



# Knowledge and use of computer by the Scientists of Punjab Agricultural University, Ludhiana

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**Abstract :** The present study was undertaken to ascertain the knowledge of scientists regarding computer, its use by them in teaching, research and extension and problems being faced by them in its use. A sample of 200 scientists working in teaching, research and extension system of the PAU was drawn by using probability proportional to size (PPS) sampling technique. The data were collected by using distributed questionnaire approach. The findings of the study revealed that majority of the scientists belonged to age group of 44 to 56 years, hailed from rural families, were Associate Professors, most of them had total annual income of Rs. 7-11 lakhs and had service experience of 7-15 years with two trainings. Majority of the scientist were male, had Ph.D educational qualification and belonged to farming families. The findings of the study further indicated 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. It was further noticed that among various computer facilities available, Internet accessing had an added advantage of its ready availability as compared to others. Insufficient budget provision for the purchase and minor repairs of computer mostly restricted the use of different computer tools whereas the major problem faced by the scientists in the use of computers was the lack of regular training. Therefore, they had suggested that the sufficient budget should be provided for the purchase and minor repairs of computer as well as sufficient number of scientists should be trained regularly from time to time.

**Key Words :** Knowledge, Use, Computer, Internet, Problems, Suggestions

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## INTRODUCTION

The State Agricultural Universities (SAUs) are primarily responsible for the growth and development of agriculture through their research, education and extension related activities. There are no two opinions about their important position in increasing food grain, livestock and poultry production. Since agricultural research, education and extension are the primary responsibilities of states; the growth of SAUs has to be achieved under any circumstances. With a view to fulfilling this paradigm, the faculties of SAUs are expected to be different than those of the traditional universities. They will have to work as investigators, academicians and extensionists, in short, all in one. The success of any agricultural university depends exclusively on the quality and professionalism shown by the faculty to satisfy their responsibilities to enhance the natural resources

dealing with the development of mankind. They accentuate the exploration of ideas as well as the application and dissemination of agricultural knowledge. They need to be watchful with their role as a major contributor to the economic development of our country through targeted research and the transfer of technology to the marketplace. Thus, through the integration of variety of programmes of teaching, research and extension education, they are committed to agricultural and rural development.

Information technology has been one of the most ambitious fields in the present world. Information technology and agriculture amalgamation caused our country to regulate overall economy and trade. The country is having rapid computerization in different fields of agriculture *i.e.* from weather forecasting for crop production to protection of crop. Different Information Technologies like Remote Sensing, Expert System and Database of research project, modeling

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techniques, different agricultural calculators and integrated management are being extensively used. After the mechanization of Indian agriculture, computerization will only support green revolution by efficient management of agricultural research (Kolhe and Kamble, 2004). The impact of Information technology has been felt on higher education in India. The inventions of Information technology in programme planning and development of human resources are possible through reforms in education system. A few years ago, it was difficult to get latest information for Indian research scholars on their academic interest, but now many academic institutions have also created many spectacular and amazing facilities for speedy communication. Many organizations involved in the development of the agricultural human resource development like SAUs have now started use of internet facility to provide direct contact to their research scholars with researchers, academicians and libraries at the global level.

Science, technology, information, skill and knowledge are the key instruments for the advancement of research, teaching and extension institutes. They have been considered as indicators of human resources development which depict the intellectual property of human beings including educationists, researchers and extensionists involved in developmental efforts. With the advent of latest information technology, teacher has entered into the internet education system. Teacher now needs to be a firm thinker in order to survive with students, time and needs of the modern period. Like other parts of the world, internet is fast emerging in our country. India has the expertise to meet the challenge and to set up internet connectivity in different colleges for teaching, research and extension purposes. Hence, the present study entitled knowledge and use of computer by the scientist of Punjab Agricultural University, Ludhiana will be helpful to the information technology planners, administrators and to many other educational institutions.

