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Computer Literacy and Information Society Skills of Public Extension Workers in Turkey

Türkiye'deki Kamu Yayım Elemanlarının Bilgisayar Okur Yazarlığı ve Bilgi Toplumu Becerileri

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ABSTRACT

Target extension efforts can develop the computer literacy and other information processing capacity of rural areas to levels deemed to be acceptable in today's information society. Extension staff must be equipped with some abilities, such as capability of using information and communication technologies, self-learning, and efficiency in human relations and team works for reaching information society level in rural area. The data were collected from 538 public extension workers in Turkey. The study aimed at presenting some suggestions for improving information society skills of public extension workers. According to the comments of extension workers, information society skills of their colleagues are at medium level. Computers as the milestone of information society are regularly used by 49% of extensionists in Turkey. In general, the staff is good enough on basic computer skills but they have problem with computer hardware and internet usage. The computer skills of extensionists vary with their age, education and gender.

Anahtar Sözcükler:

Tarımsal Yayım, bilgisayar okur yazarlığı, e-beceriler, bilgi toplumu

ÖZET

Yayım etkinliklerinin hedefi, kırsal kesimin bilgisayar okur-yazarlığını ve diğer bilgi işleme becerilerini bugünün bilgi toplumunda kabul edilebilir düzeye ulaştırılması olabilir. Yayım elemanları kırsal kesimde bilgi toplumu düzeyine ulaşmak için, bilgi ve iletişim teknolojilerini kullanma, kendi kendine öğrenme, insan ilişkileri ve ekip çalışmalarında yetkinlik gibi bazı becerilerle donatılmalıdırlar. Veriler Türkiye'deki 538 kamu yayım elemanından toplanmıştır. Çalışma, kamu yayımcılarının bilgi toplumu becerilerinin geliştirilmesine yönelik bazı öneriler sunmayı hedeflenmiştir. Yayımcıların yorumlarına göre, meslektaşlarının bilgi toplumu becerileri orta düzeydedir. Bilgi toplumunun kilometre taşı olan bilgisayarı Türkiye'deki yayımcıların %49'u düzenli olarak kullanmaktadır. Genel olarak, yayımcılar temel bilgisayar becerilerinde yeterince iyi iken, bilgisayar donanımı ve internet kullanımında sorunludurlar. Yayımcıların bilgisayar becerileri yaşlarına, eğitimlerine ve cinsiyetlerine göre farklıdır.

INTRODUCTION

Agricultural extension has contributed significantly to agricultural production and development in the past century. Agricultural extension also has an important role in preparing farmers and rural people to compete and take advantage of opportunities offered in international trade and other aspects of today's knowledge-based world (Van der Bor, Brydan, Fuller, 1995; Csaki, 1999). Furthermore, the efforts of extension professionals are critical in developing the information processing and management capacity of rural areas to the levels attained in modern information societies. In order to achieving these improvements, the structures and processes of extension systems should be digitalized, decentralized and pluralized, and made client oriented (Wagemans, 1990; Roling, 1990). ICTs *(Information and Communication Technologies)* will have significant direct and indirect effects on this redesigned extension system, and on productivity, knowledge

diffusion and innovation across the economy (Mugwisi et al., 2015; Ali and Kumar, 2011; Rad et al., 2015). ICTs are driving a rapid evolution in product and process design by embedding both automation and intelligence into nearly every product and service. In addition, tackling and solving some of the world's toughest challenges will need ICTs-literate professionals. As a result, there is a long run trend of steadily growing demand for people with "e-skills" (ICTs skills) in all sectors of public and private enterprises-Increasingly all professions require at least basic user e-skills (Dang, J., et al, 2006). Therefore, in the study, computer literacy levels and information society skills of public extension workers were investigated and the suggestions were done for improving the skills of extension workers.

MATERIAL and METHODS

The research has been conducted in nine provinces selected (Adana, Bursa, Erzurum, Konya, Malatya, Manisa, Samsun, Sanliurfa and Usak) from each agricultural zones in Turkey. Integer and purposive sampling methods were employed for defining the sample size in the research. Purposive sampling was used for the selection of provinces. The provinces were designated from the zones according to their agricultural production values. Involved provinces also represent the different regions possessing different ecological and agricultural structures. Integer was used for interviewing with the extension workers in these provinces. Although, there were totally 1154 public extension workers in these provinces extension services, during the study, 538 of them wanted to participate in the research in between 2006 and 2007 (Table 1). The rate of return of questionnaire was about 47%. All field level technical staff, such as agricultural engineers, veterinarians, agricultural and veterinarian technicians and home economists, those work to enhance the living standards of rural people, were identified as extension worker in the study.

