Marginalization, Technology Access, and Study Approaches of Undergraduate Distance Learners During the COVID-19 Pandemic in India

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Abstract

The COVID-19 pandemic has led to the disruption of classroom activities and adoption of online teaching-learning in almost all parts of the globe, including India. The sudden switch from classroom blackboards to laptop screens may have influenced students' study approaches, especially with challenges related to technology access and readiness for online learning among Indian students. Since different social and economic factors bring about differences in students' learning, an online survey was conducted with 296 randomly selected undergraduate distance learning (DL) students at Indira Gandhi National Open University to examine how technology access during the pandemic influenced the study approaches of Indian DL students from various marginalized and non-marginalized groups. The research results showed that marginalized students had lower access to technology than did their non-marginalized counterparts, although no gender differences were found in access to technology in both the groups. Lower access to technology was associated with a surface approach to study among the DL students in general and the marginalized students in particular. Females in the marginalized group were found to be at risk in terms of both access to technology and study approaches. The findings were intended to enrich our understanding of the role of technology vis-à-vis distance learners' study approaches during the pandemic and formulate appropriate teaching-learning strategies for the future.

Keywords: marginalization, technology access, online learning, approaches to study, distance students, open and distance learning

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The literature on students' learning in higher education has confirmed that students adopt different approaches to studying, (i.e., deep, surface, achieving) congruent with their learning motivation, namely intrinsic, extrinsic, and achieving (Biggs, 1987; Entwistle & Waterson, 1988). Students from different cultures and in different social milieu see learning differently (Richardson, 1994, 2000). The sudden outbreak of the COVID-19 pandemic compelled all educational institutions in India to teach and assess online (Mishra et al., 2020). This largely affected students belonging to marginalized communities like the scheduled caste (SC), scheduled tribe (ST), and other backward castes (OBCs) as marginalized people were socially disadvantaged, unable to access resources, economically deprived, and facing inequity and exclusion (United Nations Development Programme, 2019). This has deepened the digital divide between the communities of marginalized and non-marginalized (McBurnie et al., 2020). Online learning calls for devices like smart phones, computers, laptops, and so on, as well as a high bandwidth Internet connection, an uninterrupted supply of electricity, and the knowledge and skills to handle technology to one's advantage. This could be challenging for students who belong to marginalized communities. The World Bank (2020) has reported that these disparities in access to technology can create a digital divide that may restrict online education in developing countries. Olayem et al. (2021) reported that (a) fear of high Internet charges, (b) non-availability or limited access to computers, (c) lack of broadband services, and (d) interrupted electricity were major hindrances to online learning. Further to cultural and socio-economic status variations in students' study approaches, differences also exist in technology access across cultural and social groups. There was a need to examine this scenario in the context of unusual situations like the COVID-19 pandemic.

Literature Review

Phenomenography-based research studies conducted in Britain and Sweden in the late 1970s confirmed the existence of different approaches to study in students. Students adopting a deep approach aimed at understanding for their satisfaction and were engaged in wide reading from different sources to connect different ideas while learning. On the other hand, students who adopted the surface approach saw learning as unrelated bits of information and tried to memorize the learning material and do the minimum required to pass the course (Marton & Saljo, 1976; Pask, 1976). Some students have also adopted an achieving or strategic approach to their studies (Biggs, 1987; Ramsden, 1979). They attained good grades by adopting different achieving strategies such as time management, selective study by reading past year's papers, and cue seeking.

Different personal, social, and contextual factors bring about differences in the way students learn (Vermunt, 2005). Rearing practices, as well as individuals' role and status in society may also be reasons for gender differences in students' learning (Richardson, 2000). Several studies in Western countries confirmed that the study approaches of distance students did not differ from those of on-campus students (Harper & Kember, 1986; Morgan et al., 1980; Richardson, 2005). Even distance students were found to adopt a deeper approach to study as compared to on-campus students (Neroni et al., 2019; Quinn, 2011). In earlier studies, Richardson et al. (1999) and Richardson (2005) found that women studying at a distance adopted a more surface approach to study than did men, but later Richardson

(2013) found this difference had waned, perhaps due to women's changing status in society.

