Exploring Rural Area Teachers Perception of an Interactive PowerPoint

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Abstract: The purpose of this study was to construct a cost-effective and time-efficient presentation tool—an interactive PowerPoint for rural school teachers, the interactive PowerPoint, by integrating multimedia and modularity concepts into the PowerPoint. In this study, the interactive PowerPoint was designed for rural school teachers who had encountered the shortage of educational sources. An empirical study was conducted to examine the effects of teachers cognitive attitude of learning. The results of questionnaire and interviews showed that the rural school teachers were positively confirmed the usefulness of interactive PowerPoint, more satisfied with the presentation atmosphere and willingly applied to their work and shared with their colleague.

Keywords: Interactive powerpoint, modularity concept, multimedia, rural school teachers

INTRODUCTION

To date, most remote district schools have encountered some harder problems such like the small student population, the shortage of qualified and willing teachers (Collins, 1990), the shortage of finance support and the lack of communities support (Cheng et al., 2007). Although the development of information technology and the easy access of computers, the schools in the rural region still have shortage of learning resources because of the limitation of time, space and the unequal allocation of educational resources (Beavers, 2009). In Taiwan, the teachers of the rural schools are always undertaken not only their teaching job but also many annoying school affairs such like executing brilliant classroom management strategies, navigating the unrelenting gauntlet of educational politics, skilled in communication and even being fluent in student psychology, etc., (Cheng et al., 2007). Because of the small student population, these rural schools usually have too little budget to afford the expense of instructional equipment maintenance, extra teaching material and the remedial education for low academic performance students. Furthermore, the habitants in rural areas usually don intend to participate and support activity and care less about students learning because they have a lower income and are busy about earning a living (Chen, 2007; Tsai, 2000; Tsai, 2004; Nash, 2004). Hence, the students in rural school suffered the low self-confidence and motivation in learning (Chen et al., 2011).

Recently, to advance the quality of education in Taiwan, many universities and education institutions provided the on-the-job training for teachers to continue their life-long learning and career progression (Hien, 2008). The aims of teachers on-the-job training were to strengthen teachers quality and professionalism based on their teaching skills and research, which could affect teachers skills and attitudes in the classroom and further increase the quality of education the students receive (Hien, 2008; Beavers, 2009). The presentation skills of teachers especially were vital and adequately affected the students learning attitude and outcomes. Due to the innovations in information technology and telecommunications, integrating the multimedia technologies into presentation in the class was a popular tendency. However, owing to the limitation of cost and computer literacy in remote area schools, PowerPoint, after all, was a primary enabler of rapid development for instructional designer. Thus, this study intended to go through the on-the-job training for rural school teachers, implemented an alternative presentation tool—an interactive PowerPoint for teacher to enhance the class learning.

The remainder of this study was structured as follows. First, we developed the methodology. And then, we presented our discussion and conclusion.

METHODOLOGY

This study uses the PowerPoint as the experimental medium because PowerPoint is a widely accepted, easily compiled and maintained presenting medium. Previous studies also have constantly suggested that learners generally believed that the use of PowerPoint can effectively help their learning (Apperson et al., 2006; Rankin and Hoaas, 2001; Chen et al., 2011). Furthermore, considering the overwhelmed loading of teachers and the limitations of school budget and teacher personal computer literacy in rural schools, this study intends to implement a rapidly developed presentation tool—an interactive Power Point for teachers to enhance the
Fig. 1: The procedure of constructing an interactive Power Point

**Step 1.** Incorporate meaningful visual content and related concise text.

**Step 2.** Separate individual ideas onto their own slides, which can resolve the richly visual cognitive load.

**Step 3.** Simplify a vast quantity of slides, develop modules independently and link the independent modules into a hierarchical presentation networks.

**Step 4.** Hyperlink all slides together which help Presenters rapidly find and display whatever content they need, whatever they need it.

**Step 5.** Use animation to keep audiences’ attention.

Teaching/learning performance. Hence, the purpose of this study is to incorporate the multimedia technologies appropriately into PowerPoint for the rural school teacher on-the-job training and evaluate their learning effects. And we hypothesized that interactive PowerPoint would enhance learning cognitive. The hypotheses were:

- **H1:** Participants will perceive usefulness for Interactive PowerPoint presentation.
- **H2:** Participants will perceive satisfaction for interactive PowerPoint presentation.
- **H3:** Participants will willingly apply and share the learning contents and technology to their future work and their colleague.

