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Article

A taxonomy of vocabulary learning strategies used in massively multiplayer online role-playing games

Julie Bytheway

Abstract

Initiated in response to informal reports of vocabulary gains from gamers at universities in New Zealand and the Netherlands, this qualitative study explored how English language learners autonomously learn vocabulary while playing massively multiplayer online role-playing games (MMORPGs). Using research processes inherent in Grounded Theory, data was collected from a criterion sample of six experienced English-as-a-second-language players of World of Warcraft. Data included semi-structured interviews, observations, elicited email texts and extant texts. Data was transcribed, coded, and refined through a cyclic process of constant comparative analysis until patterns emerged. The results revealed 15 vocabulary learning strategies, including noticing frequency of words, recognizing knowledge gaps, selecting words for attention, equating images and actions to words, giving and receiving explanations and feedback, observing players, using words to learn words, reading in-game information, and using Google. This taxonomy of 15 vocabulary learning strategies provides a framework for further research into vocabulary learning strategy taxonomies and autonomous learning in informal digital contexts.

KEYWORDS: AUTONOMOUS LEARNING; DIGITAL GAMES; MMORPGS; VOCABULARY LEARNING STRATEGIES; WORLD OF WARCRAFT

Affiliations

Victoria University of Wellington, School of Linguistics and Applied Language Studies, Wellington, New Zealand
and
Stenden University of Applied Sciences, Meppel, The Netherlands.
email: jabyt1@student.monash.edu

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Introduction

Qualitative research is now increasingly being used to examine how people learn vocabulary, adding to the existing body of quantitative vocabulary learning research that focuses on what is and should be learned. When investigating how people learn vocabulary, many researchers have used artificial memory and recall tasks to examine psychological memory strategies; however, the ecological validity and pedagogical authenticity of many of these experiments are questionable (Gu, 2005). Descriptive qualitative research revealing participants' perspectives can add insight into how people learn in realistic, complex learning contexts with multiple and incongruent contributing factors.

Language teachers need to be aware of what good language learners do so effective language learning practices can be adapted and used during teaching (Rubin, 1975). Vocabulary learning processes are essential because they can to a considerable extent determine overall success or failure in second language acquisition (Gu, 2005; Nation, 2008). In addition, digital technologies affect modern communication and language learning contexts, and teachers need to understand the implication of this (Thorne & Reinhardt, 2008). Digital games, for example, are now increasingly being examined by language learning researchers (Bytheway, 2011; Purushotma, 2005; Rama, Black, van Es, & Warschauer, 2012; Rankin, Morrison, McNeal, Gooch, & Shute, 2009; Thorne, 2008) and language teachers are becoming aware of the potential as well as the complexities of learning in digital-game contexts.

This study examines autonomous language learning in a commercial off-the-shelf massively multiplayer online role-playing game (MMORPG), *World of Warcraft* (WoW) (Blizzard Entertainment, 2012) and identifies a taxonomy of 15 vocabulary learning strategies used by English-as-a-second-language (ESL) learners while playing and interacting within the game's virtual world.

Digital games as language learning contexts

Digital games are worth examining as language learning contexts because hundreds of millions of people play using second languages. Their popularity is wide-spread across genders, age groups, ethnicities and economic classes (Yee, 2006) and gamers spend a lot of time, playing an average of 22 to 25 hours per week (Williams, Yee, & Caplan, 2008). WoW is a popular MMORPG. In 2014, Blizzard Entertainment (2014a, 2014b) announced that WoW had over ten million subscribers and that since its beginning in 2004 over 100 million people had subscribed.

MMORPGs are real-time digital strategy games set in persistent virtual worlds where players complete collaborative tasks, trade virtual and real items, explore their environment, and interact for social and in-game business

purposes (Chatfield, 2010; Mäyrä, 2008; Yee, 2006). Players are represented by 3D animated characters. WoW is not a game created specifically for educational purposes, nor is it an open social space without any gameplay. WoW is a commercial off-the-shelf MMORPG played online by thousands of players simultaneously who may be strangers or know each other in the real world or in the virtual world.

