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Determining Factors and Levels of E-skills among Agriculture Experts of Krishi Vigyan Kendras in India

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ABSTRACT

Information and Communication Technology (ICT) is one of the emerging driving forces to disseminate the agricultural knowledge. Skilled extension personnel can grab these opportunities for the diffusion of agricultural technologies to farming community. Therefore, the present investigation measures E-skills among agricultural experts of Krishi Vigyan Kendras (KVKs) — Farm Science Centers in Rajasthan and Gujarat states of India. Data were solicited from 87 proportionately selected agricultural experts from 29 KVKs. E-skills of experts were measured on 5-point Likert–type scale. The high level of E-skills among agricultural experts were identified in internet browsing, e-mailing, Micro-Soft (MS) Word, MS Power-Point and mobile use for sending the text messages. The agricultural experts' training on ICTs had a positive and significant relationship with E-skills while experts' age had a negtive effect. Elementary in use of ICT, analytical use of ICT, use of mobile phone for information communication and use of ICT for mass communication were the major factors that governed the E-skills. The total variance explained by these factors was found 74.88%. Tactical E-skills, informative E-skills, formal E-skills and communicative E-skills were identified as important levels of E-skills in order of their expertise. Hence, the study recommends to encourage the young professionals and to impart more ICT based trainings for improving the E-skills of agricultural experts towards tactical level of E-skills.

Keywords: Agricultural experts, E-skills, ICTs, Krishi Vigyan Kendra.

INTRODUCTION

Information and Communication Technology (ICT) has a key role for social developments in this era of information society. During the last decade, research approach on the issue of 'digital divide' was focused on the binary classification of the gap between those who have and do not have access to computers and the internet (Van Dijk, 2005). Nowadays more refined approaches for understanding digital divide have appeared (e.g. DiMaggio and Hargittai, 2001; Mossberger *et al*., 2003; Van Dijk, 2005). Although earlier evidences showed the digital divide as an issue of access, it became increasingly noticeable that digital skills are the decisive factor with respect to reaching beneficial outcomes. Presently, the digital divide has increasingly been considered as a skills divide. Availability of huge information on the internet and to meet the timely need of information, the importance of skills on Information and Communication Technologies also increased (Steyaert, 2002). The level of e-skill has a strong effect on the ICT use of individuals once they have attained physical access (Hargittai, 2003; Livingstone *et al*. 2005; Mossberger *et al*., 2003; Norris, 2001; Van Dijk, 2005; Warschauer, 2003). It is being progressively recognized that internet and computer skills are not equally distributed in the society. E-skills are the capabilities required for effective application of ICT systems and devices by the individual in the

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chosen area of work (European E-Skills Forum, 2004). Van Dijk (2005) categorized the E-skills as operational, information, and strategic E-skills. Operational E-skills are the skills to operate computer and network hardware and software and can be seen as an equivalent to instrumental E-skills. Information E-skills are the skills to search, select, and process the information in computer and network sources. Finally, strategic E-skills are the competences to use these sources as the means for specific goals. Van Deursen *et al*. (2014) further added communication skill to the internet skills.

In India, agriculture is becoming more science driven and knowledge intensive. It requires a dynamic information flow from agriculture experts to the farming community. Indian public extension system has become more time consuming, costly and less effective to meet the current information demand (Mruthyunjaya and Adhiguru, 2005) with a wide variation in the extension workers to farmers, i.e., 1:300 in Kerala and 1:2,000 in Rajasthan state (Raabe, 2008). Recent developments in ICTs could facilitate the fast flow of information delivery to the farmers (Ali, 2013; Maningas, 2006) and enable better adoption of improved farming practices (Mittal and Tripathi, 2009). Krishi Vigyan Kendras (KVKs) — Farm Science Centers is the important district based extension system and knowledge center for the farmers. Hence, the skills on the part of agricultural experts are very much needed for the efficient diffusion of agricultural knowledge. A recent study by Kale *et al.*, (2015b) reported that experts of the KVKs had a positive perception towards ICTs for the extension work. It shows an ample scope to harness the benefits of ICTs in service delivery of the extension system. Agricultural experts' with higher education and who got trainings in ICTs had a positive effect on the perception regarding the use of ICTs. The aged scientists with higher working experience did not have a positive effect. Lack of knowledge of best practices in Information Technology (IT) and associated skills in workforce, are constrained in the wide use of ICT (Kaushik and Singh, 2004). It is also observed that public extension personnel are unwilling to collaborate with the ICT project, since most of them never used the internet and lack skills in using other ICT tools (Saravanan, 2008). Therefore, skilled extension personnel are required to avail ICT opportunities for better avenues in the areas such as training, distance education, extension management, communication, administration, health, education, and knowledge sharing (Meena *et al*., 2012). ICT tools are highly useful in all the activities such as preparing presentations for training, conducting surveys, research data analysis, reporting, coordination, farmers' advisory services, transfer of technologies, etc. (Mahalakshmi *et al*., 2008; Sivakami and Kumaran, 2009; Kumaran, *et al.*, 2011; Kale *et al*., 2015a).To implement these initiatives in a sustainable manner, agricultural experts should have proficiency in using ICTs. Proficiency in use of ICT tools in extension work was identified as an important e-skill for agricultural extension functionaries (Movahedi and Nagel, 2012). However, the focus of these studies on E-skills of the stakeholders engaged in agricultural technology transfer is very scanty. Therefore, a study was undertaken to measure the level of E-skills with its associated factors among the agricultural experts of KVKs.

