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Exploring e-Learning System for Agricultural Education and Extension in the Rural Development Administration (RDA), Korea

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농촌진흥청 농촌지도사업의 이러닝 시스템 분석

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요 약

이 연구의 목적은 2003년부터 농촌진흥청에서 이루어져 왔던 이러닝시스템에 대한 실태와 참여농가의 만족도를 파악하고 향후 이러닝시스템의 발전방향을 모색하는 데 있다. 농촌진흥청은 2003년부터 웹과 비디오화상시스템에 기반을 둔 이러닝시스템(e-learning system)을 이용하여 농가에 대한 지도와 교육사업을 전개하여 왔다. 2003년에는 이러닝을 통한 교육과정에 251명의 농민이 등록하였으며, 이 중 최종적으로 126명이 오이, 고추, 토마토에 대한 생산과 경영관리 교육과정을 수료하였다.

2004년에는 503명의 농민이 이러닝 교육과정에 등록하였으며, 이중 313명의 농가가 버섯, 딸기, 수박에 대한 생산과 경영관리 교육과정을 수료하였다. 이러닝 교육과정에 참여하는 농민의 76%가 이러닝시스템을 통한 교육에 만족하는 것으로 나타났다. 이러닝을 위한 시스템 형태에 따른 선호도는 비디오화상시스템만을 이용한 경우는 23%, 웹만을 이용한 경우는 13%, 이 두 시스템을 통합하여 운영한 경우에는 59%로서 통합시스템운영이 더 효과적인 것으로 나타났다. 현재 진흥청이 구축한 통합시스템은 동시에 1000명 이상의 농민을 대상으로 교육을 실시할 수 있다. 지도사업의 예산과 인원이 과거에 비해 줄어들고 있는 상황에서 이러닝시스템은 향후 농민들을 대상으로 한 지도와 교육에 효과적인 대안이 될 수 있다.

주제어 : 이러닝(e-Learning), 농촌지도사업(Agricultural Extension)

I. Introduction

Nowadays, the usage of information systems for agricultural extension is increasing rapidly. It can be said that computer systems are not alternative methods but supplementary methods. The challenge for agricultural extension is to be successful in the on-line technology transfer and just-in-time learning arena. Extension must act quickly to form strategic alliances within university and to partner effectively if it is to find the resources to invest adequately in hardware, software, skilled personnel and in-service training. At the same time, extension must encourage early adopters within community organizations to stimulate interest and point the way.

The new communication technology, which means the usage of computer systems as extension methods, isn't yet established for extension

activities. The use of e-learning systems has increased due to the development of computer and communication technologies, even more in the field of agricultural education and extension in rural Korea. It was reported that education through computer network has been effective in the following: increase in study and retention, economy on expenditure and time, keeping privacy, accomplishment on study goal, control on learner, no limit on the number of learner, open entry and exit, individualization of pacing and content, keeping the record of learner, flexibility of schedule, consistency of contents, and the economy on lecture time (Askov and Clark, 1991: Kulik and Shwalb, 1986; Swann et al., 2003).

The study aims to explore not only the current situation of usage of extension methods focusing on computer systems, but also potential usage of extension methods in order to conduct effective activities. We try to explore the satisfaction of e-learning system for agricultural extension in rural Korea. We explain the process, structure, preference and satisfaction of e-learning system on agricultural extension and the result of educational evaluation. We will point out how integrated video on demand (VOD) with video-conferencing system goes on.

Ⅱ. Theoretical Background

Lifelong learning applications using digital technologies and distance education offer limitless possibilities to engage multiple audiences, expanding extension's educational role as a "brand name" quality source for unbiased, research-based information and education. Well-designed educational approaches that apply technology appropriately will stimulate active learning, critical thinking and problem solving.

Agricultural extension, both at the central and local levels, has been and remains one of the most notable and successful agents for assisting farmers with knowledge and technology adoption (Fliegal, 2001; Eveland, 1986). However, the extension role is particularly acute among farmers "left behind" in a rapidly changing communication technology environment (Ryan and Gross, 1943; Beale and Rogers, 1960).

