

## Working Paper

# In-service Teacher Education and ICT

## Review of CLlx Baseline Data from Four States

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### 1. Introduction

The potential of ICT use for the spread of quality in-service teacher education is being increasingly discussed in Indian policy and programme documents. The ministry of human resource development (MHRD) and the National Council for Teacher Education (NCTE) recently announced the development of a National Teachers Platform (NTP) to provide teachers with digital resources for their professional use. This working paper presents an overview of current access to ICT and ICT-related practices of secondary school teachers in four Indian states, drawing on data from the baseline study made by the Connected Learning Initiative (CLlx).<sup>1</sup>

The data in this working paper is collected from a sample of 30 schools in Mizoram, 20 in Chhattisgarh, 40 in Rajasthan and 75 schools in Telangana, which have been selected for CLlx intervention. A total of 516 secondary school teachers from Chhattisgarh (71), Mizoram (118), Rajasthan (105) and Telangana (222) were surveyed as a part of the CLlx baseline study<sup>2</sup> from June to August 2016. These teachers' subject areas were English (176), mathematics (170) and science (170). Of the total, 36% teachers were women and 64% were men. The highest percentage of teachers falls in the 40–49 years category (46%), followed by 30–39 years (27%)

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<sup>1</sup> CLlx is an effort to bring global best practices in education to our country. It seeks to adapt educational innovations to the Indian context. Through CLlx, TISS aims to significantly improve the quality of high school education in science, English, mathematics and values by creating opportunities for authentic and connected learning experiences using technology. The Initiative provides engaging, hands-on, quality learning experiences in mathematics, sciences and communicative English and digital literacy, integrated with values education and 21st century skills. These resources are currently offered to students of government secondary schools in Chhattisgarh, Mizoram, Rajasthan and Telangana in the regional languages. This unique venture, seeded by the Trusts, will provide a platform for innovation in education. CLlx supports the professional development of teachers, making substantial contributions to teacher education in Indian languages. Research activities and collaborations related to CLlx nurture a pool of professionals from the fields of education, technology and science. Supported by an interconnected network of partners, institutions, public education systems, teachers and learning resources, CLlx offers a scalable and sustainable model of open education. CLlx is led by the Tata Institute of Social Sciences (TISS), the Massachusetts Institute of Technology (MIT) and Tata Trusts. For more information, please visit <https://clix.tiss.edu/>

<sup>2</sup> The CLlx baseline study included a Teacher Schedule and a Teacher Domain tool that were administered to Teachers taking English, mathematics and science in Grade 9.

and above 50 years (17%). The largest social category was OBC (37%), followed by SC (28%) and general category (26%). In terms of educational qualifications, the highest percentage of teachers were postgraduates (57%) followed by graduates (30%).

Subjects taught	Total	Chhattisgarh (CG)	Mizoram (MZ)	Rajasthan (RJ)	Telangana (TS)
English	176	23	44	35	74
Maths	170	22	41	34	73
Science	170	26	33	36	75
<b>Total</b>	<b>516</b>	<b>71</b>	<b>118</b>	<b>105</b>	<b>222</b>

*Table 1a: Number of Teachers Surveyed by State and Subject Taught*

Gender	Total	Chhattisgarh (CG)	Mizoram (MZ)	Rajasthan (RJ)	Telangana (TS)
Male	330 (64)	39 (55)	68 (58)	76 (72)	147 (66)
Female	186 (36)	32 (45)	50 (42)	29 (28)	75 (34)
<b>Total</b>	<b>516</b>	<b>71</b>	<b>118</b>	<b>105</b>	<b>222</b>

Age group	Percentage of Teachers	Social group	Percentage of Teachers	Educational Qualification	Percentage of Teachers
Below 25 years	1.5	ST	7.2	Secondary/Higher Secondary	0.6
25–29 years	6.4	SC	28.9	Graduate	30.6
30–39 years	27.9	OBC	37.2	PG	57.6
40–49 years	46.5	General	26.2	Double PG	9.1
Above 50 years	17.6	Others	0.6	M.Phil	1.4
		Do not wish to divulge	0	Ph.D	0.8
<b>Total</b>	<b>100</b>		<b>100</b>		<b>100</b>

