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Availability and usage of information and communication technologies (ICTs) by research faculties of CCS HAU, Hisar

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Abstract
The study was conducted in Hisar district of Haryana state. All the colleges of university were selected. Thus, a total of 120 research faculties were selected by simple random sampling technique from each selected college. Data was collected with the help of well-structured questionnaire. Majority of the respondents were male having age between 37-47 years with PhD with NET having service experience of 6-10 years. Cent percent of the respondents had availability of smart phones and television followed by newspapers and regarding attaining information books, smart phones and WhatsApp was utilized by majority of the respondents. Majority of the respondents had availability of all ICT services such as computer, mobile phone, television, Wi-Fi and E resources at department/workplace. Frequency of usage of ICT services such as computer, mobile phones, MS Word, Google Drive was high followed by printer while availability and usage of radio and iPad was less among respondents.

1. Introduction

ICT stands for Information and Communication Technology. It refers to the technology used to manage and process information as well as facilitate communication through various digital means. ICT encompasses a wide range of technologies, including computers, software applications, telecommunications networks, the internet and electronic devices. ICT enables fast and efficient communication between individuals, organizations and nations. It allows people to connect and interact through emails, instant messaging, video conferencing and social media platforms, bridging geographical boundaries and facilitating collaboration. ICT plays a vital role in managing and organizing vast amounts of information. It enables the storage, retrieval and analysis of data, facilitating decision-making processes in various fields such as business, healthcare, education and research.

ICTs, particularly social networks like Facebook and LinkedIn, give people the ability to interact with one another, work together and share information. Collaboration among scientists and researchers is thought to boost the output of scientific research. Due to the growing significance of collaboration in the process of knowledge production, new ICTs enable remote collaboration. ICTs, particularly the internet, foster greater researcher collaboration. Researchers are increasingly using ICTs for

communications across national, institutional and geographic barriers as a result of this dispersion. (Ward and Education, 2016). According to some studies, ICTs can help researchers conduct better research by facilitating data collection, electronic sharing, the exchange of research findings, improving global networking with greater efficiency and effectiveness and connecting with farmers to better understand their needs. Agricultural researchers make use of various ICTs in the following ways: communicating with domestic and foreign colleagues and debating scientific issues with them, putting skills and knowledge to use in the workplace, reading journals and presenting empirical evidence for their actions such as photos or movies. Additionally, they use ICTs to recruit partners for research initiatives, recognize opportunities and overcome obstacles inside their organizations. (Banmeke and Oose, 2012;) [9]. Samansiri and Wanigasundera (2014) [27] revealed that all of the respondents had availability of mobile phones as ICT tools and all the respondents had availability of the most common computer software packages such as MS Word, MS Excel and MS Power Point and the usage of the packages was also perceived high among respondents. Concluded that ICTs tools were available in ARIs (Agriculture Research Institutes) for day-to-day research activities while utilisation of agriculture journals was very limited. Ternenge and Kashimana (2019) [34] examined that

electronic information resources such as e-journals, e-newspapers, Online Public Access Catalogue (OPAC), CD-ROM databases, e-magazines, e-books, online databases, e-research reports and virtual library online were available, accessible and used for research while problems were encountered while accessing and using the available electronic information resources for research such as insufficient computers in the library. Thanuskodi and Ravi (2011) [35] observed that digital resources were used for research, publishing articles/books, teaching, keeping up-to-date in subject area, obtaining relevant material in area of specialisation and obtaining current information. Amoo Banmeke and Oose (2012) [9] discovered that majority of researchers were aware of and used social network tools such as Facebook in universities and research institutes.

Found that mobile phones were the most owned and most frequently used information and communication technology (ICT) assets followed by television and the extent of access and utilisation was found highest for mobile phones (88.83%) and television (68.62%) and internet was also found to have good extent of access and utilisation (68.00%) with applications like WhatsApp and Facebook having high frequency of usage. Concluded that the use of ICT for research purposes had a significant impact on the performance of research students and found a significant relationship between the use of ICT and the performance of research students so the use of ICT is the best predictor of the performance of research students.

