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Going Digital in the New Normal: Are Our SAUs Ready?

Surya Rathore¹, S. Ravichandran², Manmeet Kaur³ and Poonam⁴

ABSTRACT

Digital Technologies are an indispensable part of higher education and their integration in agricultural higher education have been initiated for many purposes such as for administration of agricultural institutions, record-keeping, research, teaching and learning process etc. Education Division of the Indian Council of Agricultural Research has spent crores of rupees on establishment of e-libraries, SMART classrooms, SMART seminar halls, strengthening of computer laboratories and Educational Technology Cells in State Agricultural Universities of the country apart from developing e-courses, platforms like e-granth etc. In spite of all these efforts, there still exists a gap between the efforts made and actual implementation in the teaching – learning process in agricultural education in our universities. To create a digital ecosystem, the first step is to bring it into practice in the administrative procedures. Thus, an attempt was made to find out the status of digital tools at administrative level in the temples of learning. The study employed exploratory research design conducted in the State Agricultural Universities of northern India (Madhya Pradesh, Jammu & Kashmir, Gujarat and Rajasthan). Universities and Colleges were selected through purposive sampling and so were the Deans and nodal officers. The salient results of this study revealed that use of digitised administrative procedure was remarkable due to presence of ample infrastructural facilities but its integration in mode of course delivery was not prominent. Educational Technology Cells, SMART classrooms, SMART seminar halls, computer laboratories and e-libraries were an integral part of most universities but internet speed was not up to the mark. On the basis of the findings, it is suggested that high speed internet facilities with latest digital gadgets, establishment of Directorate of Information Technology in all State Agricultural Universities, uniformity in the content of all SAU web sites and their periodical updating. Development of e-courses and mobile Applications related to agricultural education is the need of the hour. Virtual classrooms are the only pathways to curb the menace of faculty crunch in agricultural universities as well as in the new normal (post covid -19).

Key words: Digital, india, new normal, state agricultural universities.

INTRODUCTION

India's present higher agricultural educational scenario suffers from low access, not meeting quality standards, low funding, gender inequality, non-contemporary course curricula, delivery methods, inbreeding, lack of faculty-competence in cutting edge technologies etc. (NAEP, 2012). But, before we blame the faculty for lack of competence in contemporary technologies, such as digital technologies, it is deemed

necessary that we assess the very status of the presence and use of these technologies in our State Agricultural Universities. Digital technology may be considered as the most important opportunity for educational planners in agricultural institutions and the quick expansion of digitization of agricultural education is a significant development in this pandemic situation of covid -19 when all of us are looking for no touch or less touch technologies for almost everything and education is no exception. Apart from teaching and learning, there are a

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number of administrative jobs in a typical State Agricultural University such as registration of a student in each semester, getting grade sheets, all correspondences between the different actors namely; Deans, faculty members, students *etc.* Let us first understand what we mean by digital technologies and what are the examples of digital tools. Digital technologies are electronic tools, systems, devices and resources that generate, store or process data such as social media, multimedia, mobile phones, computers, tablets, laptops, SMART boards, projectors *etc.*

Indian Council of Agricultural Research has taken many initiatives to integrate digital technologies in Agricultural Education. Some of the initiatives according to Fifth Deans' Committee report are as follows. Information and Communication Technology is included as common course for all disciplines of Agricultural Education. Central Assistance for Strengthening of Higher Agricultural Education. In XII plan scheme "Strengthening and Development of Higher Agricultural Education in India" – Grants provided for Infrastructure Developments such as Computers, strengthening of library, e-resources including existing e-courses, e-granths, ICT facilities *etc.* Support also includes preparation of quality infrastructural material. Class rooms: There is also a provision to provide a special grant up to a maximum of ₹20 lakhs per university per year for the establishment of smart class rooms consisting of Interactive Board, Touch Screen, Bio-matrix, Visualized, e-kiosks and artificial intelligence (AI) based course modules *etc.* Development of facilities for Under Graduate practical – Computer Labs. The grant to a maximum ceiling of ₹20 lakhs for Agricultural University per year is being provided by the Council for the strengthening of laboratories including computers to keep the labs equipped with the latest equipment. Support to Dean: Support in order to introduce Teaching Techniques and carrying out creative activities in the college for overall welfare of staff and students. Support for existing e-resources including National Information System on Agricultural Education Network in India (NISAGENET) and e-courses.

