Spudsville: Designing a Minecraft Game for learning teaching English as a Second Language

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Abstract The aim of this study is to design Spudsville, an immersive game environment in Minecraft that can effectively help learners acquire the English language. To create a successful learning experience using Minecraft, the researchers adopted the Agile Model and the Design Thinking approach. The researchers first conducted an analysis through an extensive literature review in order to assess the learners’ needs. Afterwards, they designed and developed a Minecraft world based on the data collected during the analysis phase. The researchers learned that implementing constructivist and behaviorist approaches has benefits, even though applying a cognitivist-learning model to Spudsville could have provided the researchers with more insight on how learner processes information. Making these adjustments could improve Spudsville’s effectiveness and could potentially help the ways in which gamified learning aids with language acquisition.

Key Words : Minecraft, English as a second language, Agile model, Simulation, Educational game development

요약 이 연구의 목적은 마인크래프트의 몰입형 게임 환경인 스퍼드빌을 디자인하여 학습자가 영어를 습득할 수 있도록 효과적으로 돕는 것이다. 마인크래프트를 사용하여 성공적인 학습 경험을 만들기 위해, 본 연구에서는 애자일 모델과 디자인 사고 접근법을 체계했다. 우선 학습자들의 요구를 분석하기 위해 광범위한 문헌 검토를 수행하였으며 이후의 분석 단계에서 수집된 자료를 바탕으로 마인크래프트 월드를 설계하고 개발하였다. 연구자들은 인지주의 학습 모델을 스퍼드빌에 적용하면 학습자가 정보를 처리하는 방법에 대한 더 많은 통찰력을 제공할 수 있고 한편으로 구성주의 및 행동주의 접근 방식을 구현하는 것이 또한 이점이 있다는 것을 알게 되었다. 마인크래프트 게임을 통하여 영어학습의 효과를 향상시킬 수 있으며 게임기반학습이 영어학습에 도움이 될 수 있는 잠재력을 확인할 수 있었다.

주제어 : 마인크래프트, 제2외국어로서의 영어, 애자일 모델, 시뮬레이션, 교육용 게임 개발

1. Introduction

The use of virtual worlds in foreign language education is becoming more and more prevalent. According to Berns, Gonzalez-Pardo, and Camacho (2011), virtual worlds provide a largely immersive environment due to its...
three-dimensional makeup [1]. These virtual environments can simulate actual situations. However, Berns et al. also highlight the limitations of virtual realities, particularly for absolute beginners as "they usually lack the very basic language skills necessary to interact with other speakers in the target language" (p. 34) [1]. Despite these limitations, implementing virtual worlds into second language education has shown many positive results, especially in regard to their motivation and communication skills [2]. In an experimental study conducted on first year Spanish students at Utrecht University in the Netherlands, researchers examined three different conditions, which were the video-web communication, virtual worlds group, and the control group [2]. They found that the experimental groups had more fruitful interactions as the participants were observed to be joyful and demonstrated empathetic and congenial behaviors. According to Johansmeier (2011), monotonous memorization of information can make the learner uninterested and ultimately, demotivate them from continuing to learn [3]. Therefore, educators must work with educational game designers to create virtual worlds that do not rely on repetition of materials, but rather encourage the learner to interact with their classmates in their target language.

Apart from encouraging cooperation among learners, they should also be provided with a number of activities. For example, Johansmeier (2011) states that:

“If the user encounters various translations that prompt him to check their exact meaning, he may find expressions or idioms which contain the word he looked up before...the sentence search enhances the understanding of grammar by using an inductive procedure” (p. 88-89) [3].

This can be achieved through incorporating web-quests within a virtual world, so that learners can attain a more meaningful experience from learning a particular vocabulary word. Głębicki and Młodzianowska (2011) conclude that web quests can provide structure for learners as they must complete a series of steps for a particular task or assignment [4]. In turn, this may enhance the learners’ experience as it could offer them a sense of achievement. Furthermore, it can create a learning environment that encourages creativity and analytical thinking, which could help them to retain new vocabulary and/or grammar structures. These types of activities can be utilized within a virtual world in order to provide a number of varied activities for the learners in order to avoid boring the learner. Artur Urbaniak (2009) affirms that “people who play computer games acquire foreign language very easily” (p.274) [5,6]. Szałasny and Grubka (2011) support his claim by highlighting reasons that people often prefer non-educational video games to educational ones [6]. For example, one is chosen for entertainment purposes rather than a need to learn. In addition, Calvo Ferrer (2017) found that participants who play computer games learned significantly more than those who used a booklet with the same information [7]. Therefore, video games that incorporate the use of immersive environments should be considered as an important tool to teach a foreign language.

