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Identifying Training Needs of Agriculture and Natural Resources Faculty Members in Using Information Technology

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ABSTRACT

The main purpose of this study was to identify training needs of agricultural and natural resources faculty members in the use of information technology (IT) for educational and research activities. This study used a descriptive and correlational survey method and the population of the study included all faculty members at the Tehran and Tarbiat Modares Universities, College of Agriculture and Natural Resources (N=267). According to Krejcie and Morgan (1970), the sample size for a population of this size was 158. A systematic sampling technique was used to select faculty members in the study. The overall Cronbach's alpha coefficient for the instrument was 0.82. Findings in respect to training needs of faculty members showed that "theories and models of online education" appeared at the top of the list of training needs and the lowest level of respondents` training need were in using Microsoft Word. The T-test result showed that there were significant differences (at the 0.01 level) in the training needs level of the faculty members who had received training during the last 5 years and those who had not . In the case of those who had access to computer and the Internet and those who did not have access, training needs differed at 0.05 level of significance. The results of Pearson's correlation coefficient showed that age had a significant and positive correlation with the faculty members` training needs level of IT use in educational and research activities. In contrast, Internet use per week and willingness for online education had a significantly negative correlation with the faculty members` IT training needs. No significant relationship was revealed between teaching experiences of the respondents and their training needs level in the use of information technologies.

Keywords: Faculty members, Information technology training, Research activities, Training need.

INTRODUCTION

With the rapid expansion and improvement of the information technology (IT) during the past decade, among its other usages, it has become an effective media for teaching and learning, especially in higher education (Scutter, 2002). Enhancement of the quality of learning, maintenance of competitive advantages, and improvement of access to education and training have been mentioned as the major reasons for utilizing the information and communication technologies at the universities and educational institutions (Gammill and Newman, 2005). The new communication technologies present higher education with the arena to perform its usual mission with powerful new tools (Flood and Conklin, 2003). Increase in online education is requiring universities to change the way in which information is distributed among students; therefore, administrators need to be conscious of the changes that must take place in the area of faculty training. The faculty members and departments need to be responsible for creating learning environments that are factual and

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meaningful to all students (Edmund *et al.,* 2002).

While the Internet has fairly widespread adoption and application in educational institutions in developed countries, in Iran, the integration of new technologies into classroom instruction grows slower than expected. In the meantime, faculty members are among the main factors to integrate equipment and software into the educational and research processes (Kumar *et al.*, 2008). Faculty members must effectively incorporate new technologies into teaching activities, but, successful usage of modern technologies for teaching students requires new knowledge and skills. Therefore, one of the main reasons for this problem in Iran might be faculty members` inadequate knowledge and skills of how to incorporate and use information technology in instructional settings. Thus, this study was intended to assess the existing skills of faculty members and identify their training needs regarding the use of IT. Once the relative needs are determined and an appropriate listing of priorities is established, the available resources could be better utilized and made more productive (Ali Baygi *et al.*, 2000).

In the past few years since online education has become a practical alternative for institutions of higher education, the amount of distance education literature concerning the related teaching conditions for faculty has flourished (Pachnowski, and Jurczyk, 2000).

Dooley and Murphy (2000) found that College of Agriculture faculty members at Texas A&M University lacked experience in online education. They agreed that electronic technologies could make a valuable contribution to the learning process and should be used in all classes. Furthermore, faculty members who had not participated in online education perceived the level of support as lower than those who had taught online courses. They believed that the ability of an organization to adapt to changes was influenced by: competence or the knowledge, skills, and abilities of its staff; value or the amount of importance the staff places on the role of these technologies to accomplish teaching and learning; information technology support or the availability of high quality facilities, equipment, technical support, and training.

In a study, Malik (1999) indicated that faculty members of Auburn higher education system revealed that they were willing to use and apply the new information technologies, but they needed more institutional support. According to the results of that study, the Auburn faculty members were unsure of the instructional efficacy of online education. They were uncertain about personal involvement in online education and stated that they did not have enough knowledge and skills for online education performance. Northrup (1997) discovered that many faculty members had received little or no training prior to being assigned to an online course. Training on new tools and modern technologies may improve some of the concern expressed by the faculty. In addition, training on new instructional techniques and strategies, for promoting interactivity and providing sufficient and timely feedback, may promote an environment more favorable to learning.

