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A principled approach to utilizing digital games in the language learning classroom

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Empirical research into the use of digital games for educational purposes has shown promising results such as increased learner motivation, improved learner retention of information, and increased learner interest in subject matter. Furthermore, in the field of language learning, digital games have been used successfully in a variety of ways such as improving learners' vocabulary acquisition, raising learners' awareness of audience in writing, and increasing learners' willingness to communicate. However, not all of the research into the use of digital games for language learning is positive; in some instances, the use of games can actually interfere with language acquisition. This paper will first briefly examine the potential benefits and risks of using digital games in the language classroom. Next, three principles for deploying digital games effectively in the classroom will be presented and discussed. These principles, synthesized from published empirical research into the use of games for educational purposes, are guidelines educators can follow to help ensure that learning objectives are met when utilizing digital games. Use of these principles will be illustrated with examples from published research articles.

Introduction

Given the long history of research into using games and simulations for educational purposes (Cruickshank & Telfer, 1980), it should come as no surprise that there is now great interest in utilizing digital versions of games and simulations in the classroom. Part of this interest stems from popular books on the topic extolling the educational potential of digital games. Gee

Forum

(2007), for example, makes the argument that well-designed commercial games incorporate principles of effective learning which educators should be aware of and try to include in their classroom. Shaffer (2006) additionally suggests that digital games and simulations can be used to help train learners to think and act both creatively and critically.

Empirical research into the use of digital games and simulations for education seems to confirm their potential educational value, with promising results such as increased learner motivation (Bowman 1982; Bracey 1992; Driskell & Dwyer 1984; Malone, 1981; Rieber, Smith, & Noah, 1998), improved retention of information (Garris, Ahlers, & Driskell, 2002; Hays & Singer, 1989), and increased learner interest in the subject matter (Greenblat, 1981). Video games have been used successfully in a wide variety of educational settings including military training (Garris & Ahlers, 2001), kindergarten classrooms (Din & Calao, 2001), and high school physics classes (White, 1984). In the field of language education, video games have been utilized to aid vocabulary acquisition (Miller & Hegelheimer, 2006; Ranalli, 2008), improve learners' awareness of audience in writing (Coleman, 2002), and increase learners' willingness to communicate (Rankin, Gold, & Gooch, 2006).

However, care must be taken when using video games for language learning since there is some evidence that in certain situations video games may actually interfere with learning rather than facilitate it. For example Malone (1981) reported on how certain aspects of the fantasy world presented in an educational game designed to teach fractions seemed to negatively influence female learners' engagement with the game. Furthermore, deHaan, Reed, and Kuwada (2010) demonstrated that the cognitive demands of game playing can interfere with language acquisition. In their study, one group of learners played an English language video game while a second group in another room watched the game being played on a monitor. Both groups were told to try to learn as many vocabulary words as possible from the game. On both post-tests and delayed post-tests, the group watching the game being played scored higher than the game players themselves on a vocabulary recall test of words that appeared in the game. The researchers hypothesized that the cognitive load of attending to the action on the screen while physically manipulating the game controller actually interfered with the vocabulary acquisition of the game players.

In order to help language educators successfully maximize the potential benefits of utilizing digital games in their classrooms while avoiding potential pitfalls, this paper will present three principles for the deployment of video games in the language classroom. These principles, synthesized from the published empirical research into the use of games for educational purposes, can help guide educators into making informed choices about how to use digital games in their classroom. Discussions of each of these principles will be followed with examples from two published research articles that utilized games for language learning purposes and demonstrated how these principles can be applied in practice.