Many researchers (Delwiche, 2006; Squire, 2005; Steinkuehler & Squire, 2009; Yu, 2009) assert that MMORPGs are rich learning contexts that incorporate valuable learning opportunities. Repetition and extended practice are a core part of gameplay (McGonigal, 2010; Steinkuehler, 2004). Players learn from being observers and participants during gameplay to become members of the gaming community of practice (Wenger, 1998). MMORPGs are valuable language learning contexts because communication is central and they provide exposure to diverse types of language. Collaboration is essential in MMORPGs (Delwiche, 2006): players complete tasks in strategic teams of 10–60 people (Williams *et al.*, 2008). The WoW interfaces provide a wealth of linguistic resources, including written instructions and storylines, optional pop-up tips, accessible manuals, animated film clips with spoken audio and captions, as well as access to synchronous and asynchronous (typed) chat messaging, real-time phone-like conversations with VoIP software (voice over internet protocol), and interactive wikis. Players can simultaneously discuss multiple topics using spoken and written communication tools (Blizzard Entertainment, 2012). Players can also use a variety of languages and translation tools; however, on many servers English is the lingua franca. MMORPGs include specialized terms to facilitate effective communication and also express belonging (Mäyrä, 2008) (e.g. *respawn)*; some words have taken on new meanings in the game (e.g. *camping)* (McNamara, 2004). Texts within WoW include both every-day high-frequency language (e.g. *instead*) and more formal language (e.g. *afflicting)* (Blizzard Entertainment, 2012). MMORPG players use acronyms (e.g. *lol*, laugh out loud), abbreviations (e.g. *loc*, location), and neologisms (e.g. *n00b,* inexperienced user). The communication in MMORPGs is extremely fast because gameplay creates a sense of urgency. Players are not restricted to prescriptive norms and purposefully use creative language (North, 2007), simplifying speech and using nonstandard phrases and vocabulary (MacCallum-Stewart & Parsler, 2009).

Digital games are increasingly being researched as language learning contexts. Miller and Hegelheimer (2006) studied the Sims game and discovered that learners encountered and learned a diverse range of vocabulary. Ranalli (2008) added supplementary learning materials to the Sims game and found that players learned vocabulary. Thorne's (2008) analysis of chat within WoW revealed positive opportunities for interaction, correction, and repair between

two players. Rankin, Morrison, McNeal, Gooch and Shute (2009) investigated vocabulary learning in MMORPGs and their results showed that interaction between native speakers and non-native speakers of English and use of in-game dictionaries improved vocabulary. Peterson (2010) examined psycholinguistic and sociocultural constructs and concluded that games are valuable language learning contexts. Rama *et al.* (2012) observed two participants' WoW gameplay and explored their learning experiences through interviews, journal entries, and in-game chat, concluding that MMORPGs are 'beneficial for participants' language development and socialization' (p. 337). Thorne, Fischer, and Lu (2012) characterized in-game WoW texts as 'diverse and linguistically complex' (p. 298) with positive implications for learners of ESL. While these studies have established that game contexts offer valuable language learning contexts because of the diversity of language encountered and opportunities for meaningful interaction, this study examines how participants create, select and use vocabulary learning strategies to autonomously manage vocabulary learning while playing WoW.

Vocabulary learning strategies

Vocabulary learning strategies are a subset of language learning strategies, which Griffiths (2008) defines as activities that learners consciously choose to regulate their language learning. Vocabulary learning strategies include direct and indirect learning processes that learners deliberately use to obtain, store, retrieve, encode, rehearse and use words (Gu, 2005; Nation, 2008; Schmitt, 1997). Learners can create, select, use and manage vocabulary learning strategies that facilitate explicit learning (e.g. recalling words while using flashcards to purposefully acquire language knowledge and skills) and implicit learning (e.g. purposefully reading extensively to increase language knowledge and skills through exposure to language). Learners use vocabulary learning strategies more than they do other language learning strategies (Schmitt, 1997), and successful learners use a broad selection of strategies in flexible and versatile ways (Gu, 2005; Schmitt, 1997).