Frequency, Mann Whitney-U, Kruskal Wallis tests, T-test, Likert scale, factor analysis and cluster analysis were employed for interpreting the data in the study. Factor analysis, a class of procedures, is primarily used for data reduction and summarization (Malhotra, 1996). Some personal characteristics of extension workers such as age groups (lowest through 40 and 41 through highest), gender groups (male and female) and education groups (faculty graduates and others) and the regions were used for comparing the extension workers. Factor analysis was used for classification of computer literacy skills and information society skills of extensionists in the study. Besides these mentioned statistical methods, likert scale with a score ranging between 1 and 5 was also used for evaluating of some variables in this research.

Table 1. The level of information society skills of extension workers

Information society skills	Level					Mean
	never				high	
	1	2	3	4	5	
Relations with farmers	2.1	8.1	33.7	37.0	19.1	**3.6**
ICTs usage	3.8	27.1	38.6	23.3	7.1	**3.0**
Conducting team work	8.0	19.6	33.8	26.2	12.3	**3.1**
Problem solving	4.8	19.5	37.1	27.6	11.2	**3.2**
Openness for innovation	7.1	12.8	33.0	30.9	16.2	**3.3**
Lifelong learning	11.4	19.7	31.8	22.6	14.5	**3.0**

RESULTS and DISCUSSION

Some characteristics of extension staff

Age, education level, in-service training attendance, and occupational experience affect the performance of extension workers (Expere, 1974). The proportion of female extension personnel is considered inadequate. In 1988 only 13% of extension personnel worldwide were estimated to be women with regional differences (FAO, 1990). According to our findings, in Turkey the average age of an extensionist is 39.9, 25.2% are women and 61.2% have personal farming experience. More than half of the extension staff graduated from agricultural faculties. Most of the vocational high school graduates also attended two-year vocational programs at universities. In addition, 14.5% of the extensionists have a master's degree and 1.7% has completed their Ph.D. studies. The dynamic process of development requires institutional and individual transformations. Regarding this aspect, individual differences between age groups reflect the changing profiles of the staff. Levels of education and numbers of women among the extension workers have increased within the years.

Today, ICTs have important functions in agriculture like other sectors. For this reason, extension staff

should be equipped with ICTs, and have good foreign language abilities for digital applications (Trindade, 1999). For instance, 67% of personnel in some Middle Eastern countries have shown their insufficient English abilities as the reason of their lack of connection to the internet and the knowledge networks (UNDP, 2003). Foreign language knowledge is low among the extension staff in Turkey: 47.2% of the staff is not able to speak any foreign language and only 5% of staff declares an advanced level of knowledge for a foreign language.

Information Society Skills of Extension Workers

At the Information Society World Summit, the vision articulated was characterized as human centered and development oriented (International Telecommunication Union, 2006). In this context, people should be able to create and share knowledge (DPT, 2008) and extension workers should become information brokers in rural areas (USAID, 2003). Increasing the world knowledge stocks by publishing approximately 7000 articles in a day, doubling the scientific and technical information within a few years and the amplification effect of ICTs *(information and communication technologies)* caused an increase in the obsolescence rate of specialists. That drew attention how critically important it was for extension specialists and staff to develop the meta-learning skills if they needed to become self-directed learners (Misra, 1991; Astroth, 1990).

Recently, skills in public policy analysis and utilization of information technologies are accepted as the basis for success in extension. Given the demands of the evolving information society and the need for extension to adapt, extension staff must become proficient in foreign language, the use of information and communication technologies, self-directed learning, human relations and teamwork (Trindade, 1999). hese proficiencies are seen as the ticket for information society networks (UN, 1999) and as preconditions for advancing the social dimension of sustainable development.

In this study, information society abilities of extensionists were investigated in Turkish public extension services. Information society skills of extensionists were evaluated by their colleagues. The results showed that skills were not at the desired level except for the skills required to communicate with the farmers. According to the comments of extension workers, in general, the information society skills of their colleagues were at the medium level (Table 1).