## MATERIALS AND METHODS

The present study was conducted at Punjab Agricultural University (PAU), Ludhiana. In PAU, there are four constituent colleges, sixteen Krishi Vigyan Kendras (KVKs), Farm Advisory Service Scheme (FASS) operating in twelve districts and nine research stations. A list of the scientists, teachers and extension scientists working in all the three streams *i.e.* Teaching, Research and Extension was obtained from the Deans of constituent colleges, Directorate of Research and Directorate of Extension Education, PAU, Ludhiana. A sample of 200 research scientists, teachers and extension scientists was drawn with the help of probability proportional to size (PPS) sampling technique among which there were 17, 142 and 41 research scientists, teachers and extension scientists, respectively. For conducting the present study, a comprehensive list of different areas and sub-areas of computer was prepared by

consulting the available literature and through discussion with the members of advisory committee. A questionnaire was prepared to collect responses from the respondents about their knowledge and use of computer. Before final collection of data, the research instrument was pre-tested on 20 non-sampled respondents of College of Basic Sciences and Humanities, PAU, Ludhiana. The responses of all the non-sampled respondents were quantified by assigning scores and afterwards total score of the respondents were obtained by adding their scores for all the statements/questions. Final selection of the statements/items for the knowledge test was made with the following two criteria in view:

### Item difficulty index :

The item difficulty index is expressed in terms of percentage of correct responses obtained for a particular question/statement and worked out as under:

$$\text{Item difficulty index (P)} = \frac{\text{Number of respondents giving correct response}}{\text{Total number of respondents}} \times 100$$

The statements with P value ranging from 20 to 80 were considered for final selection in the knowledge test.

### Item discrimination index :

The discrimination index of an item was calculated by using the formula of Guilford (1954) as under:

$$\text{Item discrimination index (D)} = \frac{U - L}{F}$$

where,

- D= Index of item discriminating power
- U= Number of respondents in the upper group who answer the test items correctly
- L= Number of respondents in the lower group who answer the test items correctly
- F= Number of respondents in each group

The items with D value above 0.16 were included in the final knowledge test.

The data were collected from the respondents with the help of distributed questionnaire approach. The data were analyzed with the help of appropriate statistical tools such as frequencies, percentage, cumulative frequency cube root method, correlation co-efficient and chi-square test.

## RESULTS AND DISCUSSION

The results of the present study have been presented and discussed under the following headings:

### Socio-personal characteristics of the respondents :

The data pertaining to distribution of the scientists according to their socio-personal characteristics (Table 1) have been given as under :

**Age :**

It was seen that age of the respondents varied from 29-56 years. Most of the respondents (44.0 %) belonged to the age group of 44-56 years, 39.5 per cent belonged to the age group of 33-43 years and the remaining 16.5 per cent respondents were in the age group of 29-32 years.

**Designation :**

The relatively higher proportion of respondents was Associate Professors (43.5 %) where as 41.5 per cent were Assistant Professors and the remaining 15.0 per cent were Professors. It can be concluded from these findings that maximum proportion of the respondent was of Associate Professors and Assistant Professors.

**Family background :**

The relatively higher per cent of respondents had rural background (66.0 %) whereas 34.0 per cent of them had urban background.

**Educational qualifications :**

Nearly two-third of the respondents (65.5%) had Ph.D. degree, whereas 34.5 per cent of the respondents had M.Sc. degree.

**Total annual income :**

As many as 35.5 per cent of the respondents were in the first income group (Rs. 4-7 lakhs) and 41.5 per cent of the

respondents were in the second income group (Rs. 7-11 lakhs) whereas the remaining 23.0 per cent of the respondents belonged to third income group (Rs.11-16 lakhs).

**Service experience :**

Nearly 41.0 per cent of the respondents had service experience between 7-15 years while 40.0 per cent respondents had 16-25 years of service experience, whereas, relatively less per cent (19.0) of the respondents had service experience of 2-6 years.

