Australian Journal of Basic and Applied Sciences, 2(4): 1041-1051, 2008
ISSN 1991-8178

Designing an Efficient Information and Communication Technology (Ict) System to Train Private Agricultural Insurance Brokers in Iran

[1]Maryam Omidi Najafabadi, [2]Jamal Farajollah Hosseini, [2]Mehdi Mirdamadi [2]Reza Moghadasi

Science and Research Branch Islamic Azad University, Tehran, Iran.

Abstract: The Agricultural Insurance Fund (AIF) in Iran has hired private sectors named "brokers" to implement an agricultural insurance scheme. AIF has spent considerable time, effort, and money to train brokers. Unfortunately, many of their investments are met with disappointing results and traditional education is no longer effective. To overcome this challenge, an information and communication technology (ICT)-based training system seems the best solution. This study was conducted to design an ICT system to train agricultural insurance brokers in Iran. To achieve this aim, a theoretical framework is presented, based on previous research. Our results are given using newly developed and sophisticated statistical techniques. Namely, ordinal logistic regression indicated that the factors affecting the design of an ICT-based training system are financial, technical experts, instructors, technical, organizational strategies and learner factors; while ordinal factor analysis classified the challenges into four latent variables named human, organizational, social, and technical challenges. Finally a conceptual framework is presented for the ICT training system.

Key words: ICT, Brokers, Training, Agricultural insurance, Iran

INTRODUCTION

Variability in climate conditions has made agriculture a risky activity. Agricultural insurance can be a remarkable solution to protect against risks associated with the production of agricultural commodities. The Agricultural Insurance fund (AIF) in Iran was established in 1983 and the insurance scheme began in 1984 with cotton in the northern province of Mazandaran and sugar beet in the northwestern province of Khorasan. The insurance activity of these two products, along with other products was extended throughout the country. But the number of insurance brokers was insufficient to implement the insurance scheme, so , in 2002, the AIF decided to hire private sectors "brokers", to keep pace with the increasing demand for coverage and improve the quality of services. According to the latest reports in 2008, more than 90% of insurance contracts sales and 70% of loss assessments have been completed by brokers. The reports also indicated that the loss ratio is 2.6, which is considerably high compared with the international level and is most likely a result of unrealistic assessments carried out by brokers (AIF, 2008).

One of the main strategies to improve the quality of services is to train brokers. Many studies have indicated that using appropriate training techniques led to improve quality of assessment, and consequently reduced the loss ratio and increased the rate of satisfaction among policyholders (farmers). Training also secured the employment status for brokers (Hyer, 2002). AIF uses the traditional face-to-face methods to train brokers, but this often fails to work for several reasons. Namely: (i) the number of brokers is considerably high (5000 persons); (ii) the brokers are scattered throughout the country in 32 provinces; (iii) this method of training is very costly, difficult to manage, and implement for the AIF.

ICT based training would be an appropriate solution. Expanding e-learning brings several attractive opportunities for organizations: (1) save time, cost, and effort; (2) satisfy educational needs from remote areas; (3) provide self-learning opportunities; (4) have a positive impact on the learning process; and (5) provide a mechanism for collaborative learning (Karmakar, 2000). There are many sound reasons to shift to this new style.

The purpose of this study is to design an ICT-based training system to train the brokers in Iran. The objectives of this study are as follows: 1) develop a theoretical and conceptual framework; 2) identify appropriate ICT media; 3) identify factors which affect the efficiency of the system; and 4) identify challenges of the system.

Corresponding Author: Maryam Omidi Najafabadi Science and Research Branch Islamic Azad University, Tehran, Iran
Tel :+98 21 44206137, Email Address: maryomidi@gmail.com

This paper is organized as follows: Section 2 begins with some definitions and then a discussion of affective factors and challenges with which an ICT-based training system will be faced in practice. The related literature for both affective factors and challenges follows. Section 3 and 4 provide a theoretical framework, study hypotheses and target population. Data are analyzed in section 5 by employing sophisticated statistical techniques, such as ordinal logistic regression and ordinal factor analysis which are available in statistical software Minitab 14 and Lisrel 8.8(student version).

