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# Information technology need assessment for paradigm improvement in rice research system

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## ABSTRACT

*Rice research system in India face new demands and challenges, arising from the process of economic liberalisation, globalisation and structural adjustment. Hence there is need to reorient the stakeholders with the skill and knowledge of information technology (IT) with capacity building through suitable training modules. Designing IT training module depends on assessment of needs of the organization and prioritizing the training needs of staff and analyzing the problems and opportunities. Based on the knowledge and work responsibilities of staffs the degree of IT need assessment was varied from scientists to administrative staff followed by effective training module for capacity building.*

***Key words:*** *agricultural research systems, information technology, need assessment, training module*

Since last two decades the technological explosions in information technology (IT) sector has opened new vistas in the development scenario of Indian agriculture. It has been felt that there are many possibilities of incorporation of information, communication technologies (ICTs) in the overall agricultural and rural development (Zijp, 1994), which can bring a paradigm change in the societal development network. In order to make Indian agriculture globally more vital, there is need to participate in globally competitive marketing transactions, practice environmentally friendly farming techniques and cope with rising farm input costs. Since agricultural research is a major source of new knowledge in agriculture sector, this is a key strategic area of focus and intervention by Global Forum on Agricultural Research (GFAR) whose mandate is to promote and facilitate Agricultural Research for Development (ARD). Agricultural research systems, especially rice research in India face new demands and challenges, arising from the process of economic liberalisation, globalisation and structural adjustment. To meet these challenges, agriculture research systems are undergoing organisational, administrative and financial reforms in the line of ICT for improving individual's accountability and efficiency. The interventions in IT sector results in improving the global flow of agricultural research information, ensuring its equitable access and appropriation by all agricultural actors.

Keeping view upon this the Agricultural Research Institutes and State Agricultural Universities all over India are in the process of upgradation of their IT systems to meet the challenges of the present century. So far, not much effort has been put forth by the extension researchers to formulate a strategy for incorporating ICTs in agricultural research and extension systems. Also the scientific and technical staffs involved in various agricultural research works are not getting proper exposure in harnessing the tremendous potentials of ICTs in research and extension systems. So there is need to reorient the agriculture stakeholders with the skill and knowledge of Information Technology not only in respect of hardware and software component, but also in the capacity building process through information kiosks, multimedia, e-learning, internet, agri-portals, and market intelligence etc. through suitably designed training modules. In order to keep pace with the rapidly-changing technology, we need to maximize the productivity of all of our resources-physical, financial, information, and human; in which human resource is

the leverage point where we can make several differences in our lives, careers and organizations (Rouda & Kusy ,2006).

In this backdrop, a systematic study has been undertaken in Central Rice Research Institute (CRRI), Cuttack, Odisha to ascertain the training needs in IT followed by modular training as an intervention to build the capacity of employees, with a focus on their IT performance and organizational outputs. The present paper deals with the systematic approach for providing ICT enabled environment in the organisation through software including 'humanware' and hardware development. The specific objectives of the study were - to study the existing IT knowledge of scientists, technical officers and administrative staff; to ascertain the training needs of scientists, technical officers and administrative staff in the area of information technologies and; to design training module for scientists, technical officers and administrative staff.

## MATERIAL AND METHODS

All the staff members of three categories constituted the sample of the study out of which 32 scientists, 61 technical staff and 61 administrative staff responded within time limit making a total sample size of 154 respondents for this study. In order to assess the existing IT knowledge and the training needs of the respondents a structured questionnaire was developed and administered. Data was collected on usage of computer, usage of MS office, usage of statistical packages, usage of other specialised packages, IT training needs, knowledge of MS office, knowledge of statistical packages and knowledge of specialised packages. The data was analysed using suitable statistics such as frequency, percentage and chi-square test.

## RESULTS AND DISCUSSION

The analysis of the data revealed that 96.9 per cent of scientific staff were using computer followed by 72.1 per cent of administrative staff. While, only about 18 per cent of technical staff were using computer in their day-to-day work (Table 1). Such a low percentage of use of computer could be explained by the fact that most of the technical staff were engaged in either field job (56 per cent) or supervisory job (36 per cent).

**Table 1.** Distribution of respondents according to computer usage

| | Computer Use | |
|---|---|---|
| | Yes | No |
| Scientific | 31 (96.9%) | 1 (3.1%) |
| Technical | 11 (18%) | 50 (82%) |
| Administrative | 44 (72.1%) | 17 (27.9%) |
| Total | 86 (55.8) | 68 (44.2) |

Pearson Chi-square test=63.778***, Likelihood Ratio = 72.721*** df – 2, ***Significant at .0001 level of significance

The responses are not mutually exclusive as the respondents were performing one or more than one types of job. Since the major job responsibility of scientific staff was research and that of administrative staff was administrative job the usage of the computer was found to be much higher by the scientists as compared to technical staff. The chi-square and likelihood ratio also showed significant difference among the respondent categories with respect to computer usage.