The aim of this study is to design an immersive game environment that can effectively help learners to acquire the English language. Therefore, in order to create a successful learning experience, the researchers designed a course using the following methodologies: the Agile Model, and the Design Thinking approach. The researchers first conducted an analysis through an extensive
literature review to assess the learners’ needs. Afterwards, they designed and developed the Minecraft world based on the data collected from the analysis phase.

2. Background for Design and Development

One particular video game that has attracted many foreign language educators is Minecraft. Several studies have been conducted to determine Minecraft’s effectiveness in the classroom. In an interview with Spanish teacher, Glen Irvin (2017), Irvin who had utilized Minecraft for his classroom concluded that those who had used Minecraft had acquired twice the vocabulary than those who were taught in more traditional classrooms [8]. In another study, Dodgson (2015) utilized Minecraft to foster growth with students’ writing skills [9]. According to Egbert and Borysenko (2018), “Learners can set rules for their Minecraft towns, conduct experiments, create tasks for other users, develop and go on “treasure hunts”, explore geography and physics, build games and learn to code, and a lot more, learning about both language use and usage as they become deeply involved in these tasks” (p. 116) [10].

Utilizing Minecraft as an educational tool has been shown to be an effective tool, specifically in the foreign language education. ESL instructor James York developed a Minecraft world for his Japanese ESL students, where his students had to cooperate with their classmates in order to learn various aspects of English grammar [11]. Not only has it been used for commonly spoken languages, but it has also been used for less-commonly spoken ones. For example, in New Zealand, educators created a world, where students can learn the indigenous Maori language as part of their curriculum via a virtual world in the Minecraft Education Edition [12]. In the Maori world, students learn the long and short vowels, consonant sounds, and vocabulary words. The user must click on the various NPCs that provide opportunities for the user to learn the new Maori vocabulary, such as “pā,” or “aotearoa.” The game also includes audiovisual activities to teach the users how to pronounce certain vowel sounds. For example, learners play the “vowel” game where the user must jump onto the correct block, which corresponds to the correct vowel sound projected on the screen. The game also utilizes imagery and structures to teach the user about Maori culture. For example, when the user enters the “pā” or fortified village, they can find several NPCs who represent Maori cultural roles.

With respect to utilizing the Bloom’s digital taxonomy, players identify, recall, and relate new vocabulary learned from interacting with the NPCs and their virtual environment. Afterwards, they can then identify the obtained vocabulary, and thus, utilize the knowledge and analysis levels of Bloom’s digital taxonomy. There are of course different levels for the user to access. First, the user starts at the bottom by the river close to the location of the vowel and consonant activities. Later, the user makes their way to the fortified village where they can interact with the NPCs there. In terms of the key operations, the user interacts with the NPCs by right clicking on them. Similarly, in order to access the Hinemoa NPC, the user first right clicks on the NPC and then can jump onto the blocks that correspond to the correct grapheme based on the pronunciation heard by the user. If the user completes these activities correctly, they are rewarded with blocks with Maori ceremonial engravings.