Several researchers have created taxonomies for language and vocabulary learning strategies to clarify the variety of strategies used by learners in different contexts. However, 'the resulting lack of uniformity in terminology among researchers has made it difficult to compare … research findings' (Nyikos & Fan, 2007: 255). On the basis of Oxford's (1990) comprehensive taxonomy of language strategies, *Strategy Inventory for Language Learning* (SILL), Schmitt (1997) identified 58 vocabulary learning strategies which he organized according to Oxford's (1990) categories – memory, cognitive, compensation, metacognitive, and affective and social strategies – adding the category 'determination of meaning'. Schmitt also identified how vocabulary learning

strategies facilitated initial discovery and understanding of words and consolidation of word knowledge and skills. Gu (2005) categorized vocabulary learning strategies according to when they were used: during initial handling, consolidation, and activation of words. Nation (2001) classified vocabulary learning strategies using aspects of language learning: vocabulary planning, vocabulary sources, and vocabulary learning processes. Although they do not use the term vocabulary learning strategies, Tseng, Dörnyei and Schmitt (2006) created a model of *self-regulated vocabulary learning* based on processes which include commitment control, metacognitive control, satiation control, emotion control and environment control.

To date studies of vocabulary learning strategies have focused on classroom and real-world learning contexts. Gu (2005) warns that most studies appear to ignore culture and context and authentic communication opportunities, and he warns that language learning strategies that work in some contexts might not work in others. Existing research shows that learners' selection and use of vocabulary learning strategies are affected by real-world second language and foreign language contexts (Kojic-Sabo & Lightbown, 1999; Leeke & Shaw, 1990; Locastro 1994; Nyikos & Fan, 2007). However, second language and foreign language contexts become blurred in virtual worlds because digital contexts are often not located in any specific real-world culture or nation. Virtual-worlds span countries and cultures, and are frequently nationless contexts that develop and maintain their own in-game culture and do not define people as native or non-native.

Research questions

This study focused on the following research questions. What vocabulary learning strategies do ESL learners select and use in MMORPGs? How do vocabulary learning strategies identified in MMORPGs compare to vocabulary learning strategies and taxonomies identified in other contexts?

Methodology

This qualitative study used research processes inherent in *Grounded Theory* (Glaser & Strauss, 1967). Participants were recruited via posters displayed at a University. Criterion sampling resulted in six male students taking part in the study. They were aged 20 to 30 and used English as a second language. All were experienced gamers who had played MMORPGs for at least five hours (sometimes exceeding 40 hours) every week for more than four years and had played several high level characters (level 75 to 85) to justify their status as expert gamers. All of the participants had a current IELTS overall band score of between 6.0 and 7.5. They had completed secondary education and three

of them had completed undergraduate tertiary qualifications. Their countries of origin were Germany (Frank), Malaysia (Tuah), Ukraine (Alex), Vietnam (Hung), and China (Li and Tao). Their first languages were German, Hokkien, Russian and Ukrainian, Vietnamese, and Mandarin.

Before data collection, the University Human Ethics Committee approved the research methods. Participants are identified with pseudonyms.

Five hours of participants' gameplay was observed and video-recorded. This provided data about the gamers' behaviours and actions and allowed the researcher to compare what participants did with what they reported during the interviews. Six hours of semi-structured interviews – which were recorded with an MP3 recorder – revealed participants' perspectives of their vocabulary learning within MMORPGs. Participants reported vocabulary learning activities they purposefully engaged in and were conscious of while playing MMORPGs. The interviews were informal directed conversations, where participants were regarded as experts, were able to express views, could choose what to tell and how to tell it, and could share significant experiences and provide their interpretation of the information to the interviewer (Charmaz, 2006) (see Appendix 1 for examples of questions). The interviews were conducted in English by the author, an English language teacher. Four interviews were conducted immediately after gameplay and three were conducted before gameplay, as per each participant's preference. Responses in earlier interviews were used to improve and create the questions and discussion topics in subsequent interviews. One participant was interviewed twice. Recordings were transcribed and a vertical line (|) was used to indicate pauses in speech. Participants were also emailed to answer further questions, and three participants replied. Extant texts, i.e. 64 texts within the WoW game, such as in-game instructional texts and communication of the participants, were also included as data. Texts that participants viewed during observed gaming sessions were also included as data.

