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Developing A Template-based Edutainment System

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Abstract: As information society has been realized, educational methods using information technology such as edutainment have been developed. Furthermore, many new games, which can not be categorized into past game scope, have been exploited rapidly. However, it is not easy for teachers or instructors to develop their own educational games without having profound background in the field of information technology such as programming ability. In this paper, a template-based game development system for learning, which enables instructors to develop games as they want, will be proposed. The game style learning system has the advantage in increasing the learner's interest and continuing the learning. However, by noting the fact that if someone has completed certain learning game, he/she tends to lose the interest on the game and eventually the game becomes an useless one, a specific game learning system that can be reused and consider in depth on selecting games according to the levels of learners in the view point of learners and teachers, is designed and developed.

Key-Words: Educational game, Game style learning system, Template, Edutainment, Programming

1 Introduction

Caused by the development of information technology especially, by the increased internet diffusion rate, serious changes have been occurred in the whole society. The fact implies that present society has been changed to get information easily according to the client's ability. Moreover, information technology brings many changes in education field. Traditional education has been conducted in a specific place, appointed time and text or material base by teachers. With the reason, it is natural that the information and the contents for learners are very limited. However, even though the learners and teachers do not exist in the same area and same time, nowadays it is possible to conduct learning and teaching.

World Wide Web based learning systems make it possible to self-oriented and instant learning. By utilizing www, it is possible for people to share information anytime, anywhere and anybody. In addition, co-learning with certain students in foreign country is feasible.

A computer game is very popular in the present age. It is true that a computer game has not been generally used for educational purposes. However, a computer game which keeps the characteristics of educational playing or learning in playing can be an alternation for existing education methods.

In the section [1], the learning agent which is called PRIME CLIMB for helping learners on solving factorization is developed. By supplying various hints, it is possible to examine learners in depth and the learners can efficiently attain knowledge. However, by accomplishing the educational game, the game becomes useless. To keep studying, another game should be found and the time to understand the rule of the game is required. The time spending for preparing a new game is regarded too long and ineffective. Furthermore the learners get tired and loss precious time by doing it. By considering the fact, in this research, we design and develop the education game system to draw learners active participation and interest as corresponding with examiners intentions by transforming all the elements as well as questions shown on the game screen to instants.

2 Theoretical background

2.1 E-learning

The effective points of web based e-learning are;

First, a space limit does not exist in e-learning. If learners are in the circumstance of connecting internet, they do not have the difficulty in terms of space aspects. Compared with the fact that in the past, learners and teachers should be in the same space, learners and teachers can minimize the effort of

moving and they can reduce the costs for learning remarkably by using e-learning system.

Second, asynchronous learning is possible. If learners can be connected to server to study by web or on-line based learning program, they can keep learning by exchanging ideas even though the teachers are not in the same time period.

Third, huge information can be provided. The e-learning is occurred in the condition of using internet connected computer. It means the limitless information in the internet will be used directly for the learning. Therefore, the fact that vast information is easily provided to learners according to their intentions is one of the good points of e-learning.

Fourth, individual learning is probable. The gap in the speed of learning of learners can be overcome by the system. For the reason that the learning is not occurring at the same place and same time, the system can adjust proceeding speed in keeping with the ability of learners.

Finally, a learner does not need to be a member of a specific organization. With the fact that e-learning has good points of not having the limit of time and space, e-learning also has nice aspect of taking place in the cyber space. Therefore, all learners even though they are not members of specific organizations can have the chances to study. Composing learners' groups by common studying subjects, learners can feel the strong membership and the intention of participation can be maximized[2].

2.2 Educational games

As the advent of information society, new learning ways have been suggested and many people have put their efforts to increase learners' level of accomplishment. By the diffusion of computer and web, web is recognized as an alternative method in education. Especially, an on-line game has the virtue of drawing intention and motive of learners. Furthermore, it can be a method to figure out the using pattern of learners continuously.

