Abstract—Vocabulary is essential for English learning. However, usually, English vocabulary learning is implemented with rote learning so that most students think it is boring and they seem to lack motivation to practice memorizing vocabulary. Researchers have applied digital game-based learning for English vocabulary learning. This study applied the concept of Bingo game to develop an online multiple-user digital game-based learning system for English vocabulary. It is expected to enhance student’s motivation for learning and memorizing English vocabulary.

Keywords—Game-based Learning; English Vocabulary Learning; Bingo Game

I. INTRODUCTION

During the learning processes, it is critical to stimulate and maintain learners’ learning motivations to achieve the predefined learning objectives. Traditional learning approaches require well trained and experienced instructors to invoke learners’ motivation. However, in many contexts, learners do not actively engage in learning. Especially, to many students, learning English vocabulary is a boring task with rote learning and lacks motivation [1]. Games are able to trigger the learners’ intrinsic motivation and provide highly engaging and attractive learning environments. Primarily, it can engage in learning activities spontaneously through playing.

As a consequence, this study integrates learning activities and game play to design an online multiple-player Bingo game for English vocabulary. Learners compete synchronously on the internet. Taking the advantage of games’ characteristics, learners’ motivation can be effectively enhanced to improve their recognition of English vocabulary.

II. LITERATURE REVIEW

As the growth of globalization, promoting English communicative competence is getting important in non English speaking countries including Taiwan. The formal English education in Taiwan begins from elementary schools. However, as [3] mentioned learning another language is not an easy task at all. Vocabulary is central to foreign language learners. However, vocabulary acquisition is usually the most difficult part during the learning process for most English learners. Though spending much time to memorize vocabulary, EFL/ESL (English as a Foreign Language/English as a Second Language) students usually think vocabulary learning is difficult and boring. [4] summarized that the most severe obstacle in English vocabulary learning is the lack of well qualified instructors as well as insufficient instructional time. Nowadays, information technologies are getting popular and are integrated into educational contexts. Online learning not only enables students learn anytime and anywhere but also facilitates instructors.

Studies of how technologies are properly used to support language learning have raised many researchers and educators’ interest. The advantages of games to promote learning motivation have been found. Recently, computer technology has been integrated into game designs which stimulate the development of digital game-based learning.

Digital game-based learning integrates computer games and learning content so that makes learning processes more engaging and attractive to learners. It has a number of advantages for learning environments. Primarily, it can effectively motivate learners. Digital game-based learning works for the following reasons: (1) the added engagement that comes from putting the learning into a game context; (2) the interactive learning process employed; and (3) the way the two are integrated [5]. [6] surveyed related research and summarized that digital game-based learning can be beneficial to education in terms of learning effectiveness, cognitive ability development, learning motivation, and learning concentration. [5] mentioned that digital game-based learning can have significant effectiveness in learning boring materials including vocabulary learning. [7] summarized English vocabulary learning games into six categories and compared their characteristics as illustrated in Table 1.

<table>
<thead>
<tr>
<th>Game category</th>
<th>Advantage</th>
<th>Drawback</th>
<th>Interaction of system and user</th>
<th>Application in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-word puzzle</td>
<td>Increase the knowledge of word meaning according to hints</td>
<td>Easy to fall into puzzle by limited answer</td>
<td>No instant interaction with the system</td>
<td>A common way to test students’ word ability</td>
</tr>
<tr>
<td>Word search</td>
<td>Train the sensibility with the sight of word</td>
<td>Need to observe patiently</td>
<td>No instant interaction with the system</td>
<td>Less application in the classroom</td>
</tr>
<tr>
<td>Quiz</td>
<td>Test a range of words and evaluate scores easily</td>
<td>Less interesting like an exam</td>
<td>System reacts with answers instantly</td>
<td>As an exam to evaluate students</td>
</tr>
<tr>
<td>Hangman</td>
<td>Strengthen word structure by pondering over the memory</td>
<td>It may depend on luck, not measure the actual ability</td>
<td>System reacts after each guess instantly</td>
<td>Class can be divided into groups to compete</td>
</tr>
<tr>
<td>Match</td>
<td>Remember word content and position in the memory to strengthen word ability</td>
<td>Focus on memory more than meaning of word</td>
<td>System reacts instantly each time player turn over cards</td>
<td>Class can divide into groups to compete</td>
</tr>
<tr>
<td>Word jumble</td>
<td>Strengthen the word memory by arranging</td>
<td>According to the order of letters, less fun</td>
<td>No instant interaction with the system</td>
<td>Train ability of word spelling</td>
</tr>
</tbody>
</table>

