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A Development of Personalized Edutainment Contents through Storytelling

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***Abstract*—**Recently, 'play of learning' becomes important and is emphasized as a useful learning tool. Therefore, interest in edutainment contents is growing. Storytelling is considered first as a method that improves the transmission of information and learner's interest when planning edutainment contents. In this study, we designed edutainment contents in the form of an adventure game that applies the storytelling method. This content provides questions and items constituted dynamically and reorganized learning contents through analysis of test results. It allows learners to solve various questions through effective iterative learning. As a result, the learners can reach mastery learning.

***Keywords*—**Storytelling, edutainment, mastery learning, computer operating principle.

I. Introduction

ACCORDING to recent studies by educators and psychologists, play in learning has been emphasized and the interest in edutainment in teachers, students and parents is growing. In addition, with the development of information and communication technology in the 21st century, the development scale of educational contents, which is based on the computer, is to be gradually increased and the paradigm of education is changing at the same time [1].

The edutainment storytelling technique is a method that can be first introduced when considering factors in edutainment learning. When one applies a story, the listener gains interest and transmission of information becomes easier. To enable learners to take information and knowledge with interest, the story should be created through closely coupled connection of new information and personal information of inmates' context, socio-cultural context, and experiential context [2]. The advantage of the storytelling method is that learning achievement is very high. In the edutainment storytelling, it is important to transmit the knowledge with a narrative approach based on the interaction in connection with learner's experiences. So, edutainment storytelling plays a role of a key element that makes an edutainment by connecting education with entertainment.

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We will develop an edutainment content utilizing the techniques of storytelling for learning the principle of operation of the computer. Unlike the existing contents that provide learning contents with one-dimensional technique, we will provide learning contents that are customized to each of learners through dynamic formative evaluation system. Thus, it is possible to reach mastery learning through enhancing interest and achievement with increased interaction.

II. Background

A. Edutainment

Edutainment is a compound word that consists of 'education' and 'entertainment'. It focuses on educational game to draw an interest and immersion. The purpose of edutainment is to draw the attention of the learners by providing a game format like animation. McKenzie defines 'technotainment' that stands for technology and entertainment that relies largely on technology [3].

B. Storytelling

Storytelling is a means for sharing and interpreting experiences. Stories are universal in that they can bridge cultural, linguistic, and age-related divides. Storytelling can be adaptive for all ages leaving out notion of age segregation [4]. Storytelling can be used as a method to teach ethics, values, and cultural norms and differences [5]. Learning is most effective when it takes place in social environments that provide authentic social cues about how knowledge is to be applied. Stories provide a tool to transfer knowledge in a social context [6].

C. Mastery Learning

There is a school of thought that presumes all children can learn if they are provided with the appropriate learning conditions. Learning for mastery or mastery learning, are terms coined by Benjamin Bloom in 1968 and 1971 respectively. Bloom hypothesized that a classroom with a mastery learning focus as opposed to the traditional form of instruction would reduce the achievement gaps between varying groups of students [7]. In mastery learning, Bloom found out that the students could lead to master each learning unit before proceeding to a more advanced learning task, compared with a conventional instruction.

III. Methods

A. Storyboard

In order to organize and visualize specifically the scenario of learning contents, we made a story board as shown in Table I. This indicates a scenario, animations, graphics, sounds, and programs of learning content.

TABLE I
STORY BOARD

Scenario
Long time ago, wise king of Tando called ENIAC lived. He made a ripper with the 8 scholars in order to protect the Tando kingdom. However, there was a group of people tried to use the ripper for evil purposes. 8 Scholars and ENIAC king hid the Ripper to protect. Then, after displaying on the map the position of the ripper, was divided into nine parts. Later, story of the Ripper became a legend. One day, evil king called the Creeper in the virus kingdom caused the war to dominate the Tando kingdom. UNIVAC who is king of Tando made an expedition to find the Ripper to protect the ballistic kingdom on the basis of the legend.
Animations
▪ Thumb through the pages of a book ▪ When island appear ▪ Displays the current section ▪ Movement of the ship ▪ Show learning contents ▪ When learner obtains items ▪ Increase or Decrease of points
Graphics
▪ Background Images ▪ Navigation Map ▪ Ship ▪ Item(Parrot, Telescope, Compass) ▪ Person who tells learner learning content ▪ Points
Sounds
▪ Background music ▪ Thumb through the pages of a book ▪ Movement of the ship ▪ Leaning start & end ▪ When learner obtains items
Programs
▪ Flash ▪ Photoshop ▪ Blender

B. Learning Flow Chart

We made a flow chart as shown in Fig. 1 to explain the relationship by dividing the order of process. After each section is complete, learners must solve the 5 questions in that section. Then, check if you are in section 8 or not. If you are not in section, move on to the next step. If current section is 8, confirm the points obtained from the evaluation. If you scored more than 90 points, that means the learner had reached the learning completely and content would be terminated. However, if the score is lower than 90 points, learners will repeat learning.