Transcribed data were coded using a large number of overlapping initial codes in order to remain close to what participants said and how they described actions and processes. These initial codes were sorted into lists and clustered, resulting in groups of codes (see Appendix 2). These codes were then synthesized and integrated into 45 more focused codes. After another review, 31 focused codes emerged which were classified into vocabulary learning strategies. Patterns and relationships emerged through an on-going cyclic process of *constant comparative analysis* (Glaser & Strauss, 1967), i.e. comparing data with data, informal clustering, mind mapping, and memo writing until patterns emerged (see Table 1). To minimize personal bias, participants conducted member-checking, i.e. participants checked interviews, transcriptions, coding, sorting and results for truth and accuracy from their

perspectives. Also a postgraduate researcher in applied linguistics used qualitative research processes to check the coding and sorting to ensure inter-rater reliability.

Results

Vocabulary learning strategies

Table 1 shows the 15 vocabulary learning strategies that were identified. They have been classified as strategies that participants recommended learners use (2) and strategies that participants reported purposefully using themselves (13). The ranking of the strategies reflects the number of times that participants mentioned them during interviews. It does not indicate which strategies participants used most frequently or considered most valuable or effective.

Table 1: Identified vocabulary learning strategies

Vocabulary learning strategies			
Number of times mentioned by participants	Strategies recommended by participants	Number of times mentioned by participants	Strategies reported as used by participants
21	*interacting with players*	37	*reading in-game information/pop-ups*
19	*playing in English*	36	*looking up words in dictionaries/Google*
		35	*noticing frequency/ repetition of words*
		33	*requesting/giving explanations*
		32	*equating image/action to word*
		28	*recognizing knowledge gap*
		20	*receiving/giving feedback*
		20	*noticing in other contexts*
		17	*guessing from context*
		17	*using word to learn word use*
		16	*observing players*
		9	*selecting words for attention*
		8	*adding to existing knowledge*

Interacting with players

All participants recommended during interviews that second language learners use the strategy *interacting with players*. Participants recognized the value of practice and repetition to learn words. Tuah reported, 'just like practise more | … write more | so just type in and don't worry about the stuff | the … more you use it you will much better'. Participants were observed interacting with known and unknown players during gameplay. In addition, participants reported that they spoke with other players using VoIP software, e.g. Ventrilo, Skype. However, no participants used VoIP software to communicate during the observed playing sessions.

Playing in English

All participants recommended that second language learners use the strategy *playing in English*. Tao reported, 'play the English one and do not … use software to change all the things to Chinese'. Participants reported that MMORPGs with an English interface on an English server present a huge variety of English language that they consider valuable for vocabulary learning for meaningful and authentic communication. Use of the strategy *playing in English* was also identified during observations of all participants' gameplay.

Reading in-game information/pop-ups

All participants reported using the strategy *reading in-game information/pop-ups* in combination with other strategies to learn words. Hung reported, 'Everything has a hint inside | so you have to spend your time to read it'. The strategy *reading in-game information/pop-ups* was also observed through players' cursor movements. For example, Alex moved the glove-like cursor down through the text as he read the WoW quest description 'The Edge of Winter'.

Looking up words in dictionaries/Google

All participants reported that they used the strategy *looking up words in dictionaries/Google* to learn the meaning of words after other vocabulary learning strategies did not help them understand a word's meaning and/or use. Participants stressed that they were reluctant to interrupt gameplay and looked up words after, not during, gameplay. Tuah reported, 'I did there are some words I didn't know | I couldn't remember but I didn't take the initiative to go and find out the meaning | … normally I will Google it and then look into it'. Participants did not specify bilingual or monolingual dictionaries and referred only to online dictionaries and search engines, which were easy to access online.

Noticing frequency/repetition of words

All participants reported frequently using a strategy they referred to as *noticing frequency/repetition of words* to learn vocabulary in WoW. Several participants stressed that they were aware that words are repeated a lot in MMORPGs and that they considered this *noticing frequency/repetition of words* useful for language learning. Li reported, 'learn by game | because this words appears a lot of times | I seen them again and again and again'. This strategy *noticing frequency/repetition of words* would be affected by how many hours participants play MMORPGs. Tao reported, '[during] holiday play longer| more than 4 hours a day| [normally] if possible| about couple of hours each day'. Over a short period of time, perhaps a few days, players were able to effectively use strategies such as *noticing frequency/repetition of words* because of the sheer volume of repetitive language they encounter.