**Sample:** The experiment was motivated by the need of 38 rural school teachers in southern Taiwan during summer 2011 to learn the information security for on-the-job training. Exclude the unusable surveys which were incomplete questionnaire or activity. As a result, 31 respondents (82% of 38 cases) were used as the basis for data analysis. Of these participants, 46% were males and 54% were females, 38% were elementary school teachers, 51% were junior high school teachers and 11% were senior high school teachers.

**Instruments:**

**Constructing the presentation tool-interactive PowerPoint (Fig. 1 and 2):**

**Step 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 digit divide of rural school teachers, we used the picture-based visual communication to enable the learners comprehension of learning contents (Levie and Lentz, 1982).
Fig. 2: The presentation of the interactive Power Point

The interactive buttons (each button represented one module or-module) with hyperlink allowed learners random “on-demand” access to any particular part. Slides contain truly meaningful, visual content rather than complicated texts. And animation for presentation also has been added to address the audience’s interests.

**Step 2:** Classify the slides with the concepts of modularity.

Based on the cognitive theory of multimedia learning, separating individual topics onto their own slides can resolve the richly visual performances (Lane and Wright, 2009). In addition, 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, containing just a few closely interrelated slides. It is easy to modify any slide in the separated module in future. Each module also can supply individual or others repetition uses. From the information technology management point of view, it is a cost-effective and time-efficient approach.

**Step 3:** 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.

**Step 4:** 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:** The learning perception questionnaire which also included interview questions was adopted and modified from previous surveys (Apperson et al., 2006; Loyd and Gressard, 1986; Susskind, 2008; Lai et al., 2011a, b). Three dimensions were set in this survey questionnaire: perceived usefulness, affectivity and intention to use. The purpose of the questionnaire assessed their general attitudes, interest and efficacy for the PowerPoint presentation. This was a 15-item survey using a 5-point Likert-type scale (with 1 being Strongly Disagree and 5 being Strongly Agree). The higher scores indicated more positive learning perceptions toward the PowerPoint presentation (Lai et al., 2011b). All items were presented in Table 1. Internal consistency reliability of the questionnaire was assessed by Cronbach’s alpha (α = 0.85). The significant level was set at p = 0.05.

**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 16 h. In the workshop we not only provided

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I generally found visual elements (e.g., pictures, charts, graphics, or tables) helpful in presentations.</td>
<td>3.71</td>
<td>0.973</td>
</tr>
<tr>
<td>The use of instructional technology helped me pay attention in class.</td>
<td>3.77</td>
<td>0.956</td>
</tr>
<tr>
<td>The lectures were effective in maintaining learners interest.</td>
<td>4.06</td>
<td>0.814</td>
</tr>
<tr>
<td>The lectures were more organized.</td>
<td>3.48</td>
<td>0.926</td>
</tr>
<tr>
<td>I thought the teacher use of instructional technology while teaching was effective.</td>
<td>4.129</td>
<td>0.718</td>
</tr>
<tr>
<td>The presentations promoted my understanding of the learning contents.</td>
<td>4.032</td>
<td>0.836</td>
</tr>
<tr>
<td>I did not need more time to organize notes.</td>
<td>3.39</td>
<td>1.020</td>
</tr>
<tr>
<td>Compared to other courses, this course did not require doing additional work.</td>
<td>3.81</td>
<td>0.873</td>
</tr>
</tbody>
</table>

(Apperson et al., 2006; Loyd and Gressard, 1986; Susskind, 2008; Lai et al., 2011a, b).
the rural school teachers with the concepts of information security but also taught them how to construct the interactive PowerPoint. At the end of the activity, they accomplished the questionnaire and were interviewed.

RESULTS

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 means and standard deviations, were reported in order to understand the learners’ cognitive results of the training activity. The computed mean rating for each item was compared with the theoretical mean rating (assuming normal distribution of responses) of 3.0 to determine whether respondents agreed with the statements. Any computed mean of an item exceeding 3.0 indicated expression of agreement with the statement, while means below 3.0 indicated expression of disagreement with the statement (Donkor, 2011).

