

Full Length Research Paper

The study of implementation and evaluation of an alternative agricultural extension presentation system

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In Taiwan, to deal with the global competitive pressure, agricultural extension improvement will play an important role. The agricultural extension workers not only need to have professional agricultural knowledge but also have good presentation skills for extension activities, especially for training courses. However, a good presentation for extension activities depended on a well-designed material. This study intends to construct an alternative presentation tool – an interactive agricultural extension presentation tool. It further analyzes effects of training design on agriculture extension workers' cognitive attitude of learning interactive agricultural extension presentation system. In doing this, the participants of agricultural extension workers training camp were surveyed. Results of this study reveal that training course with interactive agricultural extension presentation system do have effects on agricultural extension worker's perception of effectiveness. The interactive agricultural extension presentation system could successfully attract their interests and engagement, best fit their needs and preferences, and help to understand the contents thereby they felt confident and satisfactory with this training activity.

Key words: Agricultural extension, interactive agricultural extension presentation system, cognitive attitude.

INTRODUCTION

In Taiwan, to deal with the seriousness of the agricultural labor shortage problem, the global proneness of free trade and international competitiveness, the traditional model of agriculture business has to be transformed and keeping the young farmers to stay on the farm also needs to be encouraged. Agricultural extension improvement will play an important role at this moment. The major function of extension workers who are employed by Farmers' Associations (FA) is to help farmers to improve their living standards by using the best available techniques (Allo, 1983). The local-level FA is the major agricultural extension system. Its main function is to introduce modern farm management, provide technical training, and offer guidance on the establishment of an

entrepreneurial production and distribution throughout local farmers. The agricultural extension worker is often under tremendous pressure but still be depicted as a sort of superman. They not only need to have professional agricultural knowledge but also have good presentation skills for extension activities, especially for training courses which provided the knowledge of new technologies and techniques. However, a good presentation for extension activities depended on a well-designed material (Chen et al., 2011).

There has been little concern about the presentation of agricultural extension courses in the past, but the presentation of extension will affect the comprehension of the courses, changing trainees' attitudes, and altering

behaviors (Mulder et al., 2006). Hence the presentation of agricultural extension must be considered. In general, integrating information technologies into the presentation activities is a popular tendency; especially the multimedia-based instruction is being widely applied in the learning environment to improve learning (Liao and Ho, 2010; Mayer, 2001). The multimedia representation includes text, audio, graphs, photographs, animation, or video. PowerPoint, a user-friendly package and popular presentation tool, can be used for the creation of visually clear, dynamic and attention capturing presentations (Holzl, 1997). Highly flexible, audience engagement, great visual tool and simple to use are the benefits of using PowerPoint. Images, audio clips, text and sound effects are used to enrich reports and studies in the presentations and slide shows. Its adoption conducts the speaker to a well-organized path on which the most important points are emphasized (Harknett and Cobane, 1997). Besides, it is easy for a user to combine multimedia with a presentation and even for a novice user to create colorful and easy-to-read slides. Without question, PowerPoint has some very attractive features as mentioned above, but the real question is whether the use of PowerPoint enables teaching/learning effectiveness. The traditional linear PowerPoint presentation is known as a "slide show" (Matheson et al., 2002) which includes a series of screens presented one after another just as slides in an old-fashioned slide projector. It is known that traditional way of teaching discourages active learning, and the slide show presentation simply enlarges the passive nature of the instruction. Hence, the specific objectives of this experiment were to apply the multimedia technologies and modularity concepts into PowerPoint on demand for the training activities of agricultural extension workers and evaluate their learning effects.

MATERIALS AND METHODS

Sample and research question

In order to inspire an agricultural extension worker to get a better understanding of agricultural affairs and learn the knowledge of new technologies and techniques, the Taiwan Council of Agriculture (COA) has implemented serious extension courses from the "Project of Motivation Farmer's Lifelong Learning". The Council of Agriculture is the competent authority on the agricultural, forestry, fishery, animal husbandry and food affairs in Taiwan. Its responsibilities include guiding and supervising provincial and municipal offices in these areas. Due to the limitation of government budget facility, the participants in our study consisted of 38 people recruited from an agricultural extension training camp in southern Taiwan. The unusable surveys which were either incomplete questionnaire or not followed instructions were identified and discarded. As a result, 32 respondents (84% of 38 cases) were used as the basis for data analysis. Of these participants, 62% were males, and 38% were females, 12% were under 30 years old, 45% were 30-50 years old, and 43% were above 50 years old. With regard to the respondents' agricultural backgrounds, more than half had majored in agriculture, and more than half had senior high

school diplomas.