Spotts (2003) found that faculty members of Midwestern University needed greater support in learning new technologies for education. Instructors need help in using the technology effectively in teaching, not just directions on how it works. Knowing the basics of a technology does not ensure its effective use in instruction. Instructors need help to see how to use it in the classroom or in their working situation. The Regents of the University of California (2002) stated that, in recent years, the campus had addressed barriers to wide dissemination of technology in and out of the classroom. Barriers included: (a) equipment failure; (b) little or no training to use equipment appropriately; (c) lack of technical expertise to create materials in multiple platforms; and (d) inability to update skills to keep pace with rapid changes in programs and equipment.

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According to Mohamadi (2004), the main reason that students and faculty members of Shahid Beheshti university did not use Information Technology and E-learning technologies was lack of computer literacy. Some of them did not know about Windows Microsoft, Outlook Express, E-learning models, E-learning concepts and techniques, and participation in videoconferences.

Shakoori (2000) studied educational needs of students and faculty members of Alzahra University regarding Information Technology. Results showed that there were significant differences in the IT educational need level of the faculty members and the training they had received.

According to Jamlan (2004), the faculty members of the University of Bahrain stated that training, well prepared online courses and learning materials, and implementation of a more robust technological infrastructure to support the technical aspects were necessary to launch and sustain e-learning courses.

Information Technology is the technology of production, storage, and communication of information using computer hardware and software systems and microelectronics (Scutter, 2002). In the present research, using information technology means the use and maintenance of computer hardware and software systems (including webpage design software, programming software, graphical software, statistical software, scanner, printer, webcam, and videoconference software and hardware) and use of Internet to organize and communicate information electronically.

A training needs assessment provides the information needed for developing a training plan based on the learning needs of the participants. It increases the relevance of the training and the commitment of the learners, as they are involved in the preparation of the training design that reflects their expressed needs. The facilitators can acquire basic knowledge of the strengths and limitations of the participants and the learners can become partners in analyzing their own learning needs. There are many tools and methods for undertaking training needs assessment. These tools and techniques range from questionnaire-based surveys to participatory learning and action (PLA) tools. One of the tools used for training needs assessment is questionnaire. This tool involves preparation of the questionnaires that participants determine their training needs level (Swist, 2001).

The main purpose of this study was to assess the existing skills and training needs of the faculty members in the College of Agriculture and Natural Resources at the Tehran and Tarbiat Modares Universities in respect to incorporating information technology into development and delivery of training programs.

The objectives of this study were to:

1. Identify the academic and personal characteristics of the faculty members;
2. Determine the existing skills and knowledge of the faculty members in using information technology;
3. Determine the amount of faculty members` training needs in using information technology for educational and research activities;
4. Determine the relationships between faculty members` personal characteristics and their training needs in using information technology.

MATERIALS AND METHODS

In this study, a descriptive and correlational survey method was used and the population of the study included all faculty members at the Tehran and Tarbiat Modares Universities, College of Agriculture and Natural Resources (N=267). According to Krejcie and Morgan (1970), the recommended sample size for a population of this size is 158. A systematic sampling technique was used to select faculty members in the study (n=158). Data were gathered via the use of an on-line questionnaire that included two parts: Part I was designed to identify the personal and professional characteristics of the selected

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respondents and their current level of involvement in technology-mediated instruction; Part II consisted of 16 statements designed to achieve items number 2 and 3 in the list of objectives presented in the previous section. A five-point Likert-type response scale was also employed. The response choices were: "0= None, 1= Little, 2= Somewhat, 3= Much, 4= Very much."

Content and face validity were established by a panel of experts consisting of faculty members at Tarbiat Modares University, College of Agriculture, where a pilot test was conducted with 30 faculty members. As a result of the pilot test, minor changes were made in the questionnaire. Questionnaire reliability was estimated by calculating Cronbach's alpha. The overall Cronbach's alpha coefficient for the instrument was 0.82. In all, 143 survey instruments were returned for a final response rate of 90.5%. Quantitative data were analyzed using SPSS software for Windows. Descriptive statistics were calculated for each variable. Frequencies, percentages, means and standard deviation were used to describe the data. The t-test was used to determine differences between faculty members` personal characteristics and their training needs in using information technology. Pearson correlation coefficient was employed to determine the relationships among the dependent and the independent variables.