In order to design a successful educational game, or lesson for that matter, learning objectives must follow a certain set of criteria [13,14]. Learning objectives should have
learner-directed goal orientation, or in other words, should be focused on the learner taking an active role in completing activities related to the learning objectives. Another Minecraft world that is very learner-oriented is the "Cambridge Adventures in English" Minecraft world, which teaches English as a second language. The CAE world provides an environment where the learner completes a variety of tasks independently. Learning objectives should also provide opportunities for interaction within the game, as the interactive experience allows for learning to occur. Within a language-learning context, this is especially important as language is acquired through interactions [15]. It also provides opportunities for the learners to interact within a safe environment in order to explore the linguistic challenges, which this game indeed delivers. Learning objectives should also give timely feedback. The CAE does not include this as the learner may place the blocks out of order, however, they would not be able to properly complete their scroll, which may cause frustration. As programming a game to mark incorrect responses may not be feasible, the game must be facilitated by a teacher who can give students feedback on their performance. Therefore, this game should not be given as a standalone activity for ESL learners, especially at the A1 level. Learning objectives should also include a relevant narrative and context that is connected to the learning activities. Educational games can empower learners as learners can create their own narratives and form their own identities within the game [16]. The CAE Minecraft achieves this by including the learning objective in the story as the NPCs instruct them to complete the tasks provided by the game. Furthermore, completing the scroll provides a puzzle for the learners to complete, which is connected to the educational games’ narrative. Lastly, learning objectives should motivate the learners to complete the activities. The CAE Minecraft world creates a variety of unique activities for the learners, which are both fun and engaging.

3. Design procedure

3.1 Needs analysis

In order to develop and design a thorough ESL course, the researchers conducted a needs analysis to assess the learners' needs. This is due the fact that the Spudsville course provides learning activities which are similar to those of an English language course. Therefore, the researchers felt it was important to appropriately assess what A1 English learners might need to learn. For the needs analysis phase, the researchers conducted a literature review, which was undertaken by reviewing articles, which focused on gamified language learning. Articles which were written before the year 1990 with the exception of Piaget’s (1951) work [17]. The primary purpose for conducting this analysis was to identify the needs of the learners, which in this case are the players [18]. Yeh and Tseng (2019) also emphasize the necessity for conducting a contextual analysis, so that the designers can properly identify the needs of the learners and then design a course according to their needs [18]. One particular world that interested the researchers was the CAE world, where students navigate the virtual world by interacting with the NPCs to complete quests, where users must mine blocks with letters on them and place them in order to form the desired word. Upon completing the activities, the user receives a prize, such as a golden helmet or other items. The words that are featured in the quest are adjectives, which
they are to complete a gap-fill activity. The gap-fill activity is provided as a quest, in which the user must fill in the missing words found on the scroll. At the bottom of the scroll, the user must complete a crossword puzzle to complete the final word: “adventure.” In the game, the user must scavenge for blocks and then place them in order to form the word. This lesson utilizes a combination of traditional and non-traditional methods to teach adjectives, comparative adjectives, while providing a safe environment for their learners to practice their spelling and communication skills. Jalalian (2018) suggests that educational video games “help students to learn English words, synonyms, [word order], and improve their comprehension skills” (p.63) [19]. The CAE Minecraft world uses a combination of fill-in-the-blank activities and spelling exercises and implements them into the game’s narrative. Similarly, Sahrir and Alias (2011) highlight the need for games in second language education, not only to improve their language skills, but also to improve their computer skills as well as help the learner understand the historical and cultural aspects of language [20]. Furthermore, including images can help learners connect the new word to its meaning, which can then facilitate their understanding and reinforce this knowledge with repetition and memorization [21].

Minecraft can help with reinforcing the learners’ memory of new vocabulary as it provides a virtual world for the learner to interact with. However, the CAE world failed to include cultural aspects of the English language. Many institutions and learning materials do not include aspects of Anglo-culture and portray English through a more-globalized context. Although it may help students understand a variety of different concepts, the learner should also be inducted in Anglo-speaking culture (i.e., British, Australian, American culture). Reviewing this Minecraft world helped the researchers analyze the successful aspects of the world when it comes to teaching English. Therefore, this analysis provides the necessary data that the researchers need for conducting the design phase.

3.2 Review of Software Development Methodologies

Several different methodologies were used for designing the Spudsaville Minecraft world. They are the agile model, the design thinking approach, and the “indie” game design model [22]. Since the game utilized a variety of different learning principles, the researchers and designers felt that integrating these models with the design thinking approach would be most appropriate.

3.2.1 Agile Model

In terms of the game’s development, the researchers implemented two frameworks: the agile model and the design thinking approach [23]. These two design methodologies were chosen due to the fact that the Spudsaville Minecraft world required the use of complex, algorithmic computation. Therefore, the scalability of this project called for a design which suited its collaborative nature. Marcelo and Davi (2017) developed a method that implements both the agile model and design thinking approach, which was also adapted for the Spusville world [23]. Their method followed the four fundamental principles of the Agile Manifesto [23-25]. However, the Spudsaville team decided to implement only four of the fundamental principles as the Spudsaville research team neither works for any shareholders nor employs any game developers. Therefore, the following principles that were
only used for the design phase:

Collaborative development: The Spudsville team, which was made up of three members, worked together to both design the game and conduct the literature review.