Keeping these facts in mind, the present study was planned with the following objectives
Objectives
1. To identify the availability of ICT facilities among research faculties.
2. To identify the frequency of usage of ICTs by research faculties.

Materials and Methods
Locale of the study
The study was carried out in the purposively selected Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana and all the colleges of university were selected for conducting research. Further, research faculty members were selected randomly from each selected college. A sample of 120 was selected from all the colleges of Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana. A well-structured questionnaire was prepared with inclusion of all independent and dependent variables of the study for collection of data for the study. The data was collected from the research faculties of the all the colleges of university. The collected data was quantified and interpreted by using statistical tools such as frequency and percentage, perceived feasibility.

Results
Profile of the respondents
Profile of the respondents presented a brief account of the personal, social and economic background of the respondents which include the independent variables of the respondents i.e., age, sex, educational qualification, service experience, income of respondent, family income, family type, family education status and occupation of family.

Availability of ICTs services among research faculties
"Availability generally refers to the state or condition of being accessible, ready for use or present when needed and often pertains to the availability of resources, services and information." The availability of ICTs services among research faculties refers to access and provision of technology and services specifically for academic and research purposes which may include high-performance computers, data storage systems and software tools for data analysis. Data in the Table 1 indicated that cent percent of the respondents had computer, television, mobile phones, LCD projector, pen drive, Wi-Fi, E journals, E books, E thesis, E conference papers and online databases available at department/workplace. While, majority of the respondents (96.6%) had memory card which was followed by laptop (91.6%), printer (88.3%), scanner (56.6%), CD Rom databases (45%), Tablet (39.2%), radio (25.8%) and iPad (16.7%) at their workplace.

Table 1: Distribution of respondents on the basis of availability of ICT facilities (n= 120)

Sr. No.	Particulars	Availability	
		Frequency	**Percentage**
1.	Computer	120	100.0
2.	Laptop	110	91.6
3.	Tablet	47	39.2
4.	LCD Projector	120	100.0
5.	iPad	20	16.7
6.	Mobile phones	120	100.0
7.	Television	120	100.0
8.	Radio	31	25.8
9.	Printer	106	88.3
10.	Scanner	68	56.6
11.	Pen Drive	120	100.0
12.	Memory card	116	96.6
13.	Modems/routers/Wi-Fi	120	100.0
14.	CD-ROM databases	54	45.0
15.	E-journals	120	100.0
16.	E-thesis	120	100.0
17.	E-books	120	100.0
18.	E-conference papers	120	100.0
19.	Online databases	120	100.0

Frequency of usage of available ICT facilities
The frequency of usage of available ICT facilities among research faculties can vary depending on several factors, including the nature of research projects, individual preferences and technological proficiency. The frequency of ICT facility usage was highly individual as some may use on daily basis while other may use occasionally.

Table 2 depicted frequency of usage of available ICT facilities. The results showed that facilities always used by the respondents were computer and mobile phones which was followed by printer, E thesis, E conference papers and E journals, (91.6%), (87.5%), (85%), (81.6%) respectively. Howbeit, majority of the respondents (76.6%) were using online databases always and similar trend was observed in usage of laptop as 75.8 percent of the respondents were using laptop always which was followed by television (79.2%), E books and Wi-Fi (62.5% each). Also, more than half of the respondents (55.8%) were using Pen Drive always which was followed by scanner (50.9%) and nearly half of the respondents (46.7%) were using LCD projector

always followed by CD Rom databases, radio, tablet, memory card and iPad, (13.3%), (11.6%), (10.9%), (9.1%) and (7.5%) respectively.

The results indicated that majority of the respondents (63.3%) were using memory card sometimes and nearly half of the respondents (49.1%) were using scanner sometimes which was followed by pen drive and LCD projector (44.2%) each. Further, more than one third of the respondents (37.5%) were using E books sometimes followed by tablet, CD Rom databases, laptop, online databases and E journals (28.3%), (25.8%), (24.2%), (23.3%), (18.3%) respectively. Whereas, only 16.6 percent of the respondents were using television sometimes which was followed by E conference papers (15%), E thesis and iPad (12.5% each), Wi-Fi (9.1%) and printer (8.3%).