The characteristics of educational games are;

First, educational games can be used to increase the intimacy with computer especially for low grade students. Second, a principle should be suggested clearly based on the educational purpose to attain the goals. Third, an educational game should induce the sense of rivalry among learners. Fourth, an educational game should include somewhat difficulties which are worth to challenge. Finally, an enough compensation for the achievement of goals should be provided to generate the utmost satisfaction[3].

In accomplishing learning, a learning motive and a learning time have close relation. Therefore, many learning methods have been developed to generate motive to learners and multimedia learning data and web are requested for keeping learning long by scholars. The learning methods in the forms of game or quiz have been developed in new on-line style by acquiring many internet users.

If a game is applied for education, learners will have the tendency of not realizing the time going in study. To utilize this peculiarity, interesting aspects in game should be investigated. To change boring and tedious learning to effective one, the learning strategy involved in the game should be closely researched and the results should be applied to the learning game.

2.3 Collaborative learning

Co-learning is defined as the learning strategy to acquire the groups' advantages by possessing common goals in the cooperative relations with individual responsibility. Furthermore it is a learning strategy of using teams with small number of participants to maximize the learning results of oneself and members[4].

On the web based class, since the learning motive, perception and analysis which are the fundamental reasons in research activities can not be estimated exactly, there are limits to present perfectly adaptive learning circumstance for learners. As an alternative to overcome the limitation, the web based learning class to apply the co-learning and to increase the interaction among learners is suggested[5].

In this research, the system which is combined with template based game learning is designed and developed to support the co-learning effectively. One of the co-learning patterns is TGT model. This model is prepared to complement the weak points of co-learning such as free-rider effects or sucker effects. This system consolidates the compensation by asking similar learning ability level learners to solve the provided questions and get points. By providing more impartial opportunity, all the students can have equal chances to success. Since this system adapts game in learning, students would have more interest and would participate in class more actively. By applying this concept on the web, the template based game learning system to make students pleasant, to generate more communication among students and to increase the

completion level of learning will be designed and developed.

3 Related work

Even though it is urgent to provide a production tool of easy to use and of rapid in producing game style courseware for teachers, developing and spreading of integrated producing tool are still insignificant[6,7].

In [8], the learners can input the questions by themselves with the added Chinese character subject. The system of generating new questions by using the input questions as basic data has been developed.

In [9], the method to introduce game elements for developing vocabulary learning courseware system to provoke active participation and to increase the interest of learners has been researched. Furthermore, on the ground of the mentioned system, a crossword puzzle game based vocabulary learning courseware producing tool has been designed and developed.

4 System design and structure

4.1 Basic direction of design

Figure 1 is the full system structure map.

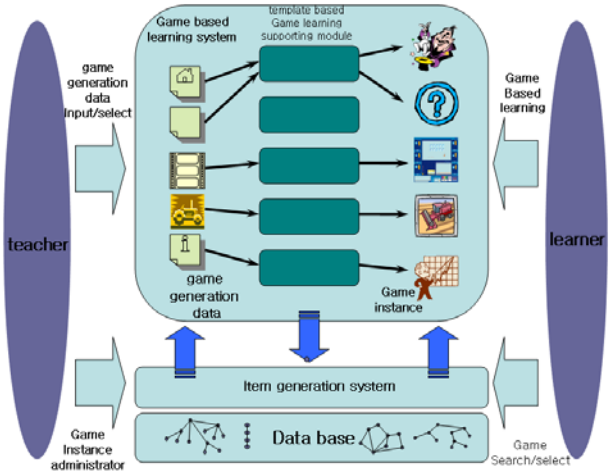

Fig. 1 The System Structure of Game based Learning

There have been studied for long periods thoughtfully to create more educationally effective teaching and learning methods. In this part, a template applied game for education is designed and developed.

Teachers can perform game style learning in the class to provide interesting lecture. However, most of the games are impossible to reuse after completing learning and it is very difficult to offer more suitable game to learners. Moreover if the learners once finish certain games, they remember the answers or lose interest when they solve the questions in the game in repeat.