MATERIALS AND METHODS

The study was undertaken during 2012-2013 at ICAR–Agricultural Technology Application Research Institute (ICAR-ATARI), Jodhpur, India. The ATARI, Jodhpur coordinates 70 KVKs functioning in Rajasthan and Gujarat states. A proportionate random sampling technique was adopted in selecting the KVKs. Out of a total of 57 KVKs (during year 2012), 29 KVKs (16 from Rajasthan and 13 from Gujarat) were

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selected. Data were solicited from randomly selected three agricultural experts from each KVK, constituting a sample size of 87 for the investigation. A scale with 17-items was designed to measure the E-skills among the experts of KVKs. The experts were asked to respond on a Likert–type 5-point continuum scale. The scores were assigned as: 5= Excellent, 4= Very good, 3= Good, 2= Fair, and 1= Poor. A multiple linear regression model was employed to study the effect of personal variables on E-skills of agricultural experts. The following functional formula has been used:

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + Ui$$

(For i= 1 to n number of respondents)

Where, Y_i= E-skills of ith respondent; X_{1i}= Age (in years) of ith respondents; X_{2i}= Working experience (in years) of ith respondent; X_{3i}= Dummy variable for designation of ith respondent (0= Programme coordinator and 1= Subject matter specialist); X_{4i}= Dummy variable for education of ith respondent (1= PhD. and 0= MSc.); X_{5i}= Dummy variable for training of ith respondent (0= No training acquired on ICT and 1= Training acquired on ICT); α= Intercept, β_1 to β_5 are the partial regression coefficients.

However, considering the problem of multi-collinearity, stepwise regression was used to identify the relevant independent variables that influence the E-skills of respondents. Factor analysis (Aaker *et al.*, 2003) has been widely used to identify the underlying dimensions or constructs in data and to reduce the number of variables by eliminating redundancy. Youssef *et al.*, (2013) used Principal Component Analysis (PCA) followed by *K-Mean* non-hierarchical cluster analysis to characterize the different modes of internet usages and skills among the students. For assessing the factors governing E-skills, Principal Component Analysis (PCA) method was employed for reducing the number of variables (17) to fewer significantly meaningful factors. The items were used to assess the factors governing the E-skills of respondents. The functional form is as:

$$Y_e = \sum_{1}^{n} a_{e,f} X_f \;; \quad f = 1, 2, \ldots, n$$

Where, Y_e represents the e-skill of eth respondent, $a_{e,f}$ represents the assessment of the fth item by eth respondent, X_f represents the fth item and n is the number of items.

The Cronbach's Alpha values for each of the four dimensions were found greater than 0.7, hence, the internal consistency and reliability of the e-skill scale is high. The Bartlett's Test of Sphericity showed that non-zero correlations exist at the significance level of 1%. It indicates that a factor analysis is very useful with the present data. Kaiser-Meyer-Olkin measure of sampling adequacy value is close to 1 (i.e. 0.83), that indicates the adequacy of sample. The findings from Table 4 confirm the appropriateness of the sample for the multivariate analysis. To find out different levels of experts' E-skills, a non-hierarchical cluster analysis based on *k-means* methodology was carried out in order to define the agricultural experts' segments for E-skills. The framework of methodology is presented in figure 1.