Lean Mentality: The Spudsville team utilized the “clone command” in order to clone blocks to reduce any unnecessary work.

Unexpected obstacles: The Spudsville team acknowledged that during the development phase obstacles in terms of calibrating the complex, computational functions.

3.2.2 Design Thinking Approach

The design thinking approach was also implemented in the development of the Spudsville world. The Spudsville team decided to implement the DT approach by including the following characteristics in their game’s design [23,26]:

Empathy: The designers should be able to empathize with the players in order to appropriately craft a fun game experience that motivates players to keep playing.

Integrative Thinking: Game design involves complex problem solving; therefore, it is important to look at all possible issues from an objective, omniscient point of view.

Optimism: The game design development process requires steadfast enthusiasm and optimism due to the fact that functional issues often occur in this process in order to effectively troubleshoot.

Experimentation: Game design also requires that the designers explore the possible ways that the game can be improved and also identify the software’s limitations.

Collaboration: This particular project required a team, which had members of varying multidisciplinary knowledge in order to build a robust, virtual environment that can provide dynamic ESL lessons.

The researchers also utilized the game concept model proposed by van Nierkerk (2017) for outlining the game’s overall structure [22]. Since language learning relies on contextual information, the researchers and designers chose to create a game that follows the puzzle adventure genre. According to van Nierkerk (2017), “an adventure game allows the learner to actively use the learned language while performing tasks within a context that simulates the real-world contexts with which such skills would be required” (p. 720) [22]. As the Spudsville game uses a gamified virtual world to teach the English language, it was most appropriate to develop an adventure game which can emulate opportunities for the player to practice these language skills. Therefore, this section will focus on explaining the game concept.

Introduction: The game “Spudsville” follows the adventures of the protagonist who has recently arrived in the small fictional town of “Spudsville,” where he/she has to interact with the town residents who, in turn, provide quests for the player. All of the NPCs can only communicate in English; therefore, the players must complete the quests in English. Each of the NPCs provides grammar and vocabulary lessons to the players.

Genre: Adventure, puzzle game

Game Elements: Essentially, the player interacts with the NPC to complete a variety of different activities that focus on specific language skills. Upon completing the activity, the player will receive a block based on their performance.

Content and Theme/Style: The theme for the Spudsville world is a small fictional town in Idaho, which emulates realistic scenarios in which a non-native English speaker might
encounter themselves in the US.

Game sequence: The game follows a sand-box environment where the player is free to roam the virtual world and complete quests by interacting with the NPCs. There is no structured sequence that the player is required to follow. However, there are three sequences of the game, which extract the player from the game and provide them with the opportunity to complete a variety of different microsimulations.

Player(s): As Minecraft allows multiple players to be connected to the server, it can be played in both single player and multiplayer mode.

Taxonomy/Design Direction: The game uses a fictional, narrative and game-oriented virtual world which emulates a realistic environment.

Immersive Model: Narrative

Worldview: First person player, 3-D graphics

Target audience: Young, intermediate learners of the English language.

3.3 Integration of Theory with Design Tool Selection

Yeh and Tseng (2019) identify the design phase’s purpose as the process of selecting instructional activities and what learning outcomes should be achieved upon completing the course [18]. The researchers decided to design activities, which transfer the user outside of the Minecraft, where the user can complete simulation activities with the Muzzy Lane authoring tool. Muzzy Lane’s SmartChat provides the learner with the opportunity to interact with a virtual character in their target language. However, there are some limitations with using it. For example, the software does not allow the developer to use ‘string’ codes. Other limitations were the ability to easily include alt-text on the videos that are displayed in the SmartChat activity. Furthermore, including a separate link for the learner will inevitably decrease usability as the learner is pushed out of the virtual world onto another webpage. This tool was chosen in order to simulate natural speech in a real conversation focusing on the present simple tense. By utilizing the SmartChat template, the user will be able to identify the correct conjugations for the verb "to be" as well as other verbs, while demonstrating how to use affirmations and negations. In fig. 1, a flowchart is used to demonstrate the learning process for the SmartChat activity.

