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Usage Pattern of Information and Communication Technology Tools among University Faculty Members

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HIGHLIGHTS

- Average usage of ICT tools for personal development, teaching, research and extension found as 86.4, 92.0, 88.9 and 62.7 per cent, respectively.
- Usage pattern of ICT tools in teaching, research, personal development found higher as comparison to extension.

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ABSTRACT

ICT boosts teaching by enabling interactive learning, supports research through advanced data analysis and collaboration tools, and enhances extension services with real-time information and communication. This integration ultimately drives innovation and improves agricultural practices and outreach. Keeping this in view, the study was carried out at the CCS Haryana Agricultural University, Hisar in 2021-22 to assess the usage pattern of ICT tools among faculty members of university. Data were collected with the help of well-structured questionnaire, especially developed for the present study. Four colleges i.e., College of Agriculture, College of Agricultural Engineering and Technology, College of Basic Sciences and Humanities, and I.C. College of Home Science were selected purposively for collection of data. Further, 25 faculty members were selected randomly from each selected college. Eleven independent variables included in the study. Data were analysed with the help of Statistical Package for the Social Sciences (SPSS). The study concluded that usage pattern of ICT tools found less for extension activities as compare to personal, teaching and research among faculty members.

INTRODUCTION

Information and Communication Technology (ICT) can be defined as a basket of technologies which assist or support in storage, processing of data/information or dissemination/ communication of data. ICT is an important tool for educational development because it employed in the collection, storage, retrieve, use, transmission and dissemination of information as accurately and efficiently as possible for the purpose of knowledge enrichment, developing decision making and problem-solving ability which helps to increase the communications between students and teachers. It is found that use of e-learning for educational purposes provides significant advantages over traditional learning (Omoniyi, 2013 & Seoud et al., 2014). However, ICT also used to secure research data, make research results more visible and increase collaboration and sharing among colleagues. Additionally, ICT provides advanced computation capabilities in research to increase speed, improved data storage and management.

As the world's current population will rises from 7.4 to 9.1 billion by 2050, food production will need to increase over this similar time (FAO 2016). So, access and utilization of ICT may become a major determining factor in the development of a modern and sustainable society (Dobrota et al., 2012; Yu et al., 2017; Torkayesh & Torkayesh, 2021) and ICTs have the capacity to retain

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and communicate the agricultural information (Okoedo & Omoregbee, 2012; Nain et al., 2019; Niranjan et al., 2023). So, in this situation (continuously increasing population) ICT can help to speed up the dissemination of agricultural technologies and innovation i.e., weather and insect-pests and disease forecasting from research and development organizations to farmers. It helps in farmers' learning, problem-solving, and access to viable markets for their crops also. Thus, ICT can play a critical role in research and extension to increase professional capacity building among professionals (World Bank, 2011 & Rohila et al., 2017).

Agriculture sector is providing employment to the 48.9 per cent of the total workforce of the country. This sector has dependency of 58 per cent of the population for their livelihood. While, the share of Haryana state in national GDP is estimated at 3.7 per cent (Anonymous, 2024). ICT is an important medium for accessing and disseminating information via use of telephones, mobiles, internet and other communication devices. It can be concluded that ICT plays a pivotal role in agricultural universities by enhancing teaching, research, and extension services. In teaching, ICT enables interactive learning through multimedia resources and online platforms. For research, it facilitates data collection, analysis, and collaboration across disciplines and locations. It also supports extension services by disseminating knowledge and best practices to farmers via digital platforms, mobile apps, and online courses, bridging the gap between academic research and practical application. Overall, ICT streamlines processes, improves accessibility, and accelerates innovation in agriculture. Keeping in view the importance of ICT in teaching, research and extension, the study was conducted to assess the usage pattern of ICT tools among faculty members of CCS Haryana Agricultural University, Hisar (Haryana) India.

METHODOLOGY

Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar, was established in 1970 through a Presidential Ordinance, which was later formalized by the Haryana and Punjab Agricultural Universities Act, 1970, passed by the Lok Sabha. The university was selected as the site for the present study, which was conducted during the 2021-22 academic year. The study focused on four colleges within CCSHAU: the College of Agriculture, the College of Agricultural Engineering and Technology, the College of Basic Sciences and Humanities, and the I.C. College of Home Science. These colleges were purposively selected for the study, and 25 faculty members were randomly chosen from each of the selected colleges, resulting in a total of 100 faculty members. A well-structured questionnaire was developed to assess the dependent variables. Eleven independent variables were considered in the study, including age, sex, educational qualification, job experience, rural-urban background, parental occupation, job preference, job satisfaction, job commitment, training received on Information and Communication Technologies (ICTs), and information-seeking behaviour. The respondents were informed about the purpose of the study to ensure transparency and gain their confidence. The collected data was systematically tabulated, analysed, and interpreted in line with the study's objectives, using the SPSS software tool for data analysis.

