



Acceptance and Use of Digital Technology by Students in India After the Covid-19 Pandemic

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ARTICLE INFO

Article history:

Received May 23, 2023

Accepted September 12, 2023

Available online May 25, 2024

Kata Kunci:

Teknologi Digital, Intensi Perilaku, Gaya Belajar, Internet Seluler, Hybrid Learner

Keywords:

Digital Technology, Behavioural Intention, Learning Styles, Mobile Internet, Hybrid Learners

DOI:

<https://doi.org/10.23887/jet.v8i2.61944>

ABSTRAK

Setelah COVID 19, penting untuk memastikan penerimaan dan penggunaan teknologi digital oleh pelajar di India. Tidak semua peserta didik memiliki niat perilaku yang sama dalam menggunakan teknologi digital. Dengan mempertimbangkan hal tersebut, penelitian ini bertujuan untuk menganalisis gaya belajar peserta didik dan menelusuri hubungan fungsionalnya dengan kelanjutan penggunaan teknologi digital. Peserta didik (n 242) yang memiliki keterampilan menggunakan teknologi internet seluler berpartisipasi dalam penelitian ini. Penelitian ini merupakan studi empiris berdasarkan desain survei qualtrics. Upaya telah dilakukan untuk memperkuat model keterkaitan struktural konstruksi dengan teknik Smart PLS-SEM. Studi ini mencatat serangkaian temuan: peserta didik, terlepas dari gaya belajarnya, menunjukkan kesediaan untuk terus menggunakan teknologi digital sebagai sumber belajar terbuka; pembelajar yang serba cepat memiliki hubungan langsung dengan penggunaan perilaku, artinya mereka lebih terorganisir dan cepat saat menggunakan alat digital untuk mengoptimalkan hasil; dan pembelajar yang bermotivasi hibrida memiliki niat perilaku yang kuat untuk e-learning. Infrastruktur digital di sekolah, jika gaya belajar tidak sesuai dapat mengakibatkan masalah perilaku penggunaan. Peserta didik dapat didorong untuk berpartisipasi dalam program pembelajaran digital untuk memaksimalkan keuntungan. Penerimaan yang tinggi dan penggunaan teknologi digital yang lebih sedikit perlu diperhatikan untuk mengatasi kesenjangan antara niat berperilaku dan perilaku penggunaan. Temuan ini berfokus pada gaya belajar yang akan membantu menjembatani kesenjangan antara penerimaan dan penggunaan teknologi digital untuk program pembelajaran di sekolah.

ABSTRACT

After COVID 19 it was pertinent to ascertain acceptability and usage of digital technology by learners in India. Not all learners had similar behavioural intention of using digital technology. Taking it into consideration the study aimed to analyze learning styles of learners and trace its functional linkages to continuance usage of digital technology. Learners (n 242) who had skills of using mobile internet technology participated in the study. It was an empirical study based on qualtrics survey design. An attempt was made to substantiate model of structural linkages of constructs by Smart PLS-SEM technique. The study noted a set of findings: learners irrespective of their learning styles showed a willingness to continue usage of digital technology for open learning resources; paced learners had a direct linkage to use behaviour meaning that they were more organized and faster while using of digital tools for optimization of results; and hybrid-motivated learners had a strong behavioural intention for e-learning. Digital infrastructure in schools, if mismatched learning styles might result in a problem of use behaviour. Learners could be encouraged to participate in digital learning programme for maximization of gains. High acceptance and less use of digital technology required to be attended to address the gap between behavioural intention and use behaviour. The findings focused on learning styles that would help bridge a gap between acceptance and use of digital technology for school learning programme.