The COVID-19 pandemic, when students were compelled to study online, raised challenges for India, as in other developing as well as low- and middle-income countries in South Asian and sub-Saharan regions, where fewer students in marginalized communities had access to technology (McBurnie et al., 2020). To ensure equity and inclusion, there was a need to explore access to technology especially by marginalized students, while they studied online during the pandemic; the marginalized students may have been more adversely affected than their counterparts. Further, access to technology needed to be examined in terms of marginalization and gender, and their influence on approaches to study.

Context of the Study

Marginalization is a common problem spread globally across different cultures and civilizations, and in different ways with varying degrees (Vinod & Kumar, 2021). These authors pointed out that "two of the most pervasive forms of inequality in the Indian context have been caste and gender" (Vinod & Kumar, 2021, pp. 6–7). India's new National Education Policy (NEP, 2020) has emphasized equity and inclusion in higher education. The policy further recognized gender identity (female and transgender) and sociocultural identity (SC, ST, and OBC) as socio-economically disadvantaged groups (Kumar, 2021). India is largely a patriarchal country; many inequalities such as gender roles and stereotypes, have been socially constructed there (Siddiqui, 2021). "This gender disparity aggravates because of the intersection of other identities, such as caste, religion, region, and tribe, and adds to a much more vulnerable position of women in the field of higher education" (Mathur & Sharma, 2021, p. 245). Goode (2010) also found gender, race, and socioeconomic status associated with access to and use of technology. As Muthuprasad et al. (2021) stated "it is important to note that the learning quality depends on the level of digital access and efficiencies" (p. 2). These prevailing situations aroused my interest in finding gender differences in access to technology and the study approaches of students in marginalized and non-marginalized communities studying online during the pandemic.

This study aimed to investigate access to technology and the study approaches of marginalized and non-marginalized distance learning students in India studying online during the pandemic. The study also intended to investigate how access to technology was related to the study approaches of these students. These were important topics since the study approaches adopted by students in higher education are significant determinants of quality of learning and academic achievement. The study was conducted to answer three key research questions.

1. Are there any significant differences in access to technology and study approaches between marginalized and non-marginalized distance learning students?

2. Are there any significant differences in access to technology and study approaches between male and female distance learning students within marginalized and non-marginalized communities?

3. What is the relationship between access to technology and study approaches of marginalized and non-marginalized distance learning students?

Methods

Research Methodology

The survey research method was used in this study. Quantitative surveys have been used by many researchers to assess the study approaches of students across institutions and cultures (Hermann et al., 2017; Ullah et al., 2016; Yin et al., 2018). Quantitative data was collected through two questionnaires—the revised two-factor study process questionnaire (R-SPQ-2F) to examine study approaches, and a self-made questionnaire measuring students' access to technology. The questionnaires were administered online through Google Forms to students selected randomly.

Participants/Samples

The study was conducted at the Indira Gandhi National Open University (IGNOU) headquartered in New Delhi, India, with regional centers as well as study centers spread across the country and in about 15 countries overseas. A center in the Delhi region was conveniently selected by the researcher; and 296 undergraduate students studying in their final year undergraduate program were randomly selected from a population of 1,000 students enrolled in arts/humanities, science, and social sciences. Of the 296 students, 133 belonged to marginalized groups and 163 belonged to non-marginalized groups (Table 1). The two questionnaires were administered online to all the randomly selected students.

Table 1

Selected Sample from Indira Gandhi National Open University (Total Population 1,000)

Group	Male	Female	Total
Marginalized	95	38	133
Non-marginalized	94	69	163
Total	189	107	296

Instruments

The revised two-factor study process questionnaire developed by Biggs et al. (2001) in English was used to get responses on students' study approaches. The questionnaire contained 20 questions and comprised two scales, the deep approach and the surface approach. Each scale was divided into two subscales—deep motive and deep strategy, and surface motive and surface strategy. There were five questions for each subscale; examples of questions from each subscale are given in Table 2.

