International Journal of Social Sciences
Citation: IJSS: **13**(01): 13-20, March 2024
DOI: 10.46852/2249-6637.01.2024.4

Research Paper

Knowledge of ICT Based on Research Life-cycle Among Research Faculties of CCS HAU, Hisar

Meenu*, Vandana Verma, Manju Dahiya, Raveena Rani and Sachin Jangra

Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana, India

*Corresponding author: meenuladoiya19@gmail.com (**ORCID ID:** 0009-0005-8984-0835)

Received: 13-12-2023 **Revised:** 23-02-2024 **Accepted:** 02-03-2024

ABSTRACT

The study was carried to determine the knowledge of ICT based research life cycle among the research faculties of CCS Haryana Agricultural University, Hisar in 2023. All the colleges of university were selected for collection of data. Data were collected personally from 120 research faculties selected by simple random sampling technique through a structured questionnaire and analyzed with the help of appropriate statistical tools by using 26 version Statistical Package for Social Sciences (SPSS). A set of 9 independent, 3 communication and 3 dependent variables were selected for the study. The findings of the study revealed that majority of the respondents were male having age between 37-47 years with PhD with NET having service experience of 6-10 years belonged to nuclear type of family and had medium family educational status. They had annual income in between ₹ 8 lakhs to ₹ 14 lakhs and in service and family income was in between ₹ 15 lakhs to 25 lakhs. It was noted that regarding the knowledge of ICT based on research life-cycle, majority of the respondents had knowledge about remote sensor, coding, presentation, audio/ video interaction.

HIGHLIGHTS

- Everyday work of researcher involves writing proposal, developing model and experiments and collecting data, analysis of data, collaborating with people, surveying literature, reviewing data, writing articles.
- ICT plays a crucial role in research life cycle, enabling researchers to efficiently conduct their work, collaborate with others and disseminate their findings.
- Remote sensing data, geophysical survey and solute transport modelling are the most used tools and techniques in the detection and mapping of soil salinity.
- Knowledge about prototyping and use of prototyping in research offered better services to the researchers.

Keywords: Information and Communication Technologies **(**ICTs), Knowledge, Research

ICT has been very helpful in developing nations to improve researchers' knowledge and understandings, which makes it easier for innovations to reach farmers and makes it possible for researchers to directly communicate information to farmers who don't have the opportunity to attend agricultural extension meetings or services. Comparing their practices to those of their counterparts in many other developing nations, agricultural researchers are still trailing behind in their use of ICT resources and the advantages ICTs have to offer in transforming and growing agriculture. (Barakabitze *et al.* 2015).

ICT has significantly transformed agriculture research,

How to cite this article: Meenu, Verma, V., Dahiya, M., Rani, R. and Jangra, S. (2024). Knowledge of ICT Based on Research Life-cycle Among Research Faculties of CCS HAU, Hisar. *Int. J. Soc. Sci.*, **13**(01): 13-20.

Source of Support: None; **Conflict of Interest:** None

bringing about numerous advancements and benefits. The significance of ICT and research in agricultural universities is multifaceted and crucial for the advancement of agricultural sciences. ICT plays a crucial role in precision agriculture, which involves the precise application of resources based on site-specific conditions. Sensors, GPS technology and farm management software enable real-time monitoring and management of agricultural inputs such as water, fertilizers and pesticides. This optimization leads to improved resource efficiency, reduced environmental impact and enhanced crop yields. ICT facilitates the dissemination of agricultural knowledge and research findings to farmers, extension workers and stakeholders. Web portals, mobile apps and online platforms provide access to information on best practices, weather forecasts, market trends and pest management strategies. This helps farmers make informed decisions and adopt innovative techniques.