**Training acquired :**

Forty two and half per cent of the respondents received two trainings, while 38.5 per cent of the respondents received one-training. Among all the selected respondents, more than two trainings were acquired by only 2.0 per cent, whereas 17.0 per cent of them received no training at all.

**Distribution of the respondents according to the usage of computer for teaching, research and extension purposes :**

It is quite clear from the data given in Table 2 that relatively higher proportion of the respondents used internet for teaching (79.5%), research (94.0) and extension (81.0%) purposes. Majority of the respondents (90%) used e-mail facility for research purpose as compared to teaching (21.0%) and extension (63.5%) purpose. Forty-six per cent of the respondents used scanner for research purpose and 71.0 per cent of them used CD for storing data which is mostly useful

Sr. No.	Socio-personal characteristics	Categories	Frequency	Percentage
1.	Age (years)	29-32	33	16.5
		33-43	79	39.5
		44-56	88	44.0
3.	Designation	Professor	30	15.0
		Associate Professor	87	43.5
		Assistant Professor	83	41.5
4.	Family background	Rural	132	66.0
		Urban	68	34.0
6.	Total annual income (Lakh Rs.)	4-7	71	35.5
		7-11	83	41.5
		11-16	46	23.0
7.	Educational qualifications	M.Sc.	69	34.5
		Ph.D.	131	65.5
8.	Service experience (years)	2-6	38	19.0
		7-15	82	41.0
		16-25	80	40.0
10.	Training acquired	No training	34	17.0
		One training	77	38.5
		Two trainings	85	42.5
		More than two trainings	4	2.0

for teaching purpose only. Relatively higher percentage of the respondents used printer (54.5%) for teaching purpose.

**Extent of knowledge and use of computer by the respondents:**

It can be observed from the data given in Table 3 that 66.5 per cent of the respondents possessed high level of knowledge about computer, whereas 21.5 per cent of them had medium level of knowledge. Only 12.0 per cent of them possessed low level of knowledge.

**Purpose of usage of computer :**

It is necessary to use computer by the research scientists, teachers and extension scientists for various purposes. A critical experimentation of the data given in Table 4 show that 75.0 per cent of the respondents used computer for information retrieval or data updating. Seventy four per cent of them used these technologies for data analysis. Majority of the respondents used computer for finding the references, searching detailed information related to subjects, e-mailing,

**Table 2: Distribution of the respondents according to the usage of computer for teaching, research and extension purposes**

Sr. No.	Facilities	Purpose of usage*					
		Teaching		Research		Extension	
		f	%	f	%	f	%
1.	Computer	142	71.0	160	80.0	135	67.5
2.	Internet	159	79.5	188	94.0	162	81.0
3.	e-mail	42	21.0	180	90.0	127	63.5
4.	Scanner	27	13.5	92	46.0	16	8.0
5.	C.D.	142	71.0	43	21.5	50	25.0
6.	Printer	109	54.5	86	43.0	74	37.0

\* Multiple response

**Table 3: Distribution of the respondents according to their knowledge about computer**

Sr. No.	Knowledge	Respondents	
		Frequency	Percentage
1.	Low (Below 50.0 %)	24	12.0
2.	Medium (50-62.5%)	43	21.5
3.	High (Above 62.5%)	133	66.5
	Total	200	100

**Table 4: Distribution of the respondents according to different purposes of usage of computer**

(n=200)

Sr. No.	Purposes of usage	Respondents*	
		Frequency	Percentage
1.	Computer information retrieval or data updating	150	75.0
2.	Data analysis for research work	148	74.0
3.	Communication with other scientists	139	69.5
4.	For findings the references	147	73.5
5.	For searching details related to subjects	146	73.0
6.	For e-mailing	145	72.5
7.	Report writing	129	64.5
8.	Printing of materials	106	53.0
9.	Entertainment	99	49.5
10.	Seminars	140	70.0
11.	Class presentations	143	71.5
12.	For data storage	49	24.5
13.	For correspondence with other scientists	39	19.5
14.	For scanning of document	130	65.0
15.	Chatting	37	18.5
16.	Typing	55	27.5