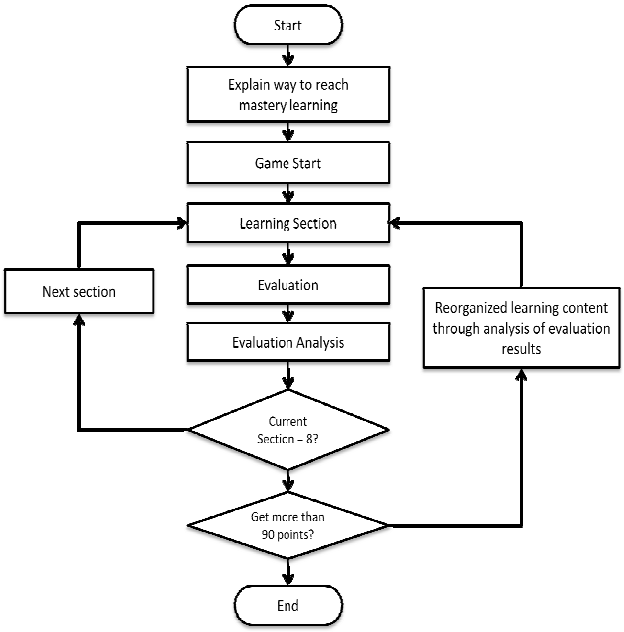

Fig. 1 Learning flow chart

IV. Prototype

This paper describes the prototype of edutainment content.

A. Contents in Each Field

Table II shows the learning contents of each component for computer operation principles applying a storytelling approach. The learning proceeds from step 1 through step 8 in sequence at the first learning stage.

TABLE II
SECTION TITLE AND CONTENT

	Title	Content
1	Meeting with genius mathematician Babbage	Hardware and software
2	Meeting with geek scientist Douglas	Input and output device
3	Guardian of the Turing Island	Control unit
4	Monster of Pascal Island	Operational unit
5	Remains of Williams	Main memory
6	Ruins of the dragon and Ramac Island	Secondary storage
7	Temple of wisdom in the Thru Island	Communication device
8	Fairy village in the Von Neumann Island	Computer operating principle

B. Screen Description

Fig. 2 shows the loading screenshot, and screenshot of START appears at the end of the loading screen as shown in Fig. 3. On the start screen, press the start button and it will switch to the next screen.

Fig. 2 Starting screenshot

Fig. 3 Loading screenshot

In Fig. 4, the content of the screen is the beginning of background story. Skip button to skip this section. At the end of the screen, Fig. 5 appears and shows how to reach the level of mastery learning. From this screen, press the start button at the bottom and it will be enabling you to study the contents about computer operating principles.

Fig. 4 Storytelling screenshot

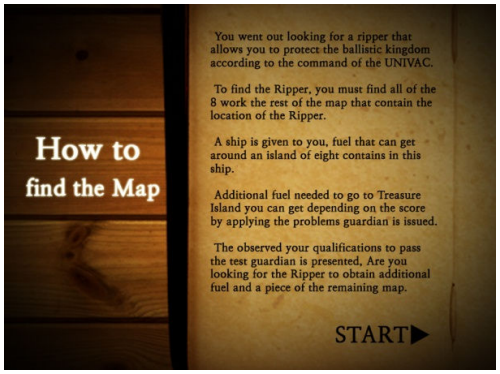

Fig. 5 How to reach mastery learning

The lesson section appears like islands as shown in Fig. 6. It is to be learning along the line you see on the island. When a light comes up on the island in the appropriate section, click the island! Once you click, learning content will be displayed, as shown in Fig. 7. Evaluation is also done at this stage. There are multiple choice questions in each section.

Fig. 6 Learning section

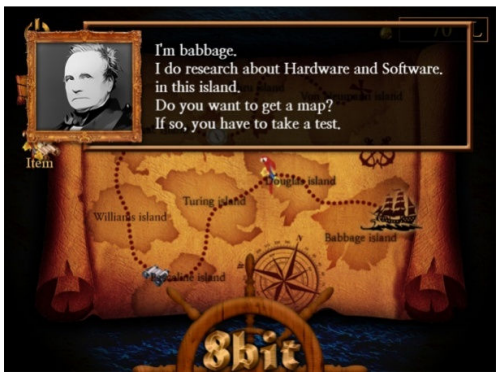

Fig. 7 Learning content

Once learning is finished, make a re-learning according to the score as shown in Fig. 8. In this screen, islands of sections that need to be re-learned will be lightened up. The learner is able to re-learn by clicking on the island of that section to solve the questions one more time. Learning content is different from

the screen in Fig. 7. Contents of problems will be showing the questions that the learner got wrong.

Fig. 8 Reorganized learning content

V. Conclusion

We designed an edutainment content in the form of adventure game that uses the method of storytelling. This paper explains the prototype of the content. Method of storytelling is used to improve the transmission of information and learner's interest. Also, reorganized learning content through analysis of evaluation results is provided for effective iterative learning. We expect that learners will be made to reach mastery learning while playing this content. Furthermore, we expect that this content help students learn computer operation principles easier and more enjoyably and it will be used as a supplementary learning tool.

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