Table 2

Example Items From Each Subscale of the R-SPQ-2F Questionnaire

Subscale	Example statement
Deep motive	I work hard at my studies because I find the material interesting.
Deep strategy	I find most new topics interesting and I often spend extra time trying to obtain more information about them.
Surface motive	I aim to pass the course with as little effort as possible.
Surface strategy	I find the best way to pass an examination is to try to remember answers to likely questions.

A second questionnaire was developed by the researcher to measure students' access to technology

during the pandemic. There were four questions for assessing students' access, and one additional question regarding students' satisfaction with access to technology during the pandemic. The five questions (given below) were measured on a three-point Likert scale (i.e., high access, medium access, and low access to technology).

1. I had access to either a smart phone, laptop, tablet, or computer while studying online during COVID-19 pandemic.

2. The software used by the university for online teaching was compatible with my device.

3. I had a broadband Internet facility at home for online study during the pandemic.

4. Many times, my online classes were disrupted/disturbed due to electricity failure.

5. Overall, I was satisfied with my access to technology while studying online during the pandemic.

Reliability and Validity of the Instruments

The R-SPQ-2F is a short and validated inventory. It measures the deep and surface approaches universally adopted by students across different cultural and linguistic contexts. It has been derived from the original study process questionnaire (Biggs, 1987) which had 64 items. The revised inventory has been validated in Japan (Fryer et al., 2012) and the Netherlands (Stes et al., 2013) and has recently been used in China and Chile (Yin et al., 2018; Yin et al., 2016) to assess the study approaches of undergraduates. The inventory has also been used to assess the study approaches of students in different contexts, such as a flipped classroom environment (Jeong et al., 2019) and a blended learning environment (Ellis et al., 2009) in Australia. The inventory has recently been used in India to assess students' engagement while studying online during the pandemic (Bhuria et al., 2021). To check its reliability for participants in this study, a pilot was conducted by the researcher with 40 randomly selected undergraduates at IGNOU. The Cronbach alpha (α) of R-SPQ-2F was found to be 0.81, which showed high reliability of the scale in the Indian context. The reliability of the different subscales is given in Table 3, as compared to Biggs et al. (2001). A strong association was found between the surface motive and surface strategy subscales with the surface approach scale, and the deep motive and deep strategy subscales with the deep approach scale. This confirmed the criterion validity of the R-SPQ-2F. The Cronbach alpha of the self-made questionnaire was found to be 0.75. The mean score of the access to technology scale was found strongly related to learners' satisfaction with access to technology during the pandemic. This showed reasonably high construct-validity of access to technology scale.

Table 3

Reliability of R-SPQ-2F Subscales: Cronbach Alpha of Biggs et al. (2001) and Current Study

Subscale	Biggs et al. (2001)	Current study
Deep motive	0.62	0.57
Deep strategy	0.63	0.54
Surface motive	0.72	0.53
Surface strategy	0.57	0.41
Deep approach	0.73	0.72
Surface approach	0.64	0.60

Findings

To begin, the quantitative data from the two questionnaires (i.e., R-SPQ-2F and access to technology survey) was checked for normal distribution in the total sample and selected sub-samples from different groups. Kolmogorov-Smirnov tests showed significance levels greater than .08 in different cases, indicating data did not deviate significantly from normal distribution.

The statistical technique, *t*-test, was applied to determine group differences (i.e., gender, marginalized, and non-marginalized students) concerning access to technology and study approaches. Pearson's correlation coefficient was used to determine the relationship between students' access to technology and their study approaches.

Access to Technology

Marginalized and Non-Marginalized Distance Students

The five-question self-made questionnaire assessed 296 distance students' access to technology. The difference in access to technology of 133 marginalized and 163 non-marginalized students was measured using a *t*-test technique at .05 and .01 levels of significance. Overall, a significant difference was found in the average scores for access to technology by marginalized and non-marginalized students (Table 4).

