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Article

Encouraging Free Play: Extramural Digital Game-Based Language Learning as a Complex Adaptive System

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Abstract

Massively multiplayer online role-playing games like World of Warcraft are ideally suited to encourage and facilitate second language development (SLD) in the extramural setting, but to what extent do the language learners' actual trajectories of gameplay contribute to SLD? With the current propensity to focus research in digital game-based language learning on vernacular games, or commercially available games that are designed with entertainment in mind, it is vital to focus on the extramural setting in which these games are designed to be played, while still being subject to rigorous and empirical analysis. This article examines the extramural gameplay and language-learning trajectories of four university German-language learners as they play World of Warcraft with native German speakers. Positioning learners' experiences within a complex adaptive systems framework (Larsen-Freeman & Cameron, 2008; de Bot & Larsen-Freeman, 2011), the change that each learner undergoes while playing the game over the course of four months is explored in detail. Understanding the game environment as an affinity space (Gee, 2005) helps to substantiate how a game, independent of instructor guidance or classroom intervention, can still promote SLD amongst language learners of varying experiences and proficiencies. The results of this study suggest that numerous factors influence the success of a language learner's extramural gameplay experience, but that these factors must be analyzed in conjunction with the emergent internal and external resources of the complex adaptive system as language learners play and interact with other players in a context removed from the traditional classroom.

KEYWORDS: DIGITAL GAME-BASED LANGUAGE LEARNING; COMPLEX ADAPTIVE SYSTEMS; AFFINITY SPACE

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Introduction

Employing digital games for the purpose of language learning has become ever more pertinent in computer-assisted language learning (CALL) research within the last decade. Games have been utilized to assist learners in developing proficiency in the second language (L2) (Miller & Hegelheimer, 2006; Peterson, 2010a; Cornillie, Jacques, De Wannemacker, Paulussen, & Desmet, 2011), acquiring vocabulary (Rankin, McNeal, Schute, & Gooch, 2008; Byteway, 2014), and even developing general strategy use for better learning an L2 (Delwiche, 2006; Peterson, 2010b). Digital games themselves have many characteristics that are expressly applicable to general learning contexts, and specifically those found in the domain of L2 learning (Sykes & Reinhardt, 2013). Factors such as enjoyment, interaction, and fantasy, while prominent in many games that are played for entertainment purposes, are less likely to be aspects of a classroom setting constrained by elements such as time, student to instructor ratio, immediacy of feedback, amongst others.

For this reason, the extramural setting can provide a meaningful learning space for language learners if accompanied by a space in which learners can reflect and discuss their experiences and utilize the target language in a conversational setting. This article explores the utility of playing World of Warcraft in the extramural learning environment for learners of German as a means to develop L2 proficiency. In order to capture an authentic gameplay experience, a complex adaptive systems (CAS) theoretical framework is helpful in understanding what exactly occurs in the extramural setting when playing games such as this in the L2, for language learning purposes.

Extramural Digital Game-Based Language Learning

Although the majority of studies examining digital game-based language learning (DGBLL) situate the learning experience within a structured academic context (see the many examples above), a large population of individuals are playing digital games in their spare time, and it is therefore imperative that the implications of playing these games outside of the classroom are explored. Research has pointed to the inhibiting constraints of the classroom with regards to extensive feedback provision (Sykes & Reinhardt, 2013), and the reality that many learners seeking L2 instruction do so outside of the classroom (Toffoli & Sockett, 2010). Knowing this, the term second language development (SLD), instead of second language acquisition, is employed to emphasize the focus on development and use of language, particularly in these extramural settings that are often difficult to observe, yet incredibly meaningful.

These challenges can, however, be mediated within the extramural digital gaming environment; the immediacy of feedback and individual goal-oriented

nature of a digital game, especially a massively multiplayer online role-playing game (MMORPG) such as World of Warcraft, encourages and helps scaffold the SLD process. MMORPGs offer language learners an immersive, vibrant virtual world in which an individual can reside, simultaneously playing a digital game while also interacting with other like-minded players of the game, all within the L2. The game and its challenging gameplay encourage, and at times necessitate, teamwork and communication between players, making it ideal for play in the target language (Cornillie et al., 2011).