ICT tools and technologies empower agricultural universities to conduct cutting-edge research. Advanced data collection and analysis techniques, precision agriculture technologies, modeling and simulation software and remote sensing capabilities enable researchers to explore complex agricultural challenges and develop innovative solutions. Dulle *et al.* (2002) concluded that information and communication technology (ICT) applications for agricultural research offered a high potential for boosting research productivity and agricultural development. Majority of the respondents indicated lack of access to information technology facilities and the majority of respondents who had access to information technology facilities did not use them effectively in fulfilling their information demands. Agwu *et al.* (2008) described that the researchers (52.5%) had high knowledge and understanding of available ICTs and majority of the researchers (65%) had access to ICT facilities. However, majority of the research personnel never used video and CD-ROM technology. Oyewole *et al.* (2013) stated that agricultural researchers visited and used specific agricultural websites and found pertinent and helpful agricultural information that helped advance agriculture. ICT facilities made contributions to agricultural development by creating websites for agricultural production and providing useful information as needed. It was suggested that agricultural researchers be given access to affordable internet facilities to improve their usability, access and contributions to agricultural development. Robelo and Bucheli (2018) concluded that ICT offer a variety of resources for the search, analysis, selection and integration of knowledge and information to develop theoretical and methodological frameworks for the publication and dissemination of research.

METHODOLOGY

Locale of the study: The present study was conducted in the purposively selected Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana and all the colleges of university were selected for conducting research. 120 research faculty members were selected randomly from each selected college as a sample of study. Empirical data were collected with the help of well-structured questionnaire and analysed using Statistical Package for Social Sciences (SPSS). Appropriate statistical techniques like frequency, percentage were used in the study.

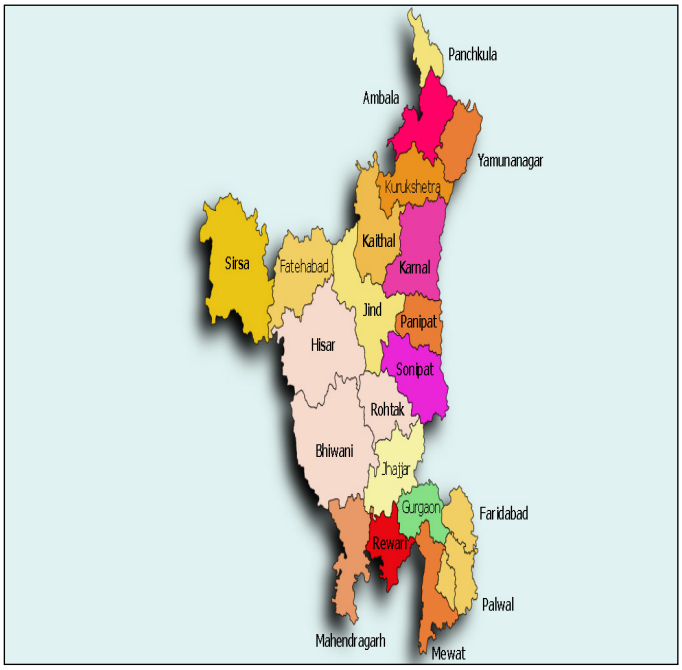

Fig. 1: Locale of the study

RESULTS

Knowledge of ICT based research life cycle among research faculties

The everyday work of researcher involves writing proposal, developing model and experiments and collecting data, analysis of data, collaborating with people, surveying literature, reviewing data, writing articles. Thus, ICT has illustrated six particular aspects of research.

1. Data Capture
2. Data Structuring and Enhancement
3. Data Analysis
4. Data Publishing and Dissemination
5. Communications and Collaboration
6. Strategy and Project Management

ICT plays a crucial role in research life cycle, enabling researchers to efficiently conduct their work, collaborate with others and disseminate their findings.

1. Knowledge of ICT tools/techniques to capture data

This part depicted the distribution of respondents based on knowledge of ICT tools/techniques for data capturing. Applications/tools were classified into nine categories which include scanner, motion capture, remote sensor, audio recorder, digital tablet, geophysical survey, speech recognition, text recognition and digital data. Table 1 depicted that nearly of respondents (88.3%) had knowledge of remote sensor, geophysical survey and speech recognition for data capture.