In the last few decades, general extension and training-visit approaches based on traditional technology transfer model were intensively employed in agriculture in developing countries. The top-down flow of information is fundamental in these approaches (Axinn, 1988). In the model, public information on production techniques was transferred to the rural areas through printed, audio and visual aids. Nevertheless, today's improvements are leading to public affairs, ICTs usage, teamwork, participatory problem solving and facilitation in extension. Agriculture has become more complicated in structure and process, which requires the application of pluralistic and participatory models in extension (Donnellan & Mantgomery, 2005).

Factor analysis was used to classify the basic characteristics of information society (Table 2). Extension workers and working staff in extension services in cities such as Bursa, Adana, Samsun and Manisa had higher level of information society skills. It appeared that the information society skills of extension workers in these regions were positively affected by the advanced information infrastructure found in these regions (Table 3 & 4).

Table 2. Classifying of information society skills (Factor analysis)

KMO Measure of sampling adequacy	Barttlett's test of chi square	Degree of freedom	Probability of significance
.882	1427.3***	15	.000
Factors	Factor 1		
Variables	Relations with farmers ICTs usage Conducting team work Problem solving Openness for innovation, Lifelong learning		
Variables for clusters	Problem solving skill and openness for innovation		
Cluster groups	Group 1		Group 2
Information society skills	Number	%	Number	%
	258	61.3	163	38.7

*Significant difference at *** α <0.01*

Table 3. Sufficiency of information society skills, Mann Whitney U Test

Education groups	Number	Mean rank	Sum of rank	Mann Whitney U	Z	Asymp. Sig. (2-tailed)
Faculty	266	190.8	50742.0	15231.0**	2.131	.033
Other	131	215.7	28261.0			

***Significant difference at 0.05>p*

Table 4. Sufficiency of information society skills according to the provinces, Kruskal Wallis Test

Provinces	Number	Mean rank	Chi Square Value	Degree of freedom	Probability of significance
Adana	23	229.6			
Bursa	44	241.8			
Erzurum	37	195.1			
Konya	36	200.7			
Malatya	47	173.0	16.638**	8	0.034
Manisa	63	221.8			
Samsun	99	229.1			
Sanliurfa	30	168.0			
Usak	42	205.9			

*Significant difference at ** $\alpha<0.05$*

Computer Literacy Levels of Extension Workers

The transition to a knowledge-based economy will make education and training a lifelong process rather than a one-off activity where knowledge becomes the main value driver for business and the key to be employable over the duration of ones working life. In this working environment, e-skills can significantly contribute to lifelong learning. The main objectives of lifelong learning are personal development, active participation by citizens, social integration, and employability/adaptability (Dang, J., et al, 2006). To realize these objectives, extensionists and staff must become computer literate and acquire e-skills. The extension workers are not able to escape from the computer revolution and they will also be responsible for the diffusion of computers in rural areas. Computer literacy is defined as reaching abilities of individuals to information by means of the digital platforms, computers and the networks (DPT, 2001). Based on this definition having superficial knowledge about computer usage is enough for individuals. On the other hand, true computer literacy means being able to use and decide which programs or applications are required in your work. Given this second definition, the rate of computer literacy in Turkey is about 5% of the country's population (Arkan, 2004).

Research indicates that the rate of web page design (20%) and the rate of power point preparation and presentation (75%) were higher among the extension workers in USA (Kallioranta, Vlosky & Leavengood, 2006). Research findings also indicate that in the U.S. the group of extension workers 40 years old and younger have higher ICT skills (Grepg & Irani, 2004). Furthermore, research findings also indicate that farmers in the U.S. tend to use the internet at a much higher rate than their counterparts in some European countries (DPT, 2001). English speaking countries seem to have the advantage in accessing internet based information because, globally, most web pages are designed in English.

Although the extension workers had limited training in computer skills at schools and in the offices, their level of computer literacy is higher than can be expected of individuals with limited access to computer training. According to the findings of this study, in Turkey 49% of extensionists use computers, 40.7% of them regularly access the internet and 27% of internet users have prepared and disseminate extension advice using the internet. In general, the staff has good basic computer skills, but they have problems with computer hardware and internet applications for example, using the scanners, installing and uninstalling the software, audio-visual communication through the internet, preparing power point presentations, participation in membership to discussion groups, banking via the internet and designing web pages. The computer literacy skills of extensionists can be placed in three categories: basic, internet, and computer hardware (Table 5 & Table 6).