Table 4

Measures of Access to Technology: Marginalized and Non-Marginalized Students

Measure	Marginalized (*n* = 133)	Non-marginalized (*n* = 163)	*t*-value
Mean	1.82	2.06	-3.59
SD	0.54	0.59	$p < .01$

Table 5 shows that the non-marginalized students had better access to smart phones, laptops, and so on than did the marginalized students ($p <.01$). The non-marginalized students' devices were also found to be more compatible with the university software for online teaching ($p <.01$). There was also a significant difference in the speed of broadband Internet between the marginalized and non-marginalized students. The marginalized students were found to have lower speed Internet facilities as compared to their non-marginalized counterparts ($p <.01$) and were found to be less satisfied with their access to technology during the pandemic ($p < .01$). In both groups, no significant difference was found concerning the disturbance of online classes due to electricity failure. A Cohen's (1988) *d* value of 0.58 in terms of the difference in speed of broadband Internet showed a medium to large part of the marginalized population was affected due by this and thus needs consideration. Meanwhile, a small to medium part of the marginalized population (Cohen's *d* = 0.33) was affected even in terms of access to devices and compatibility. A small to medium population (Cohen's *d* = 0.32) of the marginalized students were found to be less satisfied with their access to technology during the pandemic.

Table 5

Measures of Access to Technology Variables: Marginalized and Non-Marginalized Students

Variable	Parameter	Marginalized ($n = 133$)	Non-marginalized ($n = 163$)	t-value
1. Access to laptop, tablet, or smart phone while studying	Mean	1.82	2.07	-2.80
	SD	0.78	0.74	$p < .01$
2. Compatibility of device with university's software for teaching	Mean	1.76	2.01	-2.84
	SD	0.72	0.74	$p < .01$
3. Speed of broadband Internet	Mean	1.64	2.02	-4.14
	SD	0.76	0.78	$p < .01$
4. Disruption of online classes due to electricity failure	Mean	2.03	2.17	-1.48
	SD	0.78	0.76	n. s.
5. Students' satisfaction with access to technology	Mean	1.75	1.98	-2.59
	SD	0.75	0.74	$p < .01$

Note: n. s. stands for not significant.

Marginalized and Non-Marginalized Males

In the case of technology access among male students, those from non-marginalized groups were found to have better access to technology and the difference was statistically significant ($p < .01$). Though no significant difference was found in access to smart phones, laptops, and so on by students from both the groups, a significant difference was found in device compatibility with IGNOU's software and students' speed of Internet (Table 6). Marginalized male students' devices were less compatible and they had lower Internet speeds than did their non-marginalized male counterparts.

These differences were found to be statistically significant at .05 and .01 levels, respectively. However, no significant difference was found in satisfaction with technology access among males in both groups. Cohen's *d* value of 0.52 showed a medium to large effect size, which means a medium to large number of marginalized males were affected by lesser speeds of broadband Internet and compatibility of devices as compared to non-marginalized males.

Table 6

Access to Technology: Values for Male Students, Marginalized and Non-Marginalized

Variable	Parameter	Male (M) ($n = 95$)	Male (NM) ($n = 94$)	t-value
1. Access to laptop, tablet, or smart phone while studying	Mean	1.86	2.08	-1.91
	SD	0.78	0.74	n. s.

2.	Compatibility of device with university's software for teaching	Mean	1.81	2.07	-2.44
		SD	0.72	0.74	$p < .05$
3.	Speed of broadband Internet	Mean	1.67	2.07	-3.44
		SD	0.80	0.78	$p < .01$
4.	Disruption of online classes due to electricity failure	Mean	2.07	2.14	-0.66
		SD	0.78	0.76	n. s.
5.	Students' satisfaction with access to technology	Mean	1.86	2.02	-1.39
		SD	0.79	0.76	n. s.