\* Multiple response

presentations, seminars, communication with other scientists, scanning and report writing. Nearly, half of them used computer for printing of materials and entertainment. Only few respondents *i.e.* 27.5 per cent, 24.5 per cent, 19.5 per cent and 18.5 per cent used computer for typing, data storage, making correspondence with other scientists and chatting, respectively.

**Experience in computer use :**

A perusal of the data given in Table 5 showed that majority of the respondents (56.5%) had up to 5 years experience in computer use followed by 34.5 per cent of the respondents with 5-10 years experience.

**Frequency of computer use during week days and weekend:**

The responses relating to the use of computer during week days and weekend as indicated by Table 6 showed that maximum number of the respondents (52.0%) used computer for less than two hours at weekend whereas minimum number of respondents (8.0%) used computer for more than four hours at weekend. In week days, 45.5 per cent of the respondents used computer for less than two hours followed by two to four hours (44.5%) and less number of the respondents (10.0%) used computer for more than four hours.

**Place of computer use :**

The data presented in Table 7 clearly indicated that scientists utilized various kinds of sources to explore computer

facilities. It can be observed from the data that best place utilized by the scientists were university library or their concerned departments. In addition to this, other places utilized by them were private café and at their own homes. The free internet facility available at university library or department, which were nearest and most convenient sources were the probable reasons to make best use of internet facility available at library or in their concerned research department by the scientists.

**Relationship of socio-personal characteristics of the respondents with the level of knowledge of computer :**

In order to determine the relationship among the independent variables and the dependent variables, zero order correlation co-efficients were worked out with continuous data and chi-squares test was applied to the discrete data.

**Age and computer :**

A critical look at the figures presented in Table 8 indicate that there was negative and significant relationship between age of the scientists and their knowledge of computer, reflecting that extent of their knowledge was observed better among young scientists than the old aged scientists. It is obvious that the young personnel in any organization have high degree of enthusiasm, eagerness and dynamism.

**Total annual income and computer :**

It can be seen from the data given in Table 8 that there

**Table 5: Distribution of the respondents according to their experience in computer use (n=200)**

Sr. No.	Experience in computer use (years)	Respondents	
		Frequency	Percentage
1.	Up to 5 years	113	56.5
2.	5-10 years	69	34.5
3.	Above 10 years	18	9.0
	Total	200	100

**Table 6: Distribution of the respondents according to the frequency of computer use during week days and weekend (in hrs/day) (n=200)**

Sr. No.	Frequency of computer use (hrs/day)	Week days		Weekend	
		Frequency	Percentage	Frequency	Percentage
1.	Less than 2 hours	91	45.5	104	52.0
2.	2-4 hours	89	44.5	80	40.0
3.	More than 4 hours	20	10.0	16	8.0
	Total	200	100	200	100

**Table 7: Distribution of the respondents according to the place of computer use (n=200)**

Sr. No.	Place of computer use	Respondents*	
		Frequency	Percentage
1.	At own home	97	48.5
2.	University library/ Department	160	80.0
3.	Private café	42	21.0

\* Multiple response

was non-significant relationship between level of income of scientists and their extent of knowledge of computer. However, positive value of co-efficient of correlation indicates that level of knowledge slightly improved with the increase in their annual income, but this increase was non-significant.

**Service experience and computer :**

A close examination of the data given in Table 8 reflects that there was negative and significant relationship between the service experience and the extent of knowledge of computer of the scientists. More experience in any profession makes person more knowledge hunter because he has to satisfy the need of his juniors.

