Ang, C. S., & Zaphiris, P. (2009). Developing Enjoyable Second Language Learning Software Tools: A Computer Game Paradigm. In Ferdig, R. (Ed.), Handbook of Research on Effective Electronic Gaming in Education. (pp. 1372-1389). doi:10.4018/978-1-59904-808-6.ch079

DEVELOPING ENJOYABLE SECOND LANGUAGE LEARNING SOFTWARE TOOLS: A COMPUTER GAME PARADIGM

ABSTRACT

This chapter attempts to examine computer game theories – ludology and narratology – that explain computer games as play activities and storytelling media. Founded on this theoretical explanation, a game model that incorporates gameplay and narratives is presented. From the model, two aspects of learning in game environment are identified: gameplay-oriented and narrative-oriented. It is believed that playing computer games involves at least one of these types of learning, thus this game's nature can be utilized in designing engaging educational software. In addition, based on Malone's theoretical framework on motivational heuristics, it is found out that there are two methods of applying computer games in language learning: extrinsic and intrinsic, depending on the integration of game designs and learning materials. Then, two cases of language learning games are scrutinized using the game model in order to demonstrate the use of computer games in language learning.

Keywords:

Case Study, Computer-Assisted Education, Computer Games, Educational Multimedia, Educational Technology, Electronic Learning, Exploratory Study, Interactive Technology, Interface, Language Learning, Ludology, Multimedia Application, Narratology, Technology Mediated Learning

INTRODUCTION

In one of his most influential texts about computer games, The Art of Computer Game Design, Chris Crawford (1982) states that schools, but not games, are the untested fad and the violator of tradition in education. Game playing is a vital educational function for any creature capable of learning. Hence games are the most ancient and time-honored vehicle for education. He explores the reasons of people playing games and asserts that the fundamental motivation of game playing is to learn. He also cites an example to support his view by observing the behavior of lion cubs near their mother: the cubs crouch in the grass, creeping slowly toward a butterfly and pouncing on the insect. The beasts are apparently playing some sorts of game and having fun. However, the game is also how lions learn hunting down their preys without being injured. They are learning by doing with minimum risks. This observation is true not only for animals. Since the dawn of human history, games had been used in the teaching and learning process. Board games for example are believed to be the earliest games and they are battle simulations designed to instruct the young (Murray, 1978).

The ability of computer games in sparking interests among the players can hardly be denied, and some educators start to see the capability of these highly engaging games. People play games voluntarily, without asking for external rewards. Besides, the use of computer games in learning is parallel with Piaget's constructivism in which knowledge is constructed, instead of being transmitted. A lot of game-based learning projects have been carried out with an emphasis on this pedagogical epistemology. Nevertheless, most of these projects are centered in science education and mathematics. Not much theoretical work has been done on language learning although

computer games have long been used in this area. It is due to the fact that computer games are too varied, too intricate, to indicate a clear function in language education. Furthermore, what counts as a game is rather loosely defined. Therefore, a proper study of computer game theories would throw light upon this issue. This chapter is structured as follows. Section two reviews the theoretical parts of computer games which include ludology and narratology. In section three, a theoretical model of game is proposed. Section four explains two kinds of learning that occur when playing computer games based on the model. Section five outlines two different methods of integrating game designs with language learning. Section six presents an analysis of two cases of language learning games. Section seven discusses the future direction of this study and section eight concludes the chapter.

THEORETICAL REVIEW ON GAMING

Although the use of computer games in learning is gaining the attention among educators, there is still a lack of theoretical understanding of the game itself in most studies. Recent literature reveals that the research of computer games falls into two major principles: ludology and narratology. Ludology focuses on the study of computer games as play and game activities, while narratology focuses on the study of computer games as stories. The views between ludologists and narratologists are generally contradictory, as the former argues that the pleasure of playing games lies in the gameplay, while the later treats narrative as the fundamental enjoyment players are experiencing during the play session. In computer games, gameplay is referred to as activities conducted within a framework of agreed rules that directly or indirectly contribute to achieving goals (Lindley, 2002). A narrative is an account of something that happens to someone (Barrett, 1997). It consists of a series of events from the

background setting to the completion of the game. In other words, gameplay is the actions taken by the players, while narratives are an account of these actions. In this section, several kinds of game rules are explicated to better comprehend gameplay. The narrative mechanisms of the game are also scrutinized.

Gameplay and Ludology

The term ludology first appeared in the text of computer game research in 1999. Gonzalo Frasca (1999) points out in his paper, Ludology Meets Narratology: Similitude and Differences Between (Video) Games and Narrative, that there is another dimension that has been usually almost ignored when studying computer games: to analyze them as games. He proposes the term ludology to refer to the discipline that studies game and play activities as opposed to narratives, and asserts that ludology should be independent from the medium that supports the activity. Frasca (2001) identifies two kinds of game; ludus and paidea. According to him, ludus refers to the games whose result defines a winner and a loser, while paidea refers to the games whose result does not (Frasca, 2001). Based on this difference, he introduces two types of game rules: paidea rules and ludus rules. Paidea rules are rules established in order to play the game as paidea, while ludus rules are rules established in order to win or lose the game. In chess for example, the paidea rules describe how each token moves, while the ludus rules state a condition to end the match. It is noticed that we can easily switch from paidea to ludus and vice versa. In SimCity (refer figure 1), a paidea game in which no explicit ludus rules are defined, the players can engage in paidea by playing with the buildings. Once they establish a goal: say to build a city with a population of 10,000, they immediately switch to a ludus activity. We can not only have several paidea rules, we can also have several

ludus rules. In chess, we can define the winner by counting the amount and value of each player's remaining tokens. Table 1 shows some examples of paidea and ludus rules in computer games.