According to Tondeur *et.al.* (2008), a gap exists between the proposed ICT curriculum at the macro-level and the actual use of digital tools in the classroom. Number of studies have been carried out regarding the status of digital technologies use in education but a very few have been carried on administrators and there is still a dearth of research in the field of agricultural higher education. In the present context, using digital technologies is not a choice but has become a compulsion and is the need of the hour. Number of webinars have

increased in all spheres of life including agricultural education and extension as well. Seeing to the need for incremental use of digital media in the current scenario, the present study was contemplated to find out the status of digital technologies and their use for administrative work in Agricultural Higher Education in India based on which some strategies for integration of digital technologies in our State Agricultural Universities have been suggested.

METHODOLOGY

To understand the status of digital tools in Agricultural Education, data were collected through content analysis of the websites of the concerned Universities and personal visits to the selected Universities by the investigators. The content on websites of all the 10 State Agricultural Universities of Rajasthan, Gujarat, Madhya Pradesh and Jammu & Kashmir was divided into three parts such as "ICTs as mode of Course delivery", "Infrastructure" and "Administrative support" and the information obtained on visiting the websites of the State Agricultural Universities under study was grouped under these heads in the content analysis matrix and analyzed. Rest of the detailed first-hand information was collected from a sample of 20 colleges belonging to 10 State Agricultural Universities of the four northern states of the country; Rajasthan, Gujarat, Madhya Pradesh and Jammu & Kashmir. As far as possible, efforts were made to select colleges belonging to different verticals of agricultural sciences. Also, information was collected from Nodal officers of the Universities designated by ICAR and Deans of respective colleges through online questionnaire hosted on ICAR – National Academy of Agricultural Research Management (NAARM) website and a part of the data were also collected through personal distribution of the questionnaire at the designated Universities/Colleges.

RESULTS AND DISCUSSION

In Indian Agricultural higher education, digital integration has been experienced in very limited areas such as course delivery, online course materials, source of information in classrooms, accessing library materials, running distance education courses and administrative support *etc.* Information was collected through the questionnaire from Deans and nodal officers (designated by ICAR) of the Universities under study. Though there were 10 universities under study but nodal officers of only five universities provided the information and rest of them did not provide information due to lack of documentation. Thus, information was collected from informal sources through personal visits by the

investigators for these five Universities. Information was collected on presence of Educational Technology Cells, number of students and computers in each college, infrastructure related to digital tools, availability of SMART classrooms and video conference facility, digital usage for administrative purpose and maintenance of digital equipment and availability of e-resources.

Status of Digital tools

Status of digital tools in the Universities was documented and presented in tabular form depicting the facets of digitisation in Agricultural Higher Education in three different areas namely; Mode of course delivery, Infrastructure and Administrative support. Out of the 10 State Agricultural Universities in the four states of Madhya Pradesh, Gujarat, Rajasthan, and Jammu & Kashmir; only four Universities in their website reported digitization related information for mode of course delivery namely; Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur (Madhya Pradesh), Anand Agricultural University (Gujarat), Sri Karn Narendra Agriculture University, Jobner (Rajasthan) and Maharana Pratap University of Agriculture & Technology, Udaipur (Rajasthan). JNKVV, Jabalpur has resources for course delivery such as e-learning through e-content development and AAU, Anand has every class room equipped with interactive white board, projector and Closed-Circuit Television (CCTV) and online examination conducted in College of Agricultural Information Technology, Anand. In order to update the subject matter knowledge of teachers, the global knowledge bowl is made accessible to all the teachers on their desk itself through digital applications in MPUA&T, Udaipur and SKNAU, Jobner had the schedule of lectures taught on their website. Coming to infrastructure; nine Universities had reported the use of digital tools on their website except Nanaji Deshmukh Veterinary Science University, Jabalpur. The reason for this could be that it is a newly formed Veterinary university which was founded in the year 2009. Though the website of Nanaji Deshmukh Veterinary University does not have any information on e-library but on personal visit, it was found that they had a computer laboratory and also had Consortia for Educational Resources in Agriculture (CeRA) facility. Almost all the universities reported that e-library facility with CeRA and Krishiprabhware were available for students to help them with their academic and research programmes. It was revealed through personal discussion with the students that majority of them do not know how to use CeRA for information retrieval. This confirms that having something is not enough but capacity building in the needed trait is the need of the hour. Another problem in the use of CeRA by students which was observed during data collection was that CeRA is password protected and