Note: n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Marginalized and Non-Marginalized Females

The marginalized females were found to have less Internet speed than their non-marginalized counterparts (Table 7). They were also found to be less satisfied than were the non-marginalized females. These differences were statistically significant at a .05 level (Table 7). A Cohen's *d* value of 0.50 showed a medium effect size; neither a large nor small population of marginalized females was affected by lesser speeds of broadband Internet during the pandemic as compared to non-marginalized females. Further, the medium-sized population of marginalized females (Cohens' *d*: 0.42) was found to be less satisfied with their access to technology during the COVID-19 pandemic.

Table 7

Access to Technology: Values for Female Students, Marginalized and Non-Marginalized

Variable	Parameter	Female (M) ($n = 38$)	Female (NM) ($n = 69$)	*t*-value
1. Access to laptop, tablet, or smart phone while studying	Mean	1.78	2.07	-1.89
	SD	0.73	0.72	n. s.
2. Compatibility of device with university's software for teaching	Mean	1.71	1.91	-1.34
	SD	0.72	0.76	n. s.
3. Speed of broadband Internet	Mean	1.60	1.95	-2.40
	SD	0.67	0.79	$p < .05$
4. Disruption of online classes due to electricity failure	Mean	1.94	2.24	-1.70
	SD	0.80	0.74	n. s.
5. Students' satisfaction with access to technology	Mean	1.63	1.92	-2.12
	SD	0.67	0.70	$p < .05$

Note: n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Males and Females From Marginalized and Non-Marginalized Groups

A *t*-test was used to determine the gender differences between male and female students of both

communities. No significant difference was found in access to technology for both populations within both communities (Table 8).

Table 8

Measures of Access to Technology for Male and Female Students in Marginalized and Non-Marginalized Groups

Variable	Parameter	Male (NM) (*n* = 94)	Female (M) (*n* = 38)	*t*-value and signif.	Male (M) (*n* = 95)	Female (NM) (*n* = 69)	*t*-value and signif.
1. Access to laptop, tablet, or smart phone	Mean	1.86	1.78	0.50	2.08	2.07	0.10
	SD	0.80	0.73	n. s.	0.78	0.72	n. s.
2. Compatibility of device	Mean	1.81	1.71	0.71	2.07	1.91	1.34
	SD	0.72	0.72	n. s.	0.74	0.76	n. s.
3. Internet speed	Mean	1.67	1.60	0.49	2.07	1.95	0.93
	SD	0.80	0.67	n. s.	0.78	0.79	n. s.
4. Disruption due to electricity failure	Mean	2.07	1.94	0.82	2.14	2.21	0.56
	SD	0.77	0.80	n. s.	0.77	0.74	n. s.
5. Satisfaction with access to technology	Mean	1.86	1.63	1.69	2.02	1.92	0.80
	SD	0.79	0.67	n. s.	0.76	0.70	n. s.

Note: n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Study Approaches

Marginalized and Non-Marginalized Distance Students

The study approaches of 296 IGNOU students was assessed using the R-SPQ-2F, and the differences between the study approaches of 133 marginalized and 163 non-marginalized students was measured using the *t*-test (Table 9). No significant difference was found for any subscale of the study approach inventory, except the surface motive subscale. Marginalized students were found to have higher scores on surface motive than non-marginalized students. Cohen's *d* value of 0.30 showed a small to medium effect size; a small to medium population of marginalized students had more surface motives towards their study as compared to the non-marginalized group while studying online during the pandemic.

Table 9

Study Approaches: Scores for Marginalized and Non-Marginalized Students

Variable	Parameter	Marginalized (*n* = 133)	Non-marginalized (*n* = 163)	*t*-value
Deep motive	Mean	3.84	3.79	0.70
	SD	0.50	0.56	n. s.

Deep strategy	Mean	3.86	3.74	1.77
	SD	0.56	0.58	n. s.
Deep approach	Mean	3.85	3.77	1.37
	SD	0.50	0.52	n. s.
Surface motive	Mean	2.77	2.59	2.42
	SD	0.61	0.64	p < .05
Surface strategy	Mean	2.92	2.77	1.89
	SD	0.68	0.66	n. s.
Surface approach	Mean	2.84	2.71	1.37
	SD	0.58	1.09	n. s.