RESULTS

Part I: Personal Characteristics and Level of Involvement

Of the 143 respondents reporting, 132, (92.3%) were male. The respondents' ages ranged from 32 to 64 years with a mean of 46.8 and SD 6.30. Slightly more than one-half (50.4%) of the faculty were between 40 to 47 years old. Of the 131 respondents, almost 40% were full professors or associate professors. They were experienced educators. Years of teaching experience had a mean of 16.53 and SD 6.14. Over one half of the faculty members (51.1%) have been teaching at the university level for more than 14 years (Table 1).

More than three quarters of the respondents (78.3%) indicated that they had access to computer, Internet, and web at their home or office, more than two-thirds (72.7%) had received some type of computer, web and internet training and only 27.3% of the respondents never attended any course or workshops related to using information technologies in education

Table 1: Demographic characteristics of the faculty members.

Demographic Variable		Number of faculty members	% of Total
Gender	Male	132	92.3
	Female	11	7.7
Age group (years)	32-39	14	10.7
	40-47	66	50.4
	48-55	38	29.0
	56-64	13	9.9
Academic Position	Instructor	12	9.2
	Assistant Professor	68	51.9
	Associate Professor	36	27.5
	Professor	15	11.5
Teaching experience (years)	3-8	18	13.5
	9-14	47	35.3
	15-20	49	36.8
	21-29	19	14.4

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during the past 5 years. Almost 85% of the faculty members (84.8%) responding to the survey indicated that they had never taught a class to students at a distance and lacked experience in teaching learners at a distance. Only 15.2% had taught an online course. Approximately 80% of the respondents stated that they were willing to perform and present online education, while only 20% were reluctant to deliver on-line instruction. In response to the question on the extent of information technologies use in general, 18 respondents i.e.12.8%, reported "Little" use of IT in their educational and research activities, while. 43 participants (30.5%) responded "Very Much" to the same question. The mean value for this question was 3.18 (SD=.98) on a 5-point Likert scale, indicating that faculty members` ratings for their extent of IT use was "moderate". The mean of Internet use per week was 13.47 hours (SD=6.85) (Table 2).

Part II: Faculty Members` Skills and Training Needs Level

Assessment of the knowledge and skills, and training needs level of the faculty members was divided into three sections: a) Computer application software (including Microsoft Word, presentation software, calculating software, statistical software, graphical software), b) Internet and online education application (including e-mail correspondence and file attachment, using search engines, video conferencing, design of website, programming software, software setup, hardware application), and c) Theoretical concept of online education (including online content design, management of online education courses, theories and models of online education, online education standards).

The knowledge, skills, and training needs level of the faculty members are presented in Table 3. As shown, the highest levels of respondents` skills were in using Microsoft word (mean=3.65) and "send and receive e-mail and attach files" (mean=3.03), respectively, and the lowest levels of respondents` skills were in "theories and models of online education" (mean=0.59) and "design website software such as Flash, Front Page, etc." (mean= 0.77).

Regarding the training needs level of the faculty members in the use of information technologies in educational and research activities, result showed that "theories and models of online education" (mean=3.24)

Table 2: Access and use of ITs of the faculty members.

Computer and internet use question		Number of faculty members	% of Total
Access to computer and internet	Yes	112	78.3
	No	31	21.7
ITs training during last 5 years	Yes	104	72.7
	No	39	27.3
Online education presentation	Yes	20	15.2
	No	112	84.4
Willing to online education	Yes	111	79.9
	No	28	20.1
Extent of ITs use	None	0	00.0
	Little	18	12.8
	Moderate	58	41.1
	Much	22	15.6
	Very Much	43	30.5
Internet application per week	15 hours and Less	73	58.4
	More than 15 hours	62	41.6

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Table 3. Skills and training needs level of the faculty members in using information technology.