While some studies look at the spontaneous interaction that may occur between language learners and players of the game (Thorne, 2008), others explore how language learners may interact with one another when in an online virtual game environment such as World of Warcraft (Rama, Black, Van Es, & Warschauer, 2012; Zheng, Newgarden, & Young, 2012; Bytheway, 2014) and others (Rankin et al., 2008). Thorne specifically mentions the utility of the extramural learning environment in these games, arguing that "certain developmental trajectories occurring in informal learning environments may only be possible in self-selected activity marked by the establishment of relatively egalitarian, and situationally plastic, participation structures" (2008, p. 323). Many of these studies, however, situate the gameplay experience within a confined classroom environment, arguably eliminating the authentic SLD possibilities that individuals encounter when interacting with these games in their free time. Meaningful communication with other speakers of the target language can support the transfer of what was observed in-game to actual language use. Instructor/researcher intervention to facilitate the in-person discussion of gameplay-related activities is not required, however, as the broader gaming community surrounding the chosen online game, like World of Warcraft, can itself function as an affinity space (Gee, 2005).

The affinity space is structured as a result of a common shared interest between individuals interacting while engaged in a mutual activity, whether virtual or physical, with no formal qualifications or specifications necessary to gain acceptance in the space; unlike communities of practice (Lave & Wenger, 1991), value is placed on experience, rather than power or a perceived hierarchy of individuals who control the knowledge of the space (Gee, 2005). Online discussion spaces, wikis, and informal chat rooms all contribute to the affinity space and aid in further constructing knowledge (Steinkuehler, 2007). The affinity space facilitates the need to have learners reflect upon and speak about their gameplay experiences that are held in the extramural environment in order to learn from them and create meaning.

Other studies explore the use of games or affinity spaces in extramural learning, but do so in contexts removed from MMORPGs, exploring how language learners play games collaboratively in order to borrow and re-use language

observed in-game (Piirainen-Marsh & Tainio, 2009), form virtual communities within affinity spaces as a meta-reflective process (Sockett, 2011; Sockett & Toffoli, 2012), and how games are among the most effective extramural resource for the development of English language proficiency and vocabulary development (Sundqvist, 2009; Sundqvist & Sylvén, 2012, 2014; Sylvén & Sundqvist 2012). These studies all grapple with the task of observing all SLD that occurs in the extramural learning environment, and, in order to attempt to understand the affinity space and how the learner navigates this unique environment, a complex adaptive systems framework will be explored.

Complex Adaptive Systems

Complex adaptive systems view language both cognitively and socially, allowing for detailed, non-reductionist analyses that take into account as many factors and variables as possible to understand the change and SLD that occurs, thus resulting in a unified approach of the system as a whole, as opposed to a singular variable or aspect of the system (Beckner et al. 2009). Complex adaptive systems make time and change their primary unit of analysis (Larsen-Freeman & Cameron, 2008), suggesting that research should determine what happens to a CAS as it develops and its properties emerge, and which factors would have contributed to observed change.

As Larsen-Freeman and Cameron (2008) argue, all that is needed for complexity to occur is sensitivity to initial conditions, openness within the system for contextual and environmental factors to influence it, and the context itself which encourages adaptation, change, and the emergence of various factors.

These characteristics, and others, are at the root of CAS analyses, and, when positioned within a CALL context, can be formulated as specific questions to guide research (for a more detailed discussion of these characteristics, see Scholz & Schulze, in press). Of particular interest for this study are the internal and external resources of the CAS. Internal resources are those that are within the language learner, such as motivation and time to learn, ability to solve problems effectively or use a computer, and so on (de Bot & Larsen-Freeman, 2011). These are not specific to the online game, but certainly do affect the process of a language learner playing a digital game – individuals who are less motivated to learn German initially may be subsequently less motivated to play World of Warcraft, or an individual's enjoyment of online games may boost an otherwise low motivation to learn German. The external resources are by contrast not directly related to the individual, but can include items such as the spatial environment being explored or the material artifacts with which the learner interacts (de Bot & Larsen-Freeman, 2011). The primary

question that is posed here is then: Which internal and external resources lead to *change* in the learner–computer interaction and how?

Due to the early stages of research concerning CAS in SLD, and the ever-growing field of CALL, it is perhaps no surprise that there is relatively little research analyzing the two (Liou, 2012). Polat and Kim (2014) further explain that there are no studies which have applied complexity theory to untutored, or informal, learning contexts. Zheng et al., however, do argue that online games such as World of Warcraft allow players to "define their own trajectories for learning, achievement, and participation" (2012, p. 357), yet the extent to which this has been documented in research through a CAS lens is indeed quite limited.