*Table 1b: Demographic Profile of Teachers Surveyed*

## 2. Devices Owned by Teachers

Almost all teachers were found to own a smartphone (96%), and 76% have access to the internet on their phones. Ownership of smartphones was highest in Mizoram (100%) and lowest in Telangana (94%). Access to the internet, too, was highest in Mizoram (90%) and lowest in Telangana (71%). Teachers were found to be networking on social media through their smartphones for both personal and professional reasons. The use of applications (such as WhatsApp) was 74% overall. Mizoram was the highest at nearly 90%, and Rajasthan was lowest at 63%. Ownership of personal computers or laptops across all four states was 59%, with wide variations across the states—Mizoram being the highest (80%) and Rajasthan being the lowest (47%).

Type of device or service	Teachers Owning Devices and Services by States Number (per cent)				
	Total	CG	MZ	RJ	TS
Mobile phone or smartphone	495 (96)	69 (97)	118 (100)	100 (95)	208 (94)
Access to internet on phone	377 (76)	54 (78)	106 (90)	71 (71)	146 (70)
Use of applications for group chats	383 (74)	53 (75)	106 (90)	66 (63)	158 (71)
Laptop or desktop computer	306 (59)	42 (59)	94 (80)	49 (47)	121 (55)
Total	516	71	118	105	222

Table 2a: Ownership of Devices

Overall, 97% of male teachers owned smartphones as compared to 95% of female teachers. Internet access through phones was overall the same across genders (73%). In Telangana, more male teachers had access to the internet on their smartphones (TS: M=70, F=57) and the reverse was true in Rajasthan (RJ: M=63, F=79). More female teachers (67%) reported ownership of laptops and computers as compared to male teachers (55%), and this difference was found in all states. This data does not show whether teachers were actually using the computers regularly. There was little or no difference in ownership of smartphones in terms of age across the states. Access to internet on the phone and use of group chat was higher in the younger age groups.

Type of device or service	Teachers Owning Devices and Services by Gender Number (per cent)									
	Total		CG		MZ		RJ		TS	
	M	F	M	F	M	F	M	F	M	F

Mobile or smart phone	319 (97)	176 (95)	39 (100)	30 (94)	68 (100)	50 (100)	71 (93)	29 (100)	141 (96)	67 (89)
Access to internet on phone	241 (73)	136 (73)	30 (77)	24 (75)	60 (88)	46 (92)	48 (63)	23 (79)	103 (70)	43 (57)
Use of applications for group chats	246 (75)	137 (74)	30 (77)	23 (72)	59 (87)	47 (94)	44 (58)	22 (76)	113 (77)	45 (60)
Laptop or desktop computer	181 (55)	125 (67)	22 (56)	20 (63)	52 (76)	42 (84)	32 (42)	17 (59)	75 (51)	46 (61)
<b>Total</b>	<b>330</b>	<b>186</b>	<b>39</b>	<b>32</b>	<b>68</b>	<b>50</b>	<b>76</b>	<b>29</b>	<b>147</b>	<b>75</b>

*Table 2b: Ownership of Devices by Gender*

<b>Age group</b>	<b>Mobile or Smart Phone</b>	<b>Access to Internet on Phone</b>	<b>Use of Applications for group chats</b>	<b>Laptop or Desktop Computer</b>
Above 50 years	87 (96)	53 (61)	58 (64)	48 (53)
40–49 years	231 (96)	181 (78)	184 (77)	159 (66)
30–39 years	138 (96)	112 (81)	112 (78)	76 (53)
Below 30 years	39 (95)	31 (79)	29 (71)	23 (56)

*Table 2c: Ownership of Devices by Age*

### 3. Digital Literacy

Teachers in the survey were asked to rate themselves on their ability to accomplish a set of tasks demonstrating skills in the use of a computer and the internet as well as skills in operating devices commonly used in schools such as digital cameras. Teachers were asked to choose the ease with which they were able to do the tasks, do them without help, and do tasks that they had never done before.

There were certain digital literacy tasks that over 50% teachers had *never* done. These included using Microsoft PowerPoint software (52%), using hyperlinks (62%), programming a task (60%),

using simulations (72%), booking tickets online (59%), using online maps (52%) and using online conferencing services like Skype (64%) (Table 3).