Instrument

The presentation tool - interactive PowerPoint

Due to innovations in information technology and telecommunications, the use of multimedia technology is becoming more widespread throughout various sectors including education, business as well as agriculture. This study uses the PowerPoint as the experimental medium because PowerPoint is a widely accepted, easily compiled and maintained presenting medium. Furthermore, previous studies have constantly suggested that learners generally believed that the use of PowerPoint can effectively help their learning (Apperson et al., 2006; Rankin and Hoas, 2001). The description of the interactive PowerPoint is as follows and is shown in Figures 1 to 3.

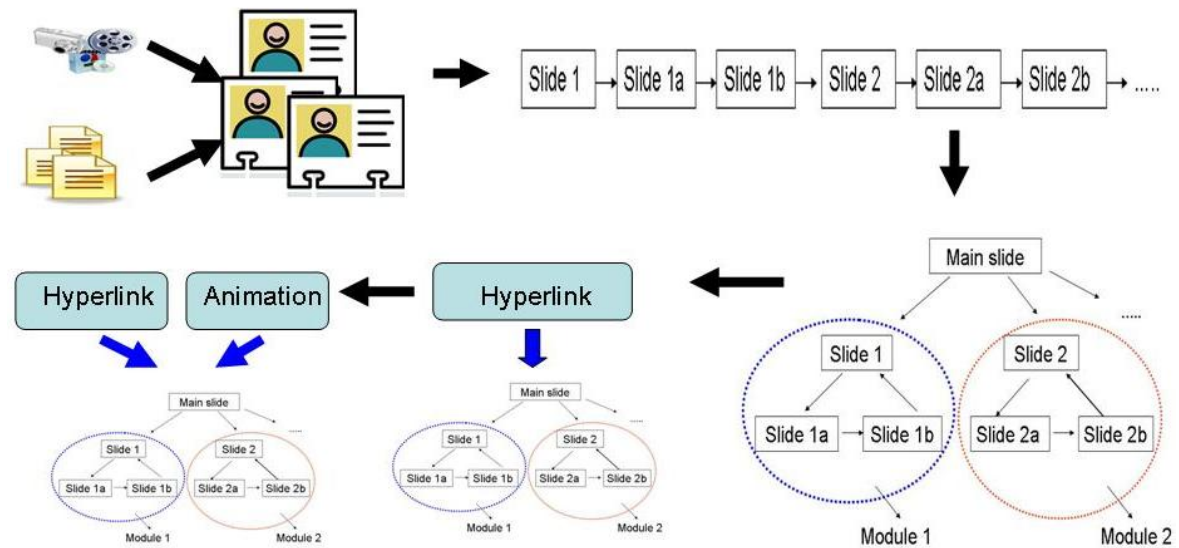
- (1) Incorporate meaningful visual content and related verbal information together. According to the dual coding theory, brain encodes visual and verbal information simultaneously but differently, in separate areas (Lane and Wright, 2009). The brain clearly handles visual content differently than it does textual information. Text, a coding system, has meaning only in a symbolic sense and viewers must expand a great deal of cognitive resources decoding words and phrases on slides. Under this kind of situation, they have little capacity left to pay attention to the speaker or they pay attention to the speaker and ignore text-heavy slides altogether. Both situations are unfavorable ideal. In contrast, visual processing can occur simultaneously and efficiently along with verbal processing because different brain regions are involved. Thus, pictures and graphics are powerful communication tools if used correctly. Further, considering the knowledge divide of agriculture and educational divide, we used the picture-based visual communication to enable the learners' comprehension of learning contents (Levie and Lentz, 1982).
- (2) Separate individual ideas onto their own slides. Based on the cognitive theory of multimedia learning, separating individual topics onto their own slides can resolve the richly visual with performances (Lane and Wright, 2009).
- (3) Classify the slides with the concepts of modularity. For preventing the passive learning attitude from the traditional linear presentation, we classified the slides with the concepts of modularity to build the hierarchically organized structures called presentation networks; each module is an entirely independent slide show.
- (4) Hyperlink all slides together. We borrowed the navigation technology in the presentation networks to provide presenters/learners with the ability to rapidly find and display whatever content they need, whenever they need it.
- (5) Highlight using animation. For keeping audiences' attention, a more engaging approach is to use animation to have each element appear at a time and at the right moment on the slide.

