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# Development of a New Presentation Tool for Cognitive Enhancement by Controlling the Whole Writing Processes

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**Abstract:** In this paper, we develop a new presentation tool which aims at learners' promotion of recognition. We assume that showing writing processes has educational rich information. We believe this information includes educational factors which influence learners' recognition of the provided learning contents. Animation functions of popular presentation tools are not enough to represent this information. The advantages of showing 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 functions with showing teachers' writing processes to introduce these advantages. Our presentation tool enables the lesson with a new type of presentation slides which introduces in these advantages.

**Keywords:** Handwriting process, writing on blackboard, replay, presentation

## Introduction

In the field of education, lessons using presentation tools are widely used. Meanwhile, there are not a few teachers and learners who dwell on writing on blackboards. Writing on blackboards has features with showing writing processes. We assume that showing this processes have educational rich information. (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.

We have developed a new educational presentation tool which introduces the advantages of showing the writing processes.

## 1. New style of slides

Figure 1 shows an example of a new educational presentation slide we propose. This is for explaining how to solve practical exercises of simultaneous linear equations in junior high school mathematics.

The upper part is explanation of processes which teachers shows in step by step. Teachers can show clearly the processes which write equations from price of apples and oranges by alpha expression. Therefore, learners can recognize relations of individual objects. We believe that this has advantages to promote learners' comprehension.

The lower part shows clearly the model processes of solving equations. Therefore, learners can imitate easily the model. We believe that this have advantages to promote

procedure acquirement. The system of having these features can easily realize the advantages of showing writing processes described in introduction.

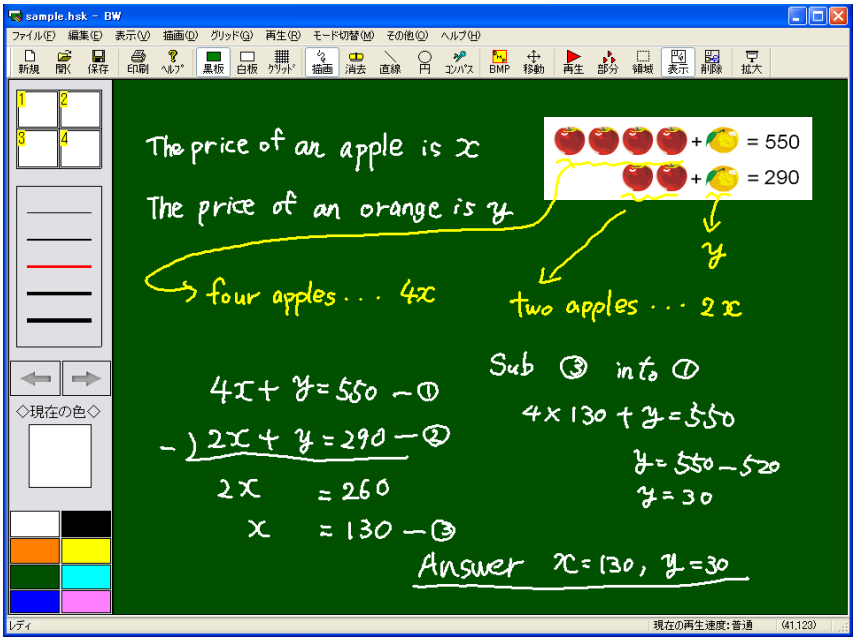


Figure. 1: A sample slide

## 2. How to use

Figure 2 shows processes of making slides and presenting. These processes are consisted of four processes below.

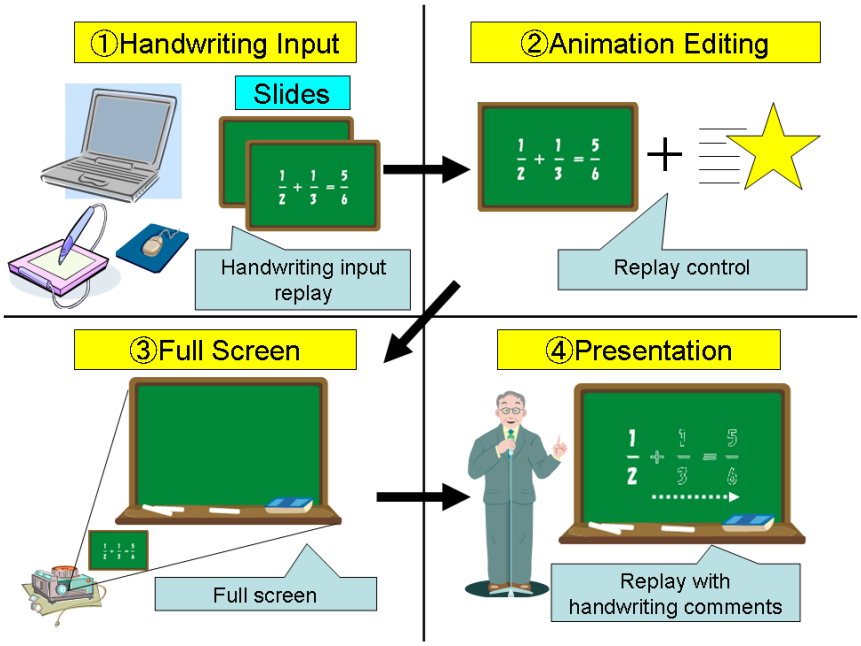


Figure. 2: Usage of system

Teachers easily make hand-written slides by just writing with an electronic pen on handwriting interface as if they are writing on note in step 1. Our system preserves handwritten strokes for handwriting input replay. Teachers can control speed and interspaces with the above-mentioned advantage (2) in step 2. The created slides in step 2 are projected by a full screen function with a liquid-crystal projector in step 3. Teachers give

lessons in coordinate with the replay and handwriting comments in step 4. They can emphasize the points in synchronizing their explanation with controlled replay.

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

## 3. System functions

### *3.1. Handwriting input replay function*

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

### *3.2. 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 and interspaces by this function.

### *3.3. Slide design function*

We have implemented 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.

### *3.4. 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.

## 4. Conclusion

In this paper, we have developed a new presentation tool to promote learners' recognition by controlling 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 show slides in 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 speed and interspaces of writing on blackboard and they can optimally replay.

The next tasks we are planning are to implement slides' management function and evaluation experiments. We expect that our tool makes a new slide presentation style.

## References

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