Prior Studies:

ICTs include technologies and methods to store, manage and process information such as computers, soft ware and for communicating information such as email and the web. (Rusten&Ramirez, 2003).In our research, we categorized ICT based training into four types as follows:

1. Synchronous training methods, which requires simultaneous participation of all learners and instructors at distributed locations and include immediate, two way communication between participants. This may take the form of video conferencing and virtual classrooms.
2. Asynchronous instruction methods, which do not require simultaneous participation of learners and instructors. It gives learners more freedom over learning time, process and content of curriculum (Anaraki, 2004)
3. CD and DVD learning techniques which include training via compact and digital video discs. Knowledge stored on the web can be updated but this is not possible with other knowledge deliver formats such as CDs and DVDs.
4. Mobile instruction method which include all mobile devices such as cell-phones and laptops. This takes advantage of learning opportunities offered by portable technologies (Sribhadung, 2006).

Affective Factors in Designing Educational Ict System:

Many studies have identified important variables dealing with an ICT-based training system. Table 1 summarizes some of their results. We summarize results given in table 1 into cultural, financial, evaluation, learner, instructor, expert and organizational factors. Those eight factors are introduced and discussed in section 3.

Table 1: Related references about the factors affecting an educational ICT system

Author	Factors
Barajas & Owen (2000)	Infrastructure, hard ware, soft ware, skills, cultural organizational.
Badrul H. khan (2001)	Evaluation, interface design, technological, pedagogical, institutional, ethical, resource support, management.
Dirr (2001)	Physical infrastructure, intellectual infrastructure, data and telematic services.
Surry (2002)	Resources, infrastructure, human, strategies, learning, evaluation, support.
Rusten & Ramirez(2003)	Connectivity and access, capacity building, content and application development, conducive governance and policy.
Ouyang(2004)	Online instructional tool and design.
Ebadi (2005)	Soft ware, hard ware, communicative hard ware, human resources, data and sources.
Angela Lo (2005)	Technical, legal and cultural infrastructures.
Mesda (2005)	Hard ware, soft ware, human ware and network.
Tai (2005)	Strategic vision, well defined learning organization, strong leadership, corporate support, content and accountability of learners and instructors
Sribhadung (2006)	Strategically planning, curriculum and content, use of the internet and acceptable use policies, connectivity infrastructure and network, intellectual property and copy right, intergovernmental issues and cost , finance and partnership.
Sun & et al(2007)	Learner, instructor, course, technology, design and environmental dimension.

The Challenges in Applying an Ict Educational System:

Simply defined, challenge is a new or difficult task that tests the ability, capacity and skills of a person, organization or community (oxford, 2002). In a challenging environment, one may find threats and change them into opportunities which is the desired outcome of a dynamic system. On the other hand, if people who are involved in a system are not familiar with of its potential challenges, these challenges will be transformed to barriers (Zamani *et al*, 2006).Therefore along with designing a system; we might identify challenges and provide some practical ways to transform them into opportunities. We consider the problems of implementation of the system as challenges not as threats which indicate the attitudes of the authors. The authors' point of view emphasize that each problem has negative and positive dimensions and one can transform a negative dimension to a positive one by cognition and understanding of the nature of a problem.
Table 2 reviews opinions of some authors about challenges of the system.

Table 2: Related resear ches about the challenges in applying ICT in an educational system

Authors	Challenges
Murphy&Terry (1998)	Cultural conflicts and high costs
Ho (2001)	Incompatibility of information infrastructure, incompatibility of learning style, complexity of e-learning course production, lack of intellectual property protection.
Bersin,Holder,King(2003)	Content development, Infrastructure and deployment
Crase(2004)	Inaccurate definition of special skills
Cantoni et al (2004)	Lacking informal social interaction and the face-to-face contact of traditional training
Leary & Berge (2005)	Hands-on component which needs face-to-face training
Sim & Fersht (2007)	Lack of IT infrastructure, lack of governmental and cultural Support, corporate attitude that does not value training

Variables and Research Model:

Based on previous studies, given in Section 2, we consider the following theoretical framework.