IT training topic	Faculty Members` Skills Level				Faculty Members` Training Needs Level			
	N	Mean	S.D	Rank	N	Mean	S.D	Rank
Theories and models of online education	129	0.59	0.71	16	116	3.24	0.87	1
Video conferencing	139	0.97	0.93	12	135	3.12	0.93	2
Design website software (Flash, Front Page, etc)	133	0.77	0.93	15	134	2.67	1.26	3
Online education standards such as IEEE. SCORM, etc.	137	0.81	0.75	14	120	2.65	0.96	4
Management of online education courses	142	1.00	0.92	11	125	2.60	1.02	5
Hardware application such as Scanner, Printer, Web cams	142	2.46	1.32	6	133	2.58	1.29	6
Programming software (Java, C++, etc)	130	0.83	0.57	13	120	2.40	1.26	7
Online content design	142	1.18	0.87	10	128	2.33	0.93	8
Graphical software (Photo Shop, etc)	135	1.71	1.15	9	134	1.88	1.23	9
Statistical software (SPSS, Minitab, etc)	139	2.18	1.13	8	138	1.64	1.31	10
Using search engines	143	2.66	1.08	4	139	1.57	1.10	11
Software setup	142	2.39	1.19	7	130	1.44	1.28	12
Calculation software (Excel, etc)	143	2.54	1.10	5	141	1.16	0.91	13
Presentation software such as Power Point	141	2.69	0.91	3	139	1.03	0.92	14
Send and receive e-mail and attach files	143	3.03	1.21	2	135	0.97	0.65	15
Microsoft Word	143	3.65	0.85	1	142	0.92	0.78	16

Scale: 0=None, 1= Little, 2= Somewhat, 3= Much, 4= Very much.

and "video conferencing" (mean=3.12) appeared at the top of the list of training needs and the lowest levels of respondents` training need were in using Microsoft Word (mean=0.92) and "send and receive e-mail and attach files" (mean=0.97).

Overall, the maximum level of training needs of the Tehran and Tarbiat Modares University faculty members was in "Theoretical concept of online education" (mean= 2.67), as compared with the other topics. Responses to related basis by faculty members are reported in Table 4.

The t-test was used to determine differences between the training needs level of those faculty members who had received ITs training during the last 5 years and those who had not. . Results showed that there were significant differences (at the 0.01 level) in the training needs level between these two groups . The mean of training needs in general for those who had received training was 1.42, with S.D=0.68, while for those who had not received training, the mean was 2.98, withS.D=1.02. This showed a significant difference (p=0.002) between these respondents (t=2.60). Difference between the training needs level of those faculty members that had access to computer, Internet, and web and those who had not access was examined by t-test. Overall, they had a mean of 1.57 and 2.37, respectively. The t-test showed a significant difference (p=0.039) between the training needs level of these faculty members at the 0.05 level of significance (Table 5).

A t-test was conducted to determine if there was a significant difference between training needs level of Tehran and Tarbiat Modares Universities faculty members in the

Table 4. Mean, standard deviations, and rank for the faculty training needs level.

IT training topic	Mean	S.D	Rank
Theoretical concept of online education	2.67	0.76	1
Internet and online education application	2.12	0.70	2
Computer application software	1.32	0.81	3

Scale: 0=None, 1= Little, 2= Somewhat, 3= Much, 4= Very much.

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Table 5. T-test results for ITs use and training needs level.

Criteria		N	Mean	S.D	Sig.	t
Received IT training during the last 5 years	Yes	104	1.42	0.68	0.002**	2.60
	No	39	2.98	1.02		
Access to computer, internet and web	Yes	112	1.57	0.96	0.039*	2.04
	No	31	2.37	1.03		

*P≤ 0.05, **P≤ 0.01- Scale: 0=None, 1= Little, 2= Somewhat, 3= Much, 4= Very much.

use of information technology in educational and research activities. No significant difference was found in this respect.

Pearson correlation coefficients was used to identify the relationship between respondents` age, teaching experience, internet application per week, and willingness for online education with their training needs level of ITs use in educational and research activities. Table 6 presents the Pearson correlation coefficients for these relationships. Result showed that age had a significant and positive correlation with the faculty members` IT training needs level. Internet application per week and willingness for online education had significant and negative correlation with the faculty members` training needs level of ITs use (r= -0.298, -0.387, P=0.041, 0.034 respectively). No significant relationships were found between teaching experience and the faculty members' IT training needs level.

DISCUSSION

The majority of the faculty members in this study were male, between 40-47 years of age, with more than 14 years of teaching experience. Most of them never taught students at a distance and had no prior experience with distance education. An overwhelming majority of the faculty members reported having access to computer, Internet, and web at their home or office. More than two-thirds had received some type of computer, web, and Internet training. About 80% of the respondents were willing to perform online education to learners (Malik, 1999). Thus, it can be concluded that a potential demand exists for colleges of agricultural sciences to use Information Technologies in educational and research activities and to deliver online courses to students. Nearly 59% of the respondents reported that they used internet less than 15 hours per week. Most of the faculty members lacked experience in teaching learners at a distance (Dooley and Murphy, 2000).