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1. INTRODUCTION

Digital technology in learning after covid-19 open a space of discussion on constructs that play an important role in understanding variation in behavioural intention of learners (Singh, 2022; Sprenger & Schwaninger, 2021). Improving digital infrastructure and encouraging learners for engagement with digital tools are not sufficient conditions that determine behavioural intention of continuance usage of edu-apps for e-learning. Not all learners have a similar behavioural intention of using digital technology. In India learners are aware of many applications of Mobile Internet. But, their usage for e-learning is a major concern. Usually, they stay temporarily on educational portals and apps and prefer to move around social media. It has posed a major challenge to ensure optimum results of digital technology. A few learners are curious to digital technology while others are found adopting blended learning. But a large number of them are still oblivious to benefits of digital technology.

It shows that only extrinsic constructs do not matter while predicting usage of digital technology, some intrinsic constructs need to be considered for ensuring good results of digital India programme. Learners' performance and efforts for digital technology, facilitating conditions of schools and social influence by which they calculate benefits of technology, are some of the significant determinants of acceptance and usage of digital technology (Venkatesh et al., 2012, 2016).

Remarkably, previous studies did not consider learning style accountable for behavioural intention of continuance usage of digital technology. The study aimed to confirm the structural path of performance expectancy, effort expectancy, social influence, facilitating conditions of schools and learning styles that leads to behavioural intention of continuance usage of digital technology in school set-up. Emerging literature on the usage of edu-tech in India has largely focused on its perceived efficacy and its potential to improve learning outcomes. The emergence of Education 4.0 concept has necessitated both the digital technology and digital infrastructure for transformational change in pedagogical procedures of school education (Kin et al., 2022; R. Kumar, 2021). Many educational portals and apps have been developed to facilitate e-learning programme both for teachers and students. Though the OECD had already addressed upcoming issues of the digital learning, India responded to the need for digital technology late during school closures since 2020 (Bosica et al., 2021; V. Kumar & Nanda, 2019). India has witnessed a sudden upsurge in the usage of digital technology by students in the government schools for improving learning performance since COVID 19. Their engagement with educational portals and apps for e-learning shows a gap in behavioural intention of continuance usage of digital technology. The study focused on a set of constructs that led to behavioural intention of learners for e-learning.

The rapid assessment of learning sketched a pattern of their stay on digital platforms (Singh, 2022; Sprenger & Schwaninger, 2021). The survey revealed that 97 per cent students spent about 3.5 hours on surfing various digital platforms. 69 per cent students at the secondary level had android mobile. Of them 57 per cent boys and 27 per cent girls had their own android mobile. About 47 per cent girls carried parents' mobile during school hours. Students (33 per cent boys and 45 per cent girls respectively) shared e-contents of learning with their colleagues. However, there existed a few evidences (about 10 per cent) of browsing websites. In a recent rapid assessment of learning in six states of India it was noted that only 68 per cent of adolescents in urban and 47 per cent in rural areas were using technology-enabled learning tools. Around 41 per cent of schools had access to computers and around 26 per cent to the internet in 2020-21. These surveys did not identify types of learners who had behavioural intention to use digital technology for enhancing learning performance. Learning styles when combined with other constructs lead to behavioural intention for actual usage of digital technology. Presumption is that not all learners have similar intention to use digital technology (Falck et al., 2018; Sheromova et al., 2020). The study was designed to examine functional linkages to predictors with behavioural intention of continuance usage of digital technology by learners. Taking a lead from previous findings the study adopted Venkatesh's model to ascertain usage of digital technology by learners in the state government schools.

The Unified Theory of Acceptance and Use of Technology (UTAUT) has extensively been applied to measure users' adoption and diffusion of digital technology in various settings (Dwivedi, Rana, Chen, et al., 2017; Dwivedi, Rana, Jeyaraj, et al., 2017; Lai, 2017). The UTAUT model explains behavioural intention and actual usage of digital technology with a set of potential predictors across settings. The behavioural usage intention and actual use of digital technology are presumed to be a function of a set of determinants such as performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), Researchers across the world have applied, integrated and extended the UTAUT to validate acceptance and use of technology (Olushola & Abiola, 2017; Venkatesh et al., 2012). Behavioural intention refers to users' evaluation of any product or service that results in positive feelings (Chou et al., 2015; Wang et al., 2022). The Venkatesh's structural model presumes some cognitive factors influencing behavioural intention of continuance usage of digital technology during the post-COVID 19. A few prototype models support basic tenets of the UTAUT. Self Determination Theory (SDT) of human motivation, for instance, explains that people often take decisions on many issues without outside influence (Fang et al., 2011; Han et al., 2018; Mouakket, 2020; Zhang et al., 2015). Technology Acceptance Model deals with two key factors of continuance usage intention: a. the perceived usefulness and b. the perceived ease of use. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance performance" and perceived ease of use as "the degree to which a person believes that using the system would be free of any complication". Expectation Confirmation Model lays emphasis on the relationships between perceived usefulness, confirmation, satisfaction, and ultimately continuance intention to use.