Farmers who utilize precision agriculture and other technologically driven production strategies may not view the Internet as a hurdle, but may view the Internet as the best way to obtain cutting-edge information (Ferguson, 2002). Therefore, evidence suggests that extension needs to continue to embrace the use of the Internet (Hall et al., 2003; O'Neill, 1999; Tennessen et al., 1997).

Recent trends suggest that the Internet may now provide a more useful communication strategy. Extension professionals and agricultural educators express an increasing desire to inform farmers about improved management practices and other issues via the Internet (Hall et al., 2003; O'Neill, 1999). In the 1990s, research indicated limited experience and perception of the Internet for educational communication purposes.

Overall, survey respondents preferred traditional written communication strategies such as newsletters, printed bulletins, and fact sheets. These findings are supported by research conducted by Gloy et al. (2000) that revealed the strong importance of farm publications as communication tools. In addition, respondents expressed the least amount of preference for technological communication strategies such as computers, e-mail, and the Internet. These findings mesh with results by Tavernier et al. (1996) that indicate the lack of preference by farmers for modern communication technology.

Despite an overall lack of support for the Internet, it is important to know whether preference for innovative communication strategies is related to farmers' demographic characteristics. Results indicate that respondents' preference for computers and the Internet as communication strategies to learn about watershed conservation issues is related to respondents' age, level of education, and gross annual income level. Younger, more educated farmers demonstrate a greater appreciation for modern sources of information (Hall et al., 2003; Riesenberg and Gor, 1989). The youngest respondents in the current study indicated a significantly higher preference for computers and the Internet than did older respondents.

The e-learning education would give the opportunity of learning higher education to students without restriction on time and location. To accomplish all the benefits of this system, we have to equip the assisting method of conference phone call, two-way video-conferencing and internet chatting to compensate the reduction of face-to-face interaction (Park et al., 2004).

If information technology and telecommunications are to satisfy the informational needs and extend the capabilities of the farmer, both the technology and the dissemination strategy must be sufficiently flexible to adapt themselves to the farmers' way of working (Wilde and Swatman, 1996). Extension should organize seminars, institutes, and workshops to train farmers in computer applications for agriculture(Bamka, 2000; O'Neill, 1999; Findlay et al., 1993). For example, incorporating youth to work with senior citizens significantly improved the seniors' perceptions of their comfort and skill levels regarding Internet use up to six months after training (Kolodinsky et al., 2002).

However, a need exists to determine the actual effectiveness of Web sites both with and without training sessions to help guide participants through the program. Technical training (Bamka, 2000; O'Neill, 1999) and application to real needs emerge as crucial aspects to reach beyond the innovators and early adopters (Hall et al., 2003; Ferguson, 2002; Carr, 1999).

If farmers perceive technology as difficult to learn, too time consuming to use, or in some way presenting a threat, they probably will not use it (Carr, 1999). Therefore, in addition to providing training sessions to introduce farmers to the benefits of using the Internet as a communication strategy, educators must specifically address reasons why farmers are hesitant to utilize the Internet as a communication strategy on an individual needs basis (Hall et al., 2003). This is particularly important if a strong desire exists among specialists to provide data via web sites because they prove to be more time and cost efficient than newsletters and brochures. Research in distance learning has primarily focused on two types of systems: storage based and real time (Keisuke, 2000). In the storage based system, the user can always access and study through the Internet. The user lacks mutual interaction with this system due to no time restriction. However, in the real time system, the video-conferencing system has been advantageous for interactive discussion between educators and students.

While distance delivery of education in not new, video-conferencing as a delivery method and responding to the wants and needs of the remote farmers and clients have made distance delivery much more labor intensive for the facilitator at a rural areas.

Ⅲ. Method

This study was conducted by literature review, participatory research as a action research, and survey from 2002 to 2004. We have done to make two kinds of systems that were the VOD and video-conferencing as a practical researcher. And I will describe the structure of two systems made through working process to operate those two systems. The data by online survey were collected with 439 learners among 754 enrolled (126 in 2003 and 313 in 2004). And the data were analyzed by SPSS/PC with frequency and percentile.