has a limitation of being used only on university computers. It is thus recommended that students should be trained how to use CeRA facility and be given access to password upon registration. As regards use of digital tools for administrative support is concerned, almost all the websites of the 10 Universities were making use of digital tools for recruitment notifications and results displayed in their website, time table as well as for student registration. Apart from all this, universities reported to be using digital technologies for various other matters such as results, syllabus, Pre – Degree Certificate, examination notification *etc.* In AAU, Anand (Gujarat) online admission process, Online Convocation, Online Job Application and Online Email/Firewall Account: Computer application is used for “online courses” at the university including Under Graduate/Post Graduate/Polytechnic courses through AAU Webmail (<http://mail.aau.in>) and Online Tour Diary was also available which manages the entire tour programme and its schedule for state agricultural university. It will store and display all the available information of each tour programme. This web-based user interface includes all the activities like starting from create tour programme to recommendation from authorized user. One unique feature found was monitoring of college activities by the authorities by CCTV which was depicted by only MPUA&T, Udaipur website whereas through personal contacts it was found that AAU, Anand, JNKVV (Agriculture College, Jabalpur) and RVSKVV (College of Agriculture, Indore) were also having the same facility in the Dean's room to keep a track of the activities of students and teachers. It was revealed through the responses of the Nodal officers and Deans of the 10 SAUs under study that majority of them had no separate budget provided to them as Information Technology budget but SKUAST, Jammu and RVSKVV, Gwalior reported 10 Lakhs Information Technology budget. Both these universities along with JAU, Junagarh had Educational Technology Cells. On seeing college –wise, it was revealed that only two colleges out of 20 colleges under study had reported to be having IT budget. These colleges were both from the state of Rajasthan namely; College of Agriculture, Sumerpur (5 Lakhs) and SKN College of Agriculture, Jobner (10 Lakhs). Out of 20 colleges under study, 13 had Educational Technology Cells, only seven colleges did not have. During informal discussions with the teachers of Nanaji Deshmukh Veterinary Science University, Jabalpur it was revealed that a non-computer specialized faculty member was heading the ARIS (Agricultural Research Information Systems) Cell who himself was not well conversant with Information Technology. It is recommended that the persons handling such IT related cells should be computer professional.

Table 1: Information regarding Number of faculty members, Students and Computers

State	University	College	Faculty Members	No. of students	Desktops/Laptops		
					Desktop	Laptop	Total
MP	JNKVV	CoA, Jabalpur	65	700	150	30	180
		CoAE, Jabalpur	21	380	52	8	60
	RVSKVV	CoA, Gwalior	51	600*	118	10	128
		CoA, Indore	41	453	98	10	108
	NDVSU	CVS&AH, Jabalpur	64	480	92	5	97
CoFSc., Jabalpur		04	91	13	0	13	
J & K	SKUAST	FOA), Chatha	105	600	80	25	105
		F.V.Sc. R.S.Pura	60	458	55	7	62
Guj	AAU	Dairy Sc., Anand	37	280	110	10	120
		CVS&AH, Anand	68	463	88	34	122
	JAU	CoA, Junagadh	84	1193	85	13	98
		CoAE&T, Junagadh	42	200	25	5	30
	NAU	CoA, Navsari	68	802	80	2	82
CoH, Navsari		58	344	100	10	110	
Raj	AU,	CoA, Mandore	06	178	30	2	32
		Jodhpur	03	164	72	2	74
	MPUAT	RCA, Udaipur	28	760	40	0	40
		CHSC, Udaipur	21	161	113	0	113
	SKNAU,	CoA, Jobner	54	639	200	50	250
Jobner	CABM, Jobner	02	55	0	0	0	
		Total	882	8401	1601	223	1824
		Average	44.1	442.15	80.05	11.15	91.2

*approximate (No formal information provided by the authorities)

As per Table 1 an average, each college had 442 students and 44 faculty members to teach them and had around 91 computers which includes desktop as well as laptops. In order to have a congenial teaching – learning situation, the teacher student ratio should be not very wide. According to 4th Dean's committee report the desirable student to teacher ratio recommended is 50:1 for theory and 25:1 for practical. Considering this, it was found that the colleges under study in the selected northern states had an ideal student: teacher ratio of 10: 1. While going into the details of student-teacher ratio, this ratio was as wide as 55: 1 in College of Agriculture, Sumerpur which comes under newly formed Agricultural University, Jodhpur founded in the year 2013. It was observed that in such colleges, deans as well as Vice Chancellor had to take classes to cope up with the crises of teachers.

