



Games for Language Learning: a User Experience Perspective

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Abstract

While the gaming market dedicated to pure entertainment dominates the industry, serious games, or educational games, are also gaining in popularity. Teachers can use games, especially educational games, as a supplementary teaching method created for a specific purpose, for instance to improve performance at work or school, or with the focus on learning new languages. Some students encounter difficulties when exposed to serious learning for extended periods of time; therefore, teachers should be aware of the possibility of modifying their lessons to fit more types of learners to increase the students' motivation. When playing games and learning, students tend to be more animated and generally exceed project requirements. In class, games decrease the level of stress which is known to impede memory formation and retrieval. New language learners can overcome the fear of speaking in a foreign language. Students are focused on building communication and collaboration skills, but also develop lasting relationships. During leisure time all games, also those meant for entertainment, help refine language skills. In addition, games tend to influence our behaviour and language. The author performs an exploratory data analysis (EDA) from Steam reviews created by users to evaluate educational games for language learning. Data gathering and pre-processing is automated. Natural language processing and machine learning help to determine positive and negative aspects of such games from the user experience perspective, and provide insights about the skills and knowledge acquired by the users.

Keywords: *natural language processing, educational games, exploratory data analysis, virtual sociolects.*

1. Introduction

In traditional learning, students are often treated as passive receptors of knowledge, which ignores the necessity for active participation in the learning process. Teaching a language with the use of interactive games helps stimulate and maintain learners' interests, handle certain issues related to stress and boredom which can impact cognition, memory, or social and emotional behaviours. Students who play educational games often go beyond expectations and tend to have more enthusiasm. They can avoid stressful situations by focusing on their interactions with the game's interface and, in the case of online games, building skills of dialogue and teamwork. The article is split into two parts. In the first part, I present definitions and characteristics of video games (I use the terms "games" and "video games" interchangeably), educational games and language learning games, as well as virtual sociolects. In the second part, I analyse the video game Influent. To understand the phenomenon of a language learning game on commercial platforms such as Steam, I rely on automated methods. Natural language processing is used to study 1401 Influent user reviews. For exploratory data analysis (EDA), I followed the method presented by Calvin D'Souza [1]. For sentiment analysis, I used the Google Natural Language method which allows to measure not only the sentiment of the review (positive, negative and neutral), but also the magnitude of emotions: a high magnitude from 0 to an infinite number indicates the strength of emotions, where 0 means no emotions.

2. Games and gamers: definition

A game is a type of play where participants follow defined rules [2] and interact within a "closed formal system that subjectively represents a subset of reality." [3]. Apart from "representation" and "interaction", other characteristics of games are "conflict" and "safety" [4]. A video game reacts to the player, contrary to traditional games (puzzle games, board games, card games). Video games require a "participant;" in other words, a "player" or "gamer," and a system defined by rules. The name "player" can refer to actual people or to an abstraction which describes players as structural positions within the framework of the system of the game [5]. To play a game is to attempt to:

- achieve a specific state of affairs (prelusory goal),
- use only means permitted by the rules (lusory means),



- where the rules prohibit the use of more efficient in favour of less efficient means (constitutive rules), and
- where the rules are accepted just because they make such an activity possible (lusory attitude). [6]

Ernst Adams defines games as a "type of play activity, conducted in the context of a pretended reality, in which the participant(s) try to achieve at least one arbitrary, nontrivial goal by acting in accordance with rules" [7]. Interestingly, a "goal" means that a game has to have a gameplay that does not necessarily have to be competitive. The researcher splits essential elements of a game into: "play," "pretending," "goal," and "rules." Also, all games, both board games and computers games, as Ernst Adams puts it, have to have a limit, a border, because computers do not possess infinite memory. However, some newer games rely on procedurally generated areas and contents that simulate infinite space and possibilities, e.g. No Man's Sky. As we can see, new examples of games or new practices revolving around games require new definitions. A reward or an achievement for completing a game is an important motivational factor. Games need to meet three psychological and intrinsic needs:

- the sense of efficiency and success while interacting with the environment,
- psychological freedom and volition to fulfil a certain task, and
- basic desires (sense of belonging, attachment, and care in relation to a group) of an individual for coherent integration with the social environment. [8]

Modern games put emphasis on a narrative or interactive story. They can show simplicity in the gameplay, with emphasis on interactive storytelling, e.g. The Walking Dead series by Telltale Games. Narrative or interactive story games influence the acquisition of language, especially when the player is given conversation choices. Some examples of such games are Dragon Age, Skyrim, Fallout, Mass Effect and the Witcher series. Godwin-Jones states that "games can offer an immersive environment in which extensive use is made of the target language" [9]. The same can be said for games that require online interaction and communication between participants. To overcome obstacles, gamers encounter a variety of recurrent communicative activities that require different kinds of language use that often arise in real life situations. Games stimulate return-to-play behaviour, and thus the learning of language use is systematic. The main problem stands in what is being assimilated, which is particularly difficult to control and assess in online (multiplayer) games.

3. Virtual sociolects

It must be remembered that although video games directly influence the acquisition of a new target language, they also influence, indirectly through communities and social media, or directly during online gameplay interactions, the way we communicate and behave. To explain this phenomenon from a communication perspective, a distinction of varieties of language is necessary. Aleksander Wilkoń distinguishes five varieties of the general common language [10]. These are:

- biolects,
- professiolects,
- psycholects,
- regional varieties, and
- sociolects.