Learning perception survey

Learning motivation is an important factor for inspiring and encouraging the participation of learners during the learning process. This study adopted the ARCS motivation model proposed by Keller (1983). The four constructs in this model include attention, relevance, confidence and satisfaction, they describe the perception procedure: while keeping the learners' attention is critical, instructors will provide an interactive and participative environment to gain and maintain learners' attention. Learners will feel relevant that the course content, activities, and assignments must be related to their personal and professional goals. Learners

Step 1: Incorporate meaningful visual content and related concise text

Step 2: Separate individual ideas onto their own slides



Step 5: Use animation to keep learner's attention

Step 4: Integrate multimedia technology (ex. Hyperlink)

Step 3: Adopt the modularity concepts to build a hierarchical presentation network

Figure 1. Five steps of implementing interactive agricultural extension materials.



Figure 2. The title page of interactive agricultural extension materials.




產銷履歷-水果-火龍果

Module and sub-modules

- 何謂產銷履歷
- 產銷履歷的價值
- 產銷履歷的應用
 - 水果
 - 花卉
 - 蔬菜
 - 其他作物
- 產銷履歷怎麼做
- 相關法令
- 履歷達人

Current slide

- 生產季節：夏日(8至10月)
- 優質產地：花蓮縣玉里鎮果樹產銷班第5班
- 特點
 - 果實品質優良甜度高，果心部位甜度有17度以上，最高可達21度。
 - 含有豐富的粗纖維與磷、鐵等礦物元素，鎂與鋅的含量高
 - 生性強健，耐病蟲害且對環境的適應能力強，是少數不太需要使用藥劑防治的水果
- 認證單位：慈心有機農業發展基金會、農產品產銷履歷驗證

訊息提供：<http://www.hdais.gov.tw/node/1594>

Figure 3. One of the presentations of interactive agricultural extension materials.

will be confident that they can achieve the expected outcomes of the course and satisfaction which derive from the instruction (Johnson and Aragon, 2003). The questionnaire, the IMMS --overall perception to learn was evaluated. IMMS that developed around Keller's ARCS model of perceptive design was designed to evaluate how instructional materials affected motivation to learn. It contained a 36 7-point Likert scale statements, ranging from extremely dissatisfied (1) to extremely satisfied (7), as well as to provide open comments on the system. Each statement measured an individual ARCS component. In order to minimize possible error because of participants' varying levels of English comprehension, a Chinese version of the questionnaire was used, with the Chinese version of IMMS administered by ESL/EFL and translation experts to prevent any translation mistakes.

Procedure

In order to verify the learning perceptions of the PowerPoint presentation, an exploratory study was conducted. In this experimental activity, total workshop duration was 20 h. The participants were randomly assigned to two classes after they registered for the extension course. Then, the participants were randomly assigned as the experimental group and the control group. The experimental group (17 participants) was lectured by a teacher using the interactive PowerPoint presentation, and the control group (15 participants) was lectured by a teacher using a linear PowerPoint presentation. The internal controls, which included teaching hours, instruments, course content, and instructor, were the same for the two groups. At the end of the training activity, IMMS was conducted to assess the participants' general attitudes, interest and efficacy for the PowerPoint presentation.