Principles for using video games effectively in the language classroom

Principle #1: Choose a game that will help learners achieve the learning outcome

The first principle of using games in the classroom is to choose a game that will help the learners achieve the desired learning outcome. This principle may at first seem obvious but is actually difficult to implement in practice, since there are now literally thousands of possible games for educators to choose from, including console games playable on consumer

game hardware from game makers like Nintendo or Sony, flash-based Internet games, mobile phone and tablet gaming applications, and PC edutainment software. Additionally, advances in technology have allowed the creation of massively multiplayer online role-playing games (MMORPGs) such as *World of Warcraft*, in which thousands of players explore the game and interact simultaneously. Empirical research into using these MMORPGs for language learning purposes has shown promising results, such as increases in learner willingness to communicate in the target language (Reinders & Wattana, 2012) and the potential to increase learners' listening, reading, and writing skills (Suh, Kim, & Kim, 2010). However, MMORPGs can have high technical demands, such as requiring sophisticated graphics cards or high-capacity broadband Internet access in order for the game to be played, making their deployment in the average language classroom difficult.

Given the overwhelming number of choices, how can educators be sure they are choosing an appropriate digital game for their class? Thinking about games in terms of the language learning affordances they provide is one method of overcoming the problem. Although there are several differing definitions of the term *affordance* (Rambusch & Susi, 2008), in this paper the term refers to features of a game that, either by themselves or collectively, provide opportunities for language learning. An examination of two cases from the published research into using games for language learning is useful in understanding the importance of considering affordances when choosing a game. First, Miller and Hegelheimer's (2006) study of vocabulary acquisition using the game *The Sims* will be analyzed. Next, Coleman's (2002) report on the use of *SimCopter* to raise learners' awareness of the importance of considering audience when writing will be examined.

Miller and Hegelheimer (2006) conducted an experiment to investigate the effects of instructional support and supplemental materials on vocabulary acquisition when using video games as a language learning tool. The participants in their study were first year university ESL students in the United States. For their study, Miller and Hegelheimer chose the popular PC game *The Sims*. In *The Sims*, players help a virtual family of characters (known as "Sims") to live out their daily lives. Players satisfy Sims' desires by giving them a variety of commands. For example, players can tell a sleepy Sim to go to bed, or a lonely Sim to call a friend. Additionally, Sims have jobs and earn money. Players use this money to purchase various household items, such as furniture or electronics, for their Sims to interact with. When purchasing items for their Sims, players must navigate an Ikea-like catalog of items, each with its own unique and often quirky description.

What affordances did *The Sims* offer to Miller and Hegelheimer for their study? One affordance was the context of the game. Because "the game focuses upon the lives of the characters who eat, socialize, work, play, and rest in a pseudo-reflection of American life" (Miller & Hegelheimer, 2006, p. 315), participants in the study would likely be familiar with situations that appeared in the game even if they were not normally game players themselves.

The vocabulary that appeared within the game was another affordance for the researchers. A detailed analysis of the vocabulary revealed that 77% of the words that appeared in the game were among the 2,000 most frequently used English words. The researchers felt participants would likely already be familiar with these words, which meant that nearly 80% of the game text would be initially comprehensible. Additionally, 6% of the words in the game appeared on the Academic Word List. Learning these words would likely be beneficial to the participants' studies, and so it was hoped that some of these words would be acquired by the participants during the experiment.

The cultural authenticity of the game provided yet another affordance. For example, Sims

go to work and earn money, which players then use to buy items for their Sims to interact with. Generally speaking, the more expensive the item, the happier the Sims are with it. Clearly this gameplay system emphasizes American cultural values such as the importance of capitalism and consumerism. Additionally, *The Sims* series of games often contain explicit cultural references. For example, in *The Sims 3* game, players can obtain a painting for their Sims called "Puck's Soliloquy." The description for this item is written in the style of a Shakespearean sonnet. Those with a Western educational background will likely recognize this as a tongue-in-cheek reference to the classic Shakespeare play "A Midsummer Night's Dream." However, learners coming from other educational backgrounds may be baffled by the odd grammar and rhyming pattern in the item description. These implicit and explicit cultural references in the game provided Miller and Hegelheimer with the opportunity to create support materials explaining the cultural references and to examine what effect, if any, these support materials had on the vocabulary acquisition process.