Of the games listed in Table 1, there are no games that designed for multiple players with synchronous interactions. The concept of Bingo games can be complementary of such gap. Bingo is a popular and easy synchronous game without limitation of number of players. Research has been applied Bingo games in educational contexts with proved learning effectiveness. [8] Designed a Bingo game to facilitate learning.
mathematical skills of fraction. [9] Revised the match of numbers to match of calculation results. Most current designs of educational Bingo games are related to Mathematics. Not many are applied to English vocabulary learning. Therefore, this study designs a Bingo game for English vocabulary learning. It aims at enhancing students’ English vocabulary competence by decreasing their feeling of boring in English vocabulary learning to achieve the learning objectives.

III. GAME DESIGN

A. System Development Tools

This system was designed with Visual C# of Microsoft Visual Studio 2008 and AJAX. The database was Microsoft SQL Server 2008. It can be implemented with general web browsers.

B. System Framework

The system framework is illustrated as Figure 1.

![System Framework Diagram]

For the first-time user, he/she needs to input his/her data to build the learning portfolio. After login the system, the user can view his/her data and introduction of the game. The user can also access his/her learning portfolio which includes the vocabulary with explanations that have been shown in his/her previous gaming experiences and the winning/losing records.

C. Game Rules

The English vocabulary Bingo game is implemented as the following:

1) As the player logins the system, he/she enters the game lobby (Figure 2). The game lobby includes numbers of game rooms each with different game settings. The called game rooms, the information of games rooms, and the number of current signed-in players are presented in the game lobby. The player can select a game room called by others to join or initiate a new game room to recruit other players to start a game.

2) As a player initiates a new game room, he/she can set different game parameters including the item type, scope of vocabulary, number of cells in the game board, number of vocabulary to be shown, vocabulary showing up interval, and the winning condition (Figure 3). There are three item types: English questions/ Chinese cells, Chinese questions/English cells, and mix of English questions/ cells and Chinese questions/cells. The scope of vocabulary is directly related to the vocabulary level. The higher the vocabulary level is, the more vocabulary are included and the more difficult the vocabulary are. The number of cells in the game board is defined by selecting from a pull-down menu which ranges from 3x3 square (9 cells) to 8x8 square (64 cells). Each cell corresponds to one different word randomly selected within the vocabulary scope. These words can be either English or Chinese word subject to the selected item type. The number of vocabulary to be shown is determined by the multiplication of the number of cells and can influence the complexity of the game. In this game, one or two times of the cell number can be selected from a pull-down menu. For instance, if the 5x5 game board and the multiplication 2 are selected, the system randomly selects 5x5x2=50 words from the vocabulary scope to show. The higher multiplication is, the more difficult to connect a line in the game board. The vocabulary showing up interval has direct influence of the progress of the game. The player can select the interval ranged from 3 seconds to 30 seconds from a pull-down menu. The shorter the interval is, the less time the player can select the answer. Short interval is suitable for skilled students and long interval is suitable for novices. In this game, different winning conditions can be selected from a pull-down menu. The winning conditions can range from any player connects one line to any player connects 5 lines.

3) Once a game room is initiated with set parameters, players can enter the room and view the game parameters. Then he/she can select the “Join the game room” button to start the game (Figure 4).

4) As the game starts, the system randomly presents questions (vocabulary) according the set game parameters. Players have to select the corresponding words, which has the same meaning in the other language, shown in the cells in the game board within the specified time duration. Figures 5 and 6 illustrate the screenshots at the same time of two players in the same game room. They have the same question but different words in the cells.

5) If the player selects the right word, the color of this cell changes to green, otherwise the color changes to grey (Figure 7). The winning rule is to connect the green cells to a line. To avoid players answer the questions by guessing, each cell can only be selected once. The grey cells (incorrect selected words)
cannot be selected later. Therefore, the grey cells become the obstacle of connecting green cells.

6) The game is finished as one player reaches the winning conditions defined in the game room.

IV. CONCLUSION

Vocabulary is essential for English learning. However, usually, English vocabulary learning is implemented with rote learning so that most students think it is boring and they seem to lack motivation to practice memorizing vocabulary. Researchers have applied digital game-based learning for English vocabulary learning. This study applied the concept of Bingo game to develop an online multiple-user digital game-based learning system for English vocabulary. It is expected to enhance student’s motivation for learning and memorizing English vocabulary.
REFERENCES