Requesting/giving explanations

Participants reported valuing a two-sided strategy – *requesting and giving explanations* – to help them learn words, and identified themselves as both requesters and givers of explanations. Hung reported, 'first time I saw that | what … is that word | I haven't seen that before | I ask them | just random people | I say oh what's that mean', and Tao reported, 'sometime the people asking me for help | and you can just have a look and you can also learn English'. Participants did not use conventional educational terms, e.g. teacher, student, pupil, or learner, to define people's roles when teaching or learning words or gameplay in MMORPGs.

Equating image/action to word

All participants reported using the strategy *equating image/action to word*. Tuah reported, 'the word is like an identity for the thing or the creature | we see this pictures and it presents these words | like the elf'. However, participants also clicked on items and watched the resulting in-game actions. Alex reported, 'I didn't really understand | when I tried the ability | I saw what it did'. Observations also showed a huge variety of language and images on the players' screens. However, the actual strategy, *equating image/action to word,* described by participants during interviews was a thought process and was not observable.

Recognizing knowledge gap and selecting words for attention

Four participants reported that they used the strategies *recognizing knowledge gap* and *selecting words for attention.* Tuah reported, 'I never ever seen this word before | but from the game itself yeah I know it | I won't say once but like minimum five times | at least five times then you start to use the words

again'. Participants frequently reported ignoring words they judged as not necessary to learn for gameplay and purposefully selecting words for attention and learning. Participants judged the usefulness of words from the use of the strategy *noticing frequency/repetition of words*. Tao reported, 'and if it is not a common | I just ignore it'.

Receiving/giving feedback

Four participants described another two-sided strategy, *receiving/giving feedback*. Participants described other players recasting their words and requesting clarification of words with a simple '?' chat response. Tao reported, 'I try to use the word | and this | and nothing happens | it means they understand the meaning'. Participants also reported other players sometimes laughing at them and making negative comments about their English. Hung reported, 'laughing at me | they say oh this guy he is not English or something like that | oh his English terrible or something like'.

Noticing in other contexts and adding to existing knowledge

Three participants reported using the strategy *noticing in other contexts* and two participants reported *adding to existing knowledge*. Tao reported, 'but in the game firstedly | first I feel ah yes it is a little bit familiar and then won't care | but later when I get to know it I check the meaning | oh I sees it's the one that I learned in the classroom'. Tao appears to connect knowledge and reach a deeper level of understanding through using a combination of strategies.

Guessing from context

Participants also described the strategy *guessing from context*. Although similar, this strategy *guessing from context* was distinctly different from the strategy *equating image/action to word*. Hung reported, 'the word itself I don't understand | but when in a sentence | common sense something like that | I start guessing'.

Using word to learn word use

Participants reported using a word before they knew the meaning of the word and while they were still unsure about the use of the word. Li reported, 'I don't know the name | I don't know the meaning | I see them a lot and see what happens and I try to use it'. Tao expected feedback from other players to confirm or reject his use of the word: 'I try to use the word | … and nothing happens | it means they understand the meaning |if it was wrong |they will maybe put question marks'. It remained unclear whether participants used unknown words to purposefully test understanding and appropriate use, or to show that they belong to the gaming community.

Observing players

Four participants reported using the strategy *observing players*, that is, purposefully watching other players' typed chat conversations or listening to other players' spoken conversations to help word learning and see the appropriate context and use of words. Hung reported, 'sometime I just learn from people chatting together | I watch their chat like | this guy's a beginner this guy's the pros | and they chatting together and this guy ask them oh how does this word mean and how you do something bla bla bla | I just like an observer | and watch the chatting groups'. Participants sometimes disengaged from the opportunity for productive language use to help vocabulary learning. One participant described disconnecting his microphone so that he did not have to speak and instead could just listen to his group's conversation. Li reported, 'I started without my microphone | and I can just a listen'.

Discussion

Motivation

In contrast to previous research about autonomous language learning and use of language learning strategies, language learners using MMORPGs as language learning contexts did not manage their language learning motivation with any learning strategy. The MMORPG context affects learners' motivation, removing the need for motivational learning strategies. As Tuah reported, '[games] keep you focused at that attention | it's like [during] the game itself | you will not blink | you try to prevent from blinking or looking away because it's exciting | things are moving | yeah every second means something | but in the classroom | just from the books you can turn away | look away | it's no big deal'.