Table 1: Paidea rules and ludus rules

	Paidea rules	Ludus rules
SimCity (Paidea game)	If the crime rate is high, the population becomes low	Nil
Tetris (Ludus game)	If the blocks fill a layer, the layer is cleared	To keep the level of block as low as possible

Figure 1: SimCity 4000 (courtesy Electronic Arts, 2003)

Besides rules, ludologists are also keen on understanding gameplay. Jesper Juul (2002) proposes two types of gameplay based on the relation between the rules of a game and the actual game sessions played. The first is the emergent gameplay, where a number of simple rules are combined to form an interesting variation of gameplay. In a game of emergence, the game structure is primitive and is defined by a set of simple paidea rules with usually only one ludus rule. Chess for instance is one of the games of emergence. It has a set of paidea rules that define how each piece moves and one

ludus rule which is to take the opponent's King. Driven towards this explicitly stated ludus rule, players might construct more ludus rules (such as to take the Knight) and plan for complicated strategies to achieve the goal. The second is the progressive gameplay where separate challenges are introduced serially for the player to solve. Most adventure games like Myst (refer figure 2) fall into this category. The players are introduced one after another, ludus rules to be achieved that lead to the attainment of the ultimate game goal.

Figure 2: Myst III (courtesy UbiSoft Entertainment, 2001)

Narratives and Narratology

For narratologists, the advent of computer signifies the birth of a new medium for storytelling. The capability of computers is not limited to performing calculations; computers are a new medium to represent human activities and to present narratives in an unprecedented way. In most modern computer games, the players can naturalize their actions as the solving of a familiar type of problems (Ryan, 1994). In Myst III, the player needs to track down the villain; in Super Mario Bros. 3 (refer figure 3), the player is trying to save Princess Toadstool; and in SimCity, the player plays the role of the mayor and plans for the city development.

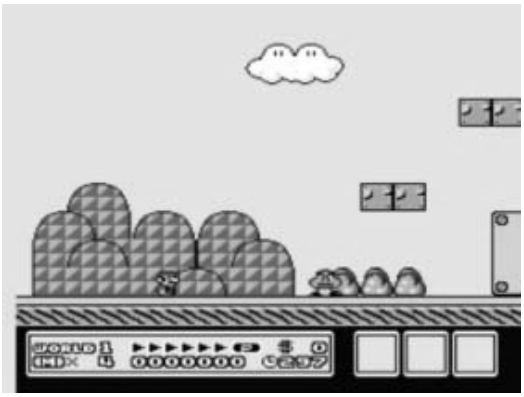


Figure 3: Super Mario Bros. 3 (courtesy Nintendo, 1988)

Marie Ryan (2001) tries to understand narratives in computer games and she proposes a definition of narrative based on mental images. According to her, a narrative is defined as a mental image, or cognitive construct, which can be activated by various types of signs. This image consists of a world (setting) populated by intelligent agents (characters). These agents participate in actions and happenings (events, plot), which cause global changes in the narrative world. Several useful terms are recognized in this definition: world, character and action, and we would like to know to what extent these exist in computer games. First, a game has a spatial representation whether it is real or abstract. Espen Aarseth (1998) has claimed in the article Allegories of Space, that computer games are essentially concerned with spatial representation and negotiation. Myst for example has a rich description of space represented with high quality pre-rendered 3D images. The player recognizes the space immediately after entering the game world, and knows what and how they should act because it resembles the real social setting. Pong, on the other hand, represents an abstract space, which might not have a referent in the real world. The players might construct their own mental image about the game, though most players would probably relate Pong with table tennis. The space in Pong is symbolic, while in Myst it is narrative. One thing in common is that these two worlds operate within a strict set of rules that define

the mechanism of the worlds. Second, most computer games feature explicit characters, which would interact with the world or the player. In Myst, the characters are descriptive and the players can interact with them as if they are real humans although the interaction is limited to several chosen aspects. In Pong, even though it does not have an explicit character, the player is apparently playing against an opponent or an intelligent agent. The character is not depicted graphically in the game world, but the existence cannot be overlooked. Third, all games involve active actions and reactions of the players. Games are usually discerned from linear narratives by the existence of interaction: the reciprocal actions between players and games. These actions include not only the action of the player, but also the autonomous actions of the characters in the game world.

A GAME MODEL OF GAMEPLAY AND NARRATIVES

In this section, we propose a game model of gameplay and narratives that attempts to unify the view of ludologists and narratologists, thus advocating the study of computer games that comprises both gameplay and narratives. From the ludological perspective, we know that game rules are significant in understanding the semantic and structure of the game. Though they constitute a very important part of computer games, rules are not always the only thing one needs to learn in order to play. Game playing is more than simply memorizing the game rules. Having learned the rules merely establishes the ability to play, and successful play does not necessarily require learning all the rules (Lindley, 2002). We need to understand something more complex that can arise from the rules: the gameplay. Examining the two types of rules and gameplay closely, it is found out that gameplay emerges from and must conform to the paidea rules that describe the semantic of the game. In addition, gameplay is

oriented towards the ludus rules that describe the structure of the game. This relation is described in the following figure:

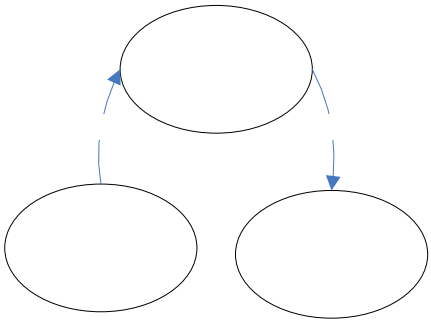


Figure 4: A game model of gameplay and rules

Usually, paidea rules are fixed and predefined by the game designer. The player cannot breach paidea rules and their planning of strategies should conform to these rules. If the paidea rules states that the game character can only move forward and backward, the player can never move it upward or downward. Ludus rules are more flexible compared to paidea rules. The player may change the ludus rules and involve in a different gameplay the game designer has intended, although the player might not be able to win the game. Gameplay emerges from paidea rules, but without ludus rules there is hardly any gameplay. Paidea rules can be simple, but ludus rules can lead to complex gameplay. If the players do not set the ludus rules while playing SimCity, the gameplay does not exist in the play session, because the players' actions are not oriented toward achieving a goal. In Super Mario Bros. 3, if the players are only playing around with the world without having the intention to solve the level, the gameplay does not exist although the ludus rules are explicitly defined by the game designer.

If we view from the prism of narratology, it appears that games and narratives are quite similar as computer games use narrative structures to organize their worlds. Nevertheless, games are not a mental image; they are a system that is defined by a set of concrete rules. Within this context, the players can act freely as long as their actions conform to the rules. The chain of these actions can then be recounted in narrative discourse. In brief, the difference between narratives in computer games and linear narratives is that a linear narrative presents the facts in an immutable sequence, while a game presents a branching tree of sequences and allows the players to create their own story by making choices at each branch point (Crawford, 1982). However, there are sequences of events in games that do not become or form stories (like in Tetris). Therefore, not all games are interactive narratives, rather some games can be interactive narratives and these games can be used as a medium for storytelling. In fact, Frasca (1999) has attempted to relate paidea and ludus with narrative elements:

"If ludus can be related to narrative plot, paidea can be related to the narrative settings. The ability to perform paidea activities is determined by the environment and the actions."

This statement is quite valuable in analyzing the relationship between rules and narratives in computer games. In order to perceive this subtle relationship, we would like to derive two narrative components from the narratological framework: spatiality, the space of the narrative and fabula, the actions and events that might happen in the space. By applying these to the previous model, we have a more descriptive one (refer figure 5). The game space usually consists of compound worlds (Gingold, 2003). In most games, players travel through many different locations and they enjoy the

exploration of these multiple worlds and the movement between the worlds. Compound worlds are collections of micro-worlds, which are governed by their own sets of paidea rules. These rules influence how the narrative world operates while the movement of each world is marked by the changes in description and organization. Music, environment, and most importantly rules change as the player moves between worlds. Ludus rules on the other hands are closely related to the narrative events in the narrative world. The player's actions are directly or indirectly affected by the ludus rules, which in turn are changed according to the players' actions.

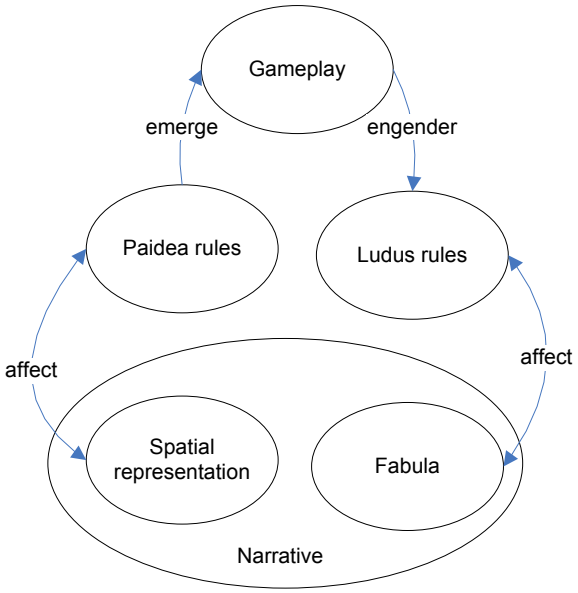


Figure 5: A game model of gameplay and narratives

The relationship between narratives and gameplay is dual-way. As narratives change, the rules become different. Evolving fabula can create new ludus rules, new sources of conflict, and even new forms of gameplay. In fact, the best evolving stories can effectively change the rules of the game, something that probably would not be tolerated by a player lacking a story-driven reason. Rules in games need not be static. Narratives provide an explanation and meaning of the change of rules so that the virtual world is more believable. To exemplify this relationship, let us presume that

Mario eats the mushroom and grows up in Super Mario Bros. 3. This event immediately triggers the creation of a ludus rule: to avoid being touched by monsters. Then it is very likely that in a certain point of the game, a monster will touch Mario and Mario will shrink. This event then again activates new ludus rules: to eat the mushroom.

THE GAME MODEL AND LEARNING IN COMPUTER GAMES

The game model that binds both gameplay and narratives reveals something about the learning activities when players are engaged in game playing. In most modern computer games, the successfully playing of a game involves at least two types of learning: gameplay and the narrative. In this section, we would look into these two aspects of learning in games and how we could utilize them in designing engaging learning software tools.

Gameplay-oriented Learning

This relationship between rules and gameplay has a significant implication on designing pleasurable activities, such as learning. In the article E-Learning as Computer Games: Designing Immersive and Experiential Learning, e-Learning software is interpreted as computer games, and several principles in designing interesting learning environments are outlined (Ang & Rao, 2004). If we look into the definition of paidea and ludus, it is not difficult to conclude that most conventional educational software is actually a loose type of game. It has paidea rules: click the menu buttons and scroll the text with the mouse button, etc. Ludus rules are usually stated as the learning objective: to understand the concept of metamorphosis. Although the definition of game is much more intricate than just having these rules,

this software could be seen as paidea or ludus games depending on the existence of an explicit goal. We are interested in investigating the reasons why it is not as engaging as commercial games with game rules.