Note. n. s. stands for not significant.

Female Students From Marginalized and Non-Marginalized Groups

No significant difference was found for any subscale except the deep motive (Table 10). Between the female students of both the groups, those in the non-marginalized groups were found to have higher scores on deep motives than were the marginalized female group ($p < .05$). The Cohen's d value of 0.42 indicated that a small to medium population of marginalized females was affected and was less deeply motivated for online study during the pandemic as compared to non-marginalized females.

Table 10

Study Approaches: Scores for Female Students

Variable	Parameter	Female (M) (*n* = 38)	Female (NM) (*n* = 69)	*t*-value
Deep motive	Mean	3.65	3.89	-2.11
	SD	0.57	0.48	p < .05
Deep strategy	Mean	3.66	3.76	-0.80
	SD	0.60	0.60	n. s.
Deep approach	Mean	3.66	3.82	-1.51
	SD	0.54	0.50	n. s.
Surface motive	Mean	2.72	2.48	1.77
	SD	0.62	0.64	n. s.
Surface strategy	Mean	2.88	2.71	1.20
	SD	0.73	0.70	n. s.
Surface approach	Mean	2.80	2.60	1.59
	SD	0.64	0.61	n. s.

Note. n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Male Students From Marginalized and Non-Marginalized Groups

The marginalized male students were found to adopt a deeper approach to study than their male counterparts in the non-marginalized groups ($p < .05$; Table 11). Marginalized males were found to have more deep motives and apply more deep strategies than did non- marginalized males while learning online ($p < .05$). A Cohen's d value of 0.4 indicated a small to medium effect size; a small to medium-sized population of marginalized males applied the deep approach to study as compared to the non-marginalized males. This population of marginalized males was more motivated to study deeply and applied more deep strategies while learning online during the pandemic.

Table 11

Study Approaches: Scores for Male Students

Variable	Parameter	Male (M) (n = 95)	Male (NM) (n = 94)	t-value
Deep motive	Mean	3.91	3.73	2.28
	SD	0.46	0.60	p < .05
Deep strategy	Mean	3.94	3.74	2.49
	SD	0.52	0.56	p < .05
Deep approach	Mean	3.93	3.74	2.60
	SD	0.45	0.53	p < .05
Surface motive	Mean	2.79	2.67	1.27
	SD	0.61	0.61	n. s.
Surface strategy	Mean	2.93	2.81	1.29
	SD	0.67	0.64	n. s.
Surface approach	Mean	2.86	2.75	1.31
	SD	0.55	0.57	n. s.

Note. n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Males and Females From Marginalized and Non-Marginalized Groups

Marginalized male students were found to adopt a deeper approach to study than did marginalized females (Table 12). They had more deep motives and applied more deep strategies while learning online ($p < .05$). No gender differences in study approaches were seen in the non-marginalized group of students. Cohen's *d* values of 0.51, 0.52, and 0.53 indicated a medium to large effect size; a medium to large population of marginalized females adopted less deep approaches and deep strategies while learning online during the pandemic as compared to marginalized male students.

Table 12

Study Approaches for Male and Female Students in Marginalized and Non-Marginalized Groups

Variable	Parameter	Male (NM) (n = 94)	Female (M) (n = 38)	t-value and signif.	Male (M) (n = 95)	Female (NM) (n = 69)	t-value and signif.
Deep motive	Mean	3.91	3.65	2.44	3.73	3.89	-1.82
	SD	0.46	0.57	p < .05	0.60	0.48	n. s.
Deep strategy	Mean	3.94	3.66	2.50	3.74	3.76	-0.16
	SD	0.52	0.60	p < .05	0.56	0.60	n. s.
Deep approach	Mean	3.93	3.66	2.65	3.74	3.82	-1.02
	SD	0.45	0.54	p < .05	0.53	0.50	n. s.
Surface motive	Mean	2.79	2.72	0.58	2.67	2.48	1.81
	SD	0.61	0.62	n. s.	0.61	0.67	n. s.
Surface strategy	Mean	2.93	2.88	0.35	2.81	2.71	0.94
	SD	0.67	0.73	n. s.	0.64	0.70	n.s.
Surface approach	Mean	2.86	2.80	0.50	2.75	2.60	1.50
	SD	0.55	0.64	n. s.	0.57	0.62	n. s.