In this research, a simple template based learning game for teachers, which is easy to produce games in accordance with specific situations of learners without learning multimedia programs or effects, is suggested.

To comprise a game, many elements are participated, for example, the time to solve questions, the contents of learning, single or multiple style game, provided hint or not, the points for solving questions, character or background for game and the possibility to change them. By paying profound attentions to the elements mentioned above, it is possible to find instances to control the game.

The most significant characteristics of this system is organizing game template by web basis regarding these instances as variables by teachers. In Figure 2, instances included in the association quiz template, which is one of the manufactured games by us, are displayed.

Fig. 2 Game Instance

4.2 The flow of game

Figure 3 is the flow chart of a game called association game. A user can log in through web site and connect to a waiting room. A user can join already existing room or generate new game room and take the role of chief and also select specific characters as well as buy items before playing game.

When a user enters a waiting room and the room is full with appointed members, he/she should press Ready button. If somebody does not press ready button in 15 seconds, it can annoy other players. For

that reason, a chief has the right to force the person out in the game.

As game starts, the vocabularies which can be clues to find the answers pop up on the screen. Those vocabularies are spread from easy to difficult levels. If somebody can not solve the question in the limited time period, he/she can use the item for time extension.

After using up the limited time, the answers of players are opened to the players in the same room and the players get proper scores according to the proximity of the right answers. As far as here is the flow of association quiz game and it is possible to repeat as much as players want. Figure 4 is the screen structure of an association quiz game.