RESULTS

Usage pattern of ICT tools by faculty members

The usage pattern (Table 1) of ICT tools for personal development reveals that faculty members rely heavily on the internet for various tasks aimed at enhancing their professional growth. All respondents (100%) used the internet to search for general information and to prepare essential reports, including self-assessment reports (SAR), career advancement schemes (CAS), and progress and performance reports. A large majority (96%) also utilize online resources such as books, magazines, journals, and articles to stay informed, while 95 per cent respondents, access the latest information relevant to their specific domains. Communication with colleagues is another area where ICT tools are widely used (93%) by the respondents. Additionally, ICTs play

Table 1. Usage pattern of ICT tools by faculty members

Statements	Yes (%)
Internet to search the general information	100.00
Acquire latest information related to domain	95.00
Communicate with colleagues	93.00
Online books, magazines, journals and articles etc.	96.00
Prepare SAR, CAS, progress and performance reports etc.	100
Apply for other post	69.00
Social media for information and entertainment	78.00
Develop and manage personal contact	82.00
ICTs for social networking	81.00
Online shopping	70.00
Collection of course materials	98.00
Online classes	98.00
Class room presentation	96.00
Assignment to students	97.00
To take photographs of class	71.00
Question paper setting	87.00
Online examination/evaluation	94.00
Preparation and submission of results	96.00
Guiding PG students	90.00
Students training and presentation	93.00
Collect data about latest trend in research field	91.00
Visiting different website for research grants	88.00
Software/ application for statistical analysis	90.00
Prepare projects designs	84.00
Prepare projects reports	83.00
Presentation of results	91.00
Discussion/collaboration of lab/field work with other expert	89.00
Attend meeting/workshop of funding agency	86.00
Write research articles/policy paper etc.	94.00
Submission of articles to journals/magazines	93.00
Text /voice message to farmers	53.00
Video clips/photographs for training/demonstration	72.00
Projector/ interactive board for training/demonstration	69.00
To deliver expert lecture	87.00
Mobile/camera for diagnostic purpose	60.00
Organize online trainings	71.00
To develop mobile application	41.00
To develop expert system	45.00
To develop extension content for farmers	66.00
To collect feedback from farmers	63.00

a significant role in personal networking, as 82 per cent of respondents use them to develop and manage personal contacts, and 81 per cent used ICT tools for social networking. Social media also frequently used (78%) by the respondents for information and entertainment purposes. While, the use of ICTs for more transactional purposes such as online shopping (70%) and applying for other posts (69%). This pattern highlights the central role of ICT tools in staying informed, building networks, and managing career advancement.

The usage pattern of ICT tools for teaching demonstrates a high level of integration and reliance on technology in academic practices. Most of faculty members utilize ICT tools for the collection of course materials and conducting online classes. While, majority of respondents i.e., 97 per cent incorporate technology for assigning tasks to students, followed by class room presentations, and preparation and submission of results as 96 per cent. The use of ICT for online examinations and evaluations is also common, with 94 per cent of faculty members adopting these tools to assess student performance. Ninety-three per cent respondents utilize ICT tools for student training and presentations, followed by guide postgraduate students (90%), question paper setting (87%) and take photographs of the class (71%). Overall, the findings highlighted the significant role of ICT tools in modernizing teaching practices, improving student engagement, and streamlining administrative tasks in education.

The usage pattern of ICT tools for research describes a strong reliance on technology for a variety of essential research activities. The use of ICT extends to academic writing and publishing, with 94 per cent of respondents writing research articles and policy papers using digital tools, followed by submitting their articles to journals or magazines online as 93 per cent. Majority of faculty members (91%) use ICT tools to collect data on the latest trends in their research and use technology to present research results, showcasing the role of digital platforms in disseminating findings to a wider audience. The use of software and applications for statistical analysis is also widespread, majority of faculty members (90%) used these tools to process and analyses of research data. Collaboration is another key area where ICT tools are heavily employed, as 89 per cent of respondents engage in discussions or collaborate on lab or fieldwork with other experts through digital means. Only 88 per cent of respondents visit websites to seek research grants, followed by attend meeting/workshop of funding agency, prepare projects designs and project reports as 86, 84 and 83 per cent, respectively. These findings illustrate the crucial role that ICT tools play in enhancing research efficiency, facilitating collaboration, and improving access to resources and publication platforms.

The usage pattern of ICT tools for extension activities reveals that significant portion of respondents (87%) used to deliver expert lecture, followed by utilize video clips and photographs for training and demonstration purposes (72%) and organize online trainings (71%), highlighting the visual and interactive elements that enhance learning and communication. The use of projectors and interactive boards for training purposes is also common, with 69 per cent of respondents employing these tools to facilitate more engaging and effective extension activities. About two-third respondents used ICTs to develop extension content for farmers, collect feedback from farmers using digital tools and mobile/camera for diagnostic purpose. While, about fifty per cent respondents use ICTs for text or voice messages to share information, followed by develop expert system and mobile application. Overall, while ICT adoption in extension activities is considerable, there is clear potential for expanding the use of advanced technologies to improve service delivery and outreach to rural communities.