Research that has been conducted has emphasized some of the CAS characteristics that are relevant to extramural language learning: sensitive dependence on initial conditions, attractor states, co-adaptation as a result of the internal reorganization of the system, and nonlinear development (de Bot & Larsson Freeman, 2011; Sockett & Toffoli, 2012; Sockett, 2013). Others have focused on the learner's manipulation of the internal and external resources of the system (Liou, 2012) and the *complex semiotic ecologies*—systems which take into account the role that external resources (such as wikis or discussion boards) have on how learners engage with the game and the opportunities for conversation that emerge—that games can encourage (Thorne, Fischer, & Lu, 2012). Others still have examined how players interact with one another to complete goals in Quest Atlantis (Zheng, Young, Wagner, & Brewer, 2009), and engaging in *eco-dialogical interaction* in environments like Second Life (Zheng, 2012).

Methods

Data Collection

The data is drawn from a larger study conducted over the course of a four-month period at a Canadian University. Participants who voluntarily agreed to participate in the study after learning of it via email were asked to play the MMORPG World of Warcraft for a minimum of ten hours in the extramural context, removed from any traditional classroom environment. The research conducted was done using a number of data-collection methods to ensure rigorous and detailed understanding of the CAS. Information concerning the participants was collected through background information questionnaires, in-game and in-person group communication, and concluding interviews at the culmination of the study.

In the first phase of the study, the researcher administered background information questionnaires and provided an hour-long orientation to World

of Warcraft before the gameplay portion of the study commenced. The questionnaire focused on four main categories: rationale for learning German, language-learning experience, gaming proficiency, and computer proficiency.

The second phase of the study was done entirely in German and involved playing World of Warcraft and engaging in three in-person conversations with fellow participants in the study, providing an affinity space for the learners. The in-person conversations which were also a part of this second phase of the study were directed by the researcher and provided the participants with an opportunity to discuss their experiences playing the game. All written communication observed and produced in-game and oral communication during in-person group conversations by the participants was transcribed and analyzed to account for frequency of linguistic constructions (see below) found in each context, in an effort to determine to what extent transfer occurred.

The final phase of the study consisted of a questionnaire with Likert scale items and a concluding interview, both of which were conducted in English, to determine the students' perception of the gameplay process, as well participants' perceived knowledge of game-specific constructions.

Participants

Altogether, 14 participants completed the study in its entirety (12 males, 2 females), with ages ranging from 15 to 37. Seven participants were completing their undergraduate degrees, whereas six were currently enrolled in a Master's program, and one was a high school student. Participants indicated various levels of proficiency in English and German, but many other languages were identified as well. English was the L1 of 13 participants, with the 14th's L1 being Slovak. For all participants German was a language that they were still actively learning and seeking out new ways to further develop, despite their various prior experiences with the language. German is, therefore, considered an L2 for all participants.

A total of 202 hours of World of Warcraft were played amongst participants, with an average play time of 14.4 hours over the course of the study (substantially more than the required ten hours of gameplay). While there were many participants who played the game in shorter chunks, individual concurrent play sessions ranged from a couple of minutes to a high of 4 hours and 36 minutes in a single sitting, lending some credence to the potential immersiveness of DGBLL in a game-enhanced setting (cf. Thorne, 2008).

Pairwise comparisons were used to identify pairs of participants where similar results may be used for analysis purposes (see Scholz & Schulze, in press). Two of these pairs will be explored in this analysis, with different underlying rationale for the inclusion of each pair. The first pair, Eisenbarchen and Föresty (pseudonyms), fully embraced the opportunity to play World of Warcraft

in the extramural environment, going far beyond the required ten hours of gameplay (with Föresty playing approximately 15 hours, and Eisenbarchen playing almost 35 hours). Föresty, having upper-intermediate German proficiency, specifically lacks an educational or local context with which to practice the German language, relying exclusively on the extramural environment to use his L2. Eisenbarchen has intermediate German language proficiency and limited classroom time to use his L2, and considers playing World of Warcraft a means by which he can further practice and develop German.

The second pair is comprised of the only two female participants, Kyrii and Trolinda. Each makes use of the extramural environment in diverse ways. For Kyrii, her relatively low proficiency in the German language makes the initial foray into the game potentially daunting, yet previous experience of playing MMORPGs provides the motivation to sustain interest in this environment without instructional intervention. Trolinda, on the other hand, has a relatively high German language proficiency due to a childhood spent in Germany, but her reluctance to play games of any sort, digital or otherwise, inhibits her initial pursuit into the game; the lack of directed instruction or specific learning goals was foreign to her. Yet by the end of the study, more frequent gameplay sessions and a self-proclaimed appreciation for this type of game was observed.