The internal structure of a game can be characterized by its paidea rules, which can further be classified into two types: symbolic and semantic. Briefly, symbolic paidea rules explain the first layer of game interface: the input and output device interactions, while semantic paidea rules describe the narrative layer of interface. Obviously, the paidea rules of most learning software are symbolic, and do not impel the learners to search for semantic meaning. The enjoyment of users should not be limited to symbolic paidea rules that define how users interact with the computer devices. Learners should engage in gameplay by observing, hypothesizing, testing and updating the semantic paidea rules of the narrative environment. The pleasure of paidea should lie in the exploration of the virtual world and the discovery of paidea rules. Some learners find some educational software interesting at first they play with it. They might have fun interacting with the mouse or the keyboard. However, they soon will see through the entire mechanisms of the system: there is nothing else more to explore. Besides, understanding the paidea rules does not let them plan for strategies to achieve the goal. Unlike Super Mario Bros. 3 where players play and observe the causality of their actions and the behavior of the spatial system, most learning software does not contain such qualities. The major "gameplay" of this software revolves around the reading of texts since the paidea rules are oversimplified: click and read.

The game designer not only has to design the paidea rules that define how games work, but also defines the goal of the game (ludus rules). We can further derive two kinds of ludus rules: micro and macro. Micro ludus rules contribute indirectly to winning a game, while macro ludus rules contribute directly. Computer games usually have macro ludus rules, which define the ultimate goal; while most micro ludus rules are either predefined by the game designers or are created by the players during the play session. Oriented toward to macro ludus rules, the player devises individual micro ludus rules in order to achieve the goal. For a game-based learning system, explicitly stated micro ludus rules can be important to scaffold learning. Micro ludus rules also function as the guidance in the virtual world that steer players towards the learning objective. Learning objectives are presented as a part of the narrative context. Instead of "to understand genetic configuration of animals", we can intrigue the learners "to defeat the monsters by breaking the genetic codes". Besides, this matches the task-based learning, while each task is introduced as ludus rules.

Narrative-oriented Learning

Narrative interfaces have been used in the game industry since its infancy and have successfully enticed a large potion of computer users for decades. Unfortunately, most educational software fails to take advantage of this highly effective design. Spatial design is obviously lacking as most interfaces of conventional learning software adopt the metaphor of a book. The computer screen should not be a representation of a page of book, but a window to a new world. Learners look through the screen like through the window to a new spatial world of knowledge in which the images of real objects act coherently with virtual models (Morozov & Markov, 2000).

Like paidea rules, the interface of game is doubled in an interesting way. The first is the interface of the computer: the keyboard and the mouse. An additional interface is the narrative metaphor, which illuminates the narrative space in a new dynamic and interactive medium. The spatial design makes the first interface "disappeared". The learners are not interacting with the keyboard or the mouse, but the story presented from the computer screen (Jaron & Biocca, 1992). Another issues pertaining to the spatiality of the software is that most educational software structures learning contents linearly, offers textual explanations, and gives a particular spatial organization that does not reflect physical experiences. The learners should not regurgitate the context-free facts; rather they expect to utilize knowledge in a contextually rich situation.

Apart from these, educational software does not offer narrativity to its users. There is hardly any action except for the clicking of the menu buttons, which is hardly conceivable as stories. As Ryan (2001) has pointed out, the players do not want to "gather points by hitting moving targets with a cursor controlled by a joystick"; they want to fight terrorists or save the earth from invasion by evil creatures from outer space. It is the same for learning software, which is also a type of game. The learners do not want to click the button to flip through the pages about genetic; they want to defeat the monsters by analyzing and breaking their genetic codes.

LANGUAGE LEARNING AS EXTRINSIC AND INTRINSIC GAMES

We have elucidated two different types of learning that might arise when playing a game. But how these game designs could be applied in language learning software? Malone (1980) has propounded a motivational heuristic of educational games which comprises challenge, curiosity and fantasy. According to his interpretation of fantasy

in computer games, two kinds of game design for learning are distinguished: intrinsic and extrinsic games. Intrinsic games rely on the understanding of the subject matter from within the game world, while extrinsic games rely on those external to the game world. Extrinsic games usually consist of a structured series of puzzles or tasks embedded in a game or narrative structure with which they have only the slenderest connection. Intrinsic games build in challenges and activities more seamlessly integrated, more dependent on the narrative of the game. In brief, extrinsic games are used to attract the users to learn a language; while in intrinsic games, the computer game itself becomes the learning activity. Therefore, the game design could be applied in language learning with two methods: the learning of the material, as well as the learning of the game itself.

Extrinsic game learning

In extrinsic game design, the language learning is superimposed on the paidea rules of an existing game, resulting in new paidea rules. This may and may not engender new gameplay depending on the quality of the bond between paidea rules and the learning material: does the game world depend on the learning? In fact, this kind of game design is quite commonly used in language learning games. Kana Warrior for example is a combination of first person shooter and the learning of Japanese characters (Stubbs, 2003). In this game, the game world is dependent on the language skill. The player must improve in the language in order to make progress in the game. It is not uncommon that extrinsic games are regarded not as good as intrinsic games. They are just somewhat much to same as conventional e-Learning software; we are not learning the paidea rules or the narrative of the system but are learning something external, the textual description of the subject matter. This is rather similar to reading

books; we are not learning how the book operates, but the contents in the book. However, extrinsic game could be effective in making some boring aspects of language learning interesting, such as rote learning of Japanese characters. The key factors that game-based learning appears more interesting than typical e-Learning software are its paidea rules and narratives. It is made enjoyable by binding paidea and ludus rules of computer games and language learning with narratives, creating an imaginary learning space that is engaging and immersive. It is very much like inventing a new form of book in which every turning of the page yields a more interesting experience to the reader. The paidea is made fun, but it does not help the learning process.