RESULTS AND DISCUSSION

Profile of agricultural experts (Table 1) revealed that most of them (47.13%) belonged to the middle aged followed by young (27.59%) and old (25.29%). Most of them (62.07%) had less than 10 years working experience in KVKs. Majority of them (67.82%) had Doctorate of Philosophy (PhD.) degree followed by post-graduation (32.18%). Most of them (74.71%) were Subject Matter Specialist (SMS) followed by the Programme Coordinator (PC) (25.29%). More than half of the respondents (60.92%) had a wide range of experience i.e, 3 to 16 years while one fifth (20.69%) of the experts had more than 16 years of service.One-third (33.33%) of the total agricultural experts had undergone the trainings on ICTs.

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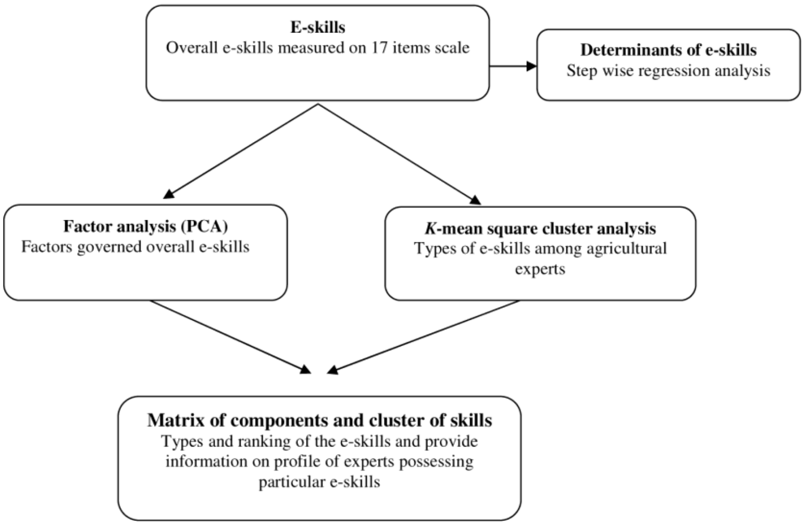

Figure 1. Framework of the study.

Table 1. Personal profile of agricultural experts (n= 87).[a]

Variables	Categories	Percentage
Age	Young < 35 years)	27.59
	Middle (36-50 years)	47.13
	Old (> 50 years)	25.29
Working experience (years)	< 5 years	29.89
	5 to 10 years	32.18
	10 to15 years	14.94
	15to 20 years	16.09
	> 20 years	6.90
Designation/Post held	Subject matter specialist	74.7
	Programme coordinator	25.3
Educational qualification	Post graduation	32.2
	PhD	67.82
Training on ICTs	Attended	66.7
	No training	33.3

[a] Source: Primary data.

E-skills Among the Agricultural Experts of KVKs

Table 2 depicts various E-skills possessed by agricultural experts of KVKs. Five main functions of E-skills,viz., internet browsing, e-mail functions, Microsoft (MS) Word, MS Power-Point and mobile use for sending text messages were frequently used by the expert. The weighted mean score of these E-skills were 81.15, 81.38, 80.92, 77.93 and 74.25, respectively. The other E-skills were MS Excel, radio talk, television talk, internet based mobile messaging, mobile phone use for sending voice message, tele-conferencing, Interactive Multimedia Compact Disc (IMCD), video conferencing and video production in the order of expertise, respectively. The agricultural experts were found with poor E-skills in use of statistical analysis package, web based

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Table 2. E-skills among agricultural experts (%) in use of ICTs (n= 87).[a]