Game-Related Factors Influencing DGBLL

In the context of SLD and DGBLL, the goal of CAS research is to understand how language emerges in the system and to what extent the myriad factors in the CAS may influence the development of L2 proficiency. The transfer of observed and produced in-game language to extramural conversational settings can be examined to provide evidence that L2 learning occurred in the game. This can be accomplished by embracing a usage-based grammar theory, substantiating the view of language that complexity theory assumes. Rather than conceptualizing language as rule based, language can be thought of as a collection of patterns that are observed through repeated use. In this sense, learners of the language notice these patterns and replicate them, as opposed to learning a concrete set of grammatical rules from a textbook (see Larsen-Freeman, 2002). This is certainly the case in extramural DGBLL environments, where noticing is crucial to learning the language.

In order to analyze the phenomenon of transfer between in-game and extramural contexts, the *linguistic construction*, the basic unit of analysis in usage-based grammar (Ellis & Larsen-Freeman, 2009), is employed. A construction can be thought of as a combination of form-meaning-use, and is therefore examined without a singular focus on either form or use—a construction examines the phonology and morphology of a linguistic item (the

form), as well as the meaning and use of the item (meaning). Conceptualizing L2 development and use in this way permits an analysis of authentic language use, as well as in what context and for what purpose.

For this study, all linguistic constructions that are identified as developed through gameplay share a number of common attributes. Each construction is found outside the list of the 1,000 most frequent words in the German language (*Das Wortschatz-Lexikon*; Quasthoff & Wolff, 1999). This frequency list filters out the linguistic constructions that are unlikely to have been developed through gameplay, and which are arguably required in order to have the necessary proficiency to play a game such as this. Furthermore, each item has not only been encountered in the game, but the learner would have produced the word in non-gaming contexts before being exposed to it in-game.

To understand how the gameplay experience contributed to SLD for each learner, *game-related factors* are conceptualized as explaining which elements of gameplay influenced change and the development of linguistic constructions in the CAS. These are identified as game-related factors as they are situated primarily in gameplay experiences, or in settings that position the game as the primary point of discussion (i.e., in various affinity spaces, such as wikis, discussion forums, or focus groups), and can be classified into three categories: *gameplay*, *communication*, and *iteration*.

Gameplay factors harness the potential of the game and the narrative/utility function of various linguistic constructions in order to progress in the game. If players do not have previous knowledge of the construction, they will need to employ available resources to determine its meaning (including using visual and written context, dictionaries, discussion boards, and any other myriad possible choices).

Communication factors are those that influence or emerge in the learner's production of language, either while playing the game or when speaking about game-related experiences. The constructions developed may not be immediately related to the game, but the language encountered and produced is still central to understanding the dynamics of the game and engaging in authentic discussion with other players of the game.

The last factor, *iteration*, suggests that there are numerous events which are experienced time and time again, with slight variation as to induce change in the system; each time the event is experienced it differs to some degree, thus resulting in a new experience. Within the game environment, iteration factors target the linguistic constructions that are frequently encountered, requiring a player to do or observe something on the screen.

With these methods explained, and the four participants chosen for analysis as part of this study, both the learners' trajectories of SLD, as well as their gameplay trajectories, will be analyzed and discussed as a means to understand

the specific and beneficial aspects of the extramural environment that may lead to language development.

Analysis and Discussion

Trajectories of Second Language Development

Abiding by the non-reductionist goals of a CAS theoretical framework, it is imperative to examine all language that was observed by the learner, and determine how and in what context each linguistic construction was produced.

In order to demonstrate this, a list of all linguistic constructions that each individual has arguably developed by playing World of Warcraft is assembled. This list was compiled using Heatley and Nation's RANGE program (Heatley, Nation, & Coxhead, 2002; Cobb, 2002). RANGE is text parsing web-based software which analyzes the distribution of lexical units between two or more texts; in this study, text files of all language produced orally out-of-game and observed in the game were compared to extract the linguistic constructions which were shared between the two domains. The resulting list was then compared to the 1k frequency list using RANGE to obtain a final list of linguistic constructions that could be argued to have been developed in the CAS. The construction, its use in the game (functioning as the participant's *exposure* to the construction), and the participant's conversational use of the construction outside of the game (identified as the *production*) are all identified. This can be observed in Table 1, where what is of interest is not what the learner is being exposed to and producing, but rather, the ability to use in-game language in novel instances, underscoring the usage-based grammar position adopted here.