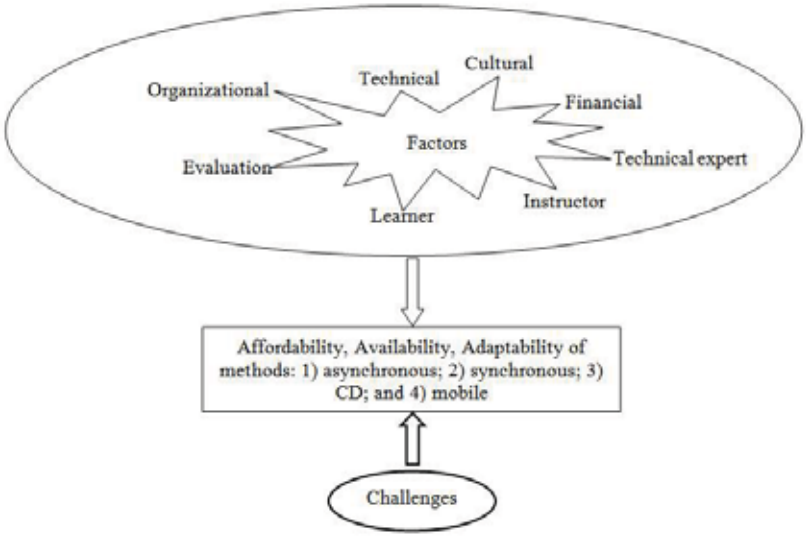

Fig. 1: A theoretical framework to design an ICT-based training system

An efficient training system identified by its *Affordability*, *Availability*, and *Adaptability,* also known as triple A-s. (Aluko, 2004 & Dunmade, 2002). This research measures those variables for each broker training method. Finally, all twelve variables summarize into a single variable which is our dependent variable, called *efficiency of an ICT-based training system from respondents' viewpoint*. Thirty-six independent variables can be categorized into eight factors which are presented alongside their related hypothesis in Table 3.

Research Design:

We conduct a series of in-depth interviews with senior experts in AIF as well as experts in e-learning to examine the validity of our research model. After that, we developed questionnaire items based on those interviews and previous literature. The questionnaires were revised with the help of experts with significant experience in e-learning (including academic and AIF). A 5-point likert scale ranging from 1 as strongly disagree to 5 as strongly agree was used for the measurement. A pretest for the reliability of the instrument was conducted with 13 AIF experts randomly chosen from the target population. We summarized factors and challenges into two single variables, F and C. Then, we computed the Cronbach's alpha from those variables as well as for the efficiency variable, labeled E, given in Section 3. The computed Cronbach's alphas for F, C, and E are 96.8%, 94.9%, and 90.8%, respectively, which indicated the high reliability of our questionnaire.

The research population included all the agricultural insurance Experts (with population size N=50) Because of small size of AIF experts, the total population was surveyed. This research used three statistical packages, Minitab 14, SPSS 16, and Lisrel 8.8 (student version) to analyze the data. Data was analyzed using the following three techniques:

Table 3: Independent variables and research hypothesis

Factor	Variable	Reference	Hypothesis
Technical	Synchronous software, e.g. chat, visual and audio conference. Asynchronous software, e.g. email, SMS, list serves. Hardware, e.g. CD_s, computers, cell phone. Presentation framework, e.g. internet and intranet. Telecommunication facilities, e.g. bandwidth, telephone line.	Castels (1990)	*Hypothesis 1:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and technical factors.
Cultural	Beliefs about virtual education Positive attitude towards life long learning positive attitude towards the use of modern technology	Sullivan(2002)	*Hypothesis 2:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and cultural factors.
Financial	Financial sources for buying equipment Budget for recruitment experts Expense of maintenance Support and up-to-date training Expense of upgrading and changing pieces Expense of advertisement and cauterization Expense of preparing digital content	Self development	*Hypothesis 3:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and financial factors.
Evaluation	Educational achievement Learners' attitude Standard courses development and presentation Quality and quantity of timely and constructive feedback to learners	Barajas and Owen (2006)	*Hypothesis 4:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and evaluation factors.
Learner	Knowledge and skills about ICT Positive attitude towards using ICT in education Information about legal affairs Self directedness	Guglielmino (2002)	Hypothesis 5: There is a significant relationship between an efficient ICT-based training system (dependent variable) and learner factors.
Instructor	Knowledge and skills using ICT Positive attitude towards the use of ICT Information about legal affairs Facilitating	Lynch (2001)	*Hypothesis 6:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and instructor factors.
Technical expert	Full-time support to solve problems Familiar with agricultural insurance affairs Specialized in ICT-based training Specialized in learning management software (LMS).	Self development	*Hypothesis 7:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and technical expert factors.
Organizational strategies	Providing human resources Issue and evaluating certificates Legislation of intellectual properties of Experts	Tai (2005)	*Hypothesis 8:* There is a significant relationship between an efficient ICT-based training system (dependent variable) and organizational strategies factors.

