

# *Arena*: Designing an Adventure Video Game for Second Language Engagement and Acquisition

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## Abstract

In this poster abstract we describe an ongoing design science project: the implementation and study of a story-based language learning game called *Arena*. We adopt the view that games can be a powerful mechanism for motivating learning through informal mechanisms. However, our design process has revealed a number of deep challenges that we continue to contend with. In this poster we reflect particularly on the fatigue players feel when engaging with stories and play in an unfamiliar language, as well as the difficulty of connecting play interactions to language tasks.

**Keywords:** Games with a purpose; educational games; second language acquisition; user experience; design

**Doi:** 10.9776/16548

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**Acknowledgements:** Many thanks to Ithaca College students João Gama Vila Nova, Claire Riley, Jeff Rosen, Evan Sobkowicz, Kizito Umunakwe, Trevor Wheeler, Ian Weise, Joe Yull, and Noah Zheutlin for the time and effort as designers, developers, and researchers of the *Arena* system.

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## 1 Introduction

In this design science research project (e.g. Hevner, 2007; Hevner, March, Park, & Ram, 2004; Hevner & Zhang, 2011; Prestopnik, 2013) we are exploring second language (L2) engagement and acquisition in story-based games. Living abroad and direct immersion in another country's language are known to be beneficial for many kinds of learners (Polanyi, 1995). We are interested in studying this kind of experience using virtual, gameful environments.

Games have many possible advantages for L2 learners. For example, games can tie purposeful activities to powerful reward structures (Howard-Jones, Demetriou, Bogacz, Yoo, & Leonards, 2011; McGonigal, 2011; L. von Ahn, 2006; Luis von Ahn, 2013), ease social pressure on uncertain learners (Petersen, 2010), and engage learners through fantasy and narrative (Garris, Ahlers, & Driskell, 2002; Malone & Lepper, 1987; Prensky, 2005).

However, video games are not a true simulation of living abroad. L2 learning is often necessary for individuals living outside of their own country for any length of time, but games are played for their own sake (Schell, 2008). They can be set aside, temporarily or permanently, at any time. Games are highly controlled experiences, but interacting with a new language in situ is usually not. The controlled environment of a game may be beneficial, establishing structured learning opportunities driven by established theories of language learning such as Psycholinguistic second language acquisition (SLA) (Petersen, 2010). However, highly controlled game experiences, especially those that emphasize stories and fantasy-driven worlds (Malone & Lepper, 1987), present significant challenges, including the fatigue players may feel while engaging with complex stories in a second language and the difficulty of connecting language acquisition tasks (work) to other game mechanics (play).

This combination of opportunity and challenge drives our interest in exploring story-oriented games for language learning. In this poster abstract we discuss the design and development of *Arena*, a purpose-built 2D adventure game designed to teach Spanish listening and reading comprehension. We also discuss future directions for this work.

## 2 The World of Arena

*Arena* is a science fiction adventure game set on a planet colonized by Spain in the year 2336. In Spanish, the word "arena" means "sand," and the planet Arena is a desert world. Thematically, we use the English meaning of arena to emphasize the world's dangerous, competitive, arena-like environment.

In the current version of the game, *Arena* is controlled by two feuding crime families that compete for resources and power. Players assume the role of Brock Springer, a young man seeking his missing parents in the planet's dangerous environs. To progress, players must learn and utilize Spanish language skills to complete story driven quests and puzzles. Players are provided with several tools, notably the *Explorer*, to help with their overarching mission.