According to the findings of this study, the basic computer skills of extensionists vary by age, education and gender. Extensionists of 40 years old and younger, faculty graduates and female have higher levels of computer skills. Computer hardware skills are higher among extensionists 40 years old and younger; and male extensionists. Internet skills are higher among younger, faculty graduates and female extensionists (Table 7).

Table 5. Computer literacy levels of extensionists

Skills	Sufficiency levels					Mean
	never				very much	
	1	2	3	4	5	
To turn on/off monitor	3.7	5.7	14.9	20.9	54.7	**4.2**
To use and adjust the printer	9.0	15.5	22.5	21.5	31.3	**3.5**
To use scanner	31.4	20.0	21.1	11.9	15.7	**2.6**
To decide the required equipments	16.4	18.8	27.3	19.2	18.3	**3.0**
To use the CD, DVD and memory sticks	11.9	12.1	21.7	22.4	31.8	**3.5**
To connect between computer to camera, microphone, etc.	22.7	15.1	20.5	15.9	25.9	**3.1**
To install and uninstall the software	29.1	21.6	19.8	12.0	17.5	**2.7**
To adjust desktop	11.9	14.3	17.1	21.0	35.7	**3.5**
To create the new file	7.5	10.0	14.3	16.8	51.4	**3.9**
To organize the archives and to zip	15.0	17.9	16.2	16.5	34.4	**3.3**
To use help files	13.5	20.9	20.2	17.5	27.8	**3.2**
To format the disks	18.7	21.2	14.6	19.0	26.5	**3.1**
To share file on network	14.7	17.8	18.3	20.5	28.6	**3.3**
To transfer audio and visuals on internet	24.3	19.0	21.8	13.4	21.5	**2.8**
To use word processing	12.3	11.5	18.1	23.8	34.3	**3.5**
To cut and copy in the files	6.3	7.4	13.5	21.3	51.5	**4.0**
To adjust the page structure	8.4	13.2	16.0	22.7	39.7	**3.7**
To prepare tables	12.0	15.9	18.5	18.8	34.9	**3.4**
To use Power Point for presentations	24.4	20.9	20.0	14.5	20.2	**2.8**
To use Excel	17.8	18.8	20.0	21.0	22.4	**3.1**
To surf on internet	9.8	9.8	16.2	24.3	39.9	**3.7**
To research information by using the search machines	12.4	10.9	16.3	20.2	40.1	**3.6**
To use electronic mail	13.9	9.9	18.8	19.0	38.5	**3.5**
To join the discussion groups	32.9	19.4	19.2	11.7	16.8	**2.6**
To manage the banking treatments trough internet	37.3	16.4	12.7	14.5	19.1	**2.6**
To shop on internet	48.5	16.8	10.3	10.8	13.6	**2.2**
To download text and picture from internet	17.5	14.1	16.5	22.1	29.7	**3.3**
To design web page	58.7	17.8	11.4	3.9	8.3	**1.8**
To connect with camera and microphone	34.6	14.6	13.4	13.9	23.5	**2.7**

Table 6. Classifying of computer literacy skills of extensionists (Factor Analysis)

KMO Measure of sampling adequacy	Barttlett's test of chi square		Degree of freedom		Probability of significance
.972	9406.0***		406		.000
Factors	Factor 1		Factor 2		Factor 3
Variables	To turn on/off monitor, To use the CD, DVD and memory sticks , To adjust desktop, To create the new file, To organize the archives and to zip, To share file on network, To use word processing, To cut and copy in the files, To adjust the page structure, To prepare tables, To surf on internet , To research information by using the search machines, To use e-mail, to download text and picture from internet		To use scanner, To decide the required equipments, To install and uninstall the software, To use help files, To format the disks, To connect between computer to camera, microphone, etc., To use Power Point for presentations , To use Excel		To shop on internet, To join the discussion groups To manage the banking treatments trough internet To design web page, To connect with camera and microphone
Clusters	Basic computer skills		Computer hardware usage skills		internet usage skills
Variables for clusters	To cut and copy, to use scanner , to shop on internet				
Cluster Groups	Group 1		Group 2		
Computer skills of extension workers	Number	%	Number	%	
	401	74.5	137	25.5	

