

# Improving Time Management for Students Through the Use of an Educational Game

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## ABSTRACT

*The poor time-management skills of Hong Kong students have raised many problems in learning. For example, university students need efficient and effective ways of planning their work schedules to meet deadlines. To address this issue, we are developing an educational game to help students better understand the importance of efficient time management. Through the use of this software, they will be able to develop proficient methods of time management. Essential parameters in time management are embodied as different entities and attributes in the game. The effectiveness and usefulness of our game will be assessed by a set of surveys. Surveys will be carried out before and after using the software. Improvements to the student's time-management skills will be observed and the results will be analyzed for future reference.*

## Keywords

Time management, game, education, deadlines, student

## INTRODUCTION

Despite their importance to all tasks and decisions with deadlines, time-management skills are largely ignored by most students. In order to provide interesting and effective time-management teaching materials to students, the Center for Enhanced Learning and Teaching (CELT) has cooperated with the Computer Science Department to improve time management for students through the use of an educational game. The implementation process includes researching the methodology and flexibility of this game. During the first phase, we analyzed the features necessary in an educational game to suit our purposes. During the second phase, we defined the methods to be used in the computer game to assist in the teaching and learning of time management. And then in the implementation phase, a demo version of the game will be implemented. Lastly, the implications and effectiveness of this project will be studied and evaluated by a set of surveys.

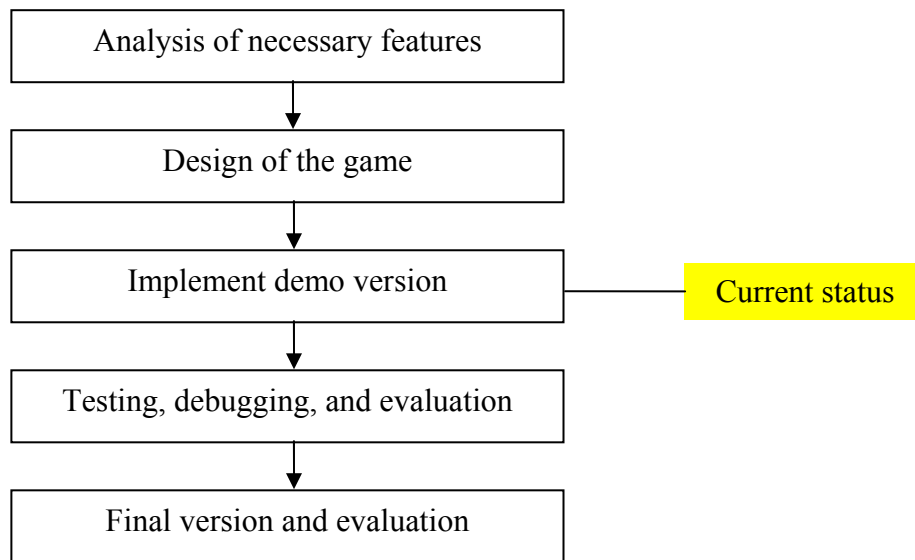


Diagram 1. Project milestones

## DESIGN OF THE GAME

A computer game is a kind of interactive software providing a wealth of virtual content using multimedia techniques. There are many varieties of computer game including text-based adventure games and other interactive fiction. An educational game is a game designed to teach people about a certain subject or to help them to learn a skill while they play. Our educational computer game for this project is a computer game teaching time-management concepts.

In implementing the game for this project, some criteria and features required definition. The game must:

- Have content that is measurable so that the students and teachers can judge the learning performance.
- Be configurable, as students have different computer settings.
- Set tasks which are easy to understand, as the goal of the game is training time-management skills only and other features may be considered a distraction.
- Have user-friendly functions for basic operations, such as installation and save functions.

### Story Design

Many types of story are not suitable for the project; they may be too violent or not related to the student's daily life. The story in the education game for this project has to meet the following criteria:

- It is related to daily student life, especially those parts of life involving time management.
- The story needs to be interesting and understandable to most players.

In line to these two criteria, we have chosen a typical undergraduate student to be the main character. The player can play with simulated events from their daily student life. In addition, the virtual campus and scenes should be interesting for undergraduate students.

### **Progress Indicators**

Management can be improved from reviewing previous performance. The indicators in this computer game must be easy to read and understand, as well as be aimed at identifying how well students can manage their time. We have defined four main attributes in the game: health, concentration, relationship, and knowledge. They are indicated in the GUI. The computer game thus records and displays many attributes relating to how well a player has done in these environments. Students can retrieve their previous performance as they apply their skills in certain environments.

### **Difficulty Levels and Game Ending**

Difficulty levels are a special kind of performance indicator. A student who has finished certain tasks can proceed to higher difficulty levels. A new level contains more challenging tasks for the student. This method is adopted in many computer games and is a very good way of indicating a student's performance. In addition, when the student finishes the game, an ending will be chosen according to the student's achievement in the game. The difficulty level and the ending encourage the student to do better in the game, and this in fact encourages the students to improve their time management skills.

At the time of writing, we are implementing the basic difficulty level. We will add more difficulty levels based on the basic design.

## **TECHNIQUES AND METHODOLOGY**

We have chosen appropriate techniques and methods and applied them in a way that maximizes the effectiveness of teaching as described below.

### **Game Engine and Development Software**

The game engine is crucial for the development speed, performance, and display of content. There is a variety of game engines on the market. Different engines are designed for different types of game. We have selected software called RealityFactory for the following reasons:

- It is free.
- It can import models and scenes from many famous and outstanding games, e.g., half-life.
- A lot of software is compatible with it, e.g., the MilkShape modeling program.
- It can be installed in MS Windows, as is used by most students.
- It is easy to configure.