The results, however, show that a majority of teachers *had* been able to do 12 out of the 22 tasks on their own, without difficulty and without help from anyone.

Digital literacy tasks that more than 50% of the teachers were capable of doing on their own without difficulty included (i) handling a mouse device (64%), (ii) recording audio or video on a smartphone or digital camera (55%), (iii) switching on a computer (54%) and (iv) typing in English on a computer (51%).

Digital literacy tasks that 30–49% teachers were able to do on their own without difficulty included using a web browser (46%), saving files (45%), downloading apps on mobile devices (45%), downloading and uploading files (42%), playing computer games (37%), using email (35%) and using a word processor programme (31%).

Tasks requiring computer, internet and technical skills	Teachers Demonstrating Level of Ease, All States Number (per cent)				
	Done without difficulty or help	Done with difficulty, without help	Done with some help	Done with difficulty and a lot of help	Not done
Start a computer	<b>278 (54)</b>	42 (8)	113 (22)	31 (6)	52 (10)
Type in English on a computer	<b>264 (51)</b>	79 (15)	92 (17)	26 (5)	55 (11)
Handle a mouse device	<b>335 (64)</b>	61 (11)	63 (12)	11 (2)	46 (8)
Save files	<b>237 (45)</b>	49 (9)	109 (21)	22 (4)	99 (19)
Use Microsoft Word or Notepad files	<b>162 (31)</b>	67 (12)	86 (16)	37 (7)	164 (31)
Use a spreadsheet	104 (20)	46 (9)	80 (16)	31 (6)	<b>255 (49)</b>
Use presentation software, e.g., Microsoft PowerPoint	82 (16)	47 (9)	94 (18)	24 (5)	<b>269 (52)</b>
Use basic graphic software, e.g., Paintbrush	159 (31)	56 (11)	75 (15)	25 (5)	<b>201 (39)</b>
Type in Hindi, Mizo, or Telugu	109 (21)	58 (11)	54 (10)	53 (10)	<b>242 (47)</b>
Use a web browser (e.g., Google Chrome, Internet Explorer)	<b>235 (46)</b>	50 (10)	84 (16)	31 (6)	116 (22)

Use email	<b>182 (35)</b>	56 (11)	83 (16)	26 (5)	169 (33)
Play computer games	<b>193 (37)</b>	54 (10)	62 (12)	25 (5)	182 (35)
Use hyperlinks	73 (14)	38 (7)	61 (12)	22 (4)	<b>322 (62)</b>
Download and upload files	<b>217 (42)</b>	62 (12)	66 (13)	30 (6)	141 (27)
Record audio and video on a smartphone or a digital camera	<b>285 (55)</b>	54 (10)	65 (13)	19 (4)	93 (18)
Take photographs with a digital camera	<b>271 (53)</b>	52 (10)	50 (10)	18 (3)	125 (24)
Programme a task	55 (11)	43 (8)	74 (14)	33 (6)	<b>311 (60)</b>
Use a simulation	34 (7)	30 (6)	60 (12)	21 (4)	<b>371 (72)</b>
Use online maps	110 (21)	46 (9)	61 (12)	29 (6)	<b>270 (52)</b>
Book a ticket online	88 (17)	37 (7)	64 (12)	21 (4)	<b>306 (59)</b>
Download and use apps on the mobile phone	<b>232 (45)</b>	47 (9)	81 (16)	23 (4)	133 (26)
Use a video conferencing tool, e.g., skype	89 (17)	37 (7)	44 (9)	14 (3)	<b>332 (64)</b>
Note: Bold numbers in each row show the largest group, that is, the most common level of ease of doing that task.					

*Table 3: Digital Literacy of Teachers*

#### 4. Digital Citizenship

Another dimension of digital literacy is the ability to utilise opportunities for electronic participation in society and make responsible use of technology. Teachers surveyed in the four states were asked to respond to questions on digital citizenship on a 3-point scale of whether they engaged in specific activities frequently (4 or more times a year), sometimes (less than 4 times a year) or never. The responses show a fairly low rate of participation of teachers for all four states. Only 16% of teachers reported that they had filled in online forms frequently. Lodging online complaints or checking local governance sites was the minimal form of participation, but 85% of teachers said they had never done these.