Further, analysis of job responsibilities revealed that all the three categories of the respondents significantly differed with respect to field, supervisory/ management, research, extension and administrative jobs (Table 2). This was found in conformation with

**Table 2.** Job responsibilities of the respondents

| | Field job | Supervisory/ Management Job | Research Job | Extension Job | Administrative Job | Training Job |
|---|---|---|---|---|---|---|
| Scientific | 31 (96.9%) | 4 (12.5%) | 32 (100%) | 12 (37.5%) | 3 (9.4%) | 2 (6.3%) |
| Technical | 34 (55.7%) | 22 (36.1%) | 1 (1.6%) | 3 (4.9%) | 11 (18.0%) | 3 (4.9%) |
| Administrative | 0 (0.0%) | 7 (11.5%) | 0 (0.0%) | 0 (0.0%) | 61 (100%) | 1 (1.6%) |
| Chi-square value | 88.333*** | 12.866** | 148.158*** | 36.245*** | 99.174*** | 1.473 |

df – 2 ***Significant at .0001 level of significance, ** Significant at .005 level of significance

the fact that each category is developed to perform specific job.

The results related to usage of software revealed that 83.72 per cent users of computer were using MS Word followed by MS Excel (53.49 per cent), MS PowerPoint (40.69 per cent) and MS Access (11.63 per cent). There was no significant difference among the respondents in case of MS Word usage. However, the respondents differed significantly in the usage of MS PowerPoint, MS Excel, MS Access and various statistical packages. Specialised statistical packages like SAS, SPSS and IRRISTAT and specialised word processor-PageMaker was used by only fifteen per cent of the scientific staff, while no technical staff was using any statistical packages for analysis of research data. Besides these softwares the other softwares used by some individuals were accounting packages, Adobe Photoshop, Adobe Reader, Corel Draw and AutoCAD.

**Table3.** Use of various Software by the Respondents

| | MS Word Use | | MS PowerPoint Use | | MS Excel Use | | MS Access Use | Use | SAS Use | | SPSS Use | | PageMaker | | IRRISTAT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scientific | 30 | 1 | 27 | 4 | 26 | 5 | 10 | 21 | 5 | 26 | 5 | 26 | 5 | 26 | 5 | 26 |
| Technical | 9 | 2 | 4 | 7 | 4 | 7 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 |
| Administrative | 33 | 11 | 4 | 40 | 16 | 28 | 0 | 44 | 0 | 44 | 0 | 44 | 0 | 44 | 0 | 44 |
| Chi-square value | 6.360 | | 45.951*** | | 17.986*** | | 20.457*** | | 9.419** | | 9.419** | | 9.419** | | 9.419** | |

df - 2, ***Significant at .0001 level of significance

The results regarding the training need revealed that non-users of the computer didn't feel any need for training in use of computer or any software. Among the 86 users of the computer maximum number of respondents who felt the need of training in IT preferred MS Excel, MS PowerPoint and PageMaker. Besides, need of training in MS Access, SPSS, MS Word, SAS and INDOSTAT were also felt by many users. Need for training in highly specific packages like Accounting, Tally, Auto CAD etc. were felt by less than five per cent users. Among the scientific staff training in SPSS was required by 35.5 per cent respondents. In general, the maximum need of training in the use of statistical packages was felt by scientists. While, 15.9 per cent administrative respondents felt the need of training in the use of MS Excel and MS PowerPoint. It may be noted that many of the softwares, though very useful may not figure in training need by many respondents just because most of the users may not be aware of them. That is why computer non-users didn't feel any need for training in IT.

Based on the respondents, knowledge with respect to some of the common softwares, it was revealed that 75 per cent of scientist respondents had average or higher knowledge of MS Word, while 85.2 per cent technical respondents had no/ least knowledge of it. Among the administrative staff more than 50 per cent respondents below average or least knowledge of MS Word. Chi-square test also showed that the three

**Table 4.** IT Training Need of the respondents

| | MS Excel | MS Power Point | Page Maker | MS Access | SPSS | MS Word | IRRIStat | SAS | INDOSTAT Package | Accounting Manager | NTSYS | Reference | Auto CAD | Endrote | Reflex | Tally |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scientific | 7 | 6 | 7 | 4 | 11 | 4 | 8 | 8 | 5 | 0 | 4 | 3 | 1 | 2 | 0 | 0 |
| Technical | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Administrative | 7 | 7 | 6 | 5 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 15 | 14 | 14 | 11 | 11 | 8 | 8 | 8 | 5 | 4 | 4 | 3 | 3 | 2 | 1 | 1 |