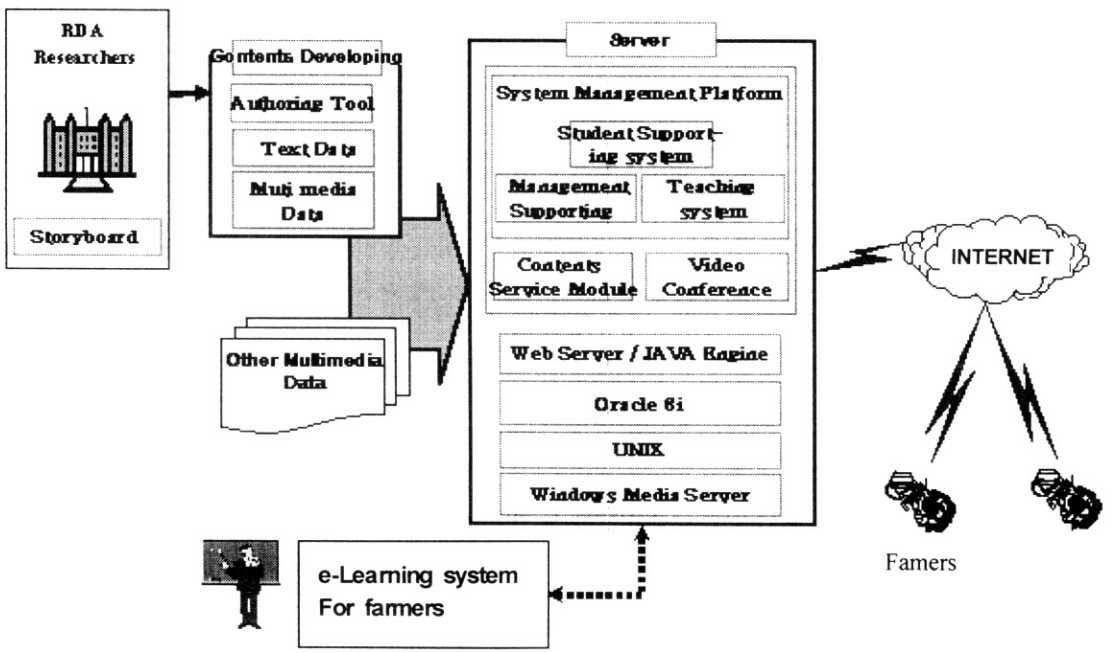
Ⅳ. Results

1. VOD e-Learning System for Far- mers: Storage-based System

Many government institutes and academic organizations of agriculture and agricultural extension organization in Korea have started constructing their e-learning systems a few years ago. Also, the RDA has developed and operated the e-learning system for farmers (Fig. 1). The purpose of developing the system was to provide the opportunity of learning agricultural techniques to farmers without restriction on time and location. It has also been providing re-training to give farmers the opportunity to study techniques in cyber space without restriction in time and space since 2003.

2. Distance Education and Consulting System: Video-conferencing System

Farmers have generally been constrained by financial and time pressures, commitments to family and jobs, and responsibilities to the operation of the family farm or business. According to Nudell et al. (2005), by utilizing



〈Fig. 1〉 The Structure of the e-Learning System.

video-conferencing, educators are successfully facilitating connections between their clients and educational resources located anywhere in the world.

The e-learning system integrates a VOD system, which has a video-conferencing system that has more interaction between educators and farmers. Video-conferencing system is to "talk face to face with telecommunication: see each other, listen to each other." This distance education and consulting system for farmers is the agricultural application of a video-conferencing system. Due to this system, farmers can face specialists on visual-image contact to get consultation and education at their own local extension institute and farm.