![Fig. 1. SmartChat Activity Flowchart](image)

This simulation incorporates a Constructivist approach as the simulation utilizes a self-directed learning model. It utilizes this model as the player is responsible for their own learning. In order to motivate the learner, the simulation utilizes a story-based activity, which aims to keep the player entertained. For example, the simulation contains dialogue, which reflects the greater story of the virtual micro-world (i.e., Minecraft Spudsville game). According to Rieber (1996), fantasy "...is used to encourage learners to imagine that they are completing the activity in a context in which they are really not present" (p. 50) [27]. As the player interacts within Minecraft in order to complete their virtual quests, they are participating in a fantasy. Furthermore, the simulations help to advance the story as each
simulation provides the player with a specific task related to the greater story. Similarly, in reference to foreign language education, Muñoz-Luna (2014) states that learner’s meaning construction is not only based on “their social interaction but also upon their conceptual knowledge of the discipline they are studying” (p. 173) [28]. The Minecraft world and the simulations within it provide the player with a highly contextual environment. They can communicate with NPCs, which illustrate some common conversations that may occur in real life. Figure 2 shows a screenshot of the Muzzy Lane Align activity, where learners can play an audio file to access the pronunciation of the word. Furthermore, Berns, Gonzalez-Pardo, & Camacho (2011) suggest that virtual worlds can emulate realistic scenarios, which can be difficult to imitate in a classroom setting [1]. Therefore, designing a Minecraft world that features a variety of different simulation activities is ideal for foreign language learners.

The Align tool provides the learner with the opportunity to memorize key grammatical structures through utilizing the flashcard generator. This tool offers many affordances: for example, the designer can include pictures and/or audio within the flashcard. It also allows the learner to click on the “category” button to look at the correct verb conjugations. However, this tool has some limitations: for example, the designer is not given the option to add both text and images, and therefore, must choose one or the other. This tool was chosen for this activity due to the fact that flashcards can help learners remember difficult information. Furthermore, since there are several irregular past verbs in the English language, utilizing the Align tool seemed to be the most appropriate in terms of helping the learner memorize these simple past conjugations.

The Muzzy Lane Align activity not only implements a behaviorist approach as it utilizes a word-card strategy [29,30], but also a cognitivist one as well. In figure 3, the flowchart shows illustrates the learning process that learner undertakes when completing the Muzzy Lane Align activity. For example, Mayer (2009) proposed three assumptions when it comes to the cognitive theory of multimedia learning: dual channels, limited capacity, and active processing [31,32]. Dual channels refers to the audio-visual processing of new information; limited capacity refers to the limitations that humans have and limited mental space to store this new information; and active processing refers to the engagement of processing...
information cognitively, the selection of new information, the organization of this newly-acquired information, and the integration of this newly-acquired information with prior knowledge. Learning with flashcards utilizes a behaviorist model as the learner must receive an external stimulus and then react to it, and may either be given a reward or punishment, based on their reaction. However, learning with flashcards relies also on cognitivist models due to the fact that humans must process the external stimulus internally in order to effectively store and recall this information. Li & Tong (2018) found that learners who study with flashcards performed better on their post-tests [32]. Furthermore, they also found that those who utilized e-flashcards performed better than those who used paper flashcards. Similarly, Altiner’s study (2019) yielded similar results as the participants were able to learn new words using the Anki flashcard software [30]. As Muzzy Lane’s Align tool utilizes a flashcard generator, the designers felt that incorporating a flashcard activity would present new information and help to reinforce this newly acquired knowledge, especially in terms of helping learners recall the simple past conjugations.

The SmartScene template implements some similar features that the SmartChat activity utilizes. For example, the player can interact with the NPCs in order to simulate a conversation. However, the SmartScene template has more visual features that the SmartChat does not provide, which improve the gameplay and can simulate a realistic virtual environment. For example, the SmartScene template allows the designer to utilize seven different scene backdrops. In the case of this activity, the designer used a train station background as it was most similar to the Spudsville world. However, the SmartScene has some limitations, as the designer cannot customize the NPCs and cannot delete any of the provided characters. This tool was most appropriate for this activity due to the fact that interrogative phrases are mostly used in conversation. Therefore, the interactive nature of the SmartScene tool seemed most appropriate in order to reproduce a natural setting where the target language could plausibly be used. Figure 4 displays the flowchart that is used to demonstrate the learning process for the SmartScene Activity.

