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Deciphering drivers of ICT use in agricultural education

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ABSTRACT

Information and Communication Technology (ICT) is an important element in the education scenario to prepare citizens for the future. Since, its inception factors influencing the use have not been studied more, hence an exploratory research study has been framed for finding those factors among the students of CCS Haryana Agricultural University, Hisar, Haryana during 2018-19. The data were collected from 200 respondents using structured interview schedule and analyzed using standard methodology. The findings revealed that the institutional factors were perceived highest with composite index value (CIV) of 70.18, followed by personal (67.35), technical (59.15) and economic constraints (47.33). Although, these factors could be overcome through implementing remedies suggested by students like; teaching should be through ICTs, followed by improved internet connection, training programme related to use of ICTs, etc. but an effective national level policy related to infrastructure facilities, software licensing, availability of high quality ICT gadgets at subsidized rates, free and regular training programmes, etc. are possible ways to deal with these factors especially during COVID-19 pandemic. The correlation and regression of different variables, i.e. age, education, family education, scientism, annual expenditure, mass media exposure, information seeking behaviour and risk orientation exhibited negative and significant effect with their perceived personal factors at 0.05 level of probability. Hence, the paper recommends that effective utilization of ICT depends not only upon the available ICT resources, but also effective utilization of the same.

Keywords: COVID-19, ICT, Driver, Decipher, Education

The agricultural education system has undergone several changes in India from past few decades. There are different courses at graduate and postgraduate level run by Indian Council of Agricultural Research (ICAR) institutes and State Agricultural Universities (SAUs) to impart quality education to improve agriculture and allied sectors in our country. But, still the crumbling educational system is a cause of concern. Therefore, there is an immense need to focus on the quantity and quality of higher education (National Education Policy 2020). In the current world, Information and Communication Technologies (ICTs) have substantial influence on wide range of education processes like access, equity, management, efficiency, pedagogy and satisfactions (Mondal and Mete 2012). During the outbreak of COVID-19 pandemic, when all schools, colleges and educational institutes remained closed, whole nation witnessed a complete lockdown and our educational system also suffered a lot, i.e. due to social distancing, then only way to get education is through different ICTs.When used appropriately, these ICTs are said to help expand access to education, reinforce the relevance of education to the increasingly digital workplace, raise educational quality and helping make teaching and learning into an engaging, active process connected to real life (Ponnusamy *et al*. 2016, Umunnakwe and Sello 2016, Pandey *et al*. 2019). However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. But, it is found that the effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology-indeed, given sufficient initial capital, getting the technology is the easiest part-but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing (Tak 2013). Looking into these aspects, this study was carried out to find out the factors influencing the use of ICTs among the students of CCS Haryana Agricultural University, Hisar, Haryana.

MATERIALS AND METHODS

An exploratory study was carried out among three constituent colleges of CCS Haryana Agricultural University, Hisar, Haryana namely, College of Agriculture, College

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of Agricultural Engineering and Technology and Indira Chakravarty College of Home Sciences during 2018–19. Descriptive research design in which ex-post facto planning stage was adopted for this study, since the phenomenon has already taken place. In this research, Under-Graduate (Pre-final and Final year) and Post-Graduate (M Sc and Ph D) students of the selected colleges registered during the session of 2017-18 were taken as the sample of the study. There were 994 students registered in U G (162 Pre-final year and 178 final year) and P G programme (363 M Sc and 291 Ph D) from selected colleges. Out of them, 200 students were selected through proportionate random sampling and data were collected through personal interview technique with the help of well-structured and pre-tested interview schedule. Empirical data were tabulated and analyzed using 26th version of the Statistical Package for Social Sciences (SPSS) for computing frequency, percentage, mean and correlation and regression analysis.

Factors were studied under various components, viz. institutional, personal, economic and technical. These were analyzed using the composite index method followed by Aiswarya (2016) with slight modifications. Based on review of literature under each component, the various aspects were identified and the responses of students' were obtained on three-point continuum scale as very serious, serious and not so serious and scores were given as 2, 1 and 0, respectively. Aggregate total weighted score was calculated for each statement separately and on the basis of calculated score, total weighted score was obtained. Further, the index was calculated for consolidating and comparing the seriousness of the problems and rank orders were assigned based on the index value. The following formula was used for calculating the index of each statement and composite index for all the classified constraints:

$$\text{Index of each statement} = \frac{\text{Total score of each statement}}{\text{Maximu score of the stateent}} \times 100$$

$$\text{Composite index} = \frac{\sum x}{M\text{x Nx S}} \times 100$$

where, Σx = sum of total scores of all statements (Sum of frequencies multiplied by weight); M = maximum score; N = number of students; and S = number of statements.