The development of the game needs other software, which includes a character modeling program, a terrain generation program, and a texture creation program. For the character modeling, MilkShape is used as the price is low and it is powerful. For the terrain generation, we used RealityFactory's built-in tools; while for building the outdoor environment, Nem's Mega Terrain Generation is used. For texture creation, GIMP is used as it is a powerful open source drawing tool and GMax is used for building generation; LithUnwrap is used for texture mapping as it is flexible and easy to use.

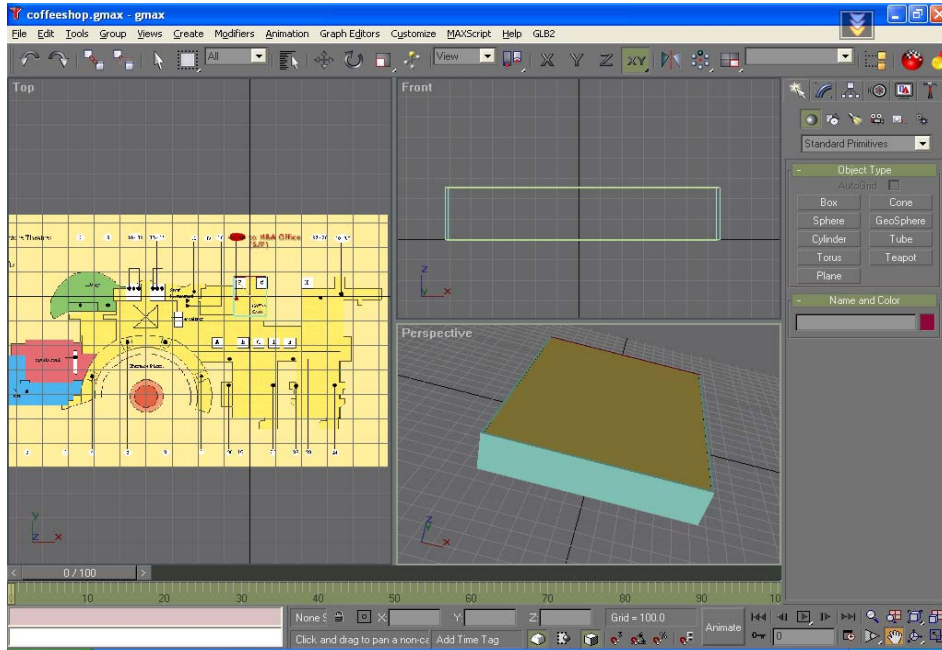


Figure 1. Using GMax with the help of the HKUST map to draw the coffee shop



Figure 2. The coffee shop in the game

## Teaching Materials in the Game

Typical ways of distributing teaching materials include notes, speech, and PowerPoint presentations. Educational computer games are very different from those typical forms of teaching. A computer game is able to convert this information and knowledge into an accepted game format. For example, rules and theories may be converted into a conversation among professors and students within the game itself; knowledge may be learnt from partners in the game; and a professor's speech may be changed to television programs in the game.



Figure 3. 'Reading a book' in the game

## Examination and Application of Time Management

The indicators and difficulty-level changes stated above are an implicit indication of a student's time-management performance. To allow students to understand more and be clear about their tasks and learning points, other forms of teaching materials will be given. One consists of an examination. The game will provide questions before the difficulty level changes. The questions will be based on the information acquired from the game or other knowledge about time management. Another consists of problem-solving tasks within a time limit. Players need to achieve certain goals within a limited time range in order to continue the game. This situation imitates real life problems with deadlines. It helps the students apply time management in real life.



Figure 4. A sand glass in the game which shows the time spent in the students' activities

## **STATUS**

Our work is in progress and is scheduled to be finished in November 2004. The following sections describe the status of the project in more detail.

### **Current Status**

The following are features we have implemented:

- Designed and tested the essential functions and software
- Implemented some scenes for the demonstration
- Drawn the basic GUI
- Imported a few characters for the game
- Programmed simple interactions among characters and the player

### **Future Development**

The final version needs more improvement and elements:

- I. More characters and scenes
- II. More contents and teaching materials
- III. More interactive activities among the player and models in the game are necessary
- IV. More difficulty levels
- V. A user manual

## **BENCHMARK**

An objective measurement of student improvement is necessary. These data can not only show the extent of a student's time-management skills, but are also useful for future study of the effects of an educational game. Therefore when the game is finished, the students' improvement will be assessed by a set of surveys. Surveys are carried out before and after using the game. The effectiveness and usefulness of the project will be evaluated from the results of the survey.

### **Benefits for Students and Teachers**

For students, the multimedia techniques convert teaching materials into an interesting

form. They can practice their time-management skills in virtual reality. Their performance is shown and stored in the game. The students also can adjust their learning pace as they can quit the game and continue at any time using the RealtifyFactor built-in save-and-load function.

For teachers, the teaching materials can be distributed through CDs or the Internet. Students can learn during the time outside class. The students individual level of achievement can be retrieved and reviewed easily. The game also provides a type of management practice and teaching materials to students in a way which is hard to achieve in classroom.

## **SUMMARY**

We have defined the necessary features and implemented the basic GUI and interactions for the game. We are developing a demonstration of using these functions for teaching time management. And we will acquire more information and techniques which are useful for students, teachers, and studies in related educational fields.

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