Digital citizenship activities (1)	Teachers Reporting Frequency of Activities Number (per cent)		
	Frequently (4 or more times)	Sometimes (less than 4)	Never

	a year)	times a year)	
Lodged an online complaint	16 (3)	62 (12)	438 (85)
Filled an online form	80 (16)	165 (32)	271 (52)
Applied for government documents online	60 (12)	151 (29)	305 (59)
Used online weather forecast	82 (16)	138 (27)	296 (57)
Checked e-panchayat website	24 (5)	56 (11)	436 (85)

*Table 4a: Digital Citizenship of Teachers (1)*

Teachers were also asked about their electronic participation such as having email accounts, obtaining PAN cards and being members of online groups. In all four states put together, the highest participation was in operating bank ATMs (97%), followed by membership of WhatsApp groups of any kind (75%) as well as groups for teachers (75%). The lowest participation was in online banking (35%). Variations between states, though not very significant, could be seen. For example, in Telangana, 74% teachers had email accounts as compared to 66% overall. Telangana teachers also used SMS to track online transactions (75%) much more than the overall figure of 57%.

<b>Digital citizenship activities (2)</b>	<b>Teachers Reporting Engaging in Activities</b>				
	Number (per cent)				
	<b>Total</b>	<b>CG</b>	<b>MZ</b>	<b>RJ</b>	<b>TS</b>
Have a personal email account	342 (66)	39 (55)	83 (70)	56 (53)	164 (74)
Operate a bank ATM	501 (97)	68 (96)	116 (98)	102 (97)	215 (97)
Use online access to a bank account	178 (35)	22 (31)	60 (51)	22 (21)	74 (33)
Use SMS to track bank, subsidy, gas and other bills and transactions	296 (57)	31 (44)	57 (48)	42 (40)	166 (75)
Member of any WhatsApp group for teachers	387 (75)	51 (72)	104 (88)	61 (58)	171 (77)
Member of any WhatsApp group	386 (75)	49 (69)	107 (91)	64 (61)	166 (75)

*Table 4b: Digital Citizenship of Teachers (2)*

## 5. Training in Digital Literacy

Teachers have had access to training in digital literacy and use of computers from various sources, including training conducted by the state or district education authorities. Responses from teachers from all states shows that 41% teachers had attended some form of ICT training in the use of computers. For individual states, the training was as follows: RJ 68%, CG 59%, MZ 41%, TS 21%.

Out of the 41% of teachers who had received some form of ICT training (Table 5), 52% attended training conducted by the state, 37% by district, 22% by government, 41% self-financed, government sponsored or informal i.e., from friends or family members.

<b>Teachers with Training in Digital Literacy</b>	<b>Total</b>	<b>CG</b>	<b>MZ</b>	<b>RJ</b>	<b>TS</b>
Number (per cent)	209 (41)	(59)	(41)	(68)	(21)

ICT Training Received from						
Teachers with ICT training, all states, Number (percent)	Total	State education authorities	District education authorities	Government	Self-financed	Informal
	209 (41)	109 (52)	77 (37)	46 (22)	86 (41)	58 (28)
Note: The percentages of sources of training attended overlap and do not add up to 100%.						

*Table 5: Training in Digital Literacy*

## 6. ICT Use in Schools

The survey also collected data from teachers on the use of ICT in their schools and the frequency of use of various devices.

The data collated for all four states shows that, in most cases, the ICT resource was not available, the exception being television and computers. Even these were not provided in 25% and 21% of the schools, respectively. About 52% teachers said their schools did not have a radio, 76% did not have a digital camera, 60% did not have an LCD projector. Overall, 60% respondents said they did not have LCD projectors, and 76% said they did not have digital cameras in school. Both of these were highest for Rajasthan at 90%. Overall, 72% teachers said their schools did not have satellite classrooms, but these were widespread in Rajasthan where only 22% did not have them.



Very rarely was an ICT resource used regularly, that is, daily or weekly. The highest use was of satellite classrooms in Rajasthan, where they were used every day in 28% cases. Mobile phones were used 26% of the time on a daily basis in Chhattisgarh.

In the case of computers, it is interesting to note that, overall, in 21% cases, computers were provided in school but were never used. Rajasthan reported comparatively high use of computers, with 25% teachers reporting usage every day and 10% reporting usage once a week. Computers not being in a working condition was highest in Telangana (33%).