Expertise	Response					Weighted mean	Rank
	Excellent	Very good	Good	Fair	Poor		
Internet browsing	39.08	36.78	16.09	6.90	1.15	81.15	1
1. E-mail functions	37.93	40.23	13.79	6.90	1.15	81.38	2
2. MS Word	39.08	37.93	12.64	9.20	1.15	80.92	3
3. MS Power Point	34.48	35.63	18.39	8.05	03.45	77.93	4
4. Mobile phone use for sending text message	24.14	37.93	28.78	03.45	5.75	74.25	5
5. MS Excel	31.03	22.99	24.14	12.64	9.20	70.80	6
6. Radio talk	25.29	27.59	20.69	16.09	10.34	68.28	7
7. TV talk	18.69	26.44	17.24	22.99	14.94	62.07	8
8. Internet based mobile messaging	8.05	22.99	37.93	12.64	18.39	57.93	9
9. Mobile use for sending voice message	03.45	11.49	21.84	24.14	39.08	43.22	10
10. Tele conferencing	02.30	12.64	19.54	25.29	40.23	42.30	11
11. Interactive Multimedia Compact Disc (IMCD)	00.00	06.90	31.03	26.44	35.63	41.84	12
12. Video conferencing	1.15	10.34	17.24	36.78	34.48	41.38	13
13. Video production	00.00	04.60	26.44	34.48	34.48	40.23	14
14. Statistical analysis packages	00.00	05.75	13.79	35.63	44.83	36.09	15
15. Web based decision support system	1.15	5.75	06.90	26.44	59.77	32.41	16
16. GIS	00.00	1.15	10.34	28.78	59.77	30.57	17

[a] Source: Primary data.

decision support system and Geographical Information System (GIS). These E-skills are important for conducting various extension activities in KVKs with the help of ICT tools. For creating awareness on improved agricultural technologies, E-skills of mobile phone based message, radio talk, television talk are needed. For carrying out the daily activities in KVK, internet browsing, e-mail functions and MS word are the major skills required by SMSs/PCs. To undertake the research surveys, analyzing research results of the knowledge of statistical software, web based decision support system and Geographical Information System (GIS) is highly useful. Moreover, the policy of Indian Government is marching towards making India digital. Many ICT based agriculture initiatives have been started. Some of these are implemented through KVK such as KVK-net e-connectivity, mobile phone based farmers' advisory services, virtual Krishi Vigyan Kendra (vKVK) etc. The capacity building of agricultural extension functionaries and scientists through training on ICT skills is necessary to win their trust in the system and ensure continuous updating on latest technologies (Kale *et al.,* 2015c). This will improve the efficiency of agricultural experts for performing the extension activities efficiently.

Effect of Selected Personal Variables on E-skills of Agricultural Experts

The results of the step-wise regression presented in Table 3 shows that only X_1 (age) and X_5 (training acquired on ICT) had a significant effect on the E-skills of agricultural experts. The variables namely, X_2 (working experience), X_3 (designation)

Table 3. Effect of personal variables on E-skills of experts.[a]

	Personal variables	Unstandardized coefficients		Standardized coefficients	*t* Value	*Sig*
		B	Std error	Beta		
1	Constant	71.214	5.311		13.408	0.000
	Age	-0.560	0.126	-0.434	-4.440	0.000
2	Constant	70.707	4.635		15.254	0.000
	Age	-0.633	0.111	-0.490	-5.704	0.000
	training on ICT	10.505	1.998	0.452	5.258	0.000
Dependent variable: E-skills, R^2= 39						

[a] Source: Primary data

and X_4 (education) were found non-significant and the final results are presented in the form of equation:

$Y_i = 70.71-0.63X_1+10.50X_5$

Stepwise regression results (Table 3) indicate that 39% variation (R^2) in E-skills of the respondents has been accounted by independent variables. Among the final significant independent variables resulted from the stepwise regression at 1% level of probability, training on ICT had a significant positive relationship with the E-skills. On an average, *ceteris paribus*, the E-skills score increases by 10.50 when the respondents imparted training on ICTs. As expected, the partial regression coefficient for age indicated a negative relationship on the E-skills. If the age of the respondent goes up by one year, then the E-skills score reduces by 0.63. Findings reveal that aged agricultural experts had more working experience, but accustomed with old technology (Kale *et al.*, 2015b; Tayade *et al.*, 2011). The young agricultural experts were more enthusiastic towards learning new tools of ICTs for technology transfer.