The t-tests results indicated significant differences between the faculty members training needs levels in ITs use in education and learning process, depending on their IT training during the last five years and access to computer and Internet. The training needs level of the group that had received training in ITs and those faculties that had access to computer, Internet, and web were less. This finding is supported by Shakoori (2000).

Considering the significant relationship between prior ITs training and further training needs of the respondents, there is a critical need to organize comprehensive and continuous training programs for introducing modern technologies and the latest teaching methods, resources, and theories to the faculty members and hold workshops on methods of integrating information technologies into the learning and educational process. Although many faculty members have had brief and informal lessons on how to use the available technology, there is no alternative to a comprehensive course on information technologies. Fundamentally, it is recommendable that most training requirements related to conceptual and technical areas of ITs use must be offered and included in the faculty development programs to provide the members with the

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skills needed to incorporate digital technology into their courses.

The results of this study illustrated that there were positive significant relationship between faculty members` age and their training needs level for ITs use in education. It seems that the younger faculty members perceived that information technology would positively impact the general process of instruction and that their knowledge and skills in the field of information technology and online education was higher than that of the older faculties.

The research presented in this paper identified the significant and negative relationship between Internet use/applications and willingness for online education in respect to training needs level of the faculty members. It seems that those faculties that use internet more than others, and those who are willing to deliver online education, are self educated because they are more eager to learn using ITs and deliver online education. To recruit and maintain motivated faculties, it is suggested that universities and institutions offer valued incentives and eliminate disincentives for the use of online teaching and information technology.

Such information and the findings of this study could be useful to policy makers and managers of higher education who strive to make decisions about distance education strategies, processes, and systems.

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بررسی نیازهای آموزشی اعضای هیات علمی دانشکده های کشاورزی و منابع طبیعی در زمینه استفاده از فناوری اطلاعات

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چکیده

هدف اصلی این تحقیق بررسی نیازهای آموزشی اعضای هیات علمی دانشکده های کشاورزی و منابع طبیعی در خصوص کاربرد فناوری اطلاعات در فعالیتهای آموزشی- پژوهشی آنها می باشد. تحقیق حاضر از نوع توصیفی– همبستگی بوده و به روش پیمایشی انجام شده است. جامعه آماری این مطالعه اعضای هیات علمی دانشکده های کشاورزی و منابع طبیعی دانشگاه های تهران و تربیت مدرس بوده (N=۲۷۶) و با استفاده از جدول نمونه گیری Krejic and Morgan (1970)، ۱۵۸ نفر به روش نمونه گیری سیستماتیک انتخاب شدند. ضریب اعتبار ابزار تحقیق از طریق انجام آزمون مقدماتی، ۰/۸۲ به دست آمد. نتایج این تحقیق بیانگر آن است که پاسخگویان در زمینه "تئوری ها و مدل های آموزش الکترونیکی" بیشترین میزان نیاز به آموزش را داشته و در زمینه استفاده از "Microsoft Office Word"کمترین میزان نیاز به آموزش را داشته اند. نتایج حاصل از آزمون t نیز حاکی از وجود تفاوت معنی دار بین شرکت در دوره های آموزشی فناوری اطلاعات طی ۵ سال اخیر، و میزان نیاز آموزشی اعضای هیات علمی در سطح معنی داری ۰/۰۱ بوده و دسترسی به کامپیوتر و اینترنت با میزان نیاز آموزشی پاسخگویان در زمینه استفاده از فناوری اطلاعات در سطح معنی داری ۰/۰۵ می باشد. آزمون همبستگی پیرسون حاکی از آن است که بین سن پاسخگویان و میزان نیاز آموزشی آنها در زمینه فناوری اطلاعات رابطه مثبت و معنی داری مشاهده شد. همچنین رابطه منفی و معنی داری بین میزان استفاده از اینترنت در طول هفته و تمایل به ارائه دروس به صورت online با میزان نیاز آموزشی اعضای هیات علمی وجود داشت. رابطه معنی داری بین میزان سابقه تدریس پاسخگویان و میزان نیاز آموزشی آنها در استفاده از فناوری اطلاعات مشاهده نشد.

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