![Fig. 4. SmartScene Activity Flowchart](image)

This activity utilizes a behaviorist, constructivist, and cognitivist approach in terms of applying a theoretical framework to the instructional activity. Firstly, it utilizes the behaviorist theoretical framework in terms of the “rewards” and “punishment” aspect of the gameplay. For example, a player is rewarded with blocks if he or she completes the activity in the correct manner or is punished by not receiving blocks. Similarly, it also employs a constructivist framework as feedback on the learners’ performance can evaluate their in-game progress [27]. Furthermore, games can provide “an organization function based on cognitive, social and cultural factors all-related to play” (p. 51) [27]. This is especially relevant to learning a language as language relies on information that is both social and cultural, which is learned and recalled. Moreover, “Piaget
considered play as an assimilation strategy and imitation as an accommodation strategy” (p. 51) [17] [27]. As the SmartScene tool allows for the player to both assimilate new information through gamified learning and then imitate it by interacting with the NPCs, these strategies highlight the cognitivist nature of this activity. Educational games that apply a constructivist framework to their learning outcomes should have some of the following characteristics:

“anchor all learning activities to a larger task or problem: design an authentic task: design the task and the learning environment to reflect the complexity of the environment they should be able to function in at the end of learning: give the learner ownership of the process used to develop a solution: and provide opportunity for reflection both the content learned and the learned process” (p. 27) [33,34].

With respect to the General Store activity, the learner is given a task, which follows the game’s narrative and reflects a plausible scenario, where the learner might have to interact with a store clerk in order to buy an item. As the simulation is gamified in nature, the learner actively learns as a result of playing the game independently. Furthermore, they are given the opportunity to reflect on their newly obtained knowledge by receiving feedback on their performance. Therefore, in order to provide more dynamic activities, the researchers decided to use the Muzzy Lane authoring tool to create varied simulation activities for the learners to access and complete outside of the Minecraft world. Like Minecraft Education Edition, Muzzy Lane also provides the capability to design simulations without having to encode them with functions. As the researchers have minimal coding skills, attaching Muzzy Lane simulations into the Minecraft world would be most appropriate for this study. Figure 5 displays a screenshot of the Muzzy Lane SmartScene activity located in the Minecraft map.

![General Store](image)

**Fig. 5. Screenshot of General Store activity**

### 4. Development of the Spudsville map

The development phase consists of building and prototyping the learning activities, which in this case, focused on prototyping the Minecraft world. According to Yeh and Tseng (2019), the development phase is a procedure used to collect and organize the learning materials [18]. The development phase of Spudsville primarily focused on testing the computational function of the game in order to ensure they worked properly and to assess whether the activities accomplished their intended purpose. In Figure 6, the development stage is broken down into three steps: prototyping, debugging, and adding functionality.

![Development Stage Flowchart](image)

**Fig. 6. Development Stage Flowchart**
Minecraft Education Edition provides many affordances for its users. In particular, it allows users to create their own world. Therefore, it is an excellent tool for educators as they can design and create a world that suits the needs of their students. Similarly, it allows the designer who may have minimal coding skills to design worlds as the user can select and place NPCs from their inventory. Furthermore, the designer can embed links and commands into the NPCs in order to provide the learner with outside resources and/or in-game functions more easily. Therefore, it was ideal to design and develop activities that can be played within the Minecraft realm. After conducting research, the researchers were able to design and develop a course. In the case of Spudsville, the researchers first designed the world, and then developed both the in-game activities and the Muzzly Lane simulations to address any potential limitations.

The researchers include two learning activities that can be completed while in the Minecraft world. They are the “Alphabet game” and the Spelling Workshop.” In the Alphabet game activity, the designers developed in-game activities: one which focused on teaching the English alphabet and phonetic pronunciation of the letters; and the other focusing on spelling. For the first activity, the designers used command blocks to import sound files and display text. This text is displayed on a black screen, which is constructed out of black concrete blocks. Upon hearing the sound of the letter, the player must jump on to the block where the corresponding digraph is displayed. At the end of the activity, the player will receive a block based on their performance. Figure 7 displays a screenshot taken of the “Alphabet Game” activity. In Figure 8, a flowchart that demonstrates the learning process for the Alphabet Game activity can be found.