Table 2: Distribution of respondents on the basis of frequency of usage of available ICT facilities, (n= 120)

Sr. No.	Particulars	Frequency of usage	
		Always f (%)	Sometimes f (%)
1.	Computer	120 (100.0)	-
2.	Laptop	91 (75.8)	29 (24.2)
3.	Tablet	13 (10.9)	34 (28.3)
4.	LCD Projector	56 (46.7)	53 (44.2)
5.	iPad	9(7.5)	15 (12.5)
6.	Mobile phones	120 (100.0)	-
7.	Television	95 (79.2)	20 (16.6)
8.	Radio	14 (11.6)	-
9.	Printer	110 (91.6)	10 (8.3)
10.	Scanner	61(50.9)	59 (49.1)
11.	Pen Drive	67 (55.8)	53 (44.2)
12.	Memory card	11 (9.1)	76 (63.3)
13.	Modems/routers/Wi-Fi	75 (62.5)	11 (9.1)
14.	CD-ROM databases	16 (13.3)	31 (25.8)
15.	E-journals	98 (81.6)	22 (18.3)
16.	E-thesis	105 (87.5)	15 (12.5)
17.	E-books	75 (62.5)	45 (37.5)
18.	E-conference papers	102 (85.0)	18 (15.0)
19.	Online databases	92 (76.6)	28 (23.3)

(Figures in parenthesis indicate percentage, f=frequency,%=percentage)

Hours spent on available ICT facilities

The no. of hours spent on available ICT facilities by research faculties vary widely depending on individual work habits, research requirements and project complexity. Some researchers prefer concentrated work sessions, dedicating several hours at a time while other prefer shorter sessions spread throughout the day.

The data in Table-3 depicted the hours spent by the respondents on the available ICT facilities. Table-10 indicated that computer got rank I (WMS 2.08) in terms of hours spent. Two-third of the respondents (66.6%) spent 2-4 hours per day in computer usage followed by 20.8 percent of the respondents who spent 4-6 hours per day. Rank II (WMS 2.00) was given to E journals and majority of the respondents (62.5%) spent 2-4 hours per day which was followed by 19.2 percent of the respondents who spent 4-6 hours per day to access E journals. Online databases secured rank III (WMS 1.86) in terms of hours spent and two-third of the respondents (66.6%) spent for 2-4 hours per day which was followed by 23.3 percent of the respondents who spent 1-2 hours per day to access online databases.

Rank IV (WMS 1.83) was given to mobiles phones in terms of hours spent. Above two-third of the respondents (70.8%) spent 2-4 hours per day which was followed by 25 percent who spent 1-2 hours per day to access mobiles phones. E thesis secured rank V (WMS 1.79) in terms of hours spent and more than half of the respondents (54.2%) spent 2-4 hours per day and one third of the respondents (33.3%) spent 1-2 hours per day to access E thesis.

Further, laptop secured rank (VI) in terms of hours spent which was followed by scanner (VII), E books (VIII), Wi-Fi (IX) and LCD projector (X). However, printer secured rank XI in terms of hours spent and majority of the respondents (73.3%) spent 1-2 hours per day to access printer followed by E conference papers (XII), pen drive (XIII) and majority of the respondents (80.8%) spent 1-2 hours per day to access pen drive. Television was given rank XIV in terms of hours spent followed by memory card (XV), tablet (XVI), radio (XVII), CD Rom databases (XVIII) and iPad (XIX).