Typology

As Nyikos and Fan (2007) proclaimed, results from vocabulary learning strategy research are difficult to compare because researchers use different terminology and typologies. No clear categories for the 15 vocabulary learning strategies emerged from the data, and many of the strategies could be classified into several existing categories from other researchers (Gu, 2005; Nation, 2008; Schmitt, 1997). Participants did sometimes mention the specific phase of the vocabulary learning process in which they used a strategy: when they initially came across a word, later when a word became more familiar, and finally when word use became more automatic. Participants alluded to strategies being categorized as part of the vocabulary learning process, which is similar to Gu's (2005) initial handling, consolidation, and activation of words categories.

Table 2: Comparison with Gu's (2005) categories

Gu's three vocabulary learning strategies categories	Vocabulary learning strategies identified in this study	Participants' comments from this study
initial handling of words	*selecting word for attention*	Li reported, 'I found some words and ignored them'
consolidation of words	*looking up words in dictionary/ Google, adding to existing knowledge*	Tao reported, 'it is a little bit familiar and then [before] I won't care | but later when I get to know it I check the meaning | oh I sees it's the one that I learned in class'
activation of words	*using word to learn word use*	Tuah reported, 'then you start to use the words again when you play the game | then you | I will use it, just flashes out, just say it out'

Some of the vocabulary learning strategies reported by and observed from players of MMORPG WoW are similar to the vocabulary learning strategies identified by Schmitt (1997). Schmitt's strategies *discover new meaning through group activity* and *interact with native speakers* are similar to the MMORPG context strategy *interacting with players*. However, the MMORPG context strategy *interacting with players* contrasts with Rankin *et al.*'s (2009) claims that non-native speakers learn English vocabulary in MMORPGs by interacting with native speakers. Participants in this study never referred to native speakers and non-native speakers, but rather spoke about highly proficient (pro) and less proficient (beginner) English language users. Participants did not appear to bestow ownership of English on people from a real-world nation or culture. Participants did not report nor show during observations that they valued interaction more with native speakers to help learn vocabulary.

Schmitt identifies a broad metacognitive strategy *use English-language media*, which is more specific in the MMORPG context and was identified as *playing in English*. Other specific strategies identified in the MMORPG context also fit into Schmitt's broad strategy *use English-language media*, e.g. *reading in-game information/pop-ups*. Schmitt identified two determination strategies *bilingual dictionary* and *monolingual dictionary* that are similar to the MMORPG context strategy *looking up words in dictionaries/Google*. Participants in this study did not refer to bilingual or monolingual dictionaries, instead participants referred to digital word-information tools that were easy to access alongside digital game interfaces. On reflection, it is possible that participants mentioned the strategy *looking up words in dictionaries/Google* frequently because the interviewer may have been perceived as a language

teacher and they may have interpreted this strategy as a correct response to 'How do you learn words?'

Schmitt also identified the strategy *analyse any available pictures or gestures* that is similar to the MMORPG context strategy *equating image/action to word.* Schmitt identified a metacognitive vocabulary learning strategy, *skip or pass new word,* that is similar to the MMORPG context strategy *selecting words for attention*. Gu (2005) judges these types of strategies as valuable – the strategy *selective attention* was the most effective strategy of Chinese learners of English. Schmitt's memory vocabulary learning strategy *connect word to personal experience* is similar to the MMORPG context strategies *noticing in other contexts* and *adding to existing knowledge, and* Schmitt's strategy *guess from textual context* is similar to the MMORPG context strategy *guessing from context*.