Theoretically, almost every genre of games from the industry – racing games, board games, action games, etc – could be utilized for this purpose. Extrinsic game design can be used to develop language learning games for spelling, character recognition and vocabulary that require memorization and repetitive learning. Extrinsic design can be characterized as drill and practice, in which learning is context-free. Games-based learning has the potential for motivating drill and practice by offering an environment in which learners actually enjoy repetition. In order to fully utilize this design in learning, the following measures are suggested:

a) Investigate the type of game that target users enjoy: if learners does no delight in the particular genres of game, it will not be successful in motivating them

b) Allow the learners to switch off the game in the middle of playing: Although the game is used totally as an extrinsic motivation to attract learners, they might become interested in the subject matter and want to focus only on the learning content

c) Provide strong narratives to create drama effect: since the bond between paidea and the subject matter is rather weak, narratives are needed to reinforce the connection apart from creating drama effect

d) The students must be familiar with the game's paidea rules: If the learner is unfamiliar with the game, the paidea rules must be simple so that the learning of paidea rules does not interfere with the learning of the subject matter.

e) Ludus rules must lead to the learning objective: ludus rules should be stated distinctly and give guidance to the learner.

Narrative-oriented Intrinsic Game Learning

Unlike extrinsic games, for intrinsic game design, learning contents are seamlessly integrated into either narrative or gaming mechanisms. Hence, intrinsic games provide two ways of learning as derived from the game model previously: narrative-oriented and the gameplay-oriented. In narrative-oriented game design, the players need to understand the virtual world, the event, the character and most importantly the story in order to proceed in games. Like a book, the game mechanisms are trivial compared to the narrative mechanisms. The learning material is woven into the game as a story, and strictly speaking the learning process is almost the same as extrinsic games. Although the learning content is woven into a narrative context, the learning is explicit because the learners are shown the learning material in the form of text or graphics. Paidea rules merely define how learners should discover and read the material.

It differs from extrinsic game design in that it serves as a complete learning situation. This is most suitable to be characterized as computer-based tutorial, in which

information is designed to present in an effective and interesting way. Material is presented to the student in a narrative structure. This design is useful for learning the cultural aspects of a language by displaying pictorial or animated narratives of the social settings, while reading skills could be fostered by exposing learners to textual narratives. In short, in this game design, the learning content or environment is designed as narratives, while paidea is for navigation. In order to fully utilize this design in language learning, the following measures are suggested:

a) Investigate what fantasy theme the target user is interested in: narratives are crucial factors in this design. If the user does not like the fantasy theme the designer has chosen, it is likely that the design will be a failure

b) The learning material is designed in the narrative context: the learning content is not presented as detached items of words or characters, but is connected to form a narrative

c) The narrative should be able to stimulate the player to know what happen next: curiosity is incited through the twist of narrative plots

d) The goals are divided into several sub-goals to scaffold learning: generally the sub-goals are gradually presented to lead learners to the learning objective.

e) The control over the program is not as crucial as the control of the flow of the learning content

Gameplay-oriented Intrinsic Game Learning

In gameplay-oriented intrinsic game, players learn in a virtual world by interacting with the characters and events with languages. In this game design, paidea rules do not mean simply as interactivity that allows the player to discover predefined material. The learning material is embedded tactfully into the paidea rules of the game. This is

used as a game design that privileges, as it demands active experimentation, rather than observation, of its subject material. It is also a way to explore, to test models and hypotheses, and to construct and acquire new knowledge in a way traditional media never can. At the extreme end of intrinsic game for language learning, it would be a computerized conversation game. In fact, a project has been undertaken to develop a language training game in a fully 3D virtual world. The character in the game would be able to respond to what the learner speaks via Natural Language Processing Parser (Johnson et al., 2004).

While in extrinsic games, the learning material is read and understood, in intrinsic games, the learning is experienced. In this design, the game designers, rather than implementing the material for the player to experience, implement a system of parts that come together to form the material in the hands of the player. This design can be used for subjects that require logic thinking, where information is not fact-based but rule or process-based such as the grammar of a language. It can be attributed to simulation. This simulation is however different from scientific simulations. This design is narrative and context-based, rather than simulating a scenario such as the lab experiment which is not relevant to real life experiences. It provides an enticing problem-solving environment, which the students play an authentic role, exploring at will, creating their own ideas of its underlying structure and synthesizing strategies, which reflect their understanding of this structure. In order to fully utilize this design, the following measures are suggested:

a) The game should have explicit goals: unlike scientific simulations which have no goals, this design should provide clear and unambiguous goals

b) It should have a narrative theme: this is true for three types of design, as without narratives, the learner will be just manipulating words and alphabets

c) The games should be able to stimulate the player to know more about the mechanism of the system by giving clear feedback

d) The control over the program is very crucial: the interaction will determine how the learner observe and infer the rules of the system, which are also the subject matter

The table below is the summary of the game-based learning design:

Table 2: The summary of extrinsic and intrinsic game design

	Extrinsic	Intrinsic	
		Narrative-oriented	Gameplay-oriented
Paidea rules	Paidea rules are loosely linked with learning contents	Paidea rules define the navigation of learning contents	Paidea rules define the construction of learning contents
Ludus rules	Fictional learning objectives	Fictional learning objectives	Fictional learning objectives
Narrative	Narrative has little or no connection with learning	Narrative provides a context and contents for learning	Narrative provides a context for learning
Learning	Explicit, Context-free	Explicit, Context-based	Tacit, Context-based

AN ANALYSIS OF GAME-BASED LANGUAGE LEARNING WITH THE GAME MODEL

In this section, a theoretical view of games in computer-based learning is elucidated based on the game model and the method of game-learning integration illustrated in the previous section. Two case studies are presented to demonstrate the implementation of "Slime Forest" in learning Japanese language, as well as how "Alien Language" is used for learning English, Spanish, French and German.