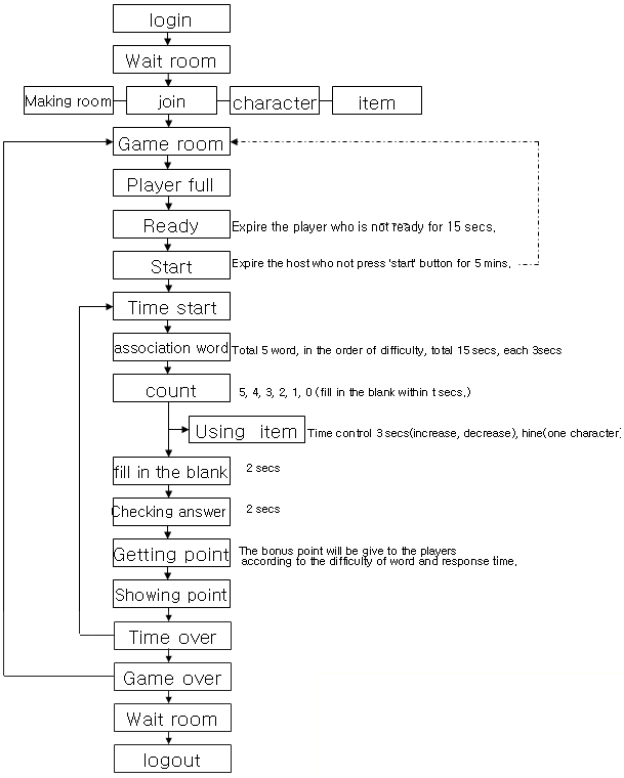

Fig. 3 Association Quiz Game Flowchart

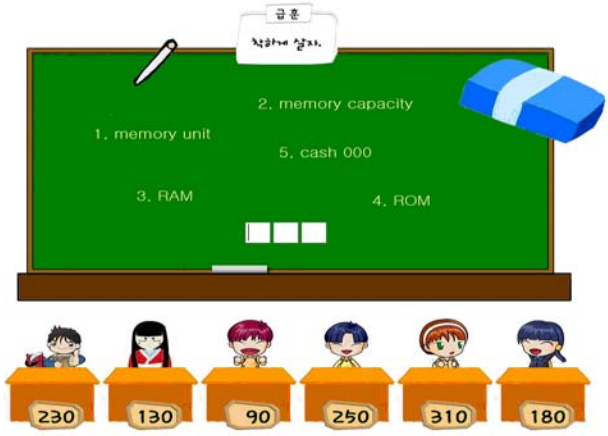

Fig. 4 Association Quiz Game Screen

4.3 Template based game design and development

4.3.1 Template managing system

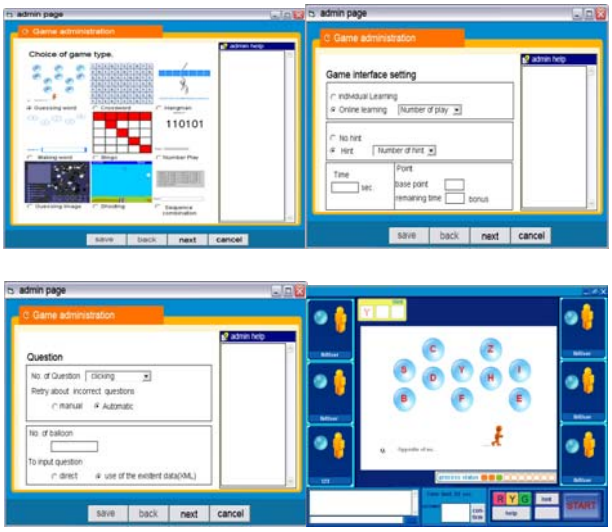

Fig. 5 Template based Game

Figure 5 shows template managing screen for generating game.

In the first page of managing program, players can choose a specific game style to control template or instances.

In this situation, Guessing World game is selected. Game interface is set up. Players set the game conditions such as single or multiple game, the number of players, existence of hints and the number of hints, time limitation, the achieved point after solving questions, and the bonus points for the

remained time for those who solve questions faster than provided time period.

In the Guessing Word game screen, ten balloons have one alphabet respectively. By combining some of alphabets in the balloons, the answers of the game can be found. In the management mode, the number of balloons can be controlled and the alphabet written in the balloons also can be inputted. Therefore, the difficulty of the game can be easily controlled.

4.3.2 Designing database

The required tables for this system are divided mainly into a question bank table for setting questions, a template table for managing each template, and a game table for real game.

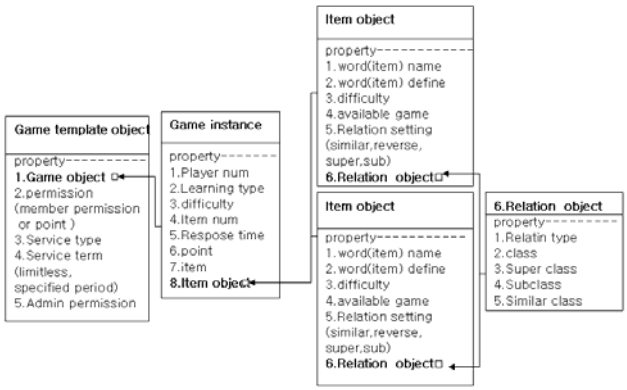

Fig. 6 Connecting Structure of Game Template Database

The table of question bank shows the list of possible questions of supply. The questions are arranged in accordance with category. Furthermore, different question saving fields are composed by inputted date and answers. A template table consists of instances comprising template. A game table is a proper combination of template and question bank and it is created actively in the situation of adding game.

4.3.3 Designing character and item

A character can be set up before entering game room after logged in. Players can choose one from various characters and regarding the situation of overlapped with other players, an individually selected knick name can be used. These are displayed on the screen during playing game. 4 items can be purchased in maximum. In the middle of playing game, the characters can be selected by clicking mouse on the screen or by pressing the key from F1 to F4. Items can be used to expand or decrease playing time and to see hints. Many various items will be created and added on this system.

4.4 Designing individual and co-learning

After logging in and studying contents, learners can play game. In this part, the mode is separated into individual learning mode and co-learning mode. An individual learning mode is a structure of studying alone for self-evaluation. Co-learning is the learning system to generate competitions among teams and to increase the sense of responsibility. The learners who select co-learning mode should organize a team and the system automatically assists to formulate a team according to the level of students to make similar education level teams. However, the learners can join the game by organizing a team actively by themselves.