As can be observed, numerous linguistic constructions are arguably developed due to gameplay experiences (exposure) and then produced either while playing the game or orally in the focus groups (production).

For Föresty and Eisenbarchen, gameplay factors prominently influence their SLD, whereas factors related to iteration play a relatively reduced role. With neither participant having prior experience playing World of Warcraft, nor possessing a high level of German proficiency, the many novel constructions encountered while playing the game (such as *annehmen* "to accept a quest", or *Zwerg* "a dwarf") would not have been observed frequently enough to be considered to have been impacted by iteration factors.

Föresty exhibits a thorough understanding of the game and a keen ability to discuss his experiences when communicating in non-gaming, extramural contexts. He produces many linguistic constructions that he claims to have developed while playing the game, demonstrating not only his knowledge of the construction, but his ability to apply it as well. As he relates his initial experiences when first playing the game, he mentions confrontations which occurred while playing with other players over game mechanics, stating that:

Table 1
Subset of Trolinda's Linguistic Constructions (Chosen at Random), Observed In-game and Produced in Extramural Setting (31 Linguistic Constructions in Total)

Construction	Exposure Example	Production Example
Gameplay factors		
Begleiter (follower)	Ihr habt einen neuen passiven Effekt erlernt: Begleiter kontrollieren.	aber ich habe einen begleiter eine hund und dieser hund hat mir geholfen
besteigen (to mount)	*Command used to mount a horse.*	für mich neue wörter war besteigen und das würde ich jetzt wirklich uhm remember
Communication factors		
Jägerin (hunter)	Wilhelm Strang sagt: Sagt mir Bescheid, wenn ich Euch auf der Suche nach etwas behilflich sein kann, Jägerin.	uhm nu nur die jägerin oh
Iteration factors		
entdeckt (discovered)	Neu-Tüftlerstadt entdeckt: 70 Erfahrung erhalten.	und ja also ich mache die queste und ich habe entdeckt dass ich auch sterben kann das war haha
Erfahrung (experience)	Wahnsinniger Lepragnom stirbt, Ihr bekommt 40 Erfahrung.	haha okay uhm die beste erfahrung für mich war wenn ich gestorben bin haha nein nein das war
Gegenstände (objects)	Eure angelegten Gegenstände verlieren 10% Haltbarkeit.	es gibt unterschiedliche gegenstände die uhm du sammelst aber es ist immer das gleiche
kämpfen (to fight)	Wir haben noch genügend Kraft und Munition, um uns nach oben zu kämpfen, aber diese Überlebenden können nicht mithalten.	uhm auch hatte könnte ich nicht gut kämpfen
sammeln (to collect)	Sprecht mit den verschiedenen Obdachlosen, die auf Jansens Hof leben, um Hinweise über die Brauenwirbelmorde zu sammeln.	sind nur nur jemanden töten und etwas sammeln
Stufe (level)	Ihr müsst mindestens Stufe 19 erreicht haben, um eintreten zu können.	und ich habe stufe vier erreicht
töten (to kill)	Ihr müsst Euch dort hinbegeben und jeden Goblin töten, den Ihr zu Gesicht bekommt. Sie müssen kapieren, dass man sich nicht mit der Allianz anlegt!	das ist nur so so einfach nur jemanden finden und töten und das ist die ganze

> [L]eider hab ich uh stoff uh genommen und mein charakter benutzt nur uh kette und leder … also ich müsste den stoff uh zurückgeben. (Föresty, In-Person Discussion 1)
>
> (Unfortunately I took cloth armor and my character only uses chainmail or leather … so I had to give back the cloth.)

Föresty does a number of things in this short interaction. While playing the game, he is forced through his mistake to understand the difference between the various types of equipment that can be used (*Stoff*, *Leder*, and *Kette*), realizing that his choice of character can only use chainmail and leather armor. Understanding the game mechanics of how equipment functions through these various iterations reinforces the linguistic constructions. Föresty's use of these words in the out-of-game context as he narrates his experience is evidence of his development of these abstract constructions, further influenced by the amount of exposure he has to them while playing World of Warcraft (Figure 1).