Knowledge of audio recorder and scanner was possessed by 85 percent and 81.6 percent of the respondents respectively. Further, 73.3 percent of the respondents

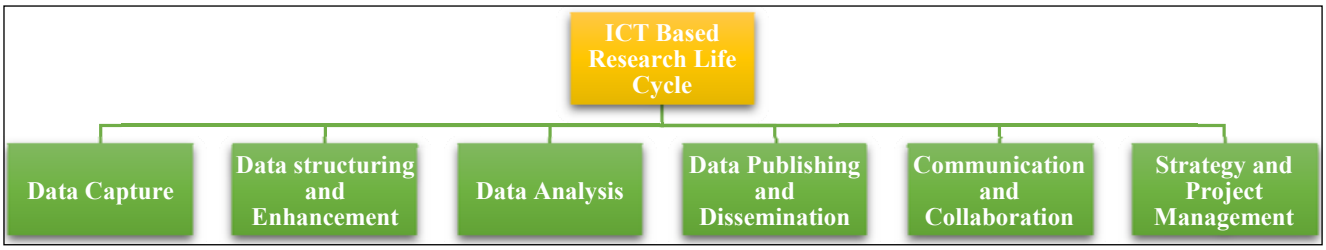

Fig. 2: ICT based research life-cycle

Table 1: Distribution of respondents based on knowledge of ICT tools/techniques for data capturing (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Scanner	Collection of data by means of a scanner or camera	98 (81.6)
2	Motion capture	Capturing and storing data by means of digital video cameras, webcams	74 (61.6)
		Capturing data using optical magnetic techniques	28 (23.3)
3	Remote sensor	Data capture by using satellite-based sensors	106 (88.3)
4	Audio recorder	Data capture by means of audio recording device	102 (85.0)
5	Digital Tablet/Table	Data capturing by means of a digitizing Table/Tablet	78 (65.0)
6	Geophysical survey	Data capture by means of geophysical methods like seismic, magnetic, electromagnetic and gravity techniques	106 (88.3)
7	Speech recognition	Conversion of spoken words and phrases into text	106 (88.3)
8	Text recognition	Conversion of scanned images of a text into text documents	72 (60.0)
9	Usage of digital data	Usage of data that already exists in digital form	88 (73.3)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

had knowledge of digital data which was followed by digital tablet (65%), whereas, in the category of motion capture majority of the respondents (61.6%) had knowledge about capturing and storing data by means of digital video cameras, webcams and 23.3 percent of the respondents had knowledge about capturing data using optical magnetic techniques.

2. Knowledge of ICT tools/techniques for data structuring and enhancement

Data in the Table 2 depicted the distribution of respondents based on knowledge of ICT tools/techniques for data structuring and enhancement. Techniques/tools were classified into six categories which include animation, image enhancer, photogrammetry, data modelling, coding, modelling. Cent percent of the respondents had knowledge about coding followed by animation (65%) and image enhancement (46.6%). Knowledge about data modelling and modelling was possessed by more than one third of the respondents i.e. 35 percent and 25.8 percent respectively. Only 7.5 percent of the respondents had knowledge about photogrammetry.

3. Knowledge of ICT tools/techniques for data analysis

Table 3 illustrated the distribution of respondents based on knowledge of ICT tools/techniques for data analysis. Results showed that cent percent of the respondents had knowledge about descriptive statistics followed by collating (90%) and content analysis (65%). Knowledge about collocating and data mining was possessed by 46.6 percent and 45.8 percent of the respondents respectively. Further, more than one third of the respondents (37.5%) had knowledge about network analysis followed by motion analysis (25.8%). Only 15.8 percent of the respondents possessed knowledge about indexing.