RESULTS AND DISCUSSION

Factors influencing the usage of ICTs: Several factors had been encountered by the students respondent in using ICTs as an informative and communicative tool. For the present study, to study various types of factors, items were collected under each category (Table 1). The present study revealed that 'lack of training facilities to learn ICTs' ranked as 1st institutional factor with highest index value (IV) 71.50, followed by 'lack of technical support from organization', 'lack of fund for ICTs' and 'poor ICTs-based infrastructure facilities at the campus' ranked 2nd, 3rd and 4th with IV 70.75, 69.75 and 68.75, respectively. The challenge most frequently referred by the respondents among various institutional level constraints is 'lack of training facilities to learn ICTs' and the reason might be lack of technical staff in the relevant field. This has resulted in having a heavy workload on the faculty and which consequently reflected poor performance. To address staffing shortage, studies have shown that state agricultural universities (SAUs) should undertake recruitment against vacant positions on priority basis. In the meantime, the SAUs should be allowed to hire experienced and retired teachers to enhance the teaching efficiency. A rolling faculty scheme may be launched to enable teachers to travel to any place and teach a course (Tamboli and Nene 2013). Study got strength from the study of Adekunmisi *et al.* (2013) who also suggested that efficient technical staff should be recruited and so that they can help technically to teachers as well as the students in accessing the internet within the University.

It was found that, among the personal factors faced by students, 'lack of expertise to use ICTs' ranked as 1st factor with highest index value (IV) 73.75, followed by 'lack of learner motivation towards using ICTs' and 'lack of confidence to use ICTs' ranked 2nd and 3rd with IV 73.25 and 65.75, respectively. 'Time management problems in learning to use ICTs' and 'use of ICTs caused health problems like eye pain, body pain, *etc.*' were the other major personal factors ranked 4th and 5th with IV 64.25 and 59.75, respectively. It reflected that many students lack even the simplest technological knowledge and skills necessary for the mere operation of a personal computer. Therefore, the students should be trained to increase their knowledge and skills of using ICTs through various programmes tailored by the state government in collaboration with universities to the specific needs of the different sectors of the agricultural community. These results were in conformity of earlier findings by Kochar *et al.* (2013) who suggested that there should be an increase in training of students to maximize the use of innumerable applications of technology in professional courses.

Under economic factors the results showed that 'availability of internet facility at a higher price' ranked as 1st factor with highest index value (IV) 59.00, followed by 'high cost of ICTs training' and 'variations in charges demanded at different cyber cafes' ranked 2nd and 3rd with IV 52.50 and 30.50, respectively. Although the University provides free of cost internet connection to the students in the campus through Wi-Fi (Wireless Fidelity) and LAN (Local Area Network). But, sometime students also accessed internet through cybercafés when it was urgent and internet did not function in the library and as cybercafés are privately owned, whose aim was purely for profit. So, the state government should support and encourage the private as well as the internet service providers to invest in ICTs such as fiber-optics technologies that have potential to make access to internet cheaper for educational purposes. Similar findings were reported by Adekunmisi *et al.* (2013) that a major source of internet comes through private cybercafé business centers around the university. This makes the cost of access very high and unaffordable to the students who

Table 1 Ranking of items under different factors influencing the usage of ICTs (n=200)

Factor	Total weighted score	Index	Rank order	SD
Institutional factors				
Lack of training facilities to learn ICTs	286	71.50	I	0.54
Lack of fund for ICTs	279	69.75	III	0.52
Poor ICTs-based infrastructure facilities at the campus	275	68.75	IV	0.58
Lack of technical support from organization	283	70.75	II	0.55
Composite index value= 70.18				
Personal factors				
Lack of expertise to use ICTs	295	73.75	I	0.64
Time management problems in learning to use ICTs	257	64.25	IV	0.72
Lack of learner motivation towards using ICTs	293	73.25	II	0.57
Use of ICTs caused health problems like eye pain, body pain, *etc*.	239	59.75	V	0.68
Lack of confidence to use ICTs	263	65.75	III	0.63
Composite index value = 67.35				
Economic factors				
Availability of internet facility at a higher price	236	59.00	I	0.78
Variations in charges demanded at different cyber cafes	122	30.50	III	0.81
High cost of ICTs training	211	52.50	II	0.82
Composite index value= 47.33				
Technical factors				
Slow functioning of internet/server breakdown	280	70.00	I	0.64
Lack of useful software	233	58.25	III	0.66
Irregular supply of electricity	181	45.25	V	0.79
No network coverage for mobile	210	52.50	IV	0.81
High threat of virus	279	69.75	II	0.53
Composite index value = 59.15				

Scale: 0= Not so serious; 1= Serious; 2= Very serious; SD = Standard deviation

usually pay through their pocket money for food and other provisions. He also suggested that charges for the use of internet browsing with the cost of printing should be low.