Using previous studies (given in Table 2) and interviews with some experts in the field of e-learning in the agricultural sector, we consider the following variables as challenges in this study.

Table 4: Challenges of the study questionnaire

challenges	reference	challenges	reference
low bandwidth	(Kerka,1998)	need time and energy to present virtual education	(Tyan 2003)
lack of appropriate hardware	(Samak,2006)	organizational staff not taking virtual education seriously	(Tyan,2003)
lack of appropriate software	(Samak,2006)	need interaction with experts	(Cantoni et al,2004)
technological phobia	(Samak,2006)	waste the time by surfing the internet	(Cantoni et al,2004)
lack of appropriate ICT infrastructure	(Cantoni et al , 2004)	high cost for ADSL method	(Cantoni et al,2004)
limited access to the internet in the workplace	(cantoni and et al 2004)	require more self discipline	(Cantoni et al 2004)
limited access to the internet at home	(Cantoni et al 2004)	inadequate experts in virtual education	Self-development
requires new knowledge and skills	(Cantoni et al 2004)	lack of appropriate support services	Self-development
security affaire	(Mungania 2004)	negative attitude of organizations towards virtual education	Self-development
lack of social interaction and face	(Mungania,2004		
to face contact	& Anaraki,2004)	lack of motivational constructs for using virtual education	(Leary & Berge,2005)
intellectual property rule	(Tyan,2003)		
certification credit	(Tyan ,2003)	difficulty in determining job skill levels	(Crase,2004)
cost of updating contents	(Tyan ,2003)	lack of relationship between instructors and students	(Leary & Berge,2005)
prejudiced beliefs of learners towards traditional education	(Tyan ,2003)	the limitation of virtual training for practical techniques	(Leary & Berge,2005)
misunderstanding of the advantages and disadvantages of virtual education	(Tyan ,2003)	incompatibility of online training with values and culture	(Leary & Berge,2005)
negative experiences of users with virtual education	(Tyan, 2003)	lack of non verbal feedback	(Ouyang,2004)

Ordinal C.V:

It is well-known that we cannot use the C.V., as criteria to compare variables whenever those variables are ordinal. (More can be found in Agresti, 1996, 2002, and Johnson & Albert 1999). Now, we develop a new C.V., called ordinal-CV, which may be used for ordinal variables. The nature of the data prevents us from employing the mean as a centrality criterion. In this case, an alternative for the mean would be the median (Agresti 1996, 2002, and Johnson & Albert 1999). A common criterion to measure dispersion data from the mean is standard deviation, but we cannot use the mean for ordinal variable, called Ordinal-S.D. An ordinal-S.D. is defines as $S.D_{Ord} = \sqrt{\sum_{i=1}^{n} (x_i - m)^2}$ which measure the dispersion of data from the median, m. Consequently, an alternative C.V, (named ordinal-C.V), for ordinal data is given by $C.V_{Ord} = \frac{S.D_{Ord}}{m}$

Ordinal Logistic Regression:

The binary logistic regression is a well-known technique to set up a generalized linear model for the binary dependent variable. But for multiple ordinal dependent variables, the binary logistic regression does not work properly. Statisticians developed ordinal logistic regressions to handle multiple ordinal dependent variables. Minitab 14 is a statistical software package that can fit an ordinal logistic regression to data. The output of the software includes: 1) *Response and Factor Information*, which displays the number of observations and the response and factor categories; 2) *Logistic Regression Table*, which shows the estimated coefficients, p-values (related to a test that the corresponding coefficient is zero) and odds ratio (which shows the effect of variables on the model); 3) *Goodness-of-Fit Tests* which displays both Pearson goodness-of-fit test of the model to data. The steps in model building for an ordinal logistic model are the same as those for the binary logistic regression model. Unfortunately, the full array of modeling tools is not available in the software packages. So, one has to choose a final and appropriate model by entering variables which their coefficients are significant (p-value<0.05) and ordering effect of variables from their odds ratio (negative coefficient along smallest odds ratio indicates more impact of the variable on the dependent variable, McCullagh & Nelder, 1992). Finally, appropriative of model is evaluated by (i) a G test whose null hypothesis states all the coefficients associated with predictors equal zero versus at least one coefficient is not zero (we prefer to reject their null hypothesis, i.e., p-value <0.05) and (ii) Goodness-of-Fit Tests, (we prefer to accept their null hypothesis, i.e., p-value >0.05), of which more can be found in Hosmer & Lemeshow (2000) and McCullagh & Nelder, (1992).