Correlation and regression analysis of respondents' personal profile with usage pattern of ICTs

Table 2 explains that job commitment had positive and significant correlation with usage pattern of ICTs, whereas, age, sex, education qualification, training, job preference, parental occupation, rural-urban background, job satisfaction, job experience and information seeking behaviour did not show any significant association at 0.05 level of probability. While, in case of partial regression coefficient of faculty members with utilization of ICTs only job commitment was found significant. However, age, sex, education qualification, job experience, rural-urban background, parental occupation, job preference, job satisfaction, training, and information seeking behaviour did not contributed to utilization of ICTs with faculty members. Further, it is concluded that 11 independent variables included in the study jointly contributed 11.00 per cent variation in the utilization of ICTs with faculty members when other factors were kept constant. It means only 11.00 per cent of the variation in the dependent variables was due to these variables and remaining 89.00 per cent variation in the study due to other variables.

DISCUSSION

Utilization pattern of ICTs tools for personal development (Table 1) may be high due to availability of computer/laptop and internet to each faculty members. ICT also offers a wide range of opportunities and resources that enable teachers to enhance their skills, access information, collaborate with peers, and adapt their

Table 2. Correlation and regression analysis of respondents' personal profile with usage pattern of ICT tools

Variable	Correlation Coefficient	Regression Coefficient	't' values
Age	-0.089^{NS}	-1.607	-0.813^{NS}
Sex	0.007^{NS}	1.135	0.690^{NS}
Education Qualification	-0.032^{NS}	-1.697	-0.858^{NS}
Job Experience	-0.057^{NS}	0.197	0.307^{NS}
Rural-Urban Background	-0.108^{NS}	-1.047	-0.857^{NS}
Parental Occupation	-0.031^{NS}	0.023	0.040^{NS}
Job Preference	-0.038^{NS}	-0.100	-0.085^{NS}
Job satisfaction	0.106^{NS}	0.047	0.229^{NS}
Job commitment	0.278*	0.411	2.278*
Training	0.033^{NS}	0.461	0.306^{NS}
Information seeking behaviour	0.152^{NS}	0.434	1.176^{NS}

Dependent Variable: Usage Pattern; *Significant at 5 per cent level; R^2 = 0.118; Constant Value = 55.759, Y = 55.759-1.607(X1) + 1.135(X2) -1.697(X3) + 0.197(X4) -1.047(X5) + 0.023(X6) + 0.100(X7) + 0.047(X8) + 0.411(X9) + 0.461(X10) + 0.434(X11)

teaching practices to meet the evolving needs of students. Study got support from research findings of Chauhan (2010); Gore & Dawne (2016); Panda et al., (2019) & Malik et al., (2021) who reported that ICT tools were used to find up-to-data information, communication with colleagues, social networking and personal development etc.

While, high utilization of ICT tools in teaching may be due to involvement of faculty members in teaching activities. Another possible reason of high utilization may be e-governance system of CCSHAU for faculty members to update attendance and marks on portal. It also offers a wide range of opportunities and resources that enable teachers to enhance their skills, access information, collaborate with peers, and adapt their teaching practices to meet the evolving needs of students. These findings derive the support from the study of Verma et al., (2020), while, other researchers also concluded that COVID-19 increased the need for the use of ICT in socio-educational interventions. Mishra & Sahoo (2023) concluded that ICT empowers teachers to become more effective, innovative, and adaptable educators, enabling them to create engaging learning experiences and meet the diverse needs of students. ICT also helps the teachers to enrich their own knowledge and skills, foster lifelong learning, and contribute to the growth and success of their students. High utilization of ICT tools in research may be involvement of researcher in a number of activities i.e., latest trend in field, designing experiments, virtual visit of funding institutions, project design, analysis, results, report writing and research paper/ articles publication etc. Similar findings were also observed by Tayade et al., (2011) & Verma et al., (2020) who reported that ICTs were used for data collection, processing, updating, analysis, printing and presentation. However, Tunji (2011) concluded that ICT frequently used by researchers and had positive impact on research. Utilization of ICT for extension activities were not as popular as utilization for teaching and research. Possible reasons of low utilization are engagement of faculty members in teaching and research. The findings are consonance with the findings of Malik et al., (2017) who reported that ICT tools use for agricultural extension purpose. However, Rohila et al., (2017); Satapathy et al., (2024); Mukherjee & Jha (2024) suggested that ICT can play vital role to provide relevant information with the aim to empower farmers and promoting sustainable agricultural practices. ICT also helps to finalise the decision making at the right time, to discover best solutions and efficient management for farming community. The results (Table 2) are in contrast of Singh et al, 2023 who concluded that age and education were an important factor in influencing the adoption of ICTs. These finding also in contrast of the findings of Malik et al., (2020). However, Pongener & Jha (2024) recommended that strengthening extension-farmer linkages and improving digital literacy may help enhance the efficacy of the information sources.

CONCLUSION

The results highlighted a strong reliance on ICT tools across various domains, emphasizing their critical role in personal development, teaching, research, and extension activities. The results of the study also reflected that the widespread importance of ICTs for knowledge enhancement and professional interaction along with facilitating research activities and improving access to global information. There is potential opportunity for further integrating ICT tools into extension services to better serve farmers and rural communities. Overall, the findings indicate a widespread embrace of ICT tools, but also highlight areas where adoption could be strengthened for enhanced outcomes in all fields.

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