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Incidental Learning of Japanese Through Reading
Online, in Print, and in Digital Games

Jeff Lynn Peterson

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Arts

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ABSTRACT

Incidental Learning of Japanese Through Reading Online, in Print, and in Digital Games

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An increasing amount of attention has been brought to language learning through digital games. Incidental learning through different media types such as in print and online have also seen an increased amount of research done in recent years. This study examines the amount of incidental learning that occurs across three media types (in print, online, and in a digital simulation game) as well as participants' perceptions of how enjoyable and helpful these media types are. Results suggest that of the three media types, incidental learning occurred most through the online reading. Furthermore, although not statistically significant, participants in the present study found the reading in print to be most enjoyable and helpful.

Keywords: incidental learning, Japanese, reading, online, manga, COTS, games, game-based learning, game-enhanced learning

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Chapter 1: Introduction

Introduction

Over the past decade there has been increasing interest in the use of digital media for learning purposes. This includes learning online (Rafatbakhsh & Alavi, 2014) as well as through digital games (Sykes & Reinhardt, 2013). Research into the learning that occurs through digital media is being conducted at all educational levels. Some universities, such as Northern Illinois University, have even adopted a “game-based environment” (Sykes & Reinhardt, 2013, p. 138) as the medium of classroom instruction (Coller & Scott, 2009). For example, the Northern Illinois University reorganized an undergraduate mechanical engineering course in numerical methods into a semester long video game-based project.

Some extremely successful commercial-off-the-shelf games (COTS) such as World of Warcraft and Minecraft have also been used in educational settings to test the effects they have on an array of learner abilities (Thorne, 2008). Even the U.S. government (including the U.S. military) has created digital games for learning (specifically for teaching American English and culture); e.g., Trace Effects, Word Soup, and Phrases in Space (<http://traceeffects.state.gov/>). With this increased interest, there has been a considerable amount of research done that has found games in learning to be beneficial to learners. Some of those benefits include increased vocabulary acquisition (Miller & Hegelheimer, 2006; Ranalli, 2008), increased second language (L2) communication (Chik, 2014), increased listening and reading comprehension (deHaan, 2005), as well as increased L2 engagement (Sylvén & Sundqvist, 2012).

There has also been much research on the amount of incidental learning that occurs during different activities such as reading online and in print. Incidental learning of language may be defined as the unintentional learning of some language aspects such as vocabulary or

culture. Much of incidental learning research focuses on the acquisition of vocabulary (Akbulut, 2007). One factor that seems to increase the amount of incidental learning of vocabulary is a combination of visuals with the text (Akbulut, 2007). Researchers have also suggested that the amount of incidental learning may rival intentional learning (Alipour Madarsara, Youhanaee, Barati, & Nasirahmadi, 2015). Furthermore, the extent of the research looking at incidental learning across media types focuses on reading in print alone or reading in print and online (Rafatbakhsh & Alavi, 2014).

Statement of Problem

Despite growing research in the use of digital media for language acquisition, there are several languages that have remained relatively ignored in this area. For example, research on the benefits of reading online, as well as in games in Japanese learning has yet to be done to the same extent as other languages and can be informed from the body of research that is currently available. Furthermore, this body of research could be bolstered by specific investigation of the incidental learning that occurs while interacting with digital media. In an effort to fill this gap some have studied the relationship between reading material (digital and in print) and amount of incidental English language learning (Rafatbakhsh & Alavi, 2014). The present study investigated the relationship between media type (e.g., print text, digital text, and digital simulation games) and amount of incidental Japanese language learning, as well as the degree to which learners felt these materials were helpful and enjoyable.

Chapter 2: Review of Literature

Literature over the past 10 years shows an increasing amount of interest in the use of digital media in language learning. Furthermore, there continues to be research published on the degree of incidental language learning that occurs through differing learning platforms. The following review of literature will cover these topics, specifically looking at digital games, content-based instruction, and incidental learning.

Digital Games in Language Learning

Digital games in language learning have received quite a bit of attention over the past decade with research articles (Chik, 2014; deHaan, 2005; Neville, Shelton, & McInnis, 2009; Peterson, 2011; Thorne, 2008; Yip & Kwan, 2006) as well as books (Sykes & Reinhardt, 2013) being published on the topic. For example, deHaan (2005) conducted research that looked into the effects of playing a baseball video game in Japanese. In the study, a single participant took writing and listening pre-tests prior to playing the baseball game for one month. After a month of play, the student's abilities were assessed and he was asked what his attitudes towards the game were. deHaan found that the student had a difficult time concentrating on both the game and language learning at the same time. However, the student felt more comfortable with the language the more he played the game. deHaan also found that the learner's listening and reading comprehension went up. Furthermore, the learner's ability to read Japanese names after playing the game (even names that did not come up directly in the game) increased. Beyond the ability gains, the participant also noted that he still had fun even when the game was difficult. The learner continued stating that "it was fun and interesting playing a game in a completely other language" (p. 280). Like in deHaan's study, entertainment is a large factor in how many learners perceive games in learning and was a theme throughout not only the the present study,

but also other studies using games (Alipour Madarsara et al., 2015; Ranalli, 2008). Although deHaan's study lacked a large number of participants and time spent studying the use of the game, it sheds some light on the attitudes a learner might have toward games in language learning.