Ordinal Factor Analysis:

The basic idea of factor analysis is the following. For a given set of observed variables $Y_{1,\ldots,} Y_n$, one wants to find a set of latent variables $\xi_1,\ldots\xi_k$ k<n that contain essentially the same information. The classic factor analysis assumes that both the observed and the latent variables are continuous variables. But, in practice, the observed variables are often ordinal. However ordinality is most often ignored and numbers such as "1, 2, 3, 4", representing ordered categories, are treated as numbers having metric properties (treated the same way as continuous variable); such a procedure is assuredly incorrect in several ways. Several authors have considered factor analysis for ordinal observed variables. Joreskog & Moustaki (2001, 2006) used the EM-algorithm technique to make factor analysis for such observed variables. The last version of their statistical software package, named LISREL 8.8 can handle such analysis. As far as we know, the software cannot directly evaluate the Goodness of model. This means that the Goodness of the model must be measured by fitting an equation model (SEM) to the data and then using statistics that are available in the SEM. Briefly, we used: 1) Goodness of fitness whose its null hypothesis indicates that the model is valid (we prefer to accept the null hypothesis, i.e., p-value>0.05); 2) RMSEA (Root Mean Square Error of Approximation), which takes into account the error of approximation in the population and asks the question "How well would the model fit the population covariance matrix if it were available?" (p-value less than 0.05 indicates good fit, and higher than 0.08 represents reasonable errors of approximation in the population), Joreskog & Moustaki (2001, 2006).

RESULTS AND DISCUSSION

Results:

Table 5 summarizes the demographic profile and descriptive statistics, while Table 6 represents ordinal-C.V. of the triple "A" for each category.

Table 5: Demographic profile and descriptive statistics of experts

Sex	Female (6%)	Male (94%)
Age/year	Mean=37.95	S.D=5. 3
Work experience/year	Mean=11.88	S.D=6.038
Computer usage (weekly)/hour	Mean=19/09	S.D=12.08
Internet usage (weekly)/hour	Mean=9.35	S.D=7.98
Degree	Undergraduate=40/42%	Graduate=59.58%

Table 6: Ordinal coefficient of variation

	Affordable	Available	Adaptable	Total	Rank Order
Asynchronous	0.3354	0.3093	0.4667	0.3372	2
Synchronous	0.3712	0.4916	0.5769	0.4663	4
CDs	0.2366	0.2298	0.204	0.2126	1
Mobile	0.4472	0.5372	0.3528	0.389	3

As one may observe that, CDs is the most efficient method with a total of three criteria met.

Ordinal Logistic Regression:

Since all variables in this research are ordinal, one has to employ the median to summarize a group of variables into one single factor. Firstly, variables in part 2 (efficiency variables) are summarized into a dependent variable. Meanwhile, independent variables are obtained by summarizing into factors, both of which are given in Table3.

Table 7 presents the coefficient, p-value and odds ratio of our ordinal logistic regression analysis.

One can summarize the results of the above Table as follows:

1. The P-Value indicates that for 0.05 alpha-level, there is sufficient evidence to conclude that, Technical, Financial, Learner, Instructor, Technical expert, and Organizational strategies are significant factors.
2. Small odds ratio indicates that the affect of factors can be ordered as Financial, Technical expert, Instructor, Technical, Organizational strategies, and Learner.
3. P-Value=0.00 for test that "all coefficient are zero" along with the P-Value of for "the Goodness-of-Fit Tests" >>0.05 (0.899) indicate that the ordinal logistic regression is an appropriate model to analyze the data.
4. The ordinal logistic regression gives 6 parallel equations ($i = 1,2,\ldots,6$) which are