Learning styles in technology-enhanced learning programme appear a significant predictor of continuance usage of digital technology. Learning styles refer to a preference for particular mode of learning. Learners differ in their choices of using digital platforms for e-learning. It shows the degree of engagement by learners in open learning resources available to them. Previous studies confirm that learning styles bring variation in behavioural intention (Manikutty et al., 2007). The deep approach to learning entails an interest in new ideas and a willingness to explore them in-depth. The surface apathetic approach is characterized by learners tending to focus on memorization, being extrinsically motivated by the fear of failure and pay attention strictly to the task at

hand. These learners tend to be bound to the syllabus and typically gain only a shallow understanding of the subject. In a study on technical institute of India observed that strategic and deep learners had more behavioural intention of digital learning (Singh, 2017). A cross-cultural variation in learning styles was also noted. Asian surface learners had less choice of using digital technology. They showed more interest in non-digital tools of teach.

Performance expectancy (PE) refers to the degree to which digital technology provides benefits to learners in performing learning activities; effort expectancy (EE) is the degree of ease associated with learners' usage of technology; social influence (SI) is the extent to which learners evaluate education consultants' advice on the usage of a particular technology; facilitating conditions (FC) explain learners' perception of learning resources and support available to perform learning behaviour. Performance expectancy (PE), effort expectancy (EE) and social influence (SI) result in behavioural intention while facilitating conditions (FC) have direct linkage to use behaviour. Facilitating conditions (FC) assume a strong predictor (Fianu et al., 2018; Schukajlow et al., 2022; Wei et al., 2022). Hybrid-motivated learners use technology to transform information into understanding. Paced learners with their digital skills focus on securing higher grades and rewards. Habitual learners are identified simply as mobile users but least interested in web learning. They have very limited version of knowledge about the usage of digital technology. By and large, learning styles bring variation in usage of digital technology. These three learning styles when combined with four predictors, would lead to variation in behavioural intention. The objectives of the study is to analyze learning styles of learners and trace its functional linkages to continuance usage of digital technology.

2. METHOD

The study focused on learners of 10th -12th grade studying in the government schools who had skills of using mobile internet technology. Mobile Internet enabled learners to develop, upload and share e-contents with colleagues for improving learning. Students from the government schools were screened at three levels. At the first level 390 respondents were shortlisted who had exposure to open learning resources at various levels. At the second level those learners (N 307) who had their own android mobile were identified for the study. Of them sixty-five respondents did not show their willingness to participate in the study. At the final level 242 respondents (boys 165 and girls 77) participated in the study. Learners selected for the study represented 86 public schools (31 higher secondary and 55 secondary) from 7 districts. About 62 per cent learners (N 154) hailed from secondary schools. Their age ranged from 14-18 years. The U-DISE (Unified-District Information of School Education), a valid yearly document published by the Ministry of Education, government of India was taken into consideration for secondary source of information about schools, teachers and students during sampling.

The state where the study was conducted had its own website and various portals for sharing educational initiatives and best practices of teachers and students. The state had mobile and app-based learning groups using social media such as You Tube, Face book, What Sapp group, Blog, LinkedIn, e-magazine, etc. for comprehensive growth of students. It was a convenient sampling and hence, only those respondents who showed their willingness to participate in the study were approached. The research team ensured confidentiality of responses to all respondents with applicable information privacy legislation.

