadhav, & Ajinkya, 2015) called nomophobia. The unproductive use of smartphones distract students from learning and the constant connectivity to social media may lead to an increase in anxiety (Lepp, Barkley, & Karpinski, 2014). Nomophobia is a fear of not having mobile phone connectivity and that creates panic and anxiety in individuals (Fletcher, 2022). Some studies highlight that nomophobia is not much related to phobia or anxiety but is more related to an addiction (Tran, 2016). The children, especially those who are in higher education in India are having own smartphones and is being used for learning and social interaction. The excess use of smartphone is a reality among these students and it has become part and parcel of their life. Their entire social life and interactions revolve around smartphone. For anything and everything, they depend on their phone. Be it to share their photos or to search for the meaning of an unknown word or to wish a best friend best wishes. The faster, reliable and cheaper internet connectivity plans gave impetus to this (over) dependency. This author has observed the behaviour of students in higher education about their smartphone usage. It is found that the first thing that they do after completion of an examination is not discussing the questions with their friends but check their smartphone for something, which is known to the concerned only. A casual talk with those students revealed that majority are having a screen time of around 4 to 6 hours a day and within that, most of the time is spend on social networking and for entertainment (Personal communication, PG students 2022-24). These instances, even though is not based on a strict empirical study, reveal that the dependency of students on smartphones are increasing and it is leading to addiction and later to the condition called nomophobia. Nomophobia is the No Mobile phone Phobia, which is the state an individual experience when they are detached from their smart gadget, especially smartphone.

A study on nomophobia among medical students (Bartwal & Nath, 2020) revealed that it is an emerging issue and almost all the medical students studied have nomophobia in varying degrees. The researchers used the nomophobia questionnaire (NMP-Q) to conduct the study. Many other studies (Dasgupta, et al., 2017; Lee, Kim, McDonough, Mendoza, & Kim, 2017; Yildirim, Sumuer, Adnan, & Yildirim, 2016) have also used NMP-Q to research nomophobia. Some studies have re-established the reliability and validity of NMP-Q in their specific context. For example, the NMP-Q has been translated and validated in the Italian language through exploratory factor analysis by a set of researchers (Adawi, et al., 2018). A psychometric evaluation of the Arabic version of NMP-Q has been done by Al-Balhan et.al. (2018) and found that the Arabic tool does not fit satisfactorily to the original factor structure. Still, NMP-Q is one of the most adopted and used tools in nomophobia related studies. Another trend observed in studies on nomophobia is that a good number of studies are conducted among medical students (Bartwal & Nath, 2020; Dasgupta, et al., 2017; Darvishi, Noori, Nazer, Sheikholeslami, & Karimi, 2019) and university students (Adawi, et al., 2018; Yildirim & Correia, 2015). The rise in the wrong use of mobile technology among adolescents is identified as a major reason for the emergence of nomophobia (Rodríguez-García, Moreno-Guerrero, & Belmonte, 2020). Nomophobia has a negative impact on education and the performance of students. An impact study among students of physiotherapy conducted by Ahmed, Pokhrel, Roy, & Samuel (2019) revealed the inverse relation between nomophobia score and academic performance. Similarly, another study on college students about the “effect cell phone usage and emotion-regulation style” has revealed that the use of cell phones impairs the academic performance of students (Lee, Kim, McDonough, Mendoza, & Kim, 2017).

As in the case of technostress, nomophobia is also on the rise due to the constant immersion of students in the virtual world especially in social networking. The studies revealed that most of the researchers used a nomophobia questionnaire to study the presence of nomophobia and most of the studies are taking place in the higher education context. Studies are conducted in higher education levels, but most of them are among medical and engineering students.

Impact on psychological well-being and academic performance

The technostress occurs when an individual is not able to cope-up with the technology efficiently especially when advanced technologies and complex LMS are used in the teaching-learning process, and nomophobia is the fear of losing own smartphone, in a highly and virtually connected social world of the children. The present generation learners are facing both these issues in the digital world. Studies were conducted on nomophobia and technostress by different researchers at different points in time. Technostress is relatively older than the concept of nomophobia, but both are extremely relevant in the present context where learning has become almost impossible without the help of technology.

We can neither reject the technological advancement nor the use of smartphones among the students. We need to re-establish the human to human, face to face interactions, thus should give priority to real world interactions rather than that of virtual interactions (Bhattacharya, Bashar, Srivastava, & Singh, 2019).

Technostress do have a positive impact on engagement in work and learning; but it adversely impacts the health (Borle, Reichel, Niebuhr, & Voelter-Mahlknecht, 2021). It leads to a decrease performance (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007) and job satisfaction (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). These studies highlight the fact that technostress can have adverse impact on overall well-being and hence it would negatively influence the academic performance of learners.

Similarly, some researchers believe that nomophobia too have a negative impact on the mental well-being of individuals, since the fear of missing the mobile is considered as a sign of unhealthy use of digital devices (Ratan, Parrish, Zaman, Alotaibi, & Hosseinzadeh, 2021). A literature review on nomophobia suggested that it is a threat to social, mental and physical health of individuals (Notara, Vagka, Gnardellis, & Lagiou, 2021) and academic performance is negatively impacted by higher levels of nomophobia (Qutishat, Lazarus, Razmy, & Packianathan, 2020; Demir, 2019). This highlights the negative impact of nomophobia on overall wellbeing of individuals and the ir academic performance.

Way forward

The impact of technostress and nomophobia on learners in the higher education would become detrimental, if not taken care of since both would affect the wellbeing and academic performance of learners. Indian students in higher education are now having an increased exposure to technology, especially for learning. The use of digital gadgets is not restricted to learning, but is equally used for social networking too.

There should be proper orientation and training to students regarding the judicious use of digital gadgets; this is possible through a well-planned digital literacy programme among the youths in the higher education. Even though they are digital natives, they lack the skill and dispositions to remain connected in a responsible manner. They are undermining the value of personal interactions and feel more comfortable in the virtual world. The higher learning institutions should device mechanisms to reduce the screen time of learners, especially in the social media. Awareness programmes could be beneficial to certain extend and along with that, the teachers in higher education institutions should promote the value of personal interactions. They can provide specific tasks to learners which could be completed only through face-to-face interactions, such as meeting people in the nearby villages or by asking them to complete some academic assignments only with the help of physical books available in the library. This would help them to have a better interaction with those domains that they seldom do in a virtual world.

Conclusion

Majority of students in India are from rural background where they do not expose formerly to any digital literacy programmes and are more vulnerable to cyberbullying and related issues in the virtual world. They are finding it difficult to meet the demands of digital learning and at the same time, are not willing to sacrifice their social networking in the virtual world. The psychological well-being of the learners is an important aspect of the nation. If the technostress and nomophobia among higher education students in India is not studied or addressed properly, they remain vulnerable to the demands and traps of virtual world.

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