Principle Components of E-skills

The analysis of the E-skills of agricultural experts by PCA resulted in four principal components with an Eigen value greater than 1. The total variance explained by these factors was 74.88% (Table 4), which is considered as highly satisfactory (Hair *et al*., 2006). In order to get a meaningful interpretation of items and for factor mapping along the principal axis, the extracted principal component was rotated using orthogonal transformation by varimax. The results of factor rotation matrix by varimax are given in Table 5. The 17 items of the E-skills were converted into four principal components or factors. The

Table 4. Reliability and goodness of fit of factors statistics

Components	Eigen value	% Of variance	Cumulative %	Cronbach's Alpha
Elementary use of ICT	7.609	44.758	44.758	0.96
Analytical use of ICT	2.318	13.637	58.396	0.86
Use of mobile for dissemination of information	1.552	9.130	67.526	0.80
Use of ICT for mass communication	1.250	7.354	74.879	0.73
KMO and Bartlett's Tests				
Kaiser-Meyer-Olkin measure of sampling adequacy.			0.83	
Bartlett's test of sphericity	Approx *Chi*-Square		1.178E3	
	df		136	
	Sig		0.000	

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behaviour of individual items in relation to others within the same factor provides confirmation of content validity because the highest factor loading is central to the domains assessed by these factors (Francis *et al.*, 2000).

The results (Table 5) revealed that the values of factor loadings ranged from 0.882 to 0.799 for factor 1 (F1). The items of E-skills of agricultural experts found in factor 1 shows proficiency in basic use of the ICT in the daily work named as *elementary use of ICT*. In factor 2 (F2), the factor loadings ranged from 0.855 to 0.678 and the items were related to the use of ICT for analysis purpose like statistical software, DSS, GIS, interactive multimedia, this is why it was interpreted as '*Analytical use of ICT'*. The factor loadings in factor 3 ranged from 0.796 to 0.382. The items in this factor related to the harnessing of mobile phones for information sharing between experts and farmers as well as among the experts *via* video and tele-conferencing, and text and voice messages. Therefore, it was named as 'Use of mobile phone for dissemination of information'. Factor 4 (F4) was named as 'Use of ICT for mass communication' because the items related to the E-skills of mass communication like radio talk, video talk and video production were found with factor loadings ranging from 0.931 to 0.375.

Levels of E-skills among the Agricultural Experts

In order to identify the different levels of experts' E-skills, grouping of the 87 experts was done by using cluster analysis. Cluster

Table 5. Factor rotation matrix by Varimax.

Items	Factors			
	F1	F2	F3	F4
Expertise in internet browsing	0.876			
Expertise in e-mail functions	0.882			
Expertise in word processing function	0.872			
Expertise in excel or spreadsheet function	0.799			
Expertise in power point presentation function	0.843			
Expertise in statistical analysis software		0.707		
Expertise in Interactive Multimedia Compact Disc (IMCD) preparation and use		0.678		
Expertise in Geographical Information System use (GIS)		0.855		
Expertise in web based Decision Support System use (DSS)		0.750		
Expertise in video conferencing			0.788	
Expertise in tele-conferencing			0.796	
Expertise in internet based mobile messaging functions			0.575	
Expertise in mobile use for sending text message			0.382	
Expertise in mobile use for sending voice message			0.557	
Expertise in radio talk				0.931
Expertise in TV talk				0.907
Expertise in video production for extension programmes and trainings				0.375

Extraction method: Principal Component Analysis
Rotation method: Varimax with Kaiser Normalization

analysis aimed to find the homogeneous groups and to maximize the difference between groups. A non-hierarchical cluster analysis based on *K means* technique was performed and four segments or groups of experts based on level of E-skills were identified. In order to interpret the level of experts' E-skills, the matrix of E-skills mean of scores in each cluster and factors was calculated and presented in Table 6.

Figure 2 represents the schematic representation of factors and levels of E-skills of agricultural experts. The E-skills are governed by 4 factors namely, elementary use of ICT, analytical use of ICT, use of mobile phone for dissemination of information, and the use of ICT for mass communication. The levels of E-skills were tactical E-skills, informative E-skills, formal E-skills, communicative E-skills and ranked 1 to 4, respectively, where 1 represents the highest level of E-skills and 4 represents the lowest. This framework of E-skill categories was found in line with the E-skills categorization given by Youssef *et al.* (2013) and Deursen and van Dijk (2010).