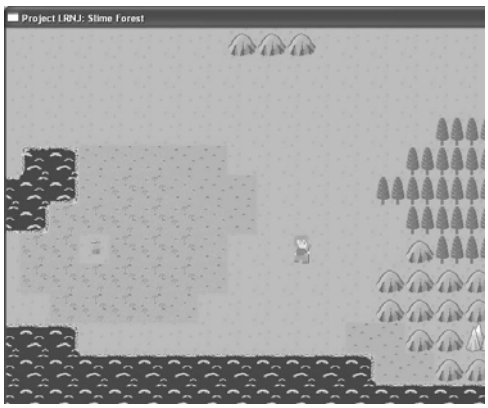
Case study: Slime Forest

Slime Forest is a game similar to a Role Player Game (RPG) created to teach three sets of kana (Japanese characters). This is a summary of Slime Forest:

"The game starts in a cave where the player is required to venture into the world outside to sell potatoes. The player will then be assigned one-by-one several sub-tasks and fight slime monsters in the forest to accomplish the tasks."

The game features two complete sets of hiragana and katakana, and 200 kanji, the Chinese characters. The aim of this game is to create a learning environment that provides a fun way of memorizing these characters which are usually learned in a classroom via rote learning. Apart from these, players are also expected to learn some words borrowed from non-Chinese foreign languages, which are written in katakana. The instruction of the game is in English; therefore this game aims at English speakers who wish to learn Japanese language.

Basically, there are two different types of activities: the world, and the battle in which the learning takes place. In the world map, the player plays a role of the game protagonist and explores different locations such as the cave and the castle. The player needs to gather information about various missions by talking to the people in the game. In the forest, the player will get involved into battles to fight slime monsters by typing the Romanized pronunciation of a particular kana that appears on top of the monster. If it is answered correctly, the player gains a chance to attack. Actually the ultimate goal of this project is to design a game for everyone, even for those who are not interested in learning Japanese.



(a) the world map

(b) dealing with one Japanese character

(c) dealing with a katakana word

Figure 6: Screenshots of Slime Forest (courtesy http://lrnj.com/sfa)

We would like to examine the game and the learning using the theoretical model of gameplay. Based on the definition of paidea and ludus, one can make learning Japanese a form of game by simply adding ludus rules, say "those who manage to write down ten kana's the fastest win the game". In slime forest, the users are more eager to learn the language because they have an interesting goal in mind: to kill the monsters so they can progress in the game. However, adding ludus rules to a boring activity merely reduce the boredom. This form of game is not fun enough to engage learners for hours. What would have happened if the rules of Who Wants to be a Millionaire were reduced down to answering the questions and wining a million dollars, without the "safe havens", "lifelines", and so on? Apparently, extra paidea rules are added to make the game really interesting.

It is noted that without the learning part, the game is a complete RPG game system (refer figure 7). The learning of Japanese characters is integrated, though in a loose manner, with the paidea rules of the battle system, resulting in a new way of gameplay, which is oriented toward the ludus rules of the RPG. Besides, the integration of the language learning and entertainment would not have been successful if not for narratives. The narrative in Slime Forest has at least two functions: to introduce fantasy learning goals (to fight monsters and save the princess) and to project the game as a complete virtual space with characters and events that retain the learner's interests. The narrative gives an explanation why players have to perform certain tasks. It is unlike certain educational software, in which the user is rewarded with a game playing session after completing learning tasks. By applying well-integrated narrative, the learning and the game are bound together. Narratives also increase the urgency that pushes learners to complete the learning tasks.