**Table 5.** Rating of MS Word & MS PowerPoint Knowledge of the Respondents

| | MS Word | | | | | MS PowerPoint | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No/Least Knowledge | Below Average Knowledge | Average Knowledge | Above Average Knowledge | Most Knowledge | No/Least Knowledge | Below Average Knowledge | Average Knowledge | Above Average Knowledge | Most Knowledge |
| Scientific | 21.9% | 3.1% | 37.5% | 25.0% | 12.5% | 25.0% | 12.5% | 28.1% | 21.9% | 12.5% |
| Technical | 85.2% | 3.3% | 9.8% | 1.6% | 0.0% | 93.4% | 3.3% | 1.6% | 1.6% | 0.0% |
| Administrative | 44.3% | 6.6% | 31.1% | 16.4% | 1.6% | 78.7% | 6.6% | 14.8% | 0.0% | 0.0% |
| Total | 55.8% | 4.5% | 24.0% | 12.3% | 3.2% | 73.4% | 6.5% | 12.3% | 5.2% | 2.6% |
| | Chi- square value 48.77*** , df 8***Significant at .0001 level of significance | | | | | Chi- square value 65.991*** , df 8 ***Significant at .0001 level of significance | | | | |

categories of the respondents differed significantly with respect to rating of MS Word knowledge. Hence it could be inferred that majority of technical respondents did not feel the training need in the usage of MS Word while it was not required for the scientific staff.

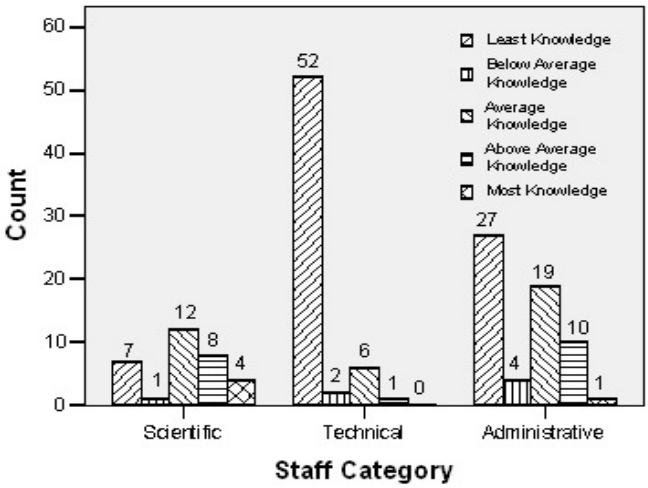


**Fig.1. Rating of MS Word knowledge**

In case of the knowledge of MS PowerPoint, 62.5 per cent scientist respondents had average or above rating, while, a very large percentage(93.4) of technical respondents had no/least knowledge of it. The trend in administrative staff respondents was similar to technical staff (78.7%)(Table 5). Therefore, it may be inferred that although most of the administrative staff respondents are not often required to make power point presentation in the current organizational responsibilities, the capacity of the technical staff should be build by providing training in MS PowerPoint as they are supposed to report, present and assist in scientific work.

A very large majority of the administrative (75.5%) and the technical (96.7%) respondents had below average or no knowledge of MS Excel (Table 6). Although only 43.9 per cent of scientist respondents had rated themselves having average or above average knowledge of MS Excel. Overall, 67.5 per cent of the respondents had no/least knowledge that required training to build their capacity. Like MS Word, MS Excel is also useful to all the category of the respondent in the organization.

**Table 6.** Rating of MS Excel and SAS knowledge of the respondents

| | MS Excel | | | | | SAS | | | |
|---|---|---|---|---|---|---|---|---|---|
| | No/Least Knowledge | Below Average Knowledge | Average Knowledge | Above Average Knowledge | Most Knowledge | No/Least Knowledge | Below Average Knowledge | Average Knowledge Knowledge | Above Average |
| Scientific | 31.3% | 25.0% | 18.8% | 18.8% | 6.3% | 87.5% | 6.3% | 3.1% | 3.1% |
| Technical | 93.4% | 3.3% | 1.6% | 1.6% | 0.0% | 100.0% | 0.0% | 0.0% | 0.0% |
| Administrative | 60.7% | 14.8% | 19.7% | 3.3% | 1.6% | 96.7% | 3.3% | 0.0% | 0.0% |
| Total | 67.5% | 12.3% | 12.3% | 5.8% | 1.9% | 96.1% | 2.6% | 0.6% | 0.6% |
| | Chi- square value 46.529*** , df 8 ***Significant at .0001 level of significance | | | | | Chi- square value 11.307#, df 8 # Not significant | | | |

In case of MS Access, 87.7 per cent respondents rated themselves as having no/least knowledge. According to nature of work of scientific, technical and administrative staff, MS Access is mainly required by administrative staff to maintain various databases while others have limited use. Hence, administrative staff may be trained in MS Access.