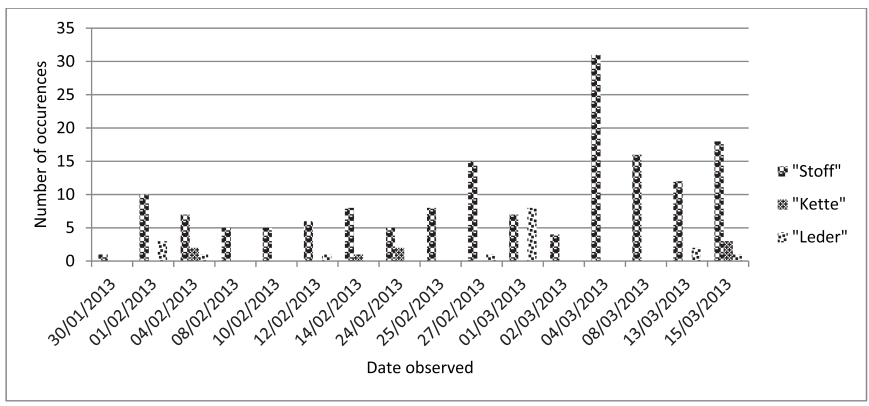

Figure 1: Development of constructions "Stoff", "Kette", and "Leder" as observed in written in-game transcripts of communication.

Eisenbarchen participates in meaningful discussion both inside and outside of the game, and, due to his intermediate proficiency in the L2, the majority of SLD can likely be attributed to his conversations in the game. In one choice encounter, similar to the experience detailed in Thorne (2008), Eisenbarchen happens to meet another player and is asked to engage in a duel. The discussion that emerges produces ample opportunity for contextualized language observation and production in real time (learning what items such as *Schild* "shield" and *Rüstung* "armor" mean); the player does not have the affordance of reading the text at his leisure and looking up words in a dictionary.

Shifting focus to Kyrii and Trolinda's SLD, Kyrii begins the gameplay experience with a rather low level of language proficiency. As a result, she claims that many linguistic constructions which may at first glance be associated with learning experiences outside of the game are actually the result of gameplay. Constructions as simple as *jetzt* ("now") and *verkaufen* ("to sell") were observed in the game initially in the context of a quest and many times thereafter, and are then correctly utilized by Kyrii in the first in-person discussion. Then in the final discussion, she reflects on learning both *jetzt* and *verkaufen* through gameplay, rather than in prior learning environments.

Finally, Trolinda attributes much less language development to specific gameplay factors (see Table 1). Constructions that are claimed by the majority of participants as being developed thanks to gameplay are instead only reinforced through iteration for Trolinda, but this is perhaps to be expected considering Trolinda's experience with the German language and her childhood spent largely in Germany; in her concluding interview she claims that she would often rely solely on context when attempting to understand the content of a quest. Participants in Sockett's (2013) study of English language learners in informal online learning contexts speak to the utility of focusing on the context of the language when unable to understand a construction within a text. Rather than reverting back to a dictionary, the participants in Sockett's study would attempt to determine the meaning of the word in another language, as Trolinda often did with her native language, Slovak. While this approach was evidently sufficient for Trolinda, it may have discouraged her from seeking out additional linguistic constructions that she did not immediately recognize.

Trajectories of Gameplay

Trajectories of SLD provide additional evidence as to how much L2 was learnt as a result of gameplay experiences, but the actual gameplay experiences themselves need to be analyzed to determine how the extramural L2 learning context influences gameplay and SLD.

Three perspectives are taken: chronological language exposure (Figure 2), exposure in 10-minute intervals (Figure 3: Exposure to language over 10-minute intervals.), and exposure per session played (Figure 4: Exposure to language per session played.). These various perspectives emphasize the complex nature of language exposure in a game such as World of Warcraft; the nonlinearity of the gameplay experience for each participant necessitates an analysis of exposure over different units of time to observe the variability in the amount of language observed. All diagrams represent text exposure in the form of individual characters of the observed text, rather than words or sentences, simply due to logistical reasons and the ease of transcript analysis.