The analysis of the perceived usefulness: The results of descriptive statistics (Table 1) showed that participants had positive attitude of the perceived usefulness in the training course. It referred that the participants found that the instructors used the effectively instructional technology (multimedia and hyperlink) (Mean = 4.129, SD = 0.718) which could successfully maintain learners interest (M = 4.06, SD = 0.814) and promote learner comprehension (M = 4.03, SD = 0.836). These results echoed the cognitive theory of multimedia learning (Mayer, 2001), learners learned better from words and pictures than from printed or spoken words alone. Consequently, hypotheses 1 received support.

The analysis of the perceived affectivity: The results of the descriptive statistics (Table 2) showed that participants are positively confirmed the perceived satisfaction of this training activity. They felt more confident (Mean = 3.84, SD = 0.820) and motivated (Mean = 3.52, SD = 0.811) in the learning process, thereby they could easily discuss the lecture with classmates afterwards (Mean = 3.52, SD = 0.770). Hence, hypothesis 2 received support.

The analysis of perceived intention to use: The results of the descriptive statistics (Table 3) revealed that participants were willingly to apply and share this training courses and technology to their future work and their colleague. As expected, hypothesis 3 received support.

Participants interview: The participants were interviewed during and after the study. The participants opinions were useful in examining the interactive PowerPoint. The participants comments were summarized as following:

The interactive PowerPoint stimulated their learning motivation and captured their attention.

The interactive PowerPoint presentations could maintain their interests and promote their understanding of the learning contents.

They felt that the modularity concept and presentation network were a cost-effective and time-efficient approach.

DISCUSSION

In this study, we worked out several interesting findings. First of all, the rural school teachers were much satisfied with perceived usefulness in interactive PowerPoint presentation. The high remarks were thought the teacher use of instructional technology while teaching was effective and the lectures were effective in maintaining learners interest and the presentations promoted my understanding of the learning contents. This finding echoed Mayer (2001) cognitive theory of multimedia learning, learners who selected from both graphic and text modes were able to build more referential connections between the verbal and visual mental representations (Lai et al., 2011a). This study employed the multimedia such like richly visual contents and meaningful animations to lead the learner to involving in the vivid learning environment that best fit their needs and preferences and thereby reinforcing their learning (Jones and Plass, 2002).

Second, learners were satisfied with the affective perception, especially, in confidence, motivation and happiness. Compared with the linear PowerPoint presentation, the interactive PowerPoint integrated the hyperlink technology and modularity concept into traditional linear PowerPoint to build the hierarchical presentation networks and provide a vivid and profound impact on learners. In doing so, learners became more
engaged in their learning experience, which could result in the increase of their understanding and retention of the subject matter (Bates and Poole, 2003). Thereby, they felt satisfaction in this learning process.

Finally, from the viewpoint of the instructional design, this study conducted the modularity concept into the interactive PowerPoint. During both the planning process and the actual construction, this strategy kept the entire material modular and reusable. The strategy enabled to provide the benefits of simplifying a vast quantity of slides, developing modules independently, loading or reusing modules from different locations and minimizing download time. Considering the limitations of school budgets and personal digit divide, this is a much more cost-effective and time-efficient approach for the rural school teachers. Accordingly, the rural school teachers perceived that the interactive PowerPoint presentation was effectively fitted their needs and willingly applied to the work after they returned and also shared to their colleague.

CONCLUSION

This study integrated the multimedia technologies and modularity concept into constructing a multimedia learning environment to promote the positive effects of the interactive PowerPoint presentation in teacher on-the-job training. The research hypotheses had received supports. We concluded the findings that this study combined the multimedia contents and technologies with modularity concept to construct an interactive PowerPoint presentation. This interactive presentation not only enabled learners to motive and understand the learning contents but also constructs a flexible and reusable designing environment for instructional designer. Accordingly, this learning environment allowed learners to create more cognitive paths to facilitate the construction of referential links and mutual references between two channel representations (Lai et al., 2011a; Chen et al., 2011). Finally, the survey results of this study have shown that the rural school teachers had a more positive attitude toward training. The interactive multimedia PowerPoint could effectively fit teachers need and satisfy them.

However, There is still room to improve in this study: the scope of the study was limited: the success of interactive PowerPoint may be varied by content and some topics or courses may be better-suited to learning than others; samples of participants drawn from one on-the-job training workshop were examined in this experiment and thus the results could reflect a bias. Further expansion of the scope and subjects is needed for the future study.

REFERENCES

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