The levels of experts' e-skills of the four clusters (segments) are illustrated in Table 6 and profile of the segments (Table 7) can be interpreted as:

Segment 1 (Tactical E-skills)

Segment 1 is characterized by tactical E-skills which consist of 26.43% of the total agricultural experts who possessed high E-skills and ranked first. The expert in this profile possessed high level of proficiency as compared to others in all factors of E-skills. A majority of them were in the middle and young age category (60.87% and 30.43%), respectively. Segment 1 is particularly notable as most of them had acquired training related to ICTs (60.87%). Training related to ICTs is essential to achieve the higher level of E-skills in KVK. The tactical e-skill is corresponding to strategic skill identified by Van Deursen and van

Table 6. Interpretation of level of E-skills clusters.[a]

E-skills	Mean				Mean	Rank
	Elementary use of ICT (F1)	Analytical use of ICT (F2)	Use of mobile for dissemination of information (F3)	Use of ICT for mass communication (F4)		
Formal E-skills	**4.05**	1.61	**2.55**	1.72	2.48	**III**
Tactical E-skills	**4.71**	**2.41**	**3.55**	**3.36**	3.51	**I**
Informative E-skills	**4.20**	1.88	**2.44**	**3.33**	2.96	**II**
Communicative E-skills	2.50	1.07	1.71	**3.05**	2.08	**IV**

[a] Note: The mean is in bold value when it is significantly higher in the considered cluster.

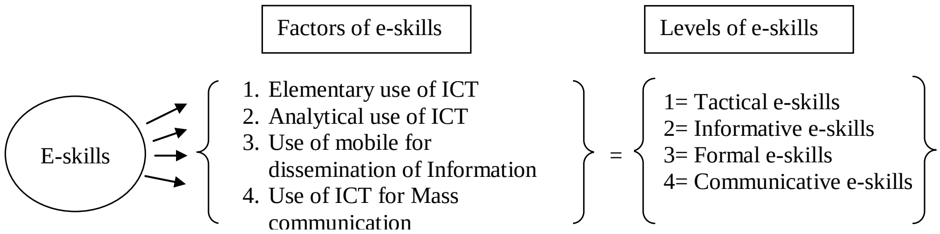

Figure 2. Schematic representation of factors determining the levels of E-skills.

Table 7. Profile of the segments by agricultural experts' E-skills

Variables	Categories	Segment-1 (Tactical E-skills)		Segment-2 (Informative E-skills)		Segment-3 (Formal E-skills)		Segment-4 (Communicative E-skills)	
		f	%	*f*	%	*f*	%	*f*	%
Age	Young (< 35 years)	07	30.43	06	28.57	10	43.48	01	05.00
	Middle (36-50 years)	14	60.87	11	52.38	11	47.83	05	25.00
	Old (>50 years)	02	08.70	04	19.05	02	08.70	14	70.00
Working experience in KVK	< 5 years	06	26.09	07	33.33	12	52.17	01	05.00
	6-10 years	10	43.48	06	28.57	08	34.78	04	20.00
	11-15 years	01	04.35	05	23.81	01	04.35	06	30.00
	15-20 years	06	26.09	02	09.52	02	08.70	04	20.00
	> 20 years	00	00.00	01	04.76	00	00.00	05	25.00
Designation	SMS	20	86.96	17	80.95	19	82.61	09	45.00
	Programme coordinator	03	13.04	04	19.05	04	17.39	11	55.00
Educational qualification	Post Graduation	08	34.78	05	23.81	11	47.83	05	25.00
	PhD	15	65.22	16	76.19	12	52.17	15	75.00
Training acquired on ICT	Yes	14	60.87	08	38.10	04	17.39	03	15.00
	No	09	39.13	13	61.90	19	82.61	17	85.00
Total		23	100	21	100	23	100	20	100

Dijk (2010) which is highly important for personal and professional development.

Segment 2 (Informative E-skills)

Segment 2 includes 24.13 % of the respondents. Experts in this segment possessed informative E-skills and ranked second based on their E-skills. Most of them (52.38%) were in the middle age category. These experts had good expertise in use of ICT for the various components like elementary use of ICT, use of mobile for dissemination of information and use of ICT for mass communication, but they were not very proficient in use of ICT based analytical tools like statistical tools, GPS, DSS and multimedia.

Segment 3 (Formal E-skills)

Segment 3 comprises 26.43% of KVKs experts who were characterized by formal E-skills and acquired proficiency in elementary use of ICT and mobile communication technologies. These respondents were ranked third in the level of E-skills. They possessed skills typically in internet browsing, e-mail, word processing, spreadsheet and power point presentation functions along with mobile phone based communication skills like video and tele-conferencing, internet and mobile based text, and voice messaging. Generally, experts from segment 3 did not use specialized software. They especially had the basic skills to operate computers and mobiles. Most of them (47.83%) and (43.48%) were in the middle to young age category respectively. Very few of them acquired training on ICTs (17.39%). Lack of training may be the reason for low level of E-skills in this segment. Specialized training courses on ICT should be organized to improve the scientists' proficiency in ICT (Kale *et al.*, 2015c and Tayade *et al.*, 2011).