Video-conferencing has been used for ten years in a variety of ways throughout rural Korea. This system has been equipped to local research and extension institutes since 1995. Also, the Internet system has been promoted to more framers since 2002. We have promoted the Internet to 1000 farmers' groups and educated farmers to access the videoconference system with Microsoft Netmeeting software and Web-camera.

3. The Conduct of the Integrated System

The Rural Development Administration (RDA) has been constructing the VOD system for extension education since 2003. The system has been consisted of three parts: teaching system, education management system, and administrator management system. The teaching system was for registering of lecture data, answering queries, and checking learner's status. The education management system was for registering for a course, checking attendance, and managing degree of progress. The administrator management system was for managing the learner and managing the subject.

4. Main Contents of e-Learning System for Farmers

The subjects on starting courses at 2003 are cucumber, red pepper, tomato, mushroom, watermelon, strawberry. The contents of each subjects is below on Table 1. Common contents

〈Table 1〉 Main Contents of e-Learning System for Farmers

Subjects	Contents
Cucumber	• Cropping system, varieties, pest control, physiological disorders, facility and farm management
Red pepper	• Varieties, farm management, prospects and marketing
Tomato	• Varieties and raising seeding, physiological disorders, pest control, cultivation, equipment and farm management
Mushroom	• Production environments and facility, rice straw sheaf cultivation, reused cotton compost cultivation, pest control, bottle and plastic bag cultivation
Watermelon	• Characteristics of varieties, seeding, nutritional disorders, pest control, high quality production
Strawberry	• Varieties, physiological and ecological characteristics, raising seeding, forcing culture, pest control

of the subjects are pest control and varieties.

5. The Process of e-Learning System

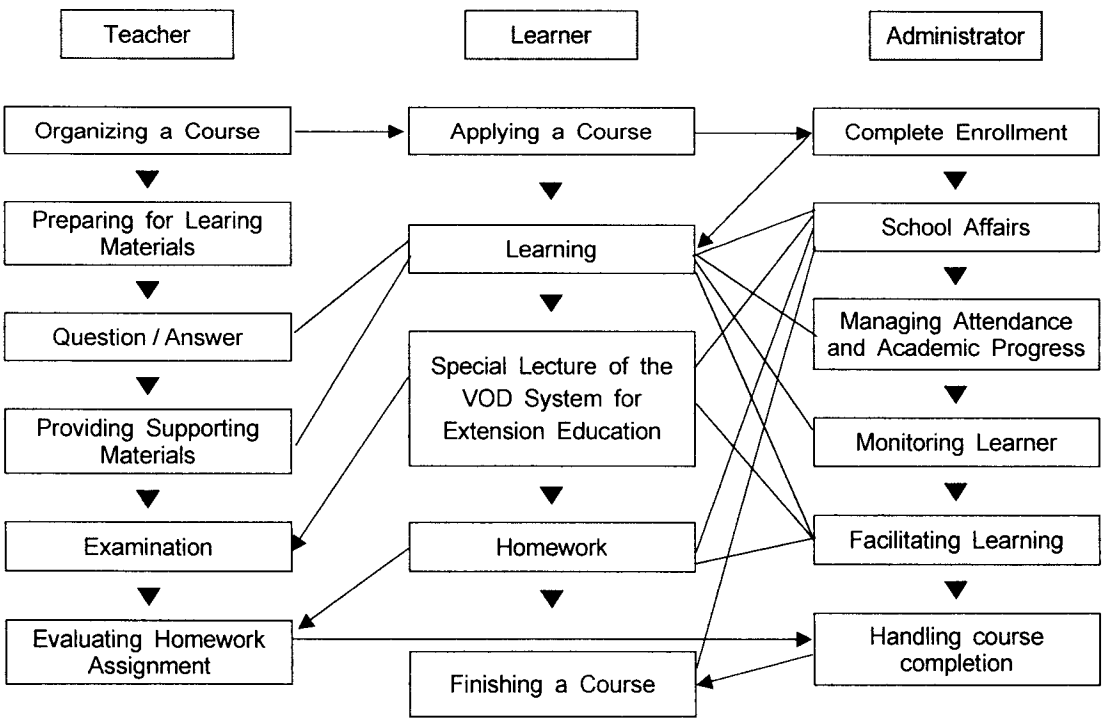
The e-learning system consists of three parts; teaching system, education management system, administrator management system. Teaching system is to register on contents for lecture, answer question, and check learner's learning status. Education management system is to register course, check attendance, and manage the rate of educational attainment. Administrator management system is to manage the learner and subject.