The designers chose to include an activity related to orthography and phonetics in order to aid learners in recognizing and identifying digraphs and their corresponding pronunciation in the English language. Rahman and Uddin (1998) designed and developed an alphabet learning system for Bengali children who are learning English as a second language [35]. They found this learning system made learning the alphabet more interesting and the repetition helped the children identify the letters of the alphabet more quickly. As many learners of the English language may struggle with the pronunciation of the letters, the designers felt that it would be advantageous to include an alphabet learning activity in the Spudsville world in order to help them identify and recognize difficult sounds. Furthermore,
Minecraft Educational Edition has screen readers which can also aid in speech recognition. Therefore, by including the alphabet-learning activity with a corresponding screen reader, learners are more likely to acquire the language more quickly.

For the other in-game activity that the designers included in the Minecraft world was the “Spelling Workshop” activity. As the CAE world incorporated activities which teach spelling, the designers felt that by including similar spelling activities could provide more adventure-like quests that can be completed within the world. However, the Spudsville “Spelling Workshop” differs in many ways from that of the CAE world. One such difference is that the CAE world’s main focus is on completing a variety of different spelling tasks, whereas the Spudsville world only includes one. Another difference is that the CAE world seems to focus more on a scavenger-hunt-like quest where the player must fill out a worksheet while arranging letter blocks in order. On the contrary, the Spudsville world provides a crossword puzzle worksheet, which is used as a guide for the player to complete so that they may arrange the blocks in the correct order. Furthermore, the Spudsville world awards players with diamonds instead of items.

As the researchers felt that a constructivist approach was ideal for the map, Spudsville is meant to be played as a free open-world, Minecraft world where players may access different parts of the world to complete learning activities. Figure 9 displays a screenshot of the Spudsville world from a bird’s eye view. The player may visit several different locations in Spudsville in order to complete the activities asynchronously and autonomously. However, the researchers learned that having too much autonomy without the proper guidance can create obstacles for the learner. For example, if the learner does not have the English level to understand the activities, then the learner will significantly struggle to complete them. Therefore, the Spudsville course should be integrated into the teacher’s curriculum, so that the teacher can provide instructions for the learners to understand what is expected of them.

5. Conclusion and Future Work

Research on gamification is still a new concept for many teachers, especially on games like Minecraft. The researchers learned that implementing constructivist and behaviorist approaches has some benefits. In addition, utilizing the Agile model can be an adequate model for designing and developing a game design procedure. However, when it comes to designing and developing an educational game, other models might also be considered. Future research might consider designing, developing, and implementing Minecraft maps into foreign language curriculum, but a test population is essential for understanding the implications of gamifying second language curriculum. Additionally, the teachers who are providing instruction should work closely with researchers in order to design and distribute gamified
curriculum effectively. Now that the researchers understand how the Spudsville map can be improved, they will implement these changes in future research.

Although the researchers had initially tried to test the game on ESL learners, it was difficult to acquire an adequate population for the study. Therefore, a proper evaluation could not be conducted on the game. Furthermore, the researchers also felt that the game could be either too difficult or too easy for learners. The researchers acknowledge that significant empirical data might be collected on a future study that utilizes an ESL Minecraft world. Additionally, the researchers might consider implementing the ADDIE model and the RETAIN model. The ADDIE model is typically used to evaluate course curriculum; however, due to the fact that the Spudsville world provides instructional materials like a course would, the ADDIE model might provide a more accurate assessment regarding Spudville’s effectiveness. Besides the ADDIE Model, the RETAIN model might also be an appropriate selection. One advantage of the RETAIN model is that it incorporates cognitive schemas and hierarchies into its model [36]. Applying a cognitivist-learning model to Spudsville could have provided the researchers with more insight on how the learner processes information. Making these adjustments could improve Spudville’s effectiveness and could potentially help the ways in which gamified learning aids with language acquisition.

REFERENCES


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