The contextual, vocabulary, and cultural affordances provided by *The Sims* made the game an obvious choice for Miller and Hegelheimer's study. Yet the language learning affordances of games are not always so obvious. For example, when Coleman (2002) sought to raise his pre-university **ESL** writing composition learners' awareness of the importance of considering audience when writing, he chose *SimCopter*. As the title suggests, *SimCopter* is a 3D helicopter simulation game in which players fly around a virtual city and respond to a variety of disasters such as traffic accidents, fires, and crimes. The game requires no writing and minimal reading on the part of the player, and therefore seems at first to be an unusual choice for an **ESL** composition class. What affordances did *SimCopter* offer to Coleman and his learners?

One major affordance of the game was that, in addition to flying around the city in the helicopter, players also have the ability to land and disembark in order to walk around the virtual city on foot. However, while outside of the helicopter players lose access to information which normally appears in the helicopter's heads-up display, such as a compass which shows their directional heading and a mini-map showing their location within the city. The feature was initially implemented so that players could get out to help injured pedestrians into the helicopter for transportation to the hospital. Coleman, however, utilized this feature in a unique way.

First, he cast the learners in the role of a helicopter service that provides written directions to destinations within the game for pedestrian clients. In this phase of the activity, learners in small groups were given a specific destination that a pedestrian client would like to reach and are asked to plot the course that the client will need to take from the heliport to get there. The students collaboratively wrote detailed directions for the client to follow and subsequently tested these directions themselves by getting out of the helicopter and walking the proposed route.

In the next part of the activity, learners took on the role of the pedestrian client and attempted to navigate to a prescribed destination within the game based on the written directions provided to them by a different group of students. Problems with audience consideration in the writing quickly became apparent at this point in the activity as learners struggled to follow the directions written by their classmates. In the final part of the activity, Coleman held a class discussion to highlight the problems with audience awareness that appeared in the students' directions and to explicitly raise the learners' awareness about the importance of considering audience when writing. Therefore, while at first seemingly

an unusual selection of game, *SimCopter* in fact provided key affordances that Coleman effectively utilized to help his learners meet the learning objective.

As Miller and Hegelheimer's and Coleman's studies show, choosing an appropriate game is essential to effectively utilizing games in a language learning setting. However, while choosing a game that provides affordances for meeting learning outcomes is important, the choice alone is not sufficient to ensure that the outcomes will be met. Supplementary materials and scaffolding are also key factors in the successful use of video games in the language classroom.

Principle #2: Provide supplementary materials that help focus learners on the language

Because video games are both fun and cognitively demanding, it is possible for learners to be engaged with and enjoy an activity that utilizes video games without actually meeting the activity's learning objectives (Leutner, 1993). Properly designed support materials and scaffolding, however, can help mitigate this effect and keep learners focused on the activity's goals. Mayer, Mautone, and Prothero (2002) demonstrated this in their study of the effectiveness of a geological simulation game on learning among university students. The researchers found that learners who received both supplemental materials and explicit instruction from teachers on how to use the materials performed better in the game than those who did not.

Miller and Hegelheimer's (2006) study also confirms the importance of supplemental materials when using digital games as a language learning tool. The researchers developed several different supplemental materials for participants to use while playing *The Sims*, including vocabulary lists and exercises for words learners would likely encounter during their gameplay, grammar notes and exercises, cultural notes, and access to an online dictionary. For each day's activities with *The Sims*, the researchers divided the participants into three groups. One group was required to use the supplemental materials during their gameplay activity. The second group was given access to the supplemental materials, but their use of the materials was optional. The final group was given no supplemental materials. At the end of each play session, learners from all groups were given quizzes on the grammar and vocabulary that appeared in the game during the day's activity. The researchers found that, to a statistically significant degree, the group required to use the supplemental materials during each day's activity outscored the other two groups. Identical results were found by Ranalli (2008) in a replication study, confirming Miller and Hegelheimer's initial findings. Both of these studies provide important empirical evidence that supplemental materials aid in the language learning process when using video games as an educational tool.