Several of the strategies identified in the MMORPG context have no equivalent in Schmitt's taxonomy. Schmitt does not identify a strategy similar to the MMORPG vocabulary learning strategy *noticing frequency/repetition of words*. Perhaps this is because Schmitt's research focused on classroom contexts where teachers frequently manage student learning and select most vocabulary for learning. Research in game studies (McGonigal, 2011; C. Steinkuehler & Williams, 2006) maintains that repetition is a core part of gameplay and this repetition may help language learners in MMORPG contexts to create and use the strategy *noticing frequency/repetition of words*. Schmitt does not specifically identify a strategy similar to *observing players*; however, this strategy could be seen as part of Schmitt's strategies *use English-language media* and *interact with native speakers*. Participants in this study clearly differentiated between the strategies *interacting with players* and *observing players*. Participants included both meaning-focused input and meaning-focused output in their strategy *interacting with players*; whereas participants did not include meaning-focused output in the strategy *observing players*, only meaning-focused input. Finally, Schmitt also does not identify any strategy similar to *using word to learn word use*.

Sometime the strategies Schmitt identifies are significantly different from the strategies identified in the MMORPGs context. Schmitt identified four strategies used to request information, *ask a teacher for first language translation, ask a teacher for a paraphrase or synonym of new word, ask a teacher for sentence including new word,* and *ask classmates for meaning*. Schmitt's research revealed three methods to ask a teacher, but only one to ask another student. He does not include any strategies that involve the learner in an information giving role. Participants in this study identified the vocabulary learning strategies *requesting/giving explanations* and *receiving/giving feedback* as separate strategies. Participants valued being in the role of learners and teachers to

autonomously learn vocabulary and used both sides of these strategies to help them learn vocabulary in different ways. Schmitt's strategies which were identified in a formal learning context appear to be less comprehensive within an informal learning context.

Learners use a broad range and combination of vocabulary learning strategies in MMORPGs, which is likely to contribute to their learning; existing research shows that successful learners use broad selections of strategies in flexible and versatile ways (Gu, 2005; Schmitt, 1997). However, the question remains whether learners can transfer the use of vocabulary learning strategies used in MMORPGs to other digital and real-world contexts. Delwiche (2006) and Steinkuehler (2007) conclude that learners can and do transfer learning from virtual life to real life. However, no participants in this study reported that they use MMORPG vocabulary learning strategies in other contexts, and only two participants reported that they use words learned in MMORPG in the real world. Tuah reported, 'it is a word I learned and then I can use it in | I do yeah | it's like what we do | in real life', and Tao reported, 'and you feel some word is quite interesting | use it in your real life'. These reports of transfer of learning from a virtual world to the real world do not provide sufficient evidence to make strong claims, but are enough to show that this topic warrants further investigation.

Conclusion

This study shows that gamers in MMORPGs create, select and use a range of vocabulary learning strategies in a variety of combinations for a broad range of purposes. Participants in this study were observed using 15 vocabulary learning strategies and they reported that they purposefully used these. In line with the principles of *Grounded Theory* the data, coding and the resulting vocabulary strategies and taxonomy remain as close as possible to the participants' words and actions.

No strategy was reported or used to manage learners' motivation because the game context provides all the motivation. MMORPGs appear to be interdependent playing/learning contexts that provide gamers with a need to learn vocabulary and ways to learn vocabulary. Some of the vocabulary learning strategies revealed in this study are similar to those used in formal learning contexts, e.g. *looking up words in dictionaries/Google* and *guessing from context*. Others, however, are distinctly different. Several of the MMORPG context strategies show how gamers value learning vocabulary in both learner and traditional teacher roles, e.g. *giving/receiving feedback*, and *requesting/receiving explanations*. The MMORPG context strategy *noticing frequency/repetition of words* has not yet been identified in formal learning contexts. Participants of this study appear to be using vocabulary learning strategies within

MMORPGs to manage their learning autonomously, without teachers instruction. Rubin's (1975) 40-year-old advice remains relevant, that is, teachers need to continue to identify what good language learners do, and use their successful practices to shape teaching practices in our ever changing communication in real-world and virtual world contexts.

Like all studies, this study has certain limitations. Collecting data from only six participants limits generalizability. Also, during observations, participants' normal gaming behaviour may have been affected by being observed. Learners may also be unreliable reporters of their own strategy use. Completing the interviews in the participants' first languages could have improved the quality of their responses and ability to explain complex ideas. Finally, this study used processes inherent in *Grounded Theory* but did not continue until a point of saturation (Charmaz, 2006) was reached.