The study followed two separate measures-digital technology scale and learning style scale (Singh, 2017). Altogether eight constructs were retained. The retained constructs with items in parenthesis were: performance expectancy (4), effort expectancy (4), social influence (3), facilitating conditions (4), behavioural intention (3), habitual learners (3), hybrid-motivated learners (3) and paced learners (2). Items of these two scales were clubbed together to generate a single measure for the study. They were modified and reframed in order to make them contextually relevant for respondents. All items were measured on four point scale. The final scale comprising 26 items was retained after a several round of workshops with the help of a group of teachers who had participated in development of e-contents for students in past. For measuring the use behavior construct a list of four popular mobile Internet applications was separately provided to respondents. They were asked to endorse their usage frequency with each application.

It was a quantitative study based on qualtrics survey design. Instrument was uploaded on the web-site prepared by a group of teachers during COVID 19. At the same time, respondents were individually approached through mobile. During this process many respondents reciprocated the team members and promptly responded to them. It took over approximately three weeks to complete the process of data collection. A group of teachers extended their support to team members during data collection. The data was analyzed with the help of Smart PLS-SEM (Partial-Least Squares-Structural Equation Method).

3. RESULT AND DISCUSSION

Result

The study used Smart PLS-SEM (Partial-Least Squares-Structural Equation Method) to substantiate structural model of behavioural intention. It consisted of two parts: a. measurement model analysis and b. structural model analysis. Table 1 shows the results of measurement model including information about reliability, validity and factor loadings.

Table 1. Confirmatory Factor Analysis: Partial Least Square Loadings and Cross- Loadings

Construct		Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
Performance expectancy	PE1	0.86	0.17	0.15	0.11	0.16	0.08	0.11	0.10
	PE3	0.82	0.20	0.14	0.21	0.10	0.11	0.09	0.17
	PE4	0.81	0.17	0.18	0.22	0.13	0.09	0.17	0.14
Effort expectancy	EE1	0.15	0.79	0.27	0.16	0.19	0.16	0.07	0.20
	EE2	0.07	0.83	0.23	0.17	0.16	0.17	0.09	0.15
	EE3	0.13	0.84	0.24	0.14	0.14	0.24	0.04	0.24
	EE4	0.16	0.77	0.30	0.14	0.15	0.25	0.08	0.15
Social influence	SI1	0.11	0.26	0.81	0.15	0.08	0.14	0.10	0.16
	SI2	0.11	0.30	0.78	0.17	0.15	0.15	0.07	0.17
	SI3	0.17	0.30	0.76	0.15	0.15	0.16	0.09	0.19
Facilitating conditions	FC1	0.19	0.30	0.17	0.80	0.08	0.17	0.14	0.23
	FC2	0.18	0.22	0.23	0.79	0.21	0.19	0.20	0.14
	FC3	0.16	0.14	0.17	0.82	0.21	0.20	0.17	0.15
	FC4	0.15	0.15	0.16	0.85	0.24	0.14	0.18	0.15
Hybrid motivated learners	HM1	0.21	0.14	0.15	0.17	0.86	0.24	0.15	0.25
	HM2	0.26	0.16	0.15	0.15	0.82	0.21	0.06	0.28
	HM3	0.27	0.19	0.19	0.15	0.79	0.10	0.11	0.25
Paced learners	PV1	0.28	0.14	0.05	0.30	0.15	0.72	0.04	0.10
	PV2	0.09	0.17	0.08	0.30	0.04	0.74	0.05	0.17
Habitual learners	HT1	0.24	0.15	0.16	0.21	0.09	0.09	0.83	0.24
	HT2	0.08	0.09	0.07	0.19	0.09	0.06	0.82	0.11
	HT3	0.19	0.12	0.11	0.23	0.08	0.07	0.82	0.21
Behavioural intention	BI1	0.11	0.23	0.22	0.13	0.15	0.08	0.11	0.84
	BI2	0.17	0.21	0.22	0.14	0.21	0.07	0.16	0.83
	BI3	0.14	0.19	0.21	0.19	0.24	0.11	0.21	0.80