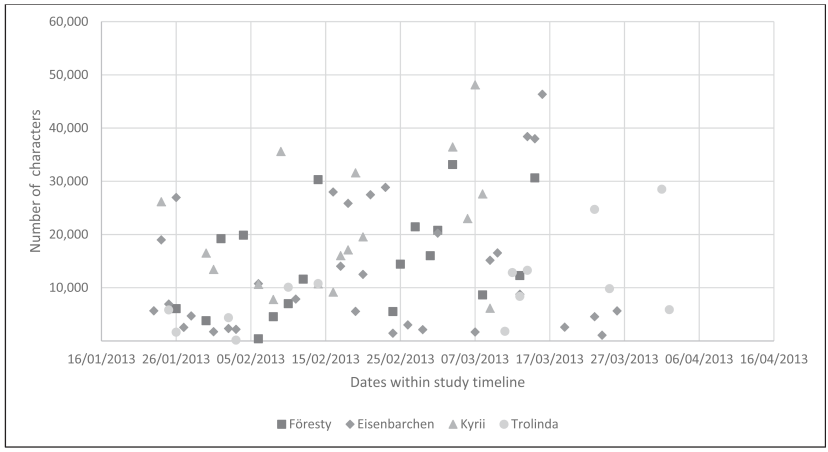

Figure 2: Chronological language exposure.

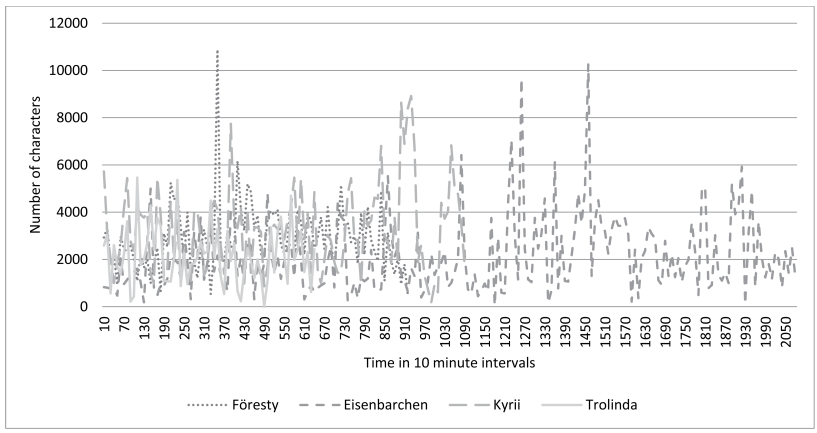

Figure 3**:** Exposure to language over 10-minute intervals.

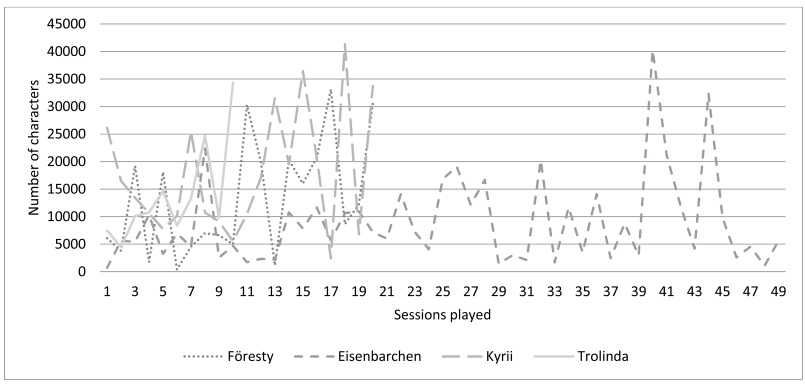

Figure 4**:** Exposure to language per session played.

As can be seen, the three perspectives (Figures 2–4) depict very different dimensions of the gameplay experience for each participant.

Föresty, as evident from his trajectories of SLD, as well as the initial conditions of the CAS (as derived from the background information questionnaire), is depicted as a learner who benefits greatly from the extramural L2 learning experience. As one of the few participants with no other form of German language instruction/maintenance, he fully embraces the opportunity to play World of Warcraft, as he readily plays an impressive number of days (17 in total—the second highest amount of all participants in the study), and his frequent interaction in the game proves to be an effective way to develop L2 proficiency as well. Föresty's gameplay experiences, as observed in Figure 3, are inherently complex and challenging to decipher, but such a depiction of the language observed in-game serves two functions. Firstly, it signifies the nonlinearity of the gameplay experience. Secondly, it can be used to further examine what causes the fluctuation and extremes in Föresty's language exposure, such as an influx of quest text or frequent interaction with other players, which may in turn lead to spikes in his language exposure in 10-minute intervals which is otherwise not observable in other timescales. In this way, Föresty mediates the limitations of having no structured L2 learning context by embracing the myriad opportunities for communication in the game, which speaks to the powerful influence of the CAS's internal resources on Föresty's SLD trajectories.