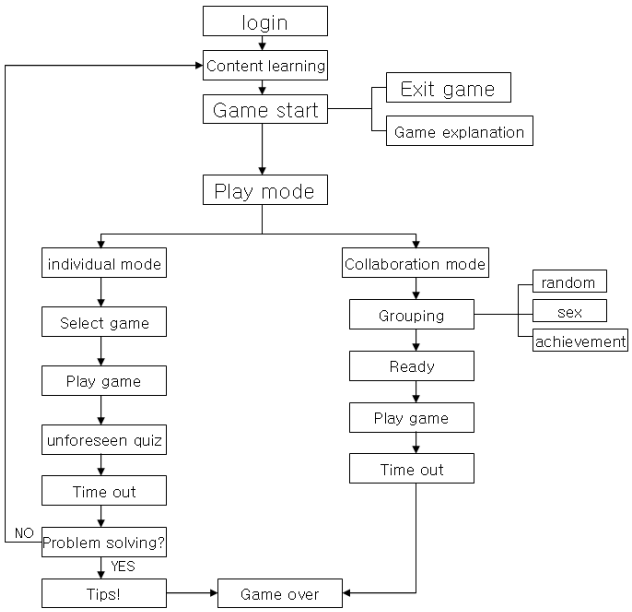

Fig. 7. Individual Learning Mode and Collaboration Learning Mode

We have developed diverse games and Cross Word Puzzle is one of them. A Cross Word game is a very famous and widely used learning game. In the co-learning mode, a cross word puzzle will be explained simply. Figure 8 shows the instance of cross word puzzle.

Not only the words made by the players but also the words that connected with the words originated by the players should produce perfect words (vocabularies). Alphabet is written in each tiles and the small number in the box means the point for completing words. The team of completing the gray part of the co-learning game can confine the teams in the white box region to the specific area. In that case, the team in the white area can not organize words beyond the gray area which is accomplished by opponents.

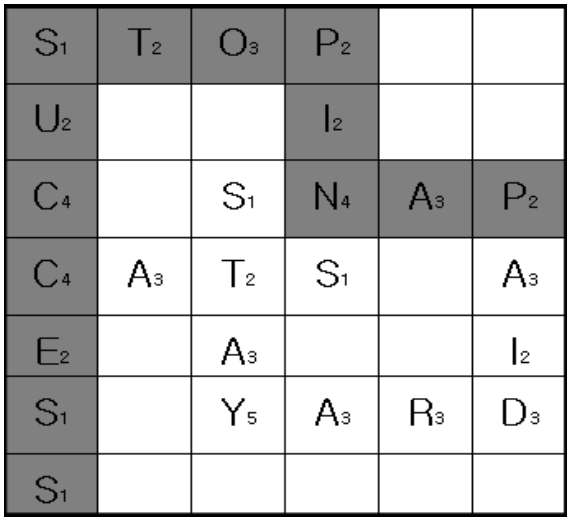

Fig. 8. Crossword Puzzle

In the picture, if someone inputs STAY, then he/she can get the point for the SNAP at the same time. However it is actually impossible in this game for the players in the white area because the word SNAP is included in gray parts. Furthermore, a solid (three dimensional) puzzle is possible. If the word SMILE is fit for the position of the word STAY, it can be a solid game. By utilizing these various instances, interests, responsibility and the competitive sense in the co-learning will be amplified and the effectiveness of learning is expected to be increased dramatically.

5 Conclusion

The present age is an e-learning period. By focusing on the fact that developing learning program which is satisfying the requirement of today is urgent, a system is researched and these positive effects are anticipated; Firstly, learners can study in interesting and funny circumstances through playing style e-learning game. Secondly, the system is based on generating game in template style. Therefore, the examiner, who does not have the basic knowledge about games, can provide easy and various games without profound efforts. More efforts will be spent in developing diverse templates and by applying the system, efficient learning atmosphere for learners will be created. Moreover, leading to the sense of rivalry and the sense of cooperation, the productivity on learning will be enlarged.

Acknowledgements

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