**Gender and computer :**

It is obvious from the data presented in Table 9 that there was non-significant association between gender of respondents and their knowledge of computer. It is obvious that whether a respondent is male or a female practically have

no influence in acquiring and nurturing their knowledge regarding computer.

**Designation and computer :**

A perusal of the data given in Table 9 indicates that, there was a significant association between designation of scientists and their level of knowledge. It was due to the reason that Assistant or Associate professors are more prone to the exposure of different modern computer tools as compared to professors who have more service experience, had a more or less similar exposure to such facilities during the course of their service experience.

**Family background and computer :**

A critical look at the data given in Table 9 brings to light that there was a significant association between the native place and extent of knowledge of computer. The positive ‘r’ value indicates that, the level of knowledge of those scientists was better, who hailed from the urban areas. It is natural that

**Table 8: Relationship of socio-personal characteristics of the respondents with the knowledge of computer**

Sr. No.	Socio-personal characteristics	Correlation co-efficient
1.	Age (years)	-0.159*
2.	Total annual income (Lakh Rs.)	0.226 <sup>NS</sup>
3.	Service experience (years)	-0.135*

\* Indicate significance of value at P=0.05, NS = Non-significant at 5 per cent level

**Table 9: Association of socio-personal characteristics of the respondents with the knowledge of computer**

Sr. No.	Socio-personal characteristics	Category	Knowledge level			Chi-square value
			Low	Medium	High	
1.	Gender (d.f.=2)	Male	15 (7.5%)	21 (10.5%)	96 (48.0%)	9.68 <sup>NS</sup>
		Female	9 (4.5%)	22 (11.0%)	37 (18.5%)	
2.	Designation (d.f.=4)	Professor	8 (4.0%)	7 (3.5%)	15 (7.5%)	8.41*
		Associate Professor	9 (4.5%)	20 (10.0%)	58 (29.0%)	
		Assistant Professor	7 (3.5%)	16 (8.0%)	60 (30.0%)	
3.	Family background (d.f.=2)	Rural	14 (7.0%)	29 (14.5%)	89 (44.5%)	10.52*
		Urban	10 (5.0%)	14 (7.0%)	44 (22.0%)	
4.	Father’s occupation (d.f.=4)	Service	9 (4.5%)	15 (7.5%)	43 (22.5%)	11.20 <sup>NS</sup>
		Farming	7 (3.5%)	18 (9.0%)	47 (23.5%)	
		Business	8 (4.0%)	10 (5.0%)	43 (22.5%)	
5.	Educational qualifications (d.f.=2)	M.Sc.	13 (6.5%)	17 (8.5%)	39 (19.5%)	6.32*
		Ph.D.	11 (5.5%)	26 (13.0%)	94 (47.0%)	
6.	Medium of instruction during school (d.f.=4)	English	9 (4.5%)	19 (9.5%)	98 (49.0%)	10.37 <sup>NS</sup>
		Hindi	8 (4.0%)	13 (6.5%)	28 (14.0%)	
		Punjabi	7 (3.5%)	11 (5.5%)	7 (3.5%)	
7.	Training acquired in computer use (d.f.=6)	No training	7 (3.5%)	16 (8.0%)	11 (5.5%)	8.78*
		One training	8 (4.0%)	14 (7.0%)	55 (27.5%)	
		Two trainings	9 (4.5%)	12 (6.0%)	64 (32.0%)	
		More than two trainings	0 (0.0%)	1 (0.5%)	3 (1.5%)	

\* Indicate significance of value at P=0.05, NS = Non-significant at 5 per cent level

persons who are brought up in urban areas have better contact of modern ways of means of communication and other technologies from the very early age than those of rural areas.

**Father’s occupation and computer :**

The data given in Table 9 indicate that, there was non-significant association between father's occupation of scientists and their level of knowledge. The extent of knowledge of computer acquired by the scientists was not at all influenced by the occupation of their father whether he is doing service, farming or business.