Implications and suggestions for further research

The effects of digital games are often portrayed negatively by the media (Chatfield, 2010; Gee, 2007; Mäyrä, 2008; McGonigal, 2011; Yee, 2006). However, teachers need to look beyond this negative image and discuss with learners how vocabulary learning strategies can be used in MMORPGs to help the learning of English words. Using MMORPGs helps to ensure that learning experiences remain relevant and meaningful to learners. For many learners, information about how MMORPGs can be used to help vocabulary learning may be empowering. Teachers should also raise gamers' awareness of the vocabulary learning strategies they use in MMORPGs. Gamers should be helped to transfer vocabulary learning strategies they develop and use within MMORPGs to other vocabulary learning contexts.

This study skims the surface of many aspects of MMORPGs as contexts for vocabulary learning strategies. Ideas for further research to explore the effects of aspects of MMORPG contexts on language learning, vocabulary learning, and learning strategies and vocabulary learning strategies are yet to be explored. The context has been identified as affecting vocabulary learning strategies. While previous research has compared ESL contexts with English as foreign language (EFL) contexts, MMORPGs are neither ESL nor EFL contexts but instead a language learning context that is yet undefined. Formal and informal contexts also need to be compared, e.g. work and play contexts. In addition, vocabulary learning strategies in MMORPGs need to be examined to find out which vocabulary learning strategies are and can be transferred to real-life situations and how. Finally, taxonomies that include vocabulary learning strategies used in informal learning contexts and digital contexts need to be developed.

About the Author

Julie Bytheway is a graduate of Massey University and Victoria University of Wellington, New Zealand, in the fields of English, education and TESOL and has over 25 years' teaching experience. She is currently the coordinator of the Bachelor of Education for International Primary School pre-service teachers at Stenden University of Applied Sciences, the Netherlands. Julie is also completing a PhD in Education by distance through Monash University, Australia. Her current research focuses on teacher education, specifically autonomous learning of teaching skills by novice teachers from diverse backgrounds.

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Appendix 1: Proposed interview questions for a semi-structured interview

name, sex, age, 1st language(s), 2nd language(s), nationalities, previous education (where/level), English level (IELTS/TOEFL scores), MMORPGs played, time played, email address

Which MMORPGs do you play? How often do you play?
Who do you play/communicate with?
What features of MMORPGs do you use to communicate?
Which languages do you use in MMORPGs?
How do you use those languages in MMORPGs? And English?

What do you do when you read/hear unknown words?
Have you ever learned words while playing MMORPGs?
Describe a memorable incident.
Did you have help learning words? From whom or what?

Describe how you learn words.
Describe how you remember words.
Do you have any tricks for learning words in MMORPGs?
Describe how you use new words.

What kinds of problems do you have learning words in MMORPGs?
How did you solve these problems?

Have you ever helped someone else learn words?
How would you recommend new players use MMORPGs to learn English words?
Describe example.

Can you explain that further? Tell me more about… What happens when…?
Is there anything else you would like to say?

Appendix 2: Examples of initially sorted codes

stressing fast communication conveying message fast communicating fast not using whole sentences communicating fast needing to conserve time happening fast typing uses too much time talking is faster	using words only for games using specific game words using specific game words using specific game words learning [in-game] abilities learning game words learning special words learning bad words	creating words based on pronunciation creating words creating words creating words creating new terms creating new pronunciation	4 x using short forms using short forms in other languages 3 x cutting down terms learning shortcut words not writing full/long forms learning short forms
recasting spelling correcting each other learning from no negative feedback laughing at me other do nothing no negative response	using single words to convey meaning using difficult words	accepting new meaning accepting new meaning	communicating with strangers communicating with strangers accessing people on server playing with strangers
using Google looking up on websites using blogs and forums researching game play using Google Googling words checking meaning checking again checking meaning again noticing special differences 2 x checking words 2 x finding meaning checking word form 2 x looking up in dictionary	advising not worrying recommending being relaxed not caring dismissing correct language	mixing languages mixing languages mixing languages mixing languages mixing languages mixing languages	2 x asking for meaning asking players about words 3 x asking experienced players learning what to do from players learning game terms from players, guild, friends explaining what to do asking anything explain things helping friends explaining how to play 2 x explaining short forms asking someone explaining in game language