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Segment 4 (Communicative E-skills)

This cluster (segment-4) includes 22.98% of experts who were characterized by the least E-skill. The experts of this group possessed skills only in use of ICT for mass communication i.e. delivering TV talk, radio talk and video production. They were having low skills in other areas of ICT use. Most of them (70%) were found in the old age category. Older people are more oriented towards the traditional techniques that may be the reason for lower E-skills. Very few of them acquired training on ICTs (15%). Lack of training on ICT and the higher age of experts were the major factors responsible for lower level of E-skills in other areas than communication e-skill.

CONCLUSIONS

The high level of E-skills possessed by the agricultural experts were identified in internet browsing, e-mailing, Micro-Soft (MS) Word, MS Power-Point and mobile use for sending text messages. The experts were constrained with advanced E-skills for use of ICTs for diffusion of agriculture technology. The proficiency in elementary use of ICT, analytical use of ICT, use of mobile phone and use of ICT for mass communication were the major factors governing the E-skills of agricultural experts. Tactical E-skills, informative E-skills, formal E-skills and communicative E-skills were identified as important levels of E-skills in order of advanced to basic. The agricultural experts' training on ICTs had a positive and significant effect while their age had a negative effect on E-skills of the experts. Hence, it is recommended that the young agricultural experts can be trained on ICTs for improving their E-skills towards the tactical level of E-skills for higher efficiency in technology diffusion. Hence, the training programs on ICT should be organized based on the level of E-skills and age. Young experts should impart more advanced tactical E-skills, whereas step wise training programs for middle to older experts should be designed to impart E-skills from communicative levels to tactical levels of E-skills. This study shows that young agricultural experts need to be promoted as they can produce better results with use of ICT in dissemination of agricultural technologies.

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تعیین عوامل و سطوح مهارت های الکترونیکی در میان کارشناسان کشاروزی Krishi Vigyan Kendras در هند

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چکیده

فناوری اطلاعات و ارتباطات (ICT) یکی از نیروهای محرک در حال ظهور برای انتشار دانش کشاورزی است.کارکنان ماهر می توانند از این فرصت ها برای رواج فن آوری های کشاورزی به جامعه کشاورزی استفاده کنند. بنابراین مطالعه حاظر، مهارت های الکترونیکی در میان کارشناسان کشاورزی KVKs- مزرعه مراکز علمی ایالت های Rajasthan و Gujarat در هند را اندازه گیری می کند. داده ها از ۸۷ کارشناس کشاورزی درخواست شدکه به تناسب از ۲۹ KVK بودند. مهارت های الکترونیکی در مقیاس لیکرت ۵ نقطه اندازه گیری شد. سطح مهارت های الکترونیکی میان کارشناسان کشاورزی از طریق استفاده آن ها از اینترنت، دریافت ایمیلی، سخت و نرم افزار، قدرت نقطه MS، و استفاده از موبایل برای فرستادن پیام شناسایی شد. کارشناسان کشاوزی اموزش دیده ICT رابطه مثبت و معنادارو سن کارشناسان رابطه منفی با مهارت های الکترونیکی داشت. مهارت در استفاده از ICT، استفاده از فناوری اطلاعات و ارتباطات تحلیلی، استفاده از تلفن همراه برای برقراری ارتباط اطلاعات و استفاده از فناوری اطلاعات و ارتباطات برای ارتباط جمعی از عوامل عمده نشان دهنده مهارت الکترونیکی می باشد. واریانس کل توضیح داده شده توسط این عوامل ۷۴٫۸۸ درصد بود. مهارت های الکترونیکی تاکتیکی، مهارت های آموزنده الکترونیکی ، مهارت های رسمی و ارتباطی الکترونیکی ، به عنوان سطوح مهم مهارت های الکترونیکی شناسایی شدند. از این رو این مطالعه، توصیه به تشویق جوانان حرفه ای و انتقال ICT بیشتر از طریق آموزش برای بهبود مهارت های الکترونیکی کارشناسان کشاورزی به سمت سطوح تاکتیکی مهارت های الکترونیکی می کند.