Both Scientific and technical staff are required to analyse data using statistical packages. More than 84 per cent scientist respondents were having no/least knowledge of SAS and SPSS, the most commonly used statistical packages. Majority of the scientists were using MS Excel for basic statistical computation (Table 6). The knowledge of statistical packages or MS Excel was found to be bare minimum in case of Technical staff. Less than seven per cent technical staff had any knowledge of MS Excel/SAS/SPSS. Overall, 4-5 per cent of total respondents possessed some knowledge of SAS and SPSS.

**Table 7.** Rating of SPSS and anti virus Knowledge

| | SPSS | | | | Computer virus | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | No/Least Knowledge | Below Average Knowledge | Average Knowledge | Above Average Knowledge | No/Least Knowledge | Below Average Knowledge | Average Knowledge Knowledge | Above Average | Most Knowledge |
| Scientific | 84.4% | 3.1% | 9.4% | 3.1% | 53.1% | 12.5% | 25.0% | 6.3% | 3.1% |
| Technical | 98.4% | 1.6% | 0.0% | 0.0% | 96.7% | 1.6% | 1.6% | 0.0% | 0.0% |
| Administrative | 96.7% | 3.3% | 0.0% | 0.0% | 93.4% | 3.3% | 3.3% | 0.0% | 0.0% |
| Total | 94.8% | 2.6% | 1.9% | 0.6% | 86.4% | 4.5% | 7.1% | 1.3% | 0.6% |
| | Chi- square value 16.081*, df 8 | | | | Chi- square value 40.594*** , df 8 | | | | |
| | *Significant at .05 level of significance | | | | ***Significant at .0001 level of significance | | | | |

The knowledge of antivirus packages is crucial for keeping the computer and data safe. About 47 per cent scientist respondents were having some knowledge of antivirus packages, but a very large majority, 96.7 and 93.4 per cent of technical and administrative respondents were having no/least knowledge of antivirus packages. No respondent felt the need of training in antivirus packages but due to obvious importance of the antivirus packages, it could be inferred that respondents had unfelt training need in antivirus packages.

The mean knowledge of the various categories of the respondents with respect to MS Word, MS PowerPoint, MS Excel, MS Access, SAS, SPSS, Antivirus and PageMaker. It was observed that scientists were better than others and technical staff had no/least IT knowledge (Fig. 2).

Based on the results, it can be concluded that almost all the scientific staff were using computer for word processing, presentation and analysis of data. However, training need was felt for specialized statistical packages such as SAS and SPSS. Among the administrative staff, two third respondents were using computer mainly for word processing and financial computing. Need of training in accounting packages, MS Excel, MS Access, MS PowerPoint and PageMaker was felt by administrative staff. More than 80 per cent technical staff respondents were not using

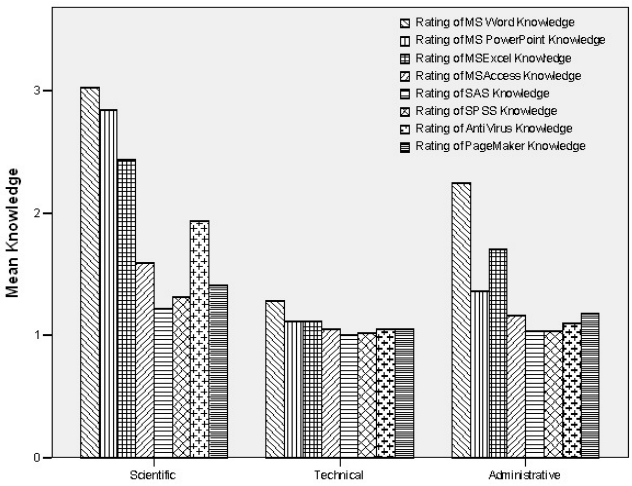


**Fig. 2. Distribution of respondents according to their IT knowledge rating**

computer to discharge their duties, hence they hardly had any felt training need. Based on the rating and work responsibilities of technical staff, the unfelt training need related to MS Word, MS PowerPoint, MS Excel, SAS and SPSS were identified in the study.

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