4. Knowledge of ICT tools/techniques for data publishing and dissemination

Table 4 depicted the distribution of respondents based on knowledge of ICT tools/techniques for data publishing and dissemination. Cent percent of the respondents had knowledge about presentation followed by desktop publishing (90%) and searching (88.3%). Knowledge about image optimizer and CD/DVD publisher was possessed by 81.6 and 70.8 percent of the respondents respectively. Two third of the respondents i.e. 66.6 percent had knowledge about audio/video resource sharing for data publishing and dissemination followed by 37.5 percent of the respondents who possessed knowledge about collaborative publishing and sharing. Further, one third of the respondents (33.3%) had knowledge about streaming audio/video for data publishing and dissemination.

Table 2: Distribution of respondents based on knowledge of ICT tools/techniques for data structuring and enhancement (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Animation	Creating independent digital pictures and placing side by side form of constant motion	78 (65.0)
2	Image enhancer	Improving the appearance of an image by edge enhancement, smoothing, and sharpening	56 (46.6)
3	Photogrammetry	Obtaining trustworthy dimensions and physical information from photographs	9 (7.5)
4	Data modelling	Analysing data objects and their relationship	42 (35.0)
5	Coding	Translating ambiguous source data into standardized codes for data processing	120 (100.0)
6	Modelling	2/3-dimensional representations/reconstructions of objects or structures	31 (25.8)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

Table 3: Distribution of respondents based on knowledge of ICT tools/techniques for data analysis (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Collating	Assemble and gather information to conduct further analysis	108 (90.0)
2	Collocating	Detecting patterns of words appearing organized in a text	56 (46.6)
3	Indexing	Producing indexes of words in a text	19 (15.8)
4	Content analysis	Analysing a text by breaking into thematic and/or conceptual units	78 (65.0)
5	Data mining	Analysing large amounts of data to discover patterns and relationship between different sections of information	55 (45.8)
6	Descriptive statistics	Analysis of data by means of OPSTAT/SPSS/MX Excel	120(100.0)
7	Motion analysis	Recording movements to improve performance	31 (25.8)
8	Network analysis	Understanding the structure and functions of complex systems	45 (37.5)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

Table 4: Distribution of respondents based on knowledge of ICT tools/techniques for data publishing and dissemination (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Audio/ Video resource sharing	Sharing of audio and video data and conducting research collaboratively	80(66.6)
2	CD/DVD publisher	Putting software, files or documents on a CD	85 (70.8)
3	Desktop publishing	Producing pre-press output/camera-ready output for commercial printing	108 (90.0)
4	Collaborative publishing and sharing	Collaboration in the creation of graphical content for network sharing	45 (37.5)
5	Image optimizer	Manipulating image's attributes to ensure the smallest file size while retaining quality	98 (81.6)
6	Presentation	Using media to transmit a message	120 (100.0)
7	Searching	Extracting information from data	106 (88.3)
8	Streaming audio/video	Streaming audio and video data	40 (33.3)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

5. Knowledge of ICT tools/techniques for communication and collaboration

Table 5 highlighted the distribution of respondents based on knowledge of ICT tools/techniques for communication and collaboration. Data depicted that cent percent of the respondents had knowledge about audio interaction and sharing, textual interaction and sharing and video-based interaction. Knowledge about graphical communication and video-based collaborative publishing was possessed by 85 percent and 20.8 percent of the respondents respectively.

6. Knowledge of ICT tools/techniques for strategy and project management

Table 6 indicated the distribution of respondents based on knowledge of ICT tools/techniques for strategy and project management. Cent percent of the respondents had knowledge about data protection and system security planning followed by the knowledge of back up (96.6%). Knowledge about ICT project manager and risk manager was possessed by 65.8 percent and 60 percent of the respondents respectively and only 37.5 percent of the respondents possessed knowledge about prototyping.