Table 7: Ordinal logistic regression

	Dependent variable, i.e., efficiency of the model			
	Coefficient	P-value	Odds ratio	Rank order
α_1	8.21	0.493	___	___
α_2	15.158	0.037	___	___
α_3	20.929	0.014	___	___
α_4	21.241	0.013	___	___
α_5	23.266	0.008	___	___
α_6	24.72	0.006	___	___
α_7	___	___	___	___
α_8	___	___	___	___
Technical(Tech.)	-1.6809	0.016	0.19	4
Cultural (Cult.)	0.2238	0.655	1.25	
Financial (Fin.)	-6.474	0.002	0	1
Evaluation (Eva.)	1.0906	0.149	2.98	
Learner (Lea.)	5.971	0.009	391.71	6
Instructor (Inst.)	-2.592	0.057	0.07	3
Technical expert (Tech. Ex)	-3.49	0.017	0.03	2
Organizational strategies (Org. St.)	2.2565	0.005	9.55	5
	P-Value for test that all coefficients are zero= 0.0			
	P-Value of the Goodness-of-Fit Tests= 0.899			

$$\gamma_i = \frac{\exp\{\alpha_i - 1.6809Tech. - 6.74Fin. + 5.971Lea. - 2.592Inst. - 3.490Tech.Ex. + 2.2565Org.St.\}}{1+\exp\{\alpha_i - 1.6809Tech. - 6.74Fin. + 5.971Lea. - 2.592Inst. - 3.490Tech.Ex. + 2.2565Org.St.\}},$$

where γ_i is the cumulative probability efficiency of the ICT of i^{th} leveland $\alpha_1, \alpha_2, \ldots, \alpha_6$ aregi the above Table.

Ordinal Factor Analysis:

Implementation of "ordinal factor analysis" along the structural equation model (SEM), the challenges, introduced in prior studies, can be classified into 4 latent variables.

Table 8: Ordinal factor analysis about challenges

FACTOR Name	Variables included	Explained common variance by factor
Technical challenge	Low bandwidth; Lack of appropriate hardware; technical challenge; Lack of appropriate ICT infrastructure; The limitation of virtual training for operational techniques; Lack of appropriate software.	7/34%
Human challenge	Require new knowledge and skills; Prejudiced beliefs of learners towards traditional education; lack of understanding of advantages and disadvantages of virtual education; Negative experiences of users with virtual education; Need interaction with experts; Waste time by surfing the internet; Require more discipline; Not adequate experts in virtual education; Negative attitudes of organization to virtual education, Technological phobia.	14/81%
Social challenge	Lack of social interaction and Face to face contact; Intellectual property rule; Certification credit; Lack of relationship between instructors and students; online training incompatible with values and culture; lack of non verbal feedback; Security affairs; Lack of motivational construct, limited access to internet in work place, limited access to internet at home.	10/46%
Organizational challenge	Cost of updating contents; Certification credit; Needing time and energy to present virtual education; organizational staff not taking virtual education seriously; High cost for ADSL method; Lack of appropriate supportive services; Negative attitude of organizations to virtual education; Not appropriate advertisement about the capabilities of virtual education; Lack of motivational constructs for using virtual education; Difficulty in determining skills of jobs cost of virtual education.	12/42%
Total	----------	45/02 %

And finally, we may observe from Table 9; Goodness of test, along small value of root mean square error of approximation (RMSEA) for both brokers and experts verify fitness of model to data.

Discussion:

The following discussion addresses the research findings according to the research objectives.

Table 9: Goodness of fit test and RMSEA of the model

Test	Statistic of test (p-value)
Goodness of fit test (p-value)	555.7816 (0.23)
RMSEA	0.03

Develop a Theoretical and Conceptual Framework:

According to literature review, the theoretical framework in Part 3 has been developed. Now according to the results, the conceptual framework can be illustrated as follows:

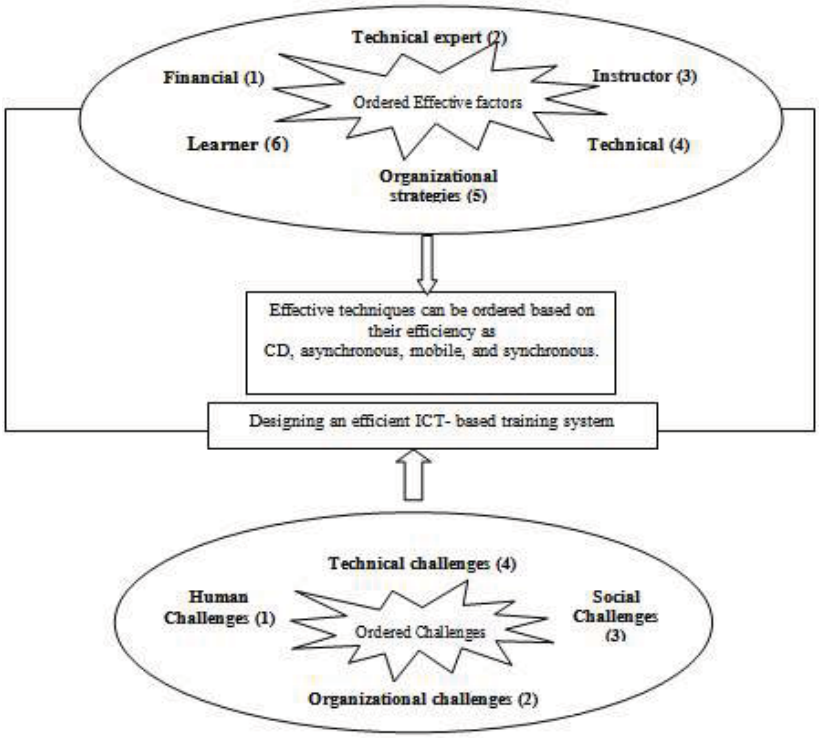

Fig. 2: A conceptual framework to design an ICT-based training system

To Identify Appropriate Ict Media to Train Brokers:

The methods to train brokers in order of efficiency are CDs; asynchronous; Mobile and the last one synchronous. Our finding indicates that the CD is the most efficient media to use to train brokers, an observation which is also verified by several authors, such as Kruse & Keil (2000). Also, Sielaff *et al* (2005) indicated that training via CD is more effective than other methods, because the interactive CD allows trainees to make their own choices, see all the consequences of these choices based on evaluation of their performance and repeat the process all at their own pace. This conclusion along with the fact that "assessment of the loss ratio" is one of the most important elements of broker training leads us to recommend AIF to prepare a multimedia package, stored on a CD, which stimulates different damaged farms and improves the ability of brokers to estimate the true loss ratio.

The asynchronous method is named as the second most effective method to train brokers. Asynchronous methods as compared to synchronous methods require low bandwidth. Most of brokers have access to low speed internet (over 50% of brokers use a dial up internet connection). On the other hand, using the asynchronous method students do not need to schedule their time around the predetermined plan of the instructor, (Kruse & Keil, 2000). Based on the observation, we suggest that the AIF use the asynchronous method to distribute urgent, up-to-date information in short period of time. Meanwhile, other information can be distributed using other techniques, such as a CD. Also, since a dial-up connection makes the downloading of images or multimedia programs considerably slow we recommend that AIF design their web page with only text and simple graphs.

Mobile phone use is the third most important media source to train brokers. The most unique and distinguishing characteristics of the mobile phone method is its ability to provide services to the user anytime,

anywhere during his physically movement (Basole, 2006). Traditional wired telephones limit users to the location of the device and network plug-in. The fact that a broker has to own a cell phone, according to the AIF rules explains why the mobile training method is the second selected method by the brokers. We suggest that the AIF use the SMS (short massage sending) system to immediately distribute important information to brokers especially during a crisis.

To Identify Factors Affecting the Design of an Efficient Ict System for Training Brokers:

From ordinal logistics regression, the following four factors are proven, statistically, to have a critical relationship with efficiency of an ICT system.

Financial:

Our findings corroborate those of Khan (2001) and Sribhadung (2006). i.e. that on time payment of the system's expenses, such as buying and maintaining equipments, plays an important and critical role in the efficiency of the system. Olugbenga, Rotimi, & Olakulehin (2006) stated that online learning has been found to be costly during the initial stage. Gradually becoming cheaper due to economic scale effects. Thus AIF managers must be informed about the potential of online learning to be cost effective in the long term.