Biolects are languages that depend on the physical features of a person: the language of a text produced by a woman or by a man. Psycholects are language varieties that take into account psycholinguistic or psychosomatic varieties. Professiolects are languages associated with professional environments, that can be further split into 1) a colloquial jargon, and 2) a strictly professional variety. As a colloquial jargon, language is used within a certain social group in informal or unofficial communications. Therefore, with reference to the vocabulary, terms and phrases that are generally understood and used in communications between participants in a group, it could be said that they are within the scope of general vocabulary where they comprise the semantic bloc of that group, e.g. two-way communication between a nurse and a doctor within the semantic bloc "medicine". With the growth of video game career professionals, professiolects represent an interesting and dynamic area of study. Regional varieties represent a variety of a language spoken in a particular region, defined by geographic or political boundaries, culture and tradition. Finally, sociolects are social language varieties, e.g. military language. The rising popularity of games has contributed to the growth of gaming communities. For some gamers, community engagement can even be more compelling than playing a game around which a community is formed. These communities last as long as at least one of the three conditions is met: 1) that the game keeps to be popular, and 2) the activity of the



community is high, but also in the case of a multiplayer game, that 3) the game servers are online. Multiplayer game communities disappear when game servers are closed. With time, relationships disappear when the game around which the community is formed becomes less popular. These communities share a common "virtual sociolect." From a linguistic perspective, virtual communities are created and operate in the same way as real life communities [11]. The notion of sociolect is thus a term suitable for communicative varieties in virtual communities [12]. As mentioned before, these types of virtual sociolects formed by gamers are fragile. Moreover, the sociolect that these communities adopt does not form a system. Participants share a common terminology and common systemic tendencies, e.g. lexeme and stem choices, linguistic patterns and styles, emphatic interjections, abbreviations, acronyms or linguistic shortcuts. Participation in a multiplayer game requires fast and brief communication for the players to be able to quickly respond to events; expressions are often drawn from military language, e.g. military attack terms. Our communication is impacted not only by playing a game, but also by the genre of the game itself. According to researchers, swearing fluency is significantly greater after playing a shooter game than after playing a golf game [13]. Virtual sociolects are assimilated by new gamers, but also new language learners who supplement their studies with games can potentially assimilate them.

4. Educational games

An educational game must possess additional qualities to encourage learning [14]. Learned capabilities that are outcomes of learning and that can also be acquired by playing a game are: intellectual skills, cognitive strategy, verbal information, motor skills and attitudes [15]. Motor skills can be acquired thanks to omni-directional VR Treadmills, HMD-VR, AR or in a conventional environment, e.g. a computer screen. A new, generally observed trend is the gamification of education, where we take game design elements in non-game contexts [16]. Gamification of education is "a strategy for increasing engagement by incorporating game elements into an educational environment" [17]. Examples of more serious games, both commercial and non-commercial, that are intended not only to be fun and compelling, but to teach the user, are:

- simulators,
- therapy games, and
- educational games.

Game "safety" from previous definitions does not mean that playing a game has no consequences; it rather means that we can simulate safe realities in which we address real life situations, useful for work, education, or as a form of therapy. Games for language learning can be considered a subcategory of educational games. Video games are different from computer-assisted language learning software. The game *Influent* is similar to *Rosetta Stone* or *Duolingo* in its goal of teaching vocabulary and various lexemes. *Influent* allows to learn the phonemic script of an object and its pronunciation presented by a voice actor; it also provides a visualisation of items. Alongside basic nouns found in the environment, the game teaches adjectives and verbs associated with each noun. The video game *Influent*, however, has a simple story and a gameplay which distinguishes it from language learning software programs.

Exploratory data analysis (EDA) of *Influent* Steam reviews provides useful insights. *Influent* shows a prevalence of 1033 "recommended" reviews over 368 "not recommended" reviews, which may be considered an indicator of the game's quality. Most "recommended" reviews have over 600 words, whereas most "not recommended" reviews have between 200 and 300 words. *Influent*'s bigrams of the negative reviews show that people dislike the game because it is confined to a small area ("living room," "small apartment") and that it has a limited gameplay ("walk around"). Term Frequency-Inverse Document Frequency (TF-IDF) reveals that people disliked the game because it tended to malfunction ("crash"). Topics generated from negative reviews through Latent Dirichlet Allocation (LDA) give a better idea about why people dislike *Influent*: it is merely a "flash card" game in a "confined" and "small" apartment where you learn a "vocabulary list" of "household items" that does not teach "sentence structure" and the use of articles. As for the positive reviews, bigrams show that it is a "fun way" or "great way" of learning a language and its vocabulary, mainly "adjectives and verbs." TF-IDF reveals that people liked the game because it has a "cool reward" system. LDA reveals it is a good "word memorisation" tool for the so-called "visual learners" which can be combined with lessons taken in "real life." Furthermore, sentiment analysis with Google Natural Language reveals mixed emotions (high magnitude score) in both positive and negative reviews.



5. Conclusions

Despite its simplicity, the video game Influent and language learning software programs are very popular. The market and the demand for this type of learning modality, which can also be performed in contexts outside of our work or educational activities that supplement learning a language, is not yet saturated. Among GOG (formerly Good Old Games), Origin, Uplay and Windows Store, only Steam had a video game designed specifically for language learning with a story and a gameplay. EDA and sentiment analysis of Influent seem to confirm that most users try to provide feedback along their review, as this type of learning is in high demand, but require further work and improvement. This is evident from the length of the reviews and the mixed emotions expressed in most of them, as well as the number of the reviews.

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