Under technical factors,'slow functioning of internet/server breakdown' ranked as 1st factor with highest index value (IV) 70.00, followed by 'high threat of virus', 'lack of useful software', 'no network coverage for mobile' and 'irregular supply of electricity' ranked 2nd, 3rd, 4th and 5th with IV 69.75, 58.25, 52.50 and 45.25, respectively. The unavailability of appropriate technology, access facilities, handling, maintenance, storage, problem from actual use and lack of relevant software/course make ICTs daunting (Mahajan 2002). In the lights of the results obtained, it is necessary that the University should relook into the matter of providing better broadband connection, high-speed, Wi-Fi internet facility at the University campus (Gaikwad *et al.* 2016). Similar findings were also observed by Kochar *et al.* (2013) who indicated the increase in awareness, availability of requisite facilities and training in computing skills are required to enable optimum utilization of digital resources by students. The results reveal that among all the factors encountered by the students, the institutional factors were perceived highest (ranked 1st) with composite index value (CIV) 70.18, followed by personal, technical and economic factors ranked 2nd, 3rd and 4th with CIV 67.35, 59.15 and 47.33, respectively. These findings were supported by the reports of Gaikwad *et al.* (2016) and Shelke *et al.* (2017) who reported that most of the problems faced by the students were related to the concerned academic institution.

Consequences of 'not using ICTs' by students: It was observed that 'loss of relevance, credibility and confidence' ranked as 1st consequence with a highest index value (IV) 80.75, followed by 'loss of contact with timely information', 'problem in near future', 'loss of management efficiency', 'inefficient and inferior services', 'loss of competitiveness' and 'isolates students' ranked 2nd, 3rd, 4th, 5th, 6th and 7th with IV 80.50, 78.75, 76.75, 65.00, 60.75 and 37.75, respectively. The results were in the same line as reported by Malik (2015) who revealed that most of the users mentioned 'loss of relevance, credibility and confidence' as a major consequence of not using internet today or in near future.

Remedies suggested by students for promoting use of ICT tools/services: Data (Table 2) indicate that most of the students suggested that 'teaching should be through

Table 2 Ranking of items under remedies suggested on ICTs use (n=200)

Remedy	Total weighted score	Index	Rank order	SD
Training programme related to use of ICTs for students	224	56.00	III	0.71
Sufficient funding for ICTs at university level	214	53.50	IV	0.72
Improved internet connection	233	58.25	II	0.64
Sufficient number of ICT tools	195	48.75	VI	0.79
Aware students about benefits of ICT tools	187	46.75	VII	0.80
Provide technical staff	184	46.00	VIII	0.78
Teaching should be through ICT tools	282	70.50	I	0.62
Provide all agriculture departments information at university website	201	50.25	V	0.76
Composite index = 53.75				

Scale: 0= Not so serious; 1= Serious; 2= Very serious; SD = Standard deviation.

ICT tools' ranked 1st with with a highest index value (IV) 70.50, followed by 'improved internet connection', 'training programme related to use of ICTs for students', 'sufficient funding for ICTs at University level', 'provide all agriculture departments information at University website', 'sufficient number of ICT tools', 'aware students about benefits of ICT tools' and 'provide technical staff' ranked 2nd, 3rd, 4th, 5th, 6th, 7th and 8th with IV 58.25, 56.00, 53.50, 50.25, 48.75, 46.75 and 46.00, respectively. As the students are engaged in learning and research activities, they need to keep themselves updated with current technologies to be competent in this globalized era. Hence, this might be a probable reason to suggest remedies for improvement in the utilization of ICTs. The findings were supported by Dash and Mishra (2012) who indicated that most of the students felt that higher bandwidth to overcome the problem of slow internet connectivity, followed by installation of firewalls for protection from viruses, internet service should be increased and, if possible, the service should be made available round the clock so that users can make maximum use of the internet facility and academic news should be provided at the college website and it should be regularly updated.

Correlation between respondent's personality traits with their perceived personal factors: The correlation and regression coefficient (Fig 1) shows relationship between students' personality traits as independent variables and personal factors as dependent variables. Correlation among 13 variables, eight variables, i.e. age (0.169), education (0.319), family education (0.164), scientism (0.391), annual expenditure (0.233), mass media exposure (0.444), information seeking behaviour (0.276) and risk orientation (0.167) with the personal constraints exhibited negative