Technical: the importance of technical factors pointed out by several authors, such as Barajas & Owen (2000), Surry (2002), Ebadi (2005), Castels (1990) among others, reflects that AIF might pay more attention to appropriate hardware and software and infrastructure of the system, such as bandwidth.

Technical Experts:

The technical complexity of ICT infrastructure means ICT infrastructure planning and monitoring needs to be coordinated by a technical expert. Our findings corroborate those of Ebadi (2005), Surry (2002) and Mesda (2005). We recommend to the AIF to employ a technical manager who undertakes the roles which need expertise.

Learner and Instructor:

Our findings corroborate those of Sun *et al* (2007), Guglielmino (2002), Lynch (2001), Samak (2006), Tai (2005), among others, who found that positive attitude, knowledge, and skills of brokers and instructors had a direct impact on the efficiency of the system. Therefore, we suggest that the AIF improve ICT knowledge and skills of both brokers and instructors. Happily, we found that the brokers generally have positive attitudes about ICT-based training system, (Omidi, 2008). Thus, we recommend that the AIF use instructors who have a similarly positive attitude about the efficiency of ICT and can help to increase the brokers' already positive attitude about ICT.

Organizational Strategies:

The importance of organizational strategies pointed out by several authors, such as Surry (2002),Rusten & Ramirez(2003),Angela Lo (2005),Tai (2005) and Sribhadung (2006) among others. The challenge, they emphasized, that is faced, is not only to understand the potential but to create the appropriate organizational strategies and approaches to try and optimize the benefits they offer for ICT in education while ensuring their cost effective and sustainable implementation and use.

Identify Challenges in an Educational Ict System:

As the ordinal factor analysis showed, we may categorize 36 challenges listed in section 3 into four factors, orderd by impact as 1) human 2) Organizational 2) social and 4) technical challenges.

The challenges described in these factors are not necessarily inevitable and with careful design most can be overcome. Based on our findings, human challenges are the most important confirming similar findings by Samak (2006), Cantoni *et al* (2004), and Tyan (2003). The AIF should promote and support the development of qualified personnel. The organizational challenges are the second from experts' view. Our findings corroborate those of Tyan (2003), Cantoni *et al* (2004) and Crase (2004). The social challenges are the third. Our findings corroborate those of Mungania(2004), Anaraki(2004), Leary & Berge(2005), and Tyan(2003).Based on our findings, technical challenges are the fourth similar findings by Ho (2001), Caspary (2003), and Sim & Fresht (2007).technical problems are always potentially troublesome in the case of synchronous training(video conferencing and virtual meeting), because issues such as sound and video quality can be affected by network traffic. As such, The AIF should consider selecting methods which do not require

high band width, such as synchronous methods.

***Conclusion*:**

The AIF spends considerable time, effort and money to train brokers. Unfortunately, many of their educational investments are met with disappointing results and traditional education is no longer effective. An ICT based training system seems the best solution to this problem.

This study provides insights for AIF to see all the components (learner, instructor, technical, technical experts, organizational, cultural, evaluation, financial) in an ICT based training system as whole. Corporations, in their rush to implement e-learning often place too much emphasis on the "e" and too little on the learning part of e-learning. So the development phase should take into consideration all of the components discussed in this research. Our results have shown that educational leaders in AIF must take a hard look at financial, technical experts, instructors, technical, organizational strategies and learner factors compared to the other factors. We believe overcoming the challenges discussed in this study require immediate and intelligent solutions, which may be offered by AIF through their provision of financial incentives and loans to buy ICT equipment etc. major change requires some legislation to improve structural facilities, as well as the country's infrastructure and copyright law, which will play a crucial role in the implementation of an ICT-based training system.

Although, this research represents a systematic effort to incorporate elements of an ICT-based training system, it has several limitations such as: 1) This was the first comprehensive study focused on designing an ICT based training system; 2) we do not have someone who is expert in both ICT and instructional science. (This points that the AIF might employ both experts in ICT and instructional affairs together). The authors suggest that the AIF should implement an ICT based training system for Tehran and Ilam provinces as a trial(pilot survey),since these provinces would include most scenarios that could be experienced in agricultural insurance training including a variety of cultural, educational, and financial features.

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