HPT: A Prototype of an Educational Presentation Tool for Better Understanding

Yasuhsa Okazaki*, Akihiro Hosoki*, Hisaharu Tanaka*, Kenzi Watanabe*
*Graduate School of Science and Engineering, Saga University, Japan

Abstract

In this paper, we describe an educational tool for presentation which shows teacher’s whole handwriting process to learners named HPT(Handwriting Presentation Tool). We assume that presenting writing processes has rich educational information. We believe this information influences learners’ understandings of the provided learning contents. Animation functions of popular presentation tools are not enough to represent this information. Our presentation tool enables the lessons with a new type of presentation slides which combine advantages of traditional blackboards and popular presentation tools.

Keywords: Handwriting, Presentation tool, Slide, Blackboard, Replay.

I. Introduction

Presentation tools have been increasingly widespread in educational fields. They have advantages in making nice-looking slides by rich functions for designing and presenting. On the other hand, negative effects have been pointed out [1]. The causes of the cognitive load problems are not the presentation tool itself but the design method of contents. Guidelines for correct usage of presentation tools have been studied [1][2]. Despite this, it is also a fact that there are teachers and learners who still like lessons by a traditional blackboard. We consider the cause of the fact as missing educational information in slides which is contained in blackboard-based lessons. Writing on blackboards has features with showing writing processes. The advantages of showing the writing processes are: (1) learners can learn implicitly by watching and imitating how to write, (2) learners can recognize connection of the elements composed in step by step. It is undesirable that slides using popular presentation tools lack these advantages from an educational point of view.

In order to solve this problem, we have designed and implemented an educational presentation tool which introduces the advantages of showing the writing processes [3].

II. Blending a blackboard and a slide

Figure 1 shows an example of our HPT (Handwriting Presentation Tool) slide. This is for explaining how to solve practical exercises of simultaneous linear equations in junior high school mathematics. Learners can watch the whole writing process like blackboard lessons.

Figure 1. A sample HPT slide: The upper part is step by step instructions. Teachers can show clearly the processes which write equations from price of apples and oranges by alpha expression. The lower part shows clearly the model processes of solving equations. Learners can imitate easily the model.

III. How to make and present HPT slides

Our HPT slide presentation is consisted of the following four steps,
Step 1: Handwriting input
Teachers easily make hand-written slides by just writing with an electronic pen on handwriting interface as if they are writing on a note. Our system preserves all hand-written strokes.

Step 2: Animation Editing
Slides made in step 1 can replay the whole writing process without modification. In this step, teachers edit slides and control animation (ex. replay speed, order, interspaces).

Step 3: Full screen
After editing slides, the created slides are projected by a full screen function with a liquid-crystal projector just like usual slides.

Step 4: Presentation
Teachers give lessons in coordinate with the replay and adding handwriting comments in this step. They can emphasize the points in synchronizing their explanation with controlled replay.

We have used Microsoft Windows XP Home Edition SP3 and Visual Studio 2008 (Visual C++ 2008) for development. We have used a liquid crystal pen tablet WACOM DTU-710 for handwriting input.

IV. Functions of HPT
The following functions are provided by our Handwriting Presentation Tool.

(1) Handwriting input replay function
For the above-mentioned advantage (1), we have implemented a handwriting input replay function. Our tool obtains hand-written strokes when teachers press the pen, drag with the pen, and release the pen. By hand-written strokes, we can represent directly the writing processes.

(2) Replay control function
For the above-mentioned advantage (2), we have implemented a "replay control function". Teachers enable to edit and control objects in slides with controlling replay speed, order and interspaces by this function.

(3) Slide design function
We have implemented the following five functions for slides' design. They are change functions of the pen width, the pen color and background of the tool, insert functions of images and grid lines.

(4) Slide data storage function
We have also implemented a slide data storage function to save and restore slides' data. By this function, teachers can reuse slides for what it is or in a modified form.

V. Conclusion
In this paper, we have designed and implemented an educational presentation tool to promote learners' understanding by presenting the whole handwriting processes in slides. The process in which teachers write has educational rich information. The advantages of showing the writing processes are: (1) learners can learn implicitly by watching and imitating how to write, and (2) learners can recognize connection of the elements composed in step by step.

We have implemented a "replay function" to realize the above-mentioned advantage (1). By this function, teachers can easily instruct step by step, and they can replay teacher's writing processes. We also have implemented a "replay control function" to realize the above-mentioned advantage (2). By this function, teachers control replay speed, order and interspaces of writing for optimally replay.

The next tasks we are planning are to implement slides' management function and evaluation experiments. We expect that our tool contributes to learner's better understanding in lessons with slide presentation.

References