Note. N= 242

Based on Table 1, the obtained loadings on each indicator of the construct were more than 0.70. The internal consistency reliabilities (ICRs) of the scale were more than 0.83. The average variance extracted (AVE) ranged between 0.63 and 0.80 in all cases and was more than the squared loadings of each indicator (>0.71) suggesting convergent validity of the scale. The pattern of loadings and cross-loadings supported internal consistency. HTMT was computed to estimate discriminant validity of each factor. On an average HTMT ratio was 0.72 showing discriminant validity of the scale. Use behaviour (UB) having four reflective indicators had weights between 0.56 and 0.62. Correlation matrix among constructs showed significant relationships among variables is show in Table 2.

Table 2. Correlation Matrix among Constructs

Construct	Mean	SD	1	2	3	4	5	6	7	8	9
1.PE	4.21	1.11	-								
2.EE	3.89	1.01	0.41***	-							
3.SI	3.61	0.98	0.48***	0.36***	-						
4.FC	4.24	1.12	0.32***	0.55***	0.33***	-					
5.HM	3.44	1.06	0.26***	0.22***	0.14**	0.15**	-				
6.PC	2.98	0.97	0.14**	0.07	0.07	0.14**	0.16**	-			
7.BI	3.97	1.05	0.41***	0.26***	0.28***	0.45***	0.36***	0.29***	-		
8.HB	3.79	1.16	0.34***	0.28***	0.37***	0.26***	-0.14**	0.06	0.40***	-	
9.UB	4.06	1.08	0.30***	0.20***	0.20***	0.30***	0.27***	0.25***	0.37***	0.43***	-

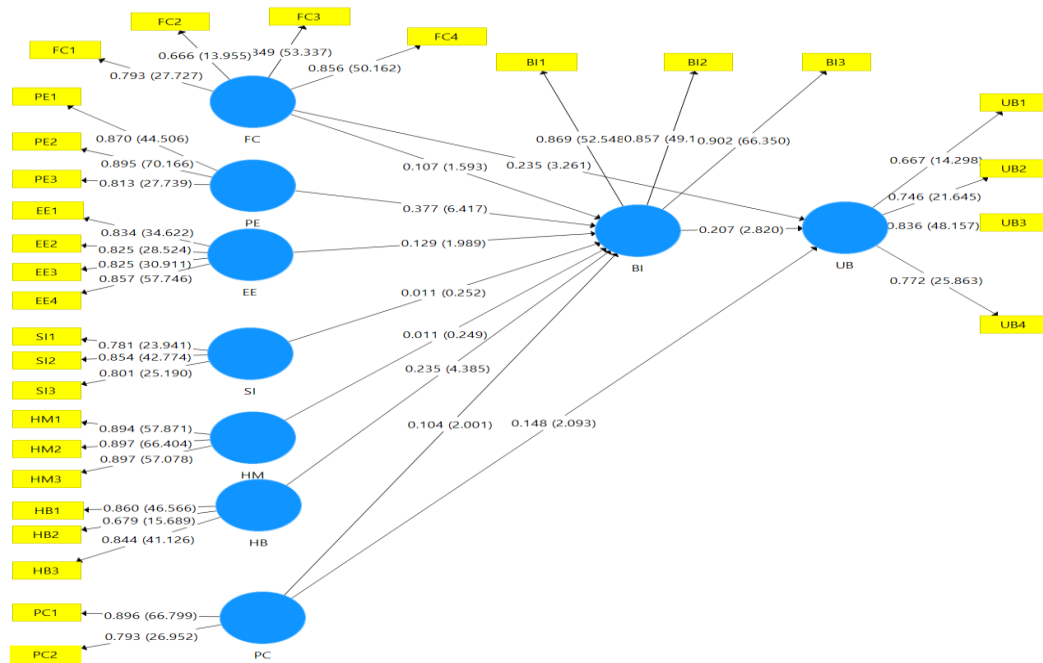
Note: N 242; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; HM: Hybrid motivated learners; PC: Paced learners; BI: Behavioural Intention; HB::Habitual learners; UB: Use behaviour; *p<0.05; **p<0.01; ***p<.001; Diagonal elements are AVEs and off-diagonal elements are correlations