Eisenbarchen is the most frequent player and exhibits interesting spikes in his gameplay habits, the first of which occurs after the participants had some of the communication restrictions that initially existed removed, such as directly contacting unknown players, when given full access to the game. As a result, Eisenbarchen is able to communicate more, proving to provide an initial incentivization to play more on the dates that depict higher language exposure. Eisenbarchen's gameplay trajectory over the 10-minute intervals is rather interesting as he plays more than any of the other seven participants, and, as seen in Figure 4, there remains a clear trajectory of growth over the course of his play time. Although Eisenbarchen's session-by-session trajectory may appear to exhibit less growth over time, this may be due to requiring a longer period of time to become fully accustomed to the game. Eisenbarchen, unlike the majority of other participants, could not decide on a single character/avatar to represent him, fluctuating frequently between several. The external resources of the CAS—the vast amount of choice that one has when playing the game—while not inhibiting SLD, did result in forfeited opportunities to interact in groups with other players due to not reaching requisite levels in the game. Yet this decision is reflective of Eisenbarchen's approach to extramural L2 learning, as he still has ample classroom opportunity to engage in

language practice, and therefore uses his extramural time to explore diverse ways to play the game.

Kyrii's previous gameplay experience allows her to immediately step into the game environment and navigate it with ease. Although she had not played World of Warcraft specifically, she relies on the external resources of the CAS that are familiar to her previous online gaming experience to better understand game mechanics. By looking at both the amount of language exposure on a session-by-session basis, as well as in 10-minute intervals, her gameplay trajectory portrays growth as she becomes more accustomed to the game. This is crucial as Kyrii's relatively low level of German proficiency could have inhibited her ability to play the game entirely, but her past gameplay experiences serve as a meaningful contributing factor which allows her to succeed in the extramural learning environment. As Eisenbarchen, she has formal L2 learning opportunities on a regular basis that readily can support her extramural learning endeavors.

Finally, Trolinda performs admirably considering her complete lack of experience with digital games, playing fewer actual sessions than others, yet playing increasingly longer in each subsequent session. Trolinda's focus on exploring the game world meant that her concentration was driven away from SLD and was focused on the game itself, allowing her to take her time and fully immerse herself in the game environment only once she understood the goals of the game. When asked about her general experiences at the end of the study, she noted that the multitude of gameplay options and experiences made it feel like an actual world, and, as a result, Trolinda placed much less emphasis on gameplay progression. Examining her trajectories of gameplay portrays two contrasting narratives of SLD. When analyzing her gameplay in 10-minute intervals, Trolinda's trajectory actually declines over time, but it develops rapidly when associated with language exposure over numerous sessions of play. Although this seems contradictory, it may well be explained with Trolinda's lack of gameplay experience. Whereas Kyrii could rely on past experiences to assist her in learning to play the game, Trolinda had very little game-related experience to support her initial foray into the game. This approach to playing the game may lead to fewer opportunities for co-player interaction, and, as a result, Trolinda's DGBLL was among the least effective, but not due to the extramural learning environment.

Conclusion

MMORPGs like World of Warcraft constitute immersive virtual worlds which function as language-learning environments should the learners approach them with a willingness to learn how to play the game and an eagerness to engage with all aspects of the game in the target language. Due to the

complexity of the game, however, each player who approaches the gameplay process is bound to interact with it in various and unique ways.

Whereas previous research has elected to look at short segments of gameplay (due to time restrictions) or has situated the gameplay experience within the classroom context (to facilitate observation), this study removes all such restrictions and allows learners to embrace the extramural environment however they choose. This type of research design is intended to replicate the experience of playing a vernacular game in one's free time, doing so primarily for entertainment purposes.

It remains advantageous, then, to encourage L2 learners who are seeking additional means to develop their L2 proficiency to seek out games and play them in a foreign language. With the support of a community of like-minded individuals, or an affinity space, to discuss their gameplay experiences, language learners can readily benefit from interactive gameplay experiences such as the one described in this study.

About the Author

Kyle Scholz works at the Centre for Teaching Excellence at the University of Waterloo, Canada. He received his doctorate in German applied linguistics at the University of Waterloo, focusing on digital game-based language learning. His research focuses specifically on the means by which language learners can develop second language proficiency in extramural environments using games and other educational technologies. More broadly, his research interests include computer-assisted language learning and complex adaptive systems.

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