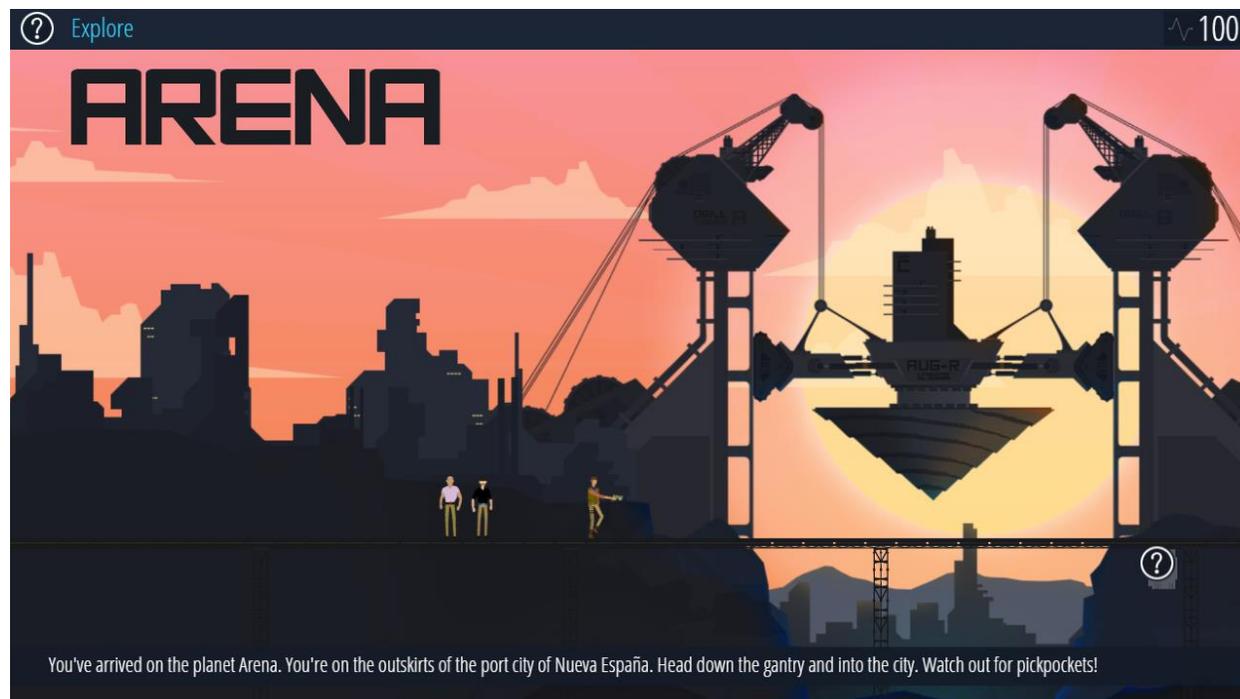


Figure 1. The *Arena* game world

### 3 Arena as Language Experience

#### 3.1 The *Explorer*

The *Explorer* is a device that affords Brock (and therefore, the player) translation features. The *Explorer* is designed to assist players with non-player character (NPC) conversations and click interactions with the environment. Currently, the *Explorer* is the primary tool by which players can meaningfully interact with written and spoken Spanish vocabulary as they follow *Arena*'s story and quests.

#### 3.2 The *Explorer* Translator

The *Explorer* gives the ability to translate Spanish words and phrases into English at any time. It is particularly useful during conversations, in which text and recorded audio are presented to the player. Use of text and audio helps players attend to the oral details of the spoken language and also connects text to pronunciation, which has been suggested to play an important role in L2 learning (Mitchell, Myles, & Marsden, 1998).

In early prototypes, translations were click-based, costing variable amounts of in-game currency. The cost mechanic was tied to a reward loop (Howard-Jones et al., 2011) that would incentivize saving and encourage players to avoid expensive translations, instead committing key vocabulary to memory.

Playtests suggested that a click-to-translate feature, while convenient and not very disruptive to play, 1) encouraged passivity from learners, and 2) made language feel disconnected from other parts of the experience. Instead of quizzing themselves and clicking to verify their answers, players clicked with very little intentionality. When out of money, they grew frustrated, or began ignoring the story. Additionally, the full reward loop remained unimplemented in early versions of the game, so players felt that the cost had no real meaning in the overall experience.

Currently, *Arena* uses a type-to-translate model in which players are encouraged to take a more active learning role by typing key vocabulary to learn translations at no cost. This model is inspired by research that suggests active "note-taking," as opposed to passive "note-having," is an important mechanism for learning unfamiliar material in classrooms (Carter & Matre, 1975).