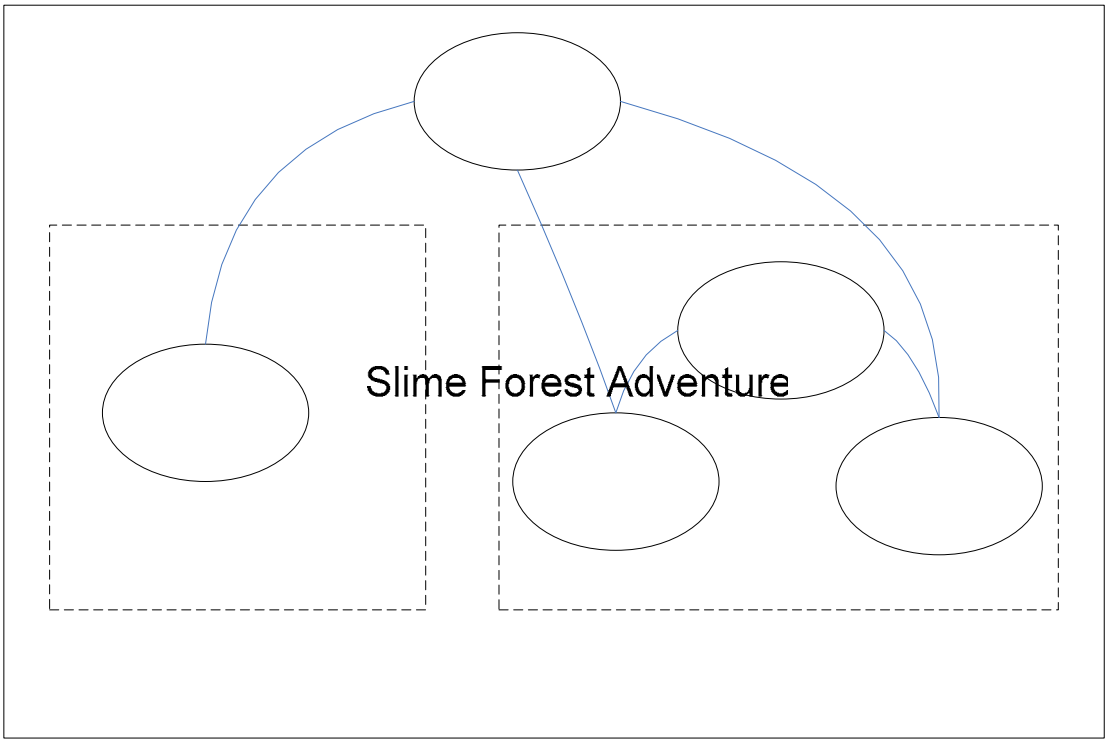


Figure 7: Theoretical view of Slime Forest

It is concluded that the RPG game used in Slime Forest serves only as an external motivation. The integration of game and learning is extrinsic. It by no means aids the users to understand the language. Some educators argue that games should not be used merely as means to motivate students to learn, and that play and learning must be mutually constitutive (Jenson, 2002). Indeed, learning should be made self-motivating so that the learners are willing to learn it voluntarily. However, we should realize that not all aspects of language learning are internally motivating. Some are boring and difficult and we need to help learners learn. In fact, if the learning was motivating, people may have learned them on their own and we probably need not put them in the curriculum (Games2train, 2003).

Case study: Alien language

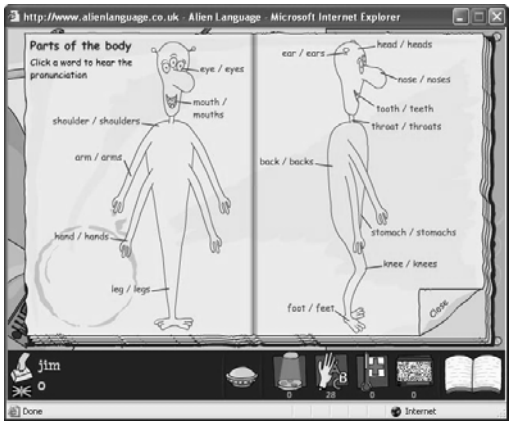
Alien Language is a game distributed over the Internet that is used to support the teaching of "Parts of the body" in four modern languages: English, French, Spanish and German. This is a brief summary of Alien Language:

"The aliens are on a mission to collect creatures from around the galaxy for the alien zoo. You need to help them transport the creatures, label the specimens and cure the sick aliens."

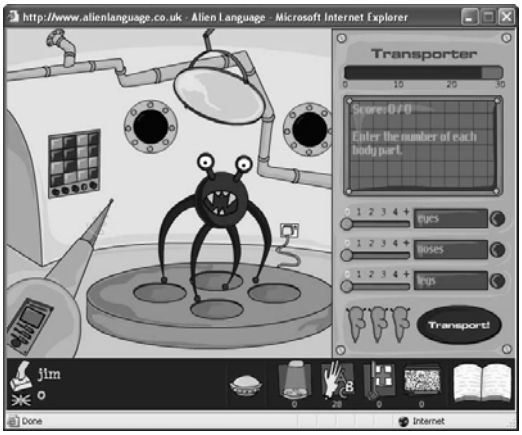
The motivation of this project is to create a supplementary material for foreign language education based on a particular topic. The key aspects of language learning – spelling, grammar and sentence constructions – are the focus of this project. The game can be used in many different combinations, for example, learning English for German speakers, learning Spanish for French speakers, etc. It assumes that the learners have known the basic vocabulary and sentences on the target language. However, if they need help, they can get a translation of the game instruction in their native language by pressing the control button.

Basically the learners have three major tasks. First, they need to record the number of each body part the alien has and transport it to the alien zoo. Second, they will label the specimen in the museum by typing the name of a body part. Third, they need to construct sentences from a set of given words to identify the medical condition of the alien. The game include a trivia game that resembles the popular "Who wants to be a

millionaire" that tests the understanding of the learners. It also contains a simple dictionary of the body parts.

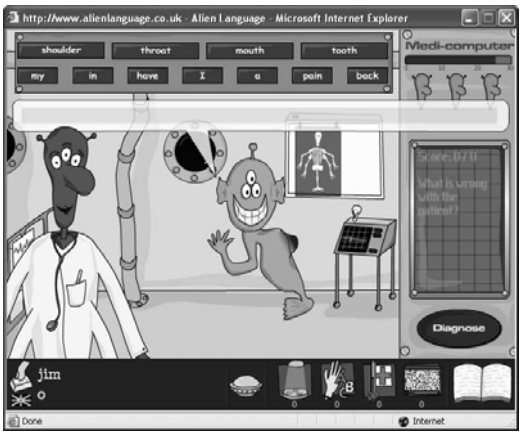


(a) the dictionary



(b) the transporter

(c) the body museum



(d) the hospital

Figure 8: Screenshots of Alien Language (courtesy http://www.alienlanguage.co.uk)

One of the best ways of learning a language is to use the language in our daily life. When interacting with people, we are actively receiving what people say, reflecting the meaning in our mind and construct sentences. Different ludus rules could be introduced to create different scenarios to the language learning environment, hence creating a game-like learning activity. If we examine Alien Language with the game model, we could see that the learning is designed to be part of the paidea rules. Taking

the hospital activity for example, it is actually a micro version of the real life conversation environment where the player constructs sentences from words although the sentence construction activity is far less complex than the real life conversation.