Coleman's (2002) study provides another example of how support materials and scaffolding are crucial in helping learners to meet learning objectives while engaging with video games. Coleman hoped to raise his learners' awareness of the importance of considering audience when writing. He chose the video game *SimCopter* for this activity, which at first seems an unlikely choice because the game does not inherently require any writing on the part of the player. As discussed previously, Coleman remedied this situation by taking advantage of the game's affordances to design a writing task that would foreground the issue of audience awareness. To help achieve the lesson's learning objective, Coleman created supplemental materials that would structure the activity so that it would run smoothly

and so that learners would focus on the language rather than simply play the game. For example, he organized the activity using web pages that provided learners with important information such as how to start and stop the game, the game controls, and the schedule of activities for each day. He also created role cards that clearly explained to learners the tasks they needed to perform during each part of the activity. Most importantly, however, Coleman organized a "debriefing" session in which the class reflected together on the outcomes of the activity. This leads us to our third principle for using games effectively in the language classroom.

Principle #3: Provide an opportunity for "debriefing"

Reflection, or "debriefing" as it is sometimes called, is crucial for learners when simulations and games are used in the classroom so that learners can relate their experiences playing the game to the course goals and objectives (Peters & Vissers, 2004). Debriefing helps learners explicitly reflect on how well they have met those goals and objectives. It also allows learners the opportunity to compare their experience with that of their classmates to obtain a broader perspective of the activity and its goals. Crookall (1992) goes so far as to say that "debriefing is perhaps the most important part of a simulation/game" (p. 141).

The importance of debriefing can be clearly seen in Coleman's (2002) study. After the learners had the opportunity to both give directions as a helicopter pilot and follow directions as a pedestrian client, Coleman held a class-wide debriefing session in which he distributed one set of anonymous student directions to the class. Using a projector and the teacher's computer to display the game in front of the class, Coleman entered the game and had the students use the directions to advise him on how to proceed to the destination. Problems with the student directions became apparent as the teacher struggled to reach the destination, even with suggestions from the class. For example, Coleman notes that student directions often referred to cardinal directions. Yet pedestrians in the game have no access to a compass, which makes such directions useless. Another problem is that students often referenced landmarks – for example, buildings – that are clearly visible from the helicopter hovering over the city but obscured from the pedestrian's view at street level by other structures. Coleman worked with the class to analyze these problems and why they occurred. Through this process, as Coleman notes, learners see the directions "as their audience sees it, not merely as a writer unconnected to audience sees it" (p.228). The debriefing session therefore was essential to helping the learners connect the activities involving *SimCopter* with the learning objective of raising awareness about the importance of considering audience when writing.

Interestingly, Miller and Hegelheimer's (2006) study, despite being focused on how supplemental materials affect vocabulary acquisition, also included an opportunity for debriefing. After each day's activities, learners were required to write a summary describing what they had done to complete the day's task. Clearly, summaries are a limited and somewhat shallow form of reflection, and it is unclear from the study what effect, if any, these summaries had on the participants' language acquisition process. However, it is interesting to note that despite the fact that investigating learner reflection was not one of the targets of the research, the researchers still chose to include debriefing as part of the experimental

design. This seems to be further testament to the importance of providing learners opportunities for reflection after engaging in language learning activities that utilize games.

Conclusion

Although empirical research into the use of video games for language learning has shown some promising results, care must be taken when deploying video games in the language classroom in order to ensure that learning objectives are met. By adhering to the following three principles, educators can help ensure that students successfully achieve the activity's learning objectives while using digital games for language learning.

1. Choose a game that will help learners achieve the learning outcome: The affordances for language learning of each game under consideration for use must be weighed against each other. The affordances of the game may be immediately clear, as was the case with *The Sims* in Miller and Hegelheimer's (2006) study, or they may not be immediately obvious, as was the case in Coleman's (2002) study.
2. Provide supplementary materials that help focus learners on language: Supplemental materials and teacher scaffolding can help keep learners on-task and increase the likelihood of learners meeting the learning objectives.
3. Provide an opportunity for debriefing: Guided reflection on the day's activities provides the learners with an opportunity to relate their experiences playing the game to the language learning objectives and therefore increases the likelihood of those objectives being achieved.

While future research into using video games for educational purposes is likely to provide further insights into how to use games effectively in a language learning setting, following these three research-backed principles can help ensure the successful use of video games in the language classroom.

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