As far as the student: computer ratio is concerned, it was reported that on an average one computer was available for 5 students but on looking into the details, it was found that in SKN College of Agri Business, Jobner; there were no computers available for students and only two teachers were there for 55 students. It is proposed that

in such colleges where there is dearth of teachers, virtual classrooms should be promoted and at the same time, presence of ARIS lab for students must be ensured in each college.

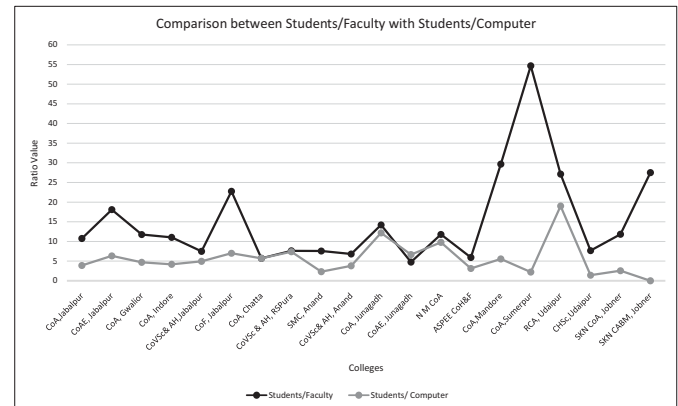


Fig 1: Comparison between Students/Faculty with Students/Computer

Infrastructural facilities related to Digitisation

Infrastructural facilities related to digitization include computers with internet, printers, SMART classrooms in the colleges and facilities of video conferencing and its usage. Cursory of Table 2 revealed that majority of the colleges (10) under study had two computer laboratories, nine of them had one computer laboratory whereas SKN college of Agribusiness Management, Jobner had no computer laboratory at all. On an average, per college; there were 80 computers with internet, 442 students with internet and 32 printers. Majority of the student hostels had internet facility barring a few.

If we see state – wise picture, Gujarat was the only state having internet facility in all the hostels, whereas in Madhya Pradesh, except College of Fisheries of NDVSU, all the colleges had internet facility for students in the hostels. No hostels of SKUAST, Jammu had internet facility for students in the hostel. In case of Rajasthan, half of the colleges under study had internet facility in their hostels for the students. It is very interesting to note that in MPUA&T, Udaipur; Home Science hostel had internet facility but Agriculture hostel had no internet facility. Agricultural University, Jodhpur had internet in Sumerpur college but not in Jodhpur college.

It is concluded that majority of the students in Home Science Colleges are girl students and in Sumerpur, there was a girl's hostel in place so they were bothered about providing in house internet facilities to girl students. Regarding the bandwidth which governs the internet speed, it was reported to be very weak which was 2-5 Megabits per second (Mbps). Only three colleges

reported that their bandwidth was between 100-125 Mbps. These were: College of Veterinary Science and Animal Husbandry, Anand; College of Agriculture, Jabalpur and NM College of Agriculture, Navsari. It was observed that

Gujarat had a higher status than other states in terms of bandwidth of internet availability among the SAUs of northern India.

Table 2: Infrastructural facilities related to Digitisation

State	University	College	Computers with internet	No. of students with internet	Computer labs	Printers	Availability of internet in hostels	Bandwidth
M P	JNKV	CoA, Jabalpur	150	700	2	10	Yes	100
		CoAE, Jabalpur	52	380	2	10	Yes	not reported
	RVSKVV	CoA, Gwalior	128	600	2	16	Yes	2
		CoA, Indore	30	453	2	30	Yes	8
	NDVSU	CVS&AH, Jabalpur	92	1159	1	30	Yes	50
J & K	SKUAST	FOA), Chatha	80	600	1	85	No	80
		F.V.Sc. R.S.Pura	37	458	2	35	No	2
Guj	AAU	Dairy Sc., Anand	110	280	2	20	Yes	2
		CVS&AH, Anand	82	463	2	84	Yes	125
	JAU	CoA, Junagadh	85	800	1	18	Yes	2
		CoAE&T, Junagadh	25	200	1	25	Yes	2
NAU	CoA, Navsari	80	802	2	65	Yes	100	
	CoH, Navsari	100	117	2	50	Yes	0	
Raj	AU, Jodhpur	CoA, Mandore	10	178	1	10	No	0
		CoA, Sumerpur	72	164	1	14	Yes	4
	MPUAT	RCA, Udaipur	40	760	1	1	No	5
		CHSC, Udaipur	113	161	1	39	Yes	5
	SKNAU, Jobner	CoA, Jobner	250	639	2	102	Yes	100
		CABM, Jobner	0	0	0	0	No	0
		Total	1597	8405	29	647		
		Mean Value	79.85	442.36	1.45	32.35		