*Significant difference at *** α <0.01*

Table 7. Computer literacy of extensionists, Mann Whitney U Test

Variable	Groups		Number	Mean rank	Sum of rank	Mann Whitney U	Z	Asymp. Sig. (2-tailed)
Basic computer skills	Age	≤ 40	229	247.7	56723.5	14724.5***	6.699	.000
		41≤	197	173.7	34227.5			
	Education	Faculty	274	216.0	59189.0	15750.0***	2.764	.006
		Others	136	184.3	25066.0			
	Gender	Male	325	208.6	67780.0	14805..0**	2.064	.039
		Female	104	235.1	24455.0			
Computer hardware usage skills	Age	≤ 40	225	232.8	52373.0	16027.0***	4.595	.000
		41≤	191	179.9	34363.0			
	Gender	Male	323	216.5	69917.0	13417.0**	2.060	.039
		Female	96	188.3	18073.0			
Internet usage skills	Age	≤ 40	227	242.0	54932.5	13394.5***	6.751	.000
		41≤	187	165.6	30972.5			
	Education	Faculty	267	206.0	54999.5	15755.5*	1.677	.094
		Others	131	186.3	24401.5			
	Gender	Male	316	202.0	63837.0	13751.0**	2.186	.029
		Female	101	230.9	23316.0			

*Significant differences at *** α <0.01 ** α <0.05 * α <0.10*

CONCLUSION

In Turkey the average age of an extensionist is 39.9, 25.2% are women and 61.2% have personal farming experience. More than half of the extension staff graduated from agricultural faculties. In addition, 14.5% of the extensionists have a master's degree and 1.7% has completed their Ph.D. studies. Levels of education and numbers of women among the extension workers have increased within the years. Foreign language knowledge is low among the extension staff in Turkey: only 5% of staff declares an advanced level of knowledge for a foreign language.

The information society skills of extension workers were at the medium level. It appeared that the information society skills of extension workers in these regions were positively affected by the advanced information infrastructure found in the regions. In Turkey 49% of extensionists use computers, 40.7% of them regularly access the internet and 27% of internet users have prepared and disseminate extension advice using the internet.

In general, the staff has good basic computer skills, but they have problems with computer hardware and internet applications for example, using the scanners, installing and uninstalling the software, audio-visual communication through the internet, preparing power point presentations, participation in membership to discussion groups, banking via the internet and designing web pages.

Extensionists of 40 years old and younger, faculty graduates and female have higher levels of computer skills. Computer hardware skills are higher among extensionists 40 years old and younger; and male extensionists. Internet skills are higher among younger, faculty graduates and female extensionists.

Agricultural extension has contributed significantly to agricultural production and development within the past century. However, keeping in step with new improvements on today's complex knowledge-based agriculture system requires constructing a decentralized, pluralized, client orientated and digitalized extension systems. The development of the information processing and knowledge management capacity in rural areas is a primary responsibility of agricultural extension. In this respect, extension workers skilled in information processing and knowledge management have vital roles to play in transforming rural society to meet the information processing and management standards of a postmodern information society (Dang, J., et al, 2006). The staff should be equipped with the capability to use information and communication technologies, the capacity to engage in self- directed learning, effective human relations skills and the ability to engage in teamwork in order to achieve the transformation of rural societies. These abilities are also seen as preconditions for advancing the social dimension of sustainable development. Based on the results of this study the following suggestions are offered:

- The pluralistic and participatory models in extension must be employed in developing countries. Computer and internet connections infrastructures

should facilitate the adoption and application of these models in a much faster, cheaper and interactive way.

• Extension staff must be encouraged to adopt and apply information society skills in extension services. To achieve this objective, in-service training activities must include instructions on computer literacy in addition to instruction in agricultural techniques.

• Because ICTs are essential components of information society, facilities such as computers, printers, scanners and internet connections must be improved in extension organizations.

• It is known that adult education is characterized by diversity in its form, content and the context in which it takes place. E-skilled extension staff can be flexible with respect to time and place in communicating with heterogeneous target groups and using diverse information sources.

• The language used in designing web pages restricts Turkish extensionists access to information on the internet. The numbers of agricultural web pages designed in Turkish must be increased by encouraging public extension services and other related actors such as universities, research institutes, farmer' organizations to develop web pages in agriculture using the Turkish language.

• During preparation of the web pages, the validity and reliability of information should be checked by extension services. In most provinces in Turkey, extension services have their own web sites, but the pages are not being regularly updated. The web pages must be built using an interactive style in order to facilitate better exchange of information between users.

• Extension workers must be encouraged to employ not only ICTs usage but also societal side of information society skills such as team works, problem solving and lifelong learning, etc. during conducting extension and rural development efforts.

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