Note. n. s. stands for not significant, M stands for marginalized, NM stands for non-marginalized.

Relationships Between Access to Technology and Study Approaches

The study approach and access to technology scores of 296 distance education students were assessed through the R-SPQ-2F inventory with a self-made additional questionnaire on access to technology, respectively. The Pearson coefficient of correlation was calculated for these students, 133 of whom were from marginalized groups and 163 who were non-marginalized. The results are summarized in Tables 13, 14, and 15.

Table 13

Results of Pearson Test for 296 Undergraduates at IGNOU

Variable	Technology access	t statistic	df	p-value
Deep approach	0.08	1.37	294	0.171
Surface approach	0.18*	3.16	294	0.0017

Note. * indicates that correlation is significant at a .01 level of significance.

The value of the coefficient of correlation r (294) of - 0.18, p = 0.0017 showed a weak negative but statistically significant correlation between technology access and surface approaches to study by students generally (Table 13). Gignac and Szodorai, (2016) described a small to medium effect size as represented by Pearson's r of magnitude 0.18. A small to medium population of undergraduate students were more inclined to adopt a surface approach due to less access to technology during the COVID-19 pandemic.

Table 14

Results of Pearson Test for 133 Marginalized Students

Variable	Technology access	t statistic	df	p-value
Deep approach	-0.09	1.03	131	0.304
Surface approach	-0.22*	2.57	131	0.0092

Note. * indicates that correlation is significant at a .01 level of significance.

The value of the coefficient of correlation r (131) of -0.22, p = 0.0092 showed a weak negative but statistically significant correlation between technology access and surface approach to study adopted by the marginalized students (Table 14). A Pearson value of 0.22 indicated a medium to large effect size (Gignac & Szodorai, 2016). A medium to a large population of marginalized students were more oriented towards a surface approach due to lesser access to technology as compared to their non-marginalized counterparts.

Table 15

Results of Pearson Test for 163 Non-Marginalized Students

Variable	Technology access	t statistic	df	p-value
Deep approach	-0.054	0.63	161	0.529
Surface approach	-0.110	1.40	161	0.163

Note. * indicates that correlation is significant at a .01 level of significance.

The *r* value of -0.054, *p* = 0.52, and *r* value of -0.11, *p* = 0.16 showed no significant correlations between technology access and study approach for non-marginalized students (Table 15).

Discussion and Implications

The COVID-19 pandemic enforced online teaching and learning for all educational delivery modes including distance education. Before the pandemic, distance courses were taught primarily through self-learning materials (SLMs) and by organizing counseling sessions on weekends. These were supplements by audio or video programs. During the pandemic, SLMs were uploaded onto the e-Gyan Kosh (IGNOU's online resource repository), counseling was held online by designated academic counselors or tutors, and assignments were submitted online at the designated portal. For online learning, students needed a suitable device compatible with the platform used by the teaching university, a broadband Internet connection, and uninterrupted electricity. This was challenging for Indian distance learners since they represented diverse social groups in terms of economic status, family background, geographical area, and Internet facility, among others.

The situation of the marginalized communities in India was not on par with that of the non-marginalized communities, and different personal, social, cultural, and economic factors affected students' learning. There was a need to study the access to technology and study approaches of students, especially the marginalized students, since the latter may have been more adversely affected than their counterparts while studying online during the pandemic. The present study aimed to ascertain the access to the technology of marginalized and non- marginalized distance learning students and how this influenced their approach to study during the COVID-19 pandemic. The important findings of this study are discussed below as per the objectives of this study.