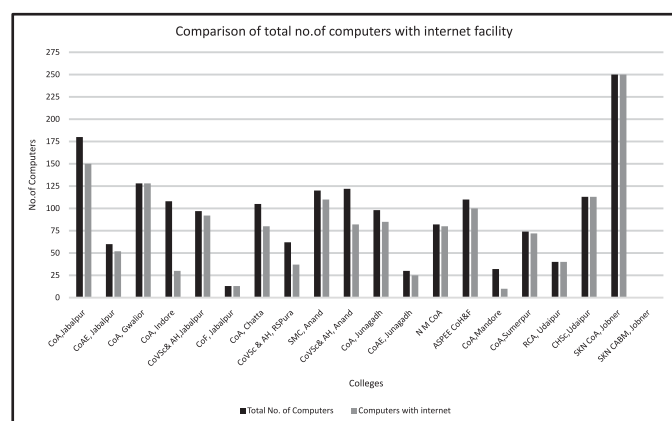


Fig 2: Comparison of total no. of computers with internet facility

Highest number of SMART classrooms were found in College of Agriculture, Jobner and Faculty of Agriculture Chhatta, Jammu (8 each) followed by College of Agriculture, Gwalior but the picture was different for SMART seminar halls which was maximum (11) in College of Agriculture, Junagarh, followed by College of

Agriculture, Indore which had 10 SMART seminar halls. Whereas other colleges had two or three SMART seminar halls. MPUA&T, Udaipur which is as old as 20 years also had only one SMART seminar hall in College of Home Science but no SMART seminar hall was found in Rajasthan College of Agriculture, Udaipur. SKNAU, Jobner had no SMART seminar hall at all and Agricultural University, Jodhpur had four SMART seminar halls in Sumerpur but none in Jodhpur campus. Video conference facility was found in half of the colleges out of 20 under study whereas it was used by majority of the colleges occasionally as per need except ASPEE College of Horticulture and Forestry, Navsari which was using monthly and College of Agriculture, Junagadh was using video conferencing daily. Ultimately, it is very clearly depicted in the findings that the status of ICT use was comparatively better in the state of Gujarat in terms of availability of SMART classrooms and video conferencing facility. This can be attributed to Table 2 which clearly mentions that the internet speed was much better in the universities of Gujarat as compared to other states under study.

Availability of e – resources

Table 3 revealed that e- journals were reported to be available in all the universities of Gujarat whereas in Rajasthan also all the agricultural colleges under study had e-journals except College of Agriculture, Mandore under Agricultural University, Jodhpur. In case of SKUAST, Jammu; Chatta campus had the availability of e-journals whereas R. S. Pura Veterinary College did not report. Though ICAR had given the facility of e-journals through CeRA still Universities like RVSKVV and NDVSU, Jabalpur were reporting to have no e-journal facility. It seems the reporting authorities themselves were not aware of the facility that CeRA provides. Regarding e-courses, only two universities out of the 10 under study had developed their own e-courses. College of Agricultural Engineering, Jabalpur and Seth M C college of Dairy had developed e-courses.

The engineering college of JNKVV, Jabalpur had developed only one e-course whereas the dairy college at AAU, Anand had developed 19 e-courses. One unique feature to be noted here is that AAU, Anand had Directorate of Information Technology (DIT) which is not commonly found in the SAUs of the country. The practice of digital report system was prevalent in only eight colleges out of 20 under study. On seeing the state –wise situation, it is revealed that in Gujarat, almost all the colleges had digital report card system whereas in Madhya Pradesh, half of the colleges had this digital report card system in practice. The remaining two states; Rajasthan and Jammu & Kashmir had no system of digital report card in their universities.