#### 3.3 The *Explorer* and the Environment

Much of *Arena*'s game world is clickable. When the player interacts with the game in this manner, the *Explorer* displays images and Spanish descriptions to reinforce vocabulary understanding. Comparing a

vocabulary word to its L1 equivalent and displaying its physical image are techniques often used in L2 classrooms (Jones, 2004).

### 3.4 The Future of the *Explorer*

In our next version of *Arena*, currently in its prototyping phase, we will continue to make changes to the *Explorer*. The type-to-translate model forces players to be less passive, but at a high cost: fatigue. In various informal playtests, we noted that players frequently avoided translation altogether, preferring to guess at meanings or simply ignore any storytelling delivered in Spanish. While a renewed emphasis on reward loops could partially alleviate this problem, the underlying issue is that translating a complex narrative with many different conversations is simply too much work, especially for players with little to no background in Spanish.

Future versions of *Arena* will be targeted towards key vocabulary rather than conversations as a whole. Players who use key vocabulary in meaningful but simple ways will advance a story that is delivered mainly in English. We hope to turn this kind of activity into a mini-game, making fatiguing learning tasks quick, enjoyable, and repeatable.

## 4 Arena as Play Experience

### 4.1 Exploration and Combat

Originally, we decided that *Arena* would oscillate between stages of work (language) and play (exploration and combat) to prevent L2 learning fatigue. Levels were designed around such oscillation; areas of the environment either contained many translation opportunities or many enemies to be battled. However, testing revealed that this oscillation felt neither “fun” nor natural. On the contrary, *Arena*’s combat felt unintentional and disconnected from its language. Hunicke, LeBlanc, and Zubek (2004) suggest that games can be characterized along three dimensions: 1) mechanics, the rules and behaviors of the game, 2) dynamics, the complex interactions between game elements, and 3) aesthetics, the emotional feel of the game. While *Arena*’s mechanics and aesthetics are nicely implemented, we feel the oscillation between language and combat has an adverse effect on its dynamics.

We are working on features to make play more exciting and better connected to language. A larger variety of weapons to wield and new enemy behaviors will contribute to more dynamic play. Levels with increased opportunity for strategic exploration intend to enhance player intentionality and self-determination (Ryan, Rigby, & Przybylski, 2006). L2 activities will also directly impact combat instead of just story progression.

### 4.2 Language Puzzles

We have been more successful with connecting language to exploration of the game world. Throughout *Arena*, players must navigate past a variety of “gateways” (restricted areas). Each gateway is associated with a puzzle that requires players to learn and use L2 vocabulary, e.g. entering numbers on a keypad, associating words with images, etc. Puzzles can be solved by finding L2 clues in the environment or by drawing upon previously learned information. Unlike combat, these puzzles unify play and work.

## 5 Limitations and Future Work

As with any research project, we are working within a variety of constraints. First, *Arena* is a linear experience that draws upon human-generated content. That is, we, the developers, are responsible for producing all of the language, art, sound, and code that run the game. This is a highly challenging task, and imposes several design trade-offs. Though hand crafted experiences can have high emotional impact, they can also grow stale across playthroughs.

Second, *Arena* facilitates reading and listening comprehension, but does not support the speaking or writing components important in L2 learning. In the future, we may address this technologically difficult challenge by incorporating machine learning algorithms, voice-to-text technology, or natural-language processing (NLP) techniques.

Finally, we have not yet formally evaluated *Arena*, so many of our insights are based on our design process, not on empirical data. Using design as a source of scholarly insight can be powerful (Hevner, 2007), but we are eager to empirically study the player experience, engagement with language, and learning outcomes.

## 6 Conclusion

*Arena* investigates several questions about L2 learning. Can a virtual play experience replicate fundamental aspects of living in a place and learning the language? What are the advantages and challenges of taking this approach? Our design process so far has suggested that, while difficult to implement, games like *Arena* may incentivize players to engage in a second language. We are excited to continue exploring this vibrant research space.

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