Technology device	State	Frequency of Use of Technology Devices in Classroom (per cent)					
		Every day	Once a week	Several times a month	Have, but never used	Not in working condition	Do not have
LCD projector	4 states	1	12	8	12	7	60
	CG	1	7	4	18	7	62
	MZ	1	2	8	25	10	53
	RJ	1	2	2	3	3	90
	TS	1	23	12	6	8	49
Television	4 states	10	13	14	22	17	25
	CG	7	3	6	14	1	69
	MZ	13	2	5	55	12	14
	RJ	2	11	17	8	14	28
	TS	3	22	19	14	27	15
Digital camera	4 states	1	3	6	8	5	76
	CG	1	0	10	4	4	80
	MZ	2	3	10	20	11	54
	RJ	3	2	1	1	3	90
	TS		5	6	5	4	80
Overhead projector	4 states	1	6	8	9	7	70
	CG	4	4	4	13	8	75
	MZ	1	2	7	13	5	73
	RJ	0	1	1	2	2	94
	TS	0.4	12	14	8	9	56
CD or DVD player	4 states	2	8	9	11	11	58

	CG	1	1	6	11	4	76
	MZ	0	2	5	16	8	69
	RJ	4	3	5	9	4	76
	TS	1	17	14	10	18	39
<b>Radio</b>	4 states	2	9	14	10	13	52
	CG	0	1	4	11	7	76
	MZ	0	0	2	7	8	84
	RJ	0	5	2	7	10	26
	TS	5	28	28	13	19	17
<b>Satellite classrooms</b>	4 states	6	6	7	4	5	72
	CG	0	0	1	8	1	89
	MZ	0	0	0	2	3	95
	RJ	28	18	17	4	11	22
	TS	1	6	8	3	9	78
<b>Computer or laptops</b>	4 states	9	12	21	21	17	21
	CG	13	11	20	31	1	24
	MZ	5	8	19	42	11	14
	RJ	23	10	26	13	3	25
	TS	3	15	18	10	33	21
<b>Smart boards</b>	4 states	1	1	1	1	1	95
	CG	0	1	0	0	0	93
	MZ	1	0	2	1	3	93
	RJ	1	0	2	1	0	96
	TS	1	1	1	1	0	96
<b>Mobile phone</b>	4 states	15	6	10	24	2	42
	CG	26	7	3	39	3	23
	MZ	12	2	7	22	1	57
	RJ	19	1	5	22	1	52
	TS	13	11	17	21	2	35
<b>Tablet</b>	4 states	0	2	2	2	1	93
	CG	1	0	1	6	1	90
	MZ	2	0	3	2	1	92
	RJ	1	2	1	0	0	96
	TS	0	2	1	2	0.4	208

*Table 6: ICT Use in Schools*

## 7. ICT Engagement of Teachers

Teachers' individual engagement with ICT for personal or professional reasons outside the school could also provide some indications of their comfort in use of technology. Teachers were asked to select the ICT-related activities they had done in the past 3 months and rate the frequency of these activities on a 4-point scale of 'almost every day', 'once in a week', 'several times', and 'never or almost never'.

The responses from all four states show minimal engagement of teachers with ICT. Only a very small percentage of teachers used ICT on a regular basis. Interestingly, however, teachers have used ICT 'several times' to search for teaching materials (45%), search for professional development opportunities (42%) and interact with online teacher communities (32%).

ICT Activity	Teachers Reporting Frequency of Independent ICT Use, All States Number (per cent)			
	Everyday	Once a week	Several times	Never
Browsed or searched the internet for personal use	106 (21)	74(14)	162 (31)	174 (34)
Browsed or searched the internet to collect teaching materials to prepare lessons	38 (7)	70 (14)	233 (45)	175 (34)
Used PowerPoint or other slides for a presentation at a conference, district meeting or other venue	1 (0.1)	15 (3)	48 (9)	452 (88)
Created digital learning materials for students	2 (0.3)	27 (5)	70 (14)	417 (81)
Searched for courses or activities for professional development	24 (5)	72 (14)	218 (42)	202 (39)
Interacted with online teachers' communities	91 (18)	47 (9)	167 (32)	211 (41)
Documented class work using video or audio	4 (1)	35 (7)	63 (12)	414 (80)
Attended EduSat classes	13 (3)	26 (5)	80 (16)	397 (77)
Used smart boards	8 (2)	4 (1)	17 (3)	487 (94)
Took clippings on mobile phone to show to students in class	3 (1)	41 (8)	159 (30)	313 (61)