Table 3: Distribution of respondents on the basis of Hours spent on available ICT facilities, (n= 120)

Sr. no.	Particulars	Hours spent on available ICT facilities				
		(4-6 hours/day) f (%)	(2-4 hours/day) f (%)	(1-2 hours/day) f (%)	WMS	Rank
1.	Computer	25 (20.8)	80 (66.6)	15 (12.5)	2.08	I
2.	Laptop	15 (12.5)	45 (37.5)	60 (50.0)	1.62	VI
3.	Tablet	-	13 (10.9)	34 (28.3)	0.5	XVI
4.	LCD Projector	-	56 (46.7)	53 (44.2)	1.37	X
5.	iPad	-	9(7.5)	15 (12.5)	0.27	XIX
6.	Mobile phones	10 (8.3)	80 (70.8)	30 (25.0)	1.83	IV

7.	Television	-	20 (16.6)	95 (79.2)	1.12	XIV
8.	Radio	-	9(7.5)	37 (30.8)	0.45	XVII
9.	Printer	10 (8.3)	22 (18.3)	88 (73.3)	1.35	XI
10.	Scanner	10 (8.3)	49 (40.8)	61(50.9)	1.57	VII
11.	Pen Drive	-	23 (19.2)	97 (80.8)	1.19	XIII
12.	Memory card		11 (9.1)	76 (63.3)	0.81	XV
13.	Modems/routers/Wi-Fi	20 (16.6)	55 (45.8)	11 (9.1)	1.50	IX
14.	CD-ROM databases	-	6 (5.0)	41 (34.2)	0.44	XVIII
15.	E-journals	23 (19.2)	75 (62.5)	22 (18.3)	2.00	II
16.	E-thesis	15 (12.5)	65 (54.2)	40 (33.3)	1.79	V
17.	E-books	10 (8.3)	45 (37.5)	65 (54.2)	1.54	VIII
18.	E-conference papers	7 (5.8)	18 (15.0)	95 (79.2)	1.26	XII
19.	Online databases	12 (10.0)	80 (66.6)	28 (23.3)	1.86	III

(Figures in parenthesis indicate percentage, f=frequency,%=percentage)

Usage of research data management applications

Research data management applications provide a structured and organized approach to storing and categorizing research data. Faculties can easily search, access and retrieve data when needed, saving time and effort in data management. Data in Table 4 highlighted the frequency of usage of research data management applications by research faculties.

An attempt was made to know the frequency of usage of research data management applications. For this purpose, the responses were collected on a three-point continuum *viz.*, every day, more than once a week and rarely and WMS were calculated.

It is inferred from the Table 4 that MS Word got rank I (WMS 2.79) in frequency of usage and 80 percent of the respondents were using MS Word daily followed by 19.2 percent of the respondents using MS word more than once a week. In terms of frequency of usage, Google drive got rank II (WMS 2.58) and majority of the respondents (65.8%) were using Google drive daily which was followed by 26.7 percent of the respondents using Google drive more than once a week. While, Google docs got rank III (WMS 2.38) in frequency of usage and more than half of the respondents (53.3%) were using google docs daily which was followed by using google docs more than once a week (31.7%). Further, MS Excel got rank IV (WMS 2.25) in frequency of usage and two third of the respondents (66.7%) were using MS Excel more than once a week while cloud got rank V followed by Mendeley, MS access and SPSS, (VI, VII, VIII) respectively.

Table 4: Distribution of respondents on the basis of frequency of usage of research data management applications, (n= 120)

Sr. no	Particulars	Frequency of usage			WMS	Rank
		Everyday f (%)	More than once a week f (%)	Rarely f (%)		
1.	MS-Excel	35 (29.2)	80 (66.7)	5 (4.2)	2.25	IV
2.	MS-Word	96 (80.0)	23 (19.2)	1 (.8)	2.79	I
3.	MS-access	33 (27.5)	29 (24.2)	58 (48.3)	1.79	VII
4.	Cloud	61 (50.8)	20 (16.7)	39 (32.5)	2.18	V
5.	Google drive	79 (65.8)	32 (26.7)	9 (7.5)	2.58	II
6.	Google docs	64 (53.3)	38 (31.7)	18 (15.0)	2.38	III
7.	SPSS	9 (7.5)	56 (46.7)	55 (45.8)	1.61	VIII
8.	Mendeley	31 (25.8)	45 (37.5)	44 (36.7)	1.89	VI

(Figures in parenthesis indicate percentage, f=frequency, % = percentage)

Usage of scientific portal

The data with regards usage of scientific portal for ICT usage among research faculties have been presented in Table 5.