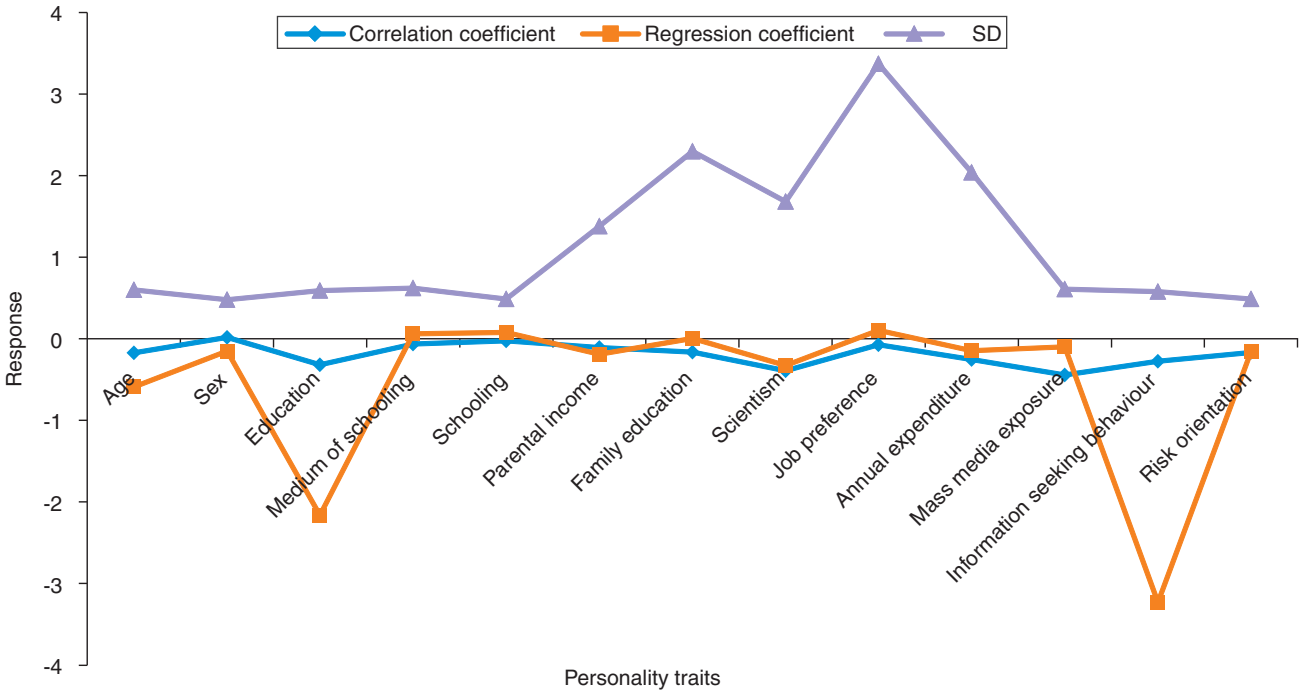

Fig 1 Correlation between respondent's personality traits with their perceived personal factors. Dependent variable - Perceived personal factors, *Significant at 0.05 levels, R^2=0.53, SD = Standard deviation, Constant value = 19.77.

and significant effect, while medium of schooling (0.065), schooling (0.025), parental income (0.108), job preference (0.073) also exhibited negative correlation but showed non-significant effect. However, sex of the respondents (0.019) showed a non-significant effect but it was positively correlated with their perceived personal factors. Similarly, regression coefficient of variables age (0.589), education (2.162), scientism (0.327) mass media exposure (0.097), information seeking behavior (3.231) and risk orientation (0.156) exhibited negative and significant effect, however medium of schooling (0.062), schooling (0.078), family education (0.007) and job preference (0.105) showed non-significant effect but it was positively correlated with personal factors at 0.05 level of probability. These findings were partially supported by the reports of Gasaymeh *et al.* (2017).

Further, it was found that all the 13 independent variables included in the study jointly contributed 53% variation in the personal factors encountered by students in using ICTs when other factors were kept constant. This means that only 53.00% (R^2=0.53) of the variation in the dependent variable was due to these variables and remaining 47% variation was due to extraneous variables which were not included in the analysis.

Results of the study indicated that lack of training facilities to learn ICTs, lack of expertise to use ICTs, availability of internet at higher price and slow functioning of internet were the major factors encountered by the students in using ICTs under four different categories, i.e. institutional, personal, economic and technical. Although, these factors could be overcome through implementing remedies suggested by students, but a well structured and sound national level policy related to infrastructure facilities, software licensing, availability of high quality ICT gadgets at subsidized rates, free and regular training programmes, scholarships, etc. which can definitely help to overcome these barriers. Some important ICT skill programs should be introduced in their computer course of the degree programme that can help them in their study like MS Excel, Windows and File management, use of digital library, Photoshop, Discussion forums and Blogs, and SPSS. Government should also support and encourage the private and as well as the internet service providers to invest in ICTs such as fiber optics technologies that have potential to make access to internet cheaper for educational purposes. Moreover, the University should not only ensure the availability of latest ICT tools to the students, but also plan the easy access and utilization strategy of the same with minimum efforts and cost.

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