In 2003, the number of farmers enrolled for this program was 251. Among them, 126 farmers attended and finished the programs on cucumber, pepper, and tomato and its related farming management. In 2004, the number of farmers enrolled is 503 farmers, 313 farmers among them finished the programs on mushroom, strawberry, and watermelon.

The e-learning system integrates a VOD system with a video conference system that has more interaction between educators and farmers. The contents of this course consist of thirty chapters per each crop by web for three months and have special educators and discussions by real-time videoconference system per every month for extension education.

6. Educational Satisfaction to Learners

The RDA has conducted two courses from May to August 2003 and from January to April 2004 using our e-learning system. The e-Learning system is evaluated by questionnaires given to 503 students during the conclusion of the second course. The questionnaires asked students to rate



〈Fig. 2〉 The Process of e-Learning System

various factors of the course on a scale of one to three. We performed a frequency analysis of the 184 survey results.

〈Table 2〉 Satisfaction on Two Systems

Unit: frequency (%)

	Very satisfied	Satisfied	Some what
VOD	140 (76.1)	43 (23.4)	1 (0.5)
Video-conferencing	141 (76.5)	40 (21.7)	3 (1.5)

〈Table 3〉 Frequency of Farmer's Preference

Unit: frequency (%)

VOD	Video-conferencing	Both	Others
24 (13.0)	42 (22.8)	109 (59.24)	9 (4.7)

Table 2 shows that 76% of the farmers were satisfied with the e-learning system in Korea's agricultural education.

Table 3 shows that the preferences of system type are integrated system (59%), two way video-conference system (23%), and VOD system (13%). As such, satisfaction on this system is higher than before. Extension educators have considered this system as an alternative for extension education in rural Korea.

The extension methods have to be chosen according to the farmers' computer capabilities. Also information provided with materials should be thoroughly updated on more farmers have access to new information.

V. Conclusions and Implications

It can be said that computer systems are not alternative methods but supplementary methods. The e-learning system has immense potential for agricultural extension education in rural Korea and it is an outstanding alternative of agricultural education and extension. The extension education being offered through video-conferencing has been so successful that we now recognize the need to provide more farmers and extension workers services than the current local county-level extension workers can supply. By utilizing video-conferencing and VOD system, Extension educators are successfully facilitating connections between farmers and educational resources located anywhere in Korea.

First, while distance delivery of education is not now, video-conferencing as a delivery method and responding to the wants and needs of the remote farmers have made distance delivery much more labor intensive for the facilitator at a remote site. Second, the unified operation combined with video-conferencing system is advisable to consolidate the interaction of present VOD agricultural education and extension system. Third, the satisfaction on this system is higher than before. 76% of the farmers were satisfied with the e-learning system in Korea's agricultural education and extension. 59% of Farmers preferred to integrated system. Fourth, as we expand beyond traditional extension non-credit training by facilitating more credit offerings, we need to prepare to proctor tests, distribute daily class materials, send and receive fax, take roll call, and complete other small tasks that increase

the facilitator's workload and time commitment. Fifth, the operation of this system in the future would be more effective during non-farming seasons to enable farmers to complete their courses. Sixth, the rewards of adding more diverse educational offerings for our rural clients far outweigh the additional burdens.

We concluded that farmers needed additional programs that were for beginner's course with several courses for learners' levels and develop a variety of contents to meet user's requirements. Facilitating credit education allows us to interact with a new and diverse audience. Also we would emphasize that computer systems should be definitely used for the 'introduction of the new agricultural technology' and it is necessary to train farmers on how to use computer systems as extension methods.

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