Base on Table 2, habitual learners did not correlate with paced learners (>0.05). By the same token, paced learners had no relation to social influence (p>0.05). There could be biasness in path coefficients in PLS-SEM as a result of multi-collinearity in the exogenous constructs (independent variables). In case of high multi-collinearity, the effect of single exogenous construct on endogenous construct was difficult to ascertain. Variance Inflation Factor (VIF) was estimated for all indicators of each factor. The VIF value more than 3 indicated a problem of collinearity and greater than 5 confirmed the problem of collinearity. The obtained VIF values of all indicators were found less than 3 showing the below critical level thereby, confirming no multi-collinearity among predictor variables. After obtaining path coefficients bootstrapping was computed to check whether an indicator had a significant contribution to its endogenous construct. Critical value of t, two tailed test at 95 % confidence interval was taken into consideration as show in Table 3.

Table 3. Assessment of Path Coefficients after Bootstrapping

Construct	Original Sample (O)	Sample Mean (M)	SD	t-value	P Values (95% CI)
BI -> UB	0.207	0.206	0.073	2.820	0.005*
EE -> BI	0.129	0.127	0.065	1.989	0.047*
FC -> BI	0.107	0.108	0.067	1.593	0.112
FC -> UB	0.235	0.239	0.072	3.261	0.001**
HB -> BI	0.235	0.238	0.054	4.385	0.000**
HM -> BI	0.011	0.011	0.043	0.249	0.803
PC -> BI	0.104	0.104	0.052	2.001	0.046*
PC -> UB	0.148	0.144	0.071	2.093	0.037*
PE -> BI	0.377	0.376	0.059	6.417	0.000**
SI -> BI	0.011	0.009	0.042	0.252	0.801

Base on Table 3, R² and R² (adj) values for behavioural intention were 0.70 and 0.69 and for the used behaviour 0.55 and 0.52 respectively. The values of R² and (R²_{adj}) were found significant (p< 0.05). The emerged structural-equation model after bootstrapping is displayed in Figure 1.



Note: PE: performance expectancy; EE: effort expectancy; SI: social influence; FC: facilitating conditions; HM: hybrid-motivated learners; PC: paced learners; HB: habitual learners; BI: behavioural intention; UB: use behaviour.

Figure 1. Structural-Equation Model (SEM) after Bootstrapping

Discussion

The study recorded a set of findings: a. learners irrespective of their learning styles had a significant linkage to behavioural intention showing willingness to continue usage of digital technology for open learning resources. Of them, paced learners had direct linkage to use behaviour meaning that they were more organized and fast while using digital tools for optimization of results; c. hybrid-motivated learners showed a strong behavioural intention that led to use behaviour for e-learning; d. habitual learners also showed their behavioural intention but had no direct linkage to use behaviour; e. facilitating conditions available to the government schools emerged as strong predictor which had direct linkage to use behaviour meaning that learners continued using digital technology in future; and g. social influence was less effective to predict behavioural intention. The findings corroborated with previous studies (Manikutty et al., 2007; Singh, 2017). Paced and hybrid learners had a fair tendency to use mobile for open learning resources.