Table 5: Distribution of respondents based on knowledge of ICT tools/techniques for communication and collaboration (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Audio interaction and sharing	Sharing ideas and working collaboratively	120 (100.0)
2	Graphical communication	Sharing concepts by editing still images, plans, diagrams etc. online workspaces	102 (85.0)
3	Textual interaction and sharing	Communication using text	120 (100.0)
4	Video-based collaborative publishing	Collaborative creation of digital video content	25 (20.8)
5	Video-based interaction	Collaboration and Real-time communication using video- e.g., Video conferencing.	120 (100.0)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

Table 6: Distribution of respondents based on knowledge of ICT tools/techniques for strategy and project management (n = 120)

Sl. No.	Applications/Tools	Particulars	Knowledge f (%)
1	Back up	Avoiding data loss that can happen any time either through a virus or disk failure	116 (96.6)
2	Data protector	Protecting personal information regarding individuals	120 (100.0)
3	ICT project manager	Organization, coordination, monitoring, and adaptation of systems development tasks and resources	79 (65.8)
4	Prototyping	Assessing the progress and standard while development is in progress	45 (37.5)
5	Risk manager	Analysing the hazards associated with the development of an information system and devising measures to mitigate them	72 (60.0)
6	System security planner	System security by password protecting desktop machine and installing anti-virus software on networked machines	120 (100.0)

Figures in parenthesis indicate percentage, f = frequency, % = percentage.

DISCUSSION

Findings of the present investigation showed that majority of the respondents had knowledge about remote sensor, geophysical survey and speech recognition which are used for data capturing howbeit, only 23.3 percent of the respondents had knowledge regarding capturing data using optical magnetic techniques. Results got support from the findings of Farifteh *et al.* (2006) who reported that remote sensing data, geophysical survey and solute transport modelling are the most commonly used tools and techniques in the detection and mapping of soil salinity. Cent percent of the respondents had knowledge about coding for data analysis followed by animation while only 7.3 percent of the respondents had knowledge about photogrammetry. Basit (2003) support the findings and found that majority of the respondents were using coding during analysis to organize and make sense of textual data.

Cent percent of the respondents had knowledge about descriptive statistics for analysis of data followed by collating while only 15.8 percent of the respondents had knowledge regarding data analysis using indexing. Results were in line with the study of Sharma (2017) who reported that majority of the respondents were using ICT for data analysis and treatment and communication and majority of the respondents could access and used descriptive statistics for analysis of data followed by collating and content analysis while, the respondents had less access and usage of indexing. Similar finding was observed by Madukwe (2006); Olatokun (2007);

Tayade *et al.* (2011) and Verma *et al.* (2020) who reported that ICTs were used for data collection, processing, updating, analysis, printing and presentation.

Cent percent of the respondents had knowledge about presentation followed by desktop publishing while respondents had less knowledge about streaming audio and video for data publishing and dissemination. Similar findings are in consonance with Manchu and Vasudevan (2018) who reported that the majority of researchers were aware of institutional repositories and open access publishing and eager to publish their work. Also, findings of the present study are in conformity with Obioha (2005) who discovered that ICTs have helped researchers with easy access to a variety of information sources, quick processing and quick dissemination of information and data. Findings were found similar with Gatiti (2022) as it was reported that knowledge sharing in development organizations was supported by ICT-based tools, social media tools and collaborative tools and these tools were used for knowledge extraction, sharing and dissemination