**Medium of instruction during school and computer :**

It is obvious from the Table 9 that there was non-significant association between medium of instruction of scientists during school and their knowledge of computer. The probable reason for this may be that computer is a modern technology in which the scientists are involved or equipped with related technologies not at their school level but later on during their professional life.

**Educational qualifications and computer :**

The data given in Table 9 reflect that there was a significant association between the educational qualifications and extent of knowledge of computer. It shows that the level of knowledge was adequate among those scientists, who had higher academic qualifications. It can be concluded that high degree holder scientists had more curiosity to learn new things through internet than those with low academic qualifications. However, this

improvement was not seen up to the level of significance.

**Training acquired in computer use and computer :**

A perusal of the figures presented in Table 9 indicates that, there was a significant association between training acquired by the scientists and their level of knowledge. The results of training of any technology visible in an individual when he understands all the technicalities of it. It is universally accepted fact that when any person has basic knowledge of any novel, current and needful operation towards any facility, he tries to engage himself more and more in the same.

**Problems faced by the scientists in the use of computers :**

It can be seen that major problem faced by the scientists during the use of computers was lack of training for use of computer as it secured first rank followed by insufficient number computers, lack of sufficient skills in efficient maintenance of computers and lack of confidence in their use, lack of knowledge in minor repair of different parts of computer, lack of adequate facilities available in the university and fear to access of new technology.

**Suggestions given by the scientists to overcome the problems faced by them in the acquisition of knowledge and use of computer :**

The various suggestions given by the scientists to overcome the problems faced by them in the acquisition of knowledge and use of computer have been given in Table 11.

In order to improve the level of knowledge and use of

**Table 10: Problems faced by the scientists in the use of computers (n=200)**

Sr. No.	Problems faced	Frequency	Rank
1.	Lack of training for use of computers	155	I
2.	Insufficient number of computers	126	II
3.	Lack of sufficient skills in efficient maintenance of computers	121	III
4.	Lack of confidence in use of computer	108	IV
5.	Lack of knowledge in minor repair of different parts of computer	96	V
6.	Lack of adequate facilities available in the university	78	VI
7.	Fear to access of new technology	69	VII

**Table 11: Suggestions given by the scientists to overcome the problems faced in the acquisition of knowledge and use of computer (n=200)**

Sr. No.	Suggestions	Frequency	Rank
1.	The knowledge of software applications should be improved	97	I
2.	Skill of scientists using features of computer should be improved	70	II
3.	Regular training on efficient use of computer for the scientists should be organized	54	III
4.	Wi-Fi facilities on the campus should be available	43	IV
5.	The speed of internet should be improved	40	V
6.	Compulsory provision of training should be there to create computer literacy among the scientists	31	VI
7.	Each department should be given all advanced computer facilities	27	VII
8.	Training on the minor repairing of different parts of computer tools should be regularly organized	18	VIII

computer by the scientists, the main suggestion given by most of them was that the knowledge of software applications should be improved followed by skill of the respondents using features of computer should be improved, regular trainings on efficient use of computer for scientists should be organized, availability of Wi-Fi facilities on the campus, the speed of internet should be improved, Compulsory provision of training should be there to create computer literacy among the scientists, each department at the college level should be given all advanced computer facilities and training on the minor repairing of different parts of computer should be organized from time to time to enhance the efficiency of the scientists and make them more confident.

### Conclusion :

After a thorough scrutiny of the research findings of the present study, it can be concluded that among the various facilities available, internet accessing with an added advantage of its ready availability as compared to other tools aroused keen interest among the research scientists, teachers and extension scientists with high level of knowledge for the detailed understanding of his/her related activities. Insufficient budget provision for purchase of different computer accessories mostly restricted their use and the lack of regular training for using computer was the major problem faced by them in the use of computers particularly. Therefore, respondents suggested that the sufficient budget should be provided for the purchase and minor repairs of computer accessories as well as sufficient number of scientists should be trained regularly from time to time.

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