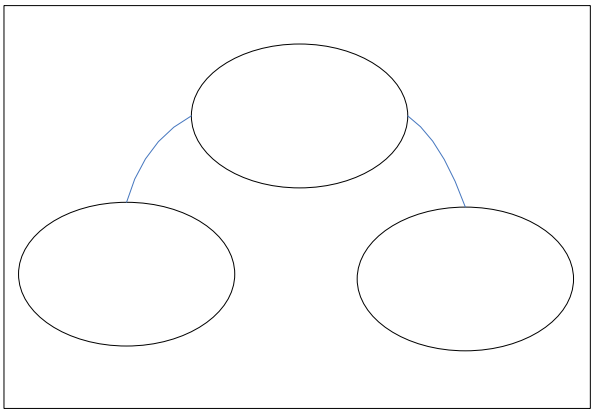


Figure 9: Theoretical view of Alien language

Figure 9 shows a similar gameplay model shown in the previous section. There is no external learning material imposed to this internal structure of game. The paidea rules of the game are in fact the grammar rules that the player needs to learn in order to proceed in the game. There are predefined ludus rules for each activity, to construct a meaningful sentence based on a given context, to construct the word and to count the number of each body part correctly. The use of narrative is also obvious in this case. The game projects a fantasy space with imaginative characters. This creates a more experiential learning environment as the learners are put in a role within the narrative space. The design is coupled with narrative so that the learners are not just manipulating the words and grammar rules, but are solving context-based problems and overcoming challenges.

Unlike Slime Forest, the learning happens in Alien language itself. The players learn to play the game, and at the same time, they learn the language. The learning happens

internally in the game, as the learning content is an integral part of the game structure. It is a gameplay-oriented intrinsic game design. Instead of learning something external to the game, the learner of Alien Language plays an authentic role and carries out interesting tasks.

Cross case analysis

Two cases are examined together in order to find out what elements differentiate them, and what they have in common. The observation is done from two perspectives: ludology and narratology to derive something about computer game designs for learning. First, it is noted that even the language learning part is removed from the game Slime Forest is still a complete RPG game on its own. The language learning is superimposed on the paidea rules and can be easily changed to something else, such as, answering mathematics questions. Therefore, paidea rules of the RPG are used to attract learners into the learning environment. For Alien Language however, this is quite different since the paidea rules are actually designed specifically for language learning. The learning contents cannot be swapped without significant modification of the fundamental structure of the game.

Second, both have clear and explicit ludus rules that bring about gameplay. The learning objectives are not stated explicitly as the learning of a language. Although both games use fantasy goals, such as defeating monsters and transporting aliens, the goals will eventually lead to language learning since without leaning the specific language, the goals can never be achieved. Third, both games make full use of the narrative metaphor in designing the user interface. The games are designed as a fantasy world with narrative events. They also feature explicit characters that interact

with learners to provide challenges: a fantasy narrative explanation of ludus rules. Some characters in Alien Language also give guidance to the learners regarding the language contents. Actions taken by the learner in the game are conceivable and can be recounted as narratives. The below table summarizes the case study:

Table 3: Summary of cross case analysis

	Slime Forest	**Alien Language**
Paidea rules	The learning material is loosely incorporated as part of the paidea rules of the RPG	The paidea rules are carefully designed based on the target languages
Ludus rules	Ludus rules are fantasy objectives, which are not related to the learning (killing monster has nothing to do with learning Japanese)	Ludus rules are fantasy objective, which are related to the learning (reporting illnesses is related to languages)
Narrative	Like paidea rules, the narrative serves no purpose in the learning. It merely makes the game appear more interesting.	The narrative presents a context in which learning takes place.

DISCUSSION AND FUTURE DIRECTION

By studying ludology and narratology, we are able to derive something on how these theories are useful in designing language learning software applications. It is maintained that computer game theories provide a better framework for designing language learning software tools, making the experience of learning more immersive

and engaging. Computer game-based language learning is expected to be better than its traditional counterpart from two perspectives: learning effectiveness and motivation. It is more effective in the sense that knowledge is constructed instead of being transmitted, especially for intrinsic game designs. It is also motivating, where it challenges the learners, intrigues their curiosity, and brings about fantasy. However, empirical study needs to be conducted to verify the advantages and these results should help guide designers of educational games to consider how to effectively balance the demands of motivation and learning. Moreover, implementing game-based learning in light of language education needs detailed studies on the nature of language learning which could be approached from linguistics, psycholinguistics as well as sociolinguistics. Each of these fields seems to pose an insightful view of language acquisition from different stands. We believe that the understanding of how a language is acquired and learned either by an infant or an adult might open up a new door for a more novel use of computer games in language learning.

SUMMARY

We have analyzed two educational games from the perspective of ludology and narratology that explain two important types of game design in language learning applications. In Slime Forest, computer games are used to attract the learner in order to learn a language aspect, while in the Alien Language, the computer game itself becomes the learning activity. By analyzing both cases with computer game theories, we are able to understand them more closely, thus derive a better principle of designing learning software based on computer games. Both extrinsic and intrinsic games are suitable for language learning designs although the later is more desirable

as it not only creates an engaging learning environment, but also an experiential one, in which learners experience the knowledge first hand, instead of being told.

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BIOBRAPHY

Chee Siang Ang is currently a PhD student in City University London. He is particularly interested in studying computer games not only as a tool for entertainment, but also a medium for other purposes such as learning a domain of knowledge, as well as conveying information and experiences. He has obtained his master's degree in Multimedia University, Malaysia by conducting research on educational technologies. His fields of interest include multimedia learning, computer games, interactive

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