Cent percent of the respondents had knowledge about audio and textual interaction and video-based interaction such as video conferencing while only 20.8 percent of the respondents had knowledge about video-based collaborative publishing. Similar conclusions were arrived at by Marhefka *et al.* (2020) discovered that during times of social distancing and beyond, researchers conducting social-behavioral studies transitioned their research to videoconferencing and participants and staff joined from the comfort of their own homes and also discovered that the transition to videoconferencing assisted in ensuring the continuity of research and provided a way for participants to benefit from potentially meaningful social interaction during a time of isolation. Results of Ziegler (2022) are in conformity with the findings of the present study stating that web 2.0 technology is composed of social networking sites such as Facebook, Twitter, WhatsApp, Wikis, blogs are content sharing platforms and text/audio video sharing platforms and emerging as important tools to increase productivity, communication and collaboration and facilitates communication and knowledge sharing between people such as family, friends and complete strangers. Cent percent of the respondents had knowledge about data protector and system security planner. Knowledge about prototyping for strategy and project management was low among the respondents. Results were in line with the study of Iverson *et al.* (2006) who stated that respondents had knowledge about the protection of data. Results are contradiction with the findings of Chaudhari *et al.* (2022) found that respondents had knowledge about prototyping and use of prototyping in research offered better services to the researchers.

CONCLUSION

From the present study it can be concluded that majority of the respondents had knowledge about remote sensor, geophysical survey and speech recognition for data capturing howbeit, the respondents had less knowledge regarding capturing data using optical magnetic techniques. Cent percent of the respondents had knowledge about coding for data analysis followed by animation while the respondents had less knowledge about photogrammetry. Cent percent of the respondents had knowledge about descriptive statistics for analysis of data followed by collating while the respondents had less knowledge regarding data analysis using indexing. Cent percent of the respondents were having knowledge about presentation followed by desktop publishing while the respondents had less knowledge about streaming audio and video for data publishing and dissemination. Cent percent of the respondents had knowledge about audio and textual interaction and video-based interaction for communication and collaboration while the respondents had very low knowledge about video-based collaborative publishing. Cent percent of the respondents had knowledge about data protector and system security planner. Knowledge about prototyping for strategy and project management was low among the respondents.

REFERENCES

Adelsberger, H.H., Collis, B. and Pawlowski, J.M. (Eds.). 2013. *Handbook on information technologies for education and training*. Springer Science and Business Media.

Butani, K. and Dhillon, D.S. 2013. Knowledge and use of computer by the scientists of Punjab Agricultural University, Ludhiana. *International Journal of Agricultural Sciences*, **9**(1): 24-31.

Chaudhari, R., Loharkar, P.K. and Ingle, A. 2022. Medical applications of rapid prototyping technology. *Recent Advances in Industrial Production: Select Proceedings of ICEM 2020*: 241-250.

Folitse, B.Y., Osei, S.K., Dzandu, L.P. and Obeng-Koranteng, G. 2017. A study on the agricultural research scientists' knowledge in the use of internet resources. *International Journal of Research Studies in Computing,* **6**(1): 9-23

Garg, C. 2020. Media usages profile: a study of Gujjar community of India. *Media Asia,* **45**(4): 114-127.

Gore-Dhalpe, N.D. and Dawane, V.T. 2016. Study of extent of knowledge and use of various information and communication technologies by scientists, teachers and extension workers in state agriculture universities. *Agriculture Update*, **11**(4): 369-373.

Kaba, A. and Ramaiah, C.K. 2019. Investigating the use of ICT tools for knowledge sharing among faculty members in UAE. *International Journal of Knowledge Management Studies*, **10**(4): 365-380.

Kasinathan, O. 2022. Technological knowledge of Research Scholars and their problems in using ICT in Bharathidasan University, Tiruchirappalli. *The Online Journal of Distance Education and e-Learning*, **10**(4): 558-563.

Ternenge, T.S. and Kashimana, F. 2019. Availability, accessibility, and use of electronic information resources for research by students in Francis Sulemanu Idachaba Library University of Agriculture, Makurdi. *Library Philosophy and Practice (e-journal)*, *2352*: 1-41.

Wikipedia. https://en.wikipedia.org/wiki/Knowledge (accessed November 30, 2017)

Ziegler, M.G. 2022. Web 2.0 and Knowledge Sharing. A Literature Review. *AI, Computer Science and Robotics Technology,* pp. 1-14.