More specifically, paced learners strategically moved forward for securing high grade and rewards for improving learning. Habitual learners were found simply mobile users and had least interest in e-learning programme. They preferred to opt for non-digital tools for learning. Based on path coefficients and significant test after bootstrapping and corresponding t and p values ($t=1.989$, $p<0.05$) the study confirmed the significant effects of latent constructs on behavioural intention. The model adopted for the study explained 70 per cent of the variances in learners' behavioral intention to use technology and 55 per cent of the variances in learners' use behaviour. Previous studies concluded the similar results (Balakrishnan & Lay, 2016; Moussa, 2018). The study attempted to verify all three objectives. Paced and hybrid-motivated learners maximized advantages of digital infrastructure of school. It reinforced them for using open learning resources through mobile Internet and other digital tools. On other side, habitual learners showed behavioural intention but had feeble linkage to use behaviour for open learning resources. The real challenge revolves around habitual learners who accept digital technology but use less of it for e-learning. Practitioners need to focus on them. Despite digital infrastructure and accessibility to digital tools such as Mobile Internet they show least interest in edu-apps and portals (Papadakis et al., 2020; Von Kotzebue, 2022). They stick to traditional mode of learning despite social influence. How to motivate them is a major problem to practitioners. They need to be promoted for using blended learning. Acceptance and usage of digital technology are two different issues. Accepting digital technology does not mean that learners would shift to digital tools for e-learning. Paced and hybrid-motivated learners not only accepted digital technology but showed their behavioural intention to use it for future gains (Buckley & Doyle, 2016; Mee Mee et al., 2020). Thus, a gap between acceptance and usage could be addressed in the context of learning styles. In India, blended learning is recommended for school education where both the digital as well as traditional modes need to be encouraged.

What motivates learners to continue usage of digital technology for e-learning? Is it enough for learners to have basic digital skills, in the sense of the ability to understand, evaluate and to communicate with digital technology for e-learning programme? TPACK (technological-pedagogical-content knowledge) model explains the kinds of knowledge required by learners for successful integration of technology in learning (R. Kumar, 2021; Paidican & Arredondo, 2022). Intersection between technology, pedagogy and content is only possible when learners have intense desire to use digital technology. Paced learners were well-versed with digital technology. They were more curious about the restructured pedagogy and contents that took place in school education under the National Education Policy. Once exposed to pedagogy and contents they showed their ability of surfing and browsing. On other hand, hybrid-motivated learners had strong intention of learning as well as understanding. While using digital technology they tried to assimilate learnt contents with conceptual understanding.

Accessibility to digital tools was not an issue to habitual learners. They showed their behavioural intention of continuance usage of edu-apps for e-learning. Facilitating conditions emerged as prominent predictor that reinforced learners to stay with edu-apps at leisure and also helped them to change the mind-set. The results showed that a large segment of learners had smart digital mind-set which cropped up during COVID 19 pandemic. Many states in India formulated a comprehensive digital learning programme during the crisis period to mobilize learners for digital technology. A few of them could take off at the school level. It was necessary to have a digital mind-set of learners for establishing linkage to open learning resources. School on Mobile (SoM) for an instance, was a successful programme during COVID 19 pandemic covering a wide range of learners from inaccessible areas. This learning management programme helped learners stay with Edu-apps. The study got substantiated by previous findings (Panisoara et al., 2020).

The implications of this research can help educational institutions in India to understand the level of acceptance and use of digital technology by students after the COVID-19 pandemic. This could lead to increased investment in digital technology infrastructure in schools and colleges, as well as teacher training in the use of these technologies. The results of this research can be used to update educational curricula by emphasizing digital skills needed in the post-pandemic era. Digital education can be integrated into the curriculum to help students prepare to face increasingly complex technological challenges. However, this study may have limited

generalizability due to its focus on students in India. The resulting findings may not be directly applicable to educational contexts in other countries or to student populations with different backgrounds.

4. CONCLUSION

The findings had a wide implication of digital learning programme in school. While inducting digital infrastructure in school and expecting maximum gains of digital learning programme, learning styles required to be blended with the digital tools. The findings would be helpful in bridging the gap between behavioural intention and behavioural usage of digital technology. Habitual learners need to be encouraged to participate in digital learning programme. A comprehensive intervention strategy needs to be formulated to bridge the gap between acceptance and use of digital technology at the national level.

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