The data in the Table 5 described that majority of the respondents (97.5%) had an account and were using google scholar which was followed by research Gate (92.5%), Researcher ID (18.3%), Mendeley (15.8%), Academia.edu (15%) and ORCID (12.5%).

Table 5: Distribution of respondents on the basis of usage of scientific portal, (n= 120)

Sr. no	Particulars	Frequency	Percentage (%)
1.	Google scholar	117	97.5
2.	Research Gate	111	92.5
3.	ORCID	15	12.5
4.	Mendeley	19	15.8
5.	Academia.edu	18	15.0
6.	Researcher ID	22	18.3

(Figures in parenthesis indicate percentage, f=frequency,%=percentage)

Discussion

The present investigation states that cent percent of the respondents had computer, television, mobile phones, LCD projector, pen drive, Wi-Fi, E journals, E books, E thesis, E conference papers and online databases available at department/workplace and results got support by the study

conducted by Ahmad *et al.* (2012) [4] as they observed that the majority of research scholars were consulting, accessing and regularly using e-journals, internet and also found easier to use electronic publications. Similar findings have been reported by Okiki (2013) [23]; Ternenge and Kashimana (2019) [34] as they concluded that electronic information resources such as e-journals, e-newspapers, Online Public Access Catalogue (OPAC), CD-ROM databases, e-magazines, e-books, online databases, e-research reports and virtual library online were available, accessible and used for research while radio and iPad were not available to majority of the respondents. Kumar (2018) [9] also supports the findings and discovered that the E-Shodh Sindhu consortium played an important role in university research.

Results further revealed that cent percent of the respondents were using computer, mobile phones always to sometimes followed by printer and E thesis while radio and iPad were less used by the respondents. Majority of the respondents were spending more time on computer, e-journal and online databases. Supported the present study by stating that two-third of the scientists had high level of knowledge of computer mainly for the purpose of computer information retrieval or data updating while more than half of them had experience in computer use up to 5 years.

Study got strength from past research study as they concluded that increased access to and use of e-resources by academic staff resulted in increased research productivity and academic staff published more international papers if they accessed and used e-resources in research. However, results are contradiction of the findings who stated that the use of electronic resources and databases in institutions was inadequate and researchers were unaware of the available sources and were not fully using sources to meet their research needs while respondents were spending least time on radio and CD Rom databases. Similar findings were observed by Agwu *et al.* (2008) [2]; Parameshwar and Patil (2009) [25] concluded that ICT frequently used by researchers and had positive impact on research.

Results further revealed that eighty percent of the respondents were using MS-Word daily which was followed by Google drive, google docs and MS Excel. However, results are contradiction of the findings of Stephen and Thanuskodi (2014) [31] who stated that researchers were hesitant to use any excel or power point programmes. Further, nearly half of the respondents were using cloud and study got strength from past research study who revealed that cloud computing has gained tremendous popularity in India and also there is high scope of research on cloud computing and storage in cloud has removed the web of IT whereas, frequency of usage of SPSS was very low among the respondents. Majority of the respondents were using google scholar which was followed by research Gate while usage of ORCID was very low among the respondents.

Conclusion
From the study it can be concluded that majority of the research faculty members had availability of all ICT services such as Internet/ Web services, MS Word, MS Excel, MS PowerPoint, computer and mobile technology. Majority of the research faculties utilized ICT services to a greater extent. Cent percent of the respondents had computer, television, mobile phones, LCD projector, pen drive, Wi-Fi, E-journals, E-books, E-thesis, E-conference papers and online databases available at department/workplace while radio and iPad were not available to majority of the respondents. Cent percent of the respondents were using computer, mobile phones always to sometimes which was followed by printer, E-thesis (91.6%) and (87.5%) respectively, while frequency of usage of radio and iPad was low among the respondents. Majority of the respondents were spending more time on computer, E journals and online databases while the respondents were spending less time on radio and CD Rom databases. Eighty percent of the respondents were using MS-Word daily which was followed by Google Drive while frequency of usage of SPSS was very low among the respondents. Majority of the respondents were using google scholar followed by research Gate while usage of ORCID was very low among the respondents.

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