Table 3: Availability of e-resources

State	University	College	Availability of e-journals	No. of e-courses	Use of Digital Report System	Institute website updating	Domain mail id
MP	JNKVV	CoA, Jabalpur	Yes	0	Yes	Daily	No
		CoAE, Jabalpur	Yes	1	No	occasionally	No
	RVSKVV	CoA, Gwalior	No	0	Yes	weekly	No
		CoA, Indore	No	0	Yes	fortnight	No
	NDVSU	CVS&AH, Jabalpur	No	0	No	occasionally	No
CoFSc., Jabalpur		No	0	No	occasionally	No	
J&K	SKUAST	FOA), Chatha	Yes	0	No	Daily	Yes
		F.V.Sc.	No	0	No	Daily	Yes
		R.S.Pura					
Guj	AAU	Dairy Sc., Anand	Yes	19	Yes	Daily	Yes
		CVS&AH, Anand	Yes	0	Yes	fortnight	Yes

JAU	CoA, Junagadh	Yes	0	No	Daily	Yes
	CoAE&T, Junagadh	Yes	0	Yes	fortnight	Yes
NAU	CoA, Navsari	Yes	0	Yes	monthly	Yes
	CoH, Navsari	Yes	0	Yes	weekly	Yes
AU, Jodhpur	CoA, Mandore	No	0	No	weekly	No
	CoA, Sumerpur	Yes	0	No	Daily	No
Raj	MPUAT RCA, Udaipur	Yes	0	No	weekly	No
	CHSC, Udaipur	Yes	0	No	fortnight	No
SKNAU	CoA, Jobner	Yes	0	No	weekly	Yes
	CABM, Jobner	Yes	0	No	occasionally	No

Thirty percent of the colleges under study were updating their websites daily whereas a quarter of them were updating their websites weekly and almost equal percentage *i.e.* 20 per cent were updating fortnightly and occasionally whereas only 5 per cent were updating their websites monthly. Out of the three states, all the SAUs of Gujarat and J&K had domain e-mail ids whereas only Agricultural University, Jobner in Rajasthan had domain id. The SAUs of Madhya Pradesh did not possess their university domain id. Almost half of the universities under study did not have their domain mail id, still the teacher and the taught were communicating with each other through e-mails in majority of the universities under study. SKUAST, Jammu in spite of having its own domain id was using Gmail due to less space in their domain id.

Table 4: Digital Technology usage for Administrative procedures

State	University	College	Online Admissions	SIS	Staff Biometrics	Student Biometrics	Online payment of fees	Student & Staff communication through mail
M P	JNKVV	CoA, Jabalpur	Yes	Yes	No	No	Yes	Yes
		CoAE, Jabalpur	Yes	Yes	No	No	Yes	Yes
		RVSKVV CoA, Gwalior	Yes	No	Yes	No	Yes	Yes
		CoA, Indore	Yes	No	Yes	Yes	Yes	Yes
		NDVSU CVS&AH, Jabalpur	Yes	Yes	No	No	Yes	Yes
J& K	SKUAST	CoFSc., Jabalpur	No	No	No	No	No	No
		FOA), Chatha	Yes	No	No	No	No	Yes
		F.V.Sc. R.S.Pura	Yes	No	No	No	No	Yes
Guj	AAU	Dairy Sc., Anand	Yes	Yes	No	No	No	Yes

	CVS&AH, Anand	Yes	Yes	No	No	No	Yes
JAU	CoA, Junagadh	No	No	No	No	No	No
	CoAE&T, Junagadh	Yes	No	No	No	No	Yes
NAU	CoA, Navsari	Yes	Yes	No	No	No	Yes
	CoH, Navsari	Yes	Yes	No	No	No	Yes
Raj	AU, Jodhpur	Yes	No	Yes	No	No	Yes
	CoA, Sumerpur	Yes	Yes	Yes	No	Yes	Yes
MPUAT	RCA, Udaipur	Yes	Yes	Yes	No	Yes	Yes
	CHSC, Udaipur	No	No	Yes	No	Yes	No
SKNAU,	CoA, Jobner	No	Yes	Yes	No	Yes	No
Jobner	CABM, Jobner	No	No	No	No	Yes	No

Digital Technology Usage for Administrative Procedures

Digital technologies have truly transformed the Agricultural Education in India which is well depicted in Table 4. Online admissions have become a part and parcel of almost all the State Agricultural Universities under study. Student Information System (SIS) is a management information system to manage student data. It provides capabilities for registering students in courses, documenting, grading, transcript, result of student tests and other assessment scores, building students' time table, tracking student attendance etc. SIS was found in 50 per cent of the colleges under study whereas staff biometrics was found only in seven colleges out of 20 under study. As far as student biometrics attendance is concerned, only one college under study, *i.e.* College of Agriculture, Indore had adopted it. It was observed during University visit that College of Agricultural Information Technology of AAU; Anand had the facility of biometrics for tracking students' attendance. Only two states (Madhya Pradesh and Rajasthan) under study had the facility for students to pay their fees online. College of Fisheries, Jabalpur (M. P.) and College of Agriculture, Jodhpur (Rajasthan) which were budding ones were devoid of this facility.