*Table 7: ICT Engagement of Teachers*

## 8. Teachers' Beliefs About Use of Technology

What are teachers' beliefs regarding the use of technology in teaching? Surveyed teachers responded to a list of positive and negative statements about ICT in teaching on a 4-point scale of 'strongly agree', 'agree', 'disagree' and 'strongly disagree'. The collated data for all four states were categorised according to positive and negative beliefs. Teachers in general have positive beliefs about the educational uses of technology. Nearly all teachers (99%) agreed that the use of technology would help to improve student learning (50% strongly agree and 49% agree). Nearly all teachers (99%) felt that use of technology also promotes teacher collaboration (63% agree and 36% strongly agree). Most of the teachers (85%) felt that the use of technology was worth the extra time spent in learning and using it (75% agree and 10% strongly agree). As high as 97% teachers believed that technology promotes student collaboration and student interactions (70% agree and 27% strongly agree). About 95% teachers believed that technology helps students apply concepts as well as satisfy the parents' interests (72% agree and 23% strongly agree).

Beliefs about use of technology	Teachers Expressing Level of Agreement, All States			
	Number (per cent)			
	Strongly agree	Agree	Disagree	Strongly disagree
Improve learning	257 (50)	256 (49)	3 (1)	
Help students grasp concepts	144 (28)	345 (66)	26 (5)	
Improve teaching	176 (34)	327 (63)	13 (3)	
Promote teacher collaboration	184 (36)	327 (63)	5 (1)	
Improve student projects	120 (23)	347 (67)	48 (9)	1 (1)
Promote student collaboration	141 (27)	363 (70)	9 (2)	3 (1)
Be worth the extra time	54 (10)	388 (75)	72 (14)	2 (1)
Promote student Interaction	54 (10)	365 (71)	91 (18)	6 (2)
Promote healthy competition	121 (23)	365 (71)	28 (5)	2 (1)
Satisfy parents	117 (23)	373 (72)	24 (5)	2 (0.3)
Help students apply concepts	130 (25)	370 (72)	16 (3)	
Reduce fear of failure	86 (17)	376 (73)	53 (10)	1 (0.1)

*Table 8a: Teachers' Positive Beliefs About Technology Use*

Teachers were by and large *not* in agreement with the negative statements listed in the survey about the use of technology, with a couple of notable exceptions. Teachers disagreed with the statement that technology, or computers in particular, makes students lazy (74%), but some teachers (26%) did agree with this. A majority of teachers felt that use of technology would be time-consuming (57%), but as seen in Table 9a, most of them also felt that this time was well spent.

Beliefs about use of technology	Teachers Expressing Level of Agreement, All States			
	Number (per cent)			
<b>Negative beliefs</b>	Strongly agree	Agree	Disagree	Strongly disagree
Makes students lazy	14 (3)	120 (23)	332 (64)	50 (10)
Is time-consuming	32 (6)	261 (51)	9 (2)	
Has group work that is not useful	8 (2)	139 (27)	341 (66)	28 (5)
Worsens writing quality	66 (13)	234 (45)	207 (41)	9 (2)
Is not useful	31 (6)	209 (40)	257 (50)	19 (4)

*Table 8b: Teachers' Negative Beliefs About Technology Use*

## 9. Challenges in Integrating Technology

One of the main challenges that the teachers surveyed identified with regard to technology directly relates to an important debate with regards to ICT in schools. The merits of having a separate computer teacher as compared to building teacher capacities to incorporate technology meaningfully to learn subject topics have been debated for long. In this survey, 51% teachers considered the lack of a computer teacher as extremely challenging for integrating technology. Poor internet speed was considered extremely challenging by 50% of the teachers. Insufficient training for teachers (43%) and unstable power supply (41%) were also regarded as extremely challenging. Aspects that were seen as challenging to some extent were differing student levels (53%), lack of space in curriculum (48%), time taken away from completing the syllabus (46%) and problems of classroom management (44%).