RESULTS AND ANALYSIS

After distributing the questionnaires, the researcher gathered the responses and used Statistical Package for the Social Sciences (SPSS) for Windows, a statistical program, for data analysis. The data collected was coded and entered into a computer by optical scoring, and analyzed using SPSS. Descriptive statistics, including frequencies, means and standard deviations, were reported in order to understand the learners' cognitive results of the training activity. T-tests were used to determine the effects of experimental activity. The standard for significance in this study was <0.05 .

The reliability of the IMMS, as assessed by Cronbach alpha for internal consistency, was .883. For the four components (attention, relevance, confidence, and satisfaction) of IMMS, Cronbach alpha was between 0.818 ~ 0.875. Table 1 shows the significant results of the experimental analysis, which indicated as following: It showed that the interactive PowerPoint presentation provided the rich visual interactivity and the instructor effectively used the instructional technology to present the teaching materials. Hence, the instructor's use of the instructional technology helps participants pay attention in class, $t = 7.999$, $p < 0.001$, $d = 0.814$. It also showed that the participants felt relevant that the course content and activity were closed to their personal and professional works (goals), $t = 9.330$, $p < 0.001$, $d =$

Table 1. Descriptive statistics of learning perception in different groups.

Model constructs	Control (n=15)	Experiment (n=17)	t-value	Effect size Cohen's d
	M(SD)	M(SD)		
Attention	21.18 (2.128)	28.53 (3.044)	7.999***	0.814
Relevance	26.88(3.080)	36.60(2.772)	9.330***	0.856
Confidence	26.88(4.608)	36.60(3.832)	6.434***	0.754
Satisfaction	26.18(5.341)	33.47(5.357)	3.848**	0.563

*, **, *** Significant at <0.05, <0.01 and <0.001, respectively.

0.856. According to the cognitive theory of multimedia learning (Mayer, 2001), participants learned better from words and pictures than from printed or spoken words alone. The slides modality concepts and hyperlink technology conduct the interactive presentation which effectively let participants feel that the presentations could promote their understanding of the learning contents. They felt they were more confident, $t = 6.434$, $p < 0.001$, $d = 0.754$. Finally, they satisfied with this extension activity, $t = 3.848$, $p < 0.01$, $d = 0.563$. In summary, the results of IMMS that the participants in experimental group get higher learning motivation than that of in control group.

DISCUSSION

The results of survey pointed out that the interactive PowerPoint is helpful in the extension course. Three statements can be verified from this experiment. First, the interactive PowerPoint could facilitate learning. The interactive PowerPoint presentation provided the rich visual information and technology could successfully attract participants' interests and engagement. Second, considering the cognitive load and knowledge divide, we simplified the contents of the slide such as one slide presented one topic and used the visual information to substitute the complicated texts. And the contents of the instructional materials are more close to participants' life experience. As doing so, participants felt that best fit their needs and preferences and thereby reinforcing their learning (Jones and Plass, 2002). Finally, the interactive PowerPoint presentation incorporated hyperlinks and hierarchical design strategies that provided the instructor with the flexibilities and efficiency in managing the presentation slides. The instructor also easily changed and selected the particular slide to help participants with their questions, thereby helping the cognitive process in the comprehension of the content being taught (Hasler et al., 2007; Wallen et al., 2005). However, in the linear PowerPoint display environment, instructor cannot quickly move and change the desirable slides to explain two successive or separated slides. He/She may lose chances to make important links between more distantly related topics by showing materials in a set order. This

may result in decreasing participants' ability to solve a particular problem. Thus, the participants of the experimental group felt more confident and satisfactory than those of the control group.

Conclusions

The results of survey not only showed that the interactive PowerPoint presentation could benefit agricultural extension workers' learning but also showed that the extension course could best fit their needs and preferences. Since the extension workers play the role of facilitator, trainer, and consultant to the farmers that also facilitate them to popularize their jobs. The research findings confirmed that the interactive PowerPoint presentation could contribute effectively to providing the learning environment for agricultural extension.

However, there is still room to improve in this study. For example, we focused the samples who were recruited from only one extension camp in this experiment and thus the results could reflect a bias. In addition, since the training for agricultural extension workers is crucial that a panel study is conducted to track the behavioral changes of participants, specifically their willingness eventually apply the training knowledge in the agricultural extension.

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