Deans of majority of the colleges under study reported that they were using digital technologies in order to carry out institute management related tasks, were communicating online with teachers and communication by e-mails with educational authorities. Only two Deans were not communicating online with teachers and educational authorities. Whereas 40 per cent of the Deans

were communicating online with the wards of students. The number is so less because majority of the students were from rural background and hopefully their parents cannot communicate through e-mail. One very unique feature observed in the R. S. Pura campus of SKUAST, Jammu is that they make process plans to communicate electronically with faculty as well as outside the university. They have created g-mail group and WhatsApp group of faculty members and a group of CR (Class Representatives). For teachers, Short Message Service (SMS) alerts are sent after every mail to remind them.

Maintenance of digital tools too is a very important component because if gadgets are not periodically maintained, then technology can be a bane instead of being a boon. Out of 20 colleges, 11 Deans reported that they had in – house maintenance of computers, laptops and other related digital tools whereas only five colleges were outsourcing the maintenance work. Still, four of the colleges were having hybrid maintenance work *i.e.* a combination of both; in house as well as outsourcing. The possible reasons for more than half of the colleges having in-house maintenance could be that it is always better to have in-house maintenance to get quick services.

CONCLUSION

There is a need for infrastructural development and skilled man power in the area of digitization of educational resources. It is suggested that there should be separate IT budget. Also, workshops, seminars, conferences, webinars should be organized in the area of digital technologies. There should be mandatory capacity building programmes for staff including administrative, finance and technical personnel with provision of additional funding for digital training and capacity building. Campuses of State Agricultural Universities should be provided with high speed internet facility which may facilitate and strengthen digital based education in our Agricultural Universities. Computer courses associated with the curricula should be practical oriented rather than theoretical.

There should be collaboration between all agricultural universities regarding reading material and information on same topic to be accessed by all. Free and open access to students in universities regarding digital facilities and they shouldn't be locked anymore. Availability of the sites like G-gate, e-journal, Krishikosh, krishiprabha, e-CeRA etc. have to be made available outside the boundaries of Universities too. Free Wi-Fi in hostel and college with good internet speed, infrastructural facilities and quality and updated tools are sufficient for students to learn.

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REFERENCES

- Jamieson-Proctor, R. M. Burnett, P.C. Finger, G. and Watson, G. (2006). ICT integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools, *Australasian Journal of Educational Technology*, 22(4), 511-530.
- Jones, S., & Madden, M. (2002). The Internet Goes to College: How Students are Living in the Future with Today's Technology http://www.pewinternet.org/PPF/r/71/report_display.asp. Retrieved on 1 May 2016.
- Joshi, P.J. and Chauhan, N. B. (2013). Tool to measure attitude towards computer Application, *Gujarat Journal of Extension Education*, 24(12): 55-57.
- Koulaouzides, G.A., Acker, D., Vergos, E. A., Crunkilton, J. R. (2003). Innovative Agricultural Education Curriculum Practices Promote Sustainability in the Balkan Region of South Eastern Europe, *Journal of International Agricultural and Extension Education*, 10(1).
- National Agricultural Education Project (NAEP), (2012). Indian Council of Agricultural Research Department of Agricultural Research & Education Detailed Project Report of the National Agricultural Education Project (NAEP) <http://www.icar.org.in/files/NAEP-Project-documentt.pdf> accessed on 27/11/2016.
- Raj, M.P. Kathiriya , D.R. and Parmar, R.S. (2014). Web based customized e-learning management system for students' academic evolution. *Guj. J. Ext. Edu.* 25 (1) 80-82.
- Rathore, S. Ravichandran, S. and Poonam (2017). Status of ICTs in Agricultural Higher Education: A Bird's Eye View, ICAR – National Academy of Agricultural Research Management, Rajendranagar, Hyderabad – 500030, Telangana, India. 51p.
- Tondeur. J. Keer, H. V. Braak, J. V. Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy, *Computers & Education* 51: 212–223.