Challenges in integrating technology in teaching	Teachers Rating Challenges in Use of ICT, All States Number (per cent)				
	Extremely challenging	To some extent	Not sure	Not a challenge	Not challenge, but opportunity
Not enough computers in computer lab	166 (32)	221 (43)	61 (12)	22	46 (9)
Not enough training for teachers to use computers	221 (43)	200 (39)	26 (5)	25 (5)	44 (9)
Not enough opportunity to practice computers in curriculum	150 (29)	247 (48)	52 (10)	32 (6)	35 (7)
Unstable or intermittent power supply	211 (41)	198 (38)	39 (8)	48 (9)	20 (4)
Frequent crashing of computers or outdated computers	195 (38)	209 (41)	62 (12)	30 (6)	20 (4)
Poor internet speed	260 (50)	170 (33)	34 (7)	30 (6)	22 (4)
Too many students in the class (difficulty of giving individual attention to students)	188 (36)	220 (43)	34 (7)	46 (9)	28 (5)
Lack of knowledge of how to use computers to teach one's subjects	123 (24)	213 (41)	51 (10)	80 (16)	49 (10)
Non-supportive leadership	76 (15)	217 (42)	96 (19)	82 (16)	45 (9)
Variation in students' computer skills and aptitude	136 (26)	273 (53)	42 (8)	40 (8)	25 (5)
Unavailability of computer teacher	264 (51)	146 (28)	42 (8)	36 (7)	28 (5)
Time taken away from completion of syllabus	87 (17)	238 (46)	74 (14)	71 (14)	46 (9)
Difficulty in class management as students have difficulties using a computer	113 (22)	226 (44)	68 (13)	71 (14)	38 (7)

*Table 9: Challenges in Integrating Technology*

## 10. Summary

The study throws light on the digital presence of teachers based on a survey conducted in four states of the country, which provides insight into the potential use of technology for continuing

professional development of teachers. The data clearly indicates large scale use of digital devices such as smartphones by secondary teachers in all four states (95%) and high usage of internet through these devices as well (76%). A majority of teachers (75%) are connected with peers through mobile applications and are networking online. This is particularly significant given the move towards digitisation through the National Teacher Platform (NTP) that envisages continuous learning for teachers across the country through:

- Resources for use in classrooms
- Dashboards to track progress and assessment
- Communities for collaboration and discussions
- Announcements, notifications and circulars<sup>3</sup>

Many teachers reported being able to use computers to type in English (51%) and use a web browser (46%). Although 66% teachers reported having email accounts, only 35% reported using their email accounts. Digital citizenship was also found to be minimal, with most teachers (85%) reporting that they had never filled an online form.

With regard to ICT use in schools and classrooms, there is strong positive belief among teachers about the use of technology and its potential for improving student learning, with 75% teachers agreeing that use of technology is worth the extra time that is spent on it. Yet, we find a very low percentage of teachers reporting use of ICT in classrooms, which is largely due to lack of its availability in their schools. Unstable power supply and insufficient training were noted as severe challenges to the use of technology by 41% and 43% of teachers, respectively. Computers were used several times a month in 21% of the cases, while in as many cases, schools had no computers. It is interesting, however, that 21% of the teachers reported using the internet for personal or professional purposes on a daily basis. In addition, teachers reported that they had used the internet 'several times' to search for teaching materials (45%), search for professional development opportunities (42%) and interact with online teacher communities (32%). This seems to indicate a keen interest among teachers to engage with technology for their professional development, particularly when seen in conjunction with the fact that only 41% of teachers reported receiving training of some form or another in ICT.

The survey indicates a high level of interest in ICT among teachers, both for their own professional development and for teaching. The survey also shows that there is a lot of room for improvement in terms of both outreach for training teachers in larger numbers in the use of ICT as well as enhancing the quality of training in ways that enable meaningful integration with the curriculum.

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<sup>3</sup> National Teacher Platform. (2017, May). *Strategy and Approach*. Ministry of Human Resource Development. Retrieved from [http://mhrd.gov.in/ntp/doc/NTP\\_Strategy&ApproachPaper.pdf](http://mhrd.gov.in/ntp/doc/NTP_Strategy&ApproachPaper.pdf)