First, an average score of 1.82 on the access to technology scale for the marginalized students represented lower to moderate access to technology for those students, while an average score of 2.06 for the non-marginalized students represented moderate to high access to technology for those students. A significant difference was found in access to technology for marginalized and non-marginalized students. Marginalized students were found to have lower access to digital devices, less compatible devices, and lower speed of broadband Internet as compared to non-marginalized students. Those in the marginalized groups were also found to be less satisfied with access to technology during the pandemic as compared to their non-marginalized counterparts. The results of this study aligned with Kimble-Hill et al. (2020) who reported that marginalized students (in terms of lower income level, color, and rural background) struggled with access to technology. Since online education has been promoted by the government of India when it announced that up to 40% of credits could be earned through online courses, such a significant difference in access to technology could lead to marginalized distance students lagging behind. This digital divide can widen the gaps in online learning between marginalized and non- marginalized students.

Second, no gender difference concerning access to technology was found in the groups of marginalized and non-marginalized students. These findings were consistent with Bhandari (2019) who conducted a study of 51 countries and found no significant gender difference concerning access to technology and information and communication technology (ICT) use in many of them. Our results relating to gender were found inconsistent with Pande and van der Weide (2012) and Nsibirano (2009) who found significant gender differences in access to and use of ICT devices.

The marginalized students were found to have higher scores on surface motives as compared to non-marginalized students. In particular, marginalized female students were found to have fewer deep motives for online study as compared to non-marginalized females. Access to technology during the pandemic could have been an important factor contributing to the motivation of marginalized students; the lower the technology access, the higher the surface motives for study.

Despite having no significant gender difference in access to technology in either group, a significant gender difference was found concerning the study approach among marginalized students. The marginalized female students were found to adopt a less deep approach to study than the marginalized male students. Fewer deep motives and deep strategies used by marginalized female students as compared to their male counterparts during online study may have been due to less access to technology alongside other social and cultural factors that adversely affected their deep approach to study. A lesser use of a deep approach and less access to technology for marginalized females studying online could be cause for concern among educators. As Vagishwari (2021) pointed out "women are yet to cross this digital divide to be an integral part of the digital world in India" (p. 234). The situation becomes more critical in the case of marginalized women as this adds on to other social and cultural barriers thereby making online learning challenging for this vulnerable sector.

Third, one unexpected result was found in this study, that the marginalized male students (despite having lesser access to technology than the non-marginalized males) were found to adopt a deeper approach to study than their male counterparts in the non-marginalized group. The marginalized males were also found to have higher scores on deep motives and deep strategies as compared to the non-marginalized males. These findings underline that marginalized males have achieved a better position in society through education even with fewer resources and less access to technology. This should be a measure of concern for both policymakers and educational administrators in the country.

Fourth, although distance students' deep approach to study was not associated with their access to technology, lesser access to technology was found associated with the surface approach to study. This association was also found in the marginalized students. This suggested that better access to technology can reduce the surface approach to study by distance education students in general, and by marginalized students in particular, as far as online learning is concerned. However, on the contrary, poor access to technology enhanced the surface approach to study (rote learning and memorizing essential pieces to pass the course) in distance students, as well as in marginalized distance students.

This study had two major implications. First, to reduce the digital gap and promote online and blended learning between the marginalized and non-marginalized students, there is a need to facilitate special institutional support to the marginalized students in terms of free access to smart phones, tablets, and so on with high-speed Internet connectivity as well. Second, female students in marginalized groups need more support in terms of both technology access and courses on study skills, as they were found to adopt a less deep approach to study than did their counterparts (marginalized males and non-marginalized females). As a general conclusion, to ensure equity and inclusion in higher education, the needs of the marginalized sectors of society in terms of access to ICT and the competencies to use these tools effectively for study should be the basis of designing online teaching-learning where learner support forms an integral part of curriculum design itself (Panda, 2022).

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