Despite conflicting views on the utility of games in learning (Franciosi, 2014), Yip and Kwan (2006) found that the instructors involved with using online games thought highly of the use of games in a teaching and learning environment. Specifically, they noted that instructors found online games to be effective vocabulary learning tools. Yip and Kwan investigated the difference in English vocabulary acquisition of two groups, one that used a new way of learning vocabulary using online games and one that used traditional activity-based learning. A pre-/post-test design was used to investigate if any difference in the amount of vocabulary learned through the two methods existed. Three to five weeks following the treatment, the post-test was given along with a survey questionnaire to assess the amount of vocabulary acquired and to ascertain how helpful and effective the design for each treatment was for the English learners. Yip and Kwan found that there was a 47% increase in test scores between the initial pre-test and post-test for the experiment group and a 9% increase for the control group. This difference was found to be statistically significant ($p < .01$). Furthermore, both students and teachers reflected positively on the game play and noted that the possible use of simulation games in the future may also be helpful in vocabulary acquisition. This focus on vocabulary acquisition is not uncommon among the research, with very little looking at other aspects of language learning. The present study investigated vocabulary acquisition as well as cultural aspects, and grammar acquisition.

Beyond the use of COTS, some research has been done on completely unique games made specifically for language learning (Holden & Sykes, 2011; Neville, Shelton, & McInnis,

2009; Shea, 2014). Neville, Shelton, and McInnis (2009) created a game to help their students learn German. Although games are often built for entertainment purposes alone, the game that Neville, Shelton, and McInnis created was built with learning objectives as its priority. In this study, seven third-semester students studying German were split into a control group and an experiment group. The experiment group received the game and completed homework based on the vocabulary presented in the game. The control group read stories that covered the same content as the game and were required to complete the same homework assignments and write a short essay. Along with the identical homework, students were required to take a survey containing Likert scales. On the Likert scales, students indicated “the apparent complexity and difficulty of the assigned task, mental effort spent on the task, sense of immersion in the German culture, enjoyment of the task, and the degree to which the task engaged and retained attention” (Neville et al., 2009, p. 415). The researchers found that the average perceived effectiveness of the tasks was higher in the control group than in the experiment group. Furthermore, the control group was more confident in their mastery of the language and had higher levels of satisfaction than the experiment group. However, the overall scores on the assessments show that the group that used the digital game did better. Curiously, the experiment group did not find the assessments as difficult as the paper-based group did. This is particularly interesting, in that the researcher supposed that both groups would find the assessments to be equally difficult. The same was found for the homework; the experiment group found it to be easier. Furthermore, the experiment group expressed that culturally they got more out of the game than the control group did whose treatment was paper-based alone. Neville, Shelton, and McInnis (2009) also found it interesting “that the [digital game-based learning] students wrote longer essays, used more

pertinent vocabulary words in the essay, and manifested a higher vocabulary to non-vocabulary ratio” (p. 420).

Although there has been much to indicate the benefits of digital games in language learning, some have found difficulties in the implementation of these types of learning experiences (Peterson, 2011; Yip & Kwan, 2006). Although instructors involved in Neville et al.'s (2009) and Yip and Kwan's (2006) study found the games to be helpful, some instructors are still unconvinced that games offer real learning outcomes (Franciosi, 2014; Sykes & Reinhardt, 2013). Beyond learning aspects, sometimes students also find games difficult to use (Peterson, 2011). In Peterson (2011), English learners in Japan were asked to play a massively multiplayer online role playing game or MMORPG. Although participants were shown how to play the game and use the in-game functionality to move their character around and chat with native English speakers, all of the participants with little gaming experience had difficulty following through. These participants had a difficult time figuring out how to continue to use the commands and communication functions in the game. However, three of them were able to figure it out after one play session. Unfortunately, one participant was unable to continue after encountering multiple issues within the game. Although the experienced players in the study had no difficulty in-game, these findings suggest that difficulty level and functionality should be considered when choosing games for learning purposes. The instructor should keep the student's background and current abilities in mind when making this decision.

Later research, Sylvén and Sundqvist (2012) studied the use of extramural English activities, such as digital game play in English, in an elementary school in Sweden. Eighty-six English learners aged 11-12 participated in their study. The participants in this study were asked to engage in some type of out of class extramural English activity regularly. These activities

were decided by the students and could include an eclectic mix of activities ranging from playing digital games in English to listening to music in English. The participants in this study recorded their activities in a language diary and were given a questionnaire about the experience. They were also given three proficiency tests. Sylvén and Sundqvist found that the students who decided to play digital games often (five hours or more per week) outperformed all other students in the study. They also claim that, “background variables could not explain the between-group differences . . . [and that] the findings [suggest] that playing digital games at an early age may be important for L2 acquisition” (p. 302). One important thing to note, however, is the amount of time those students playing games spent on the task. The five hours these students spent on the task was likely a large contributor to the outcome. However, studies, including this one, have also found that students who use games in learning can outperform those who use more traditional tasks.

In 2014, Chik conducted further research in digital gaming and language learning. In her 12-month exploratory study, she conducted a survey of all first-year Chinese-speaking undergraduate students at a university where English was the lingua franca. In the survey she asked students to indicate the type and amount of L2 learning the student participated in outside of class. Although the total amount of surveys that were sent out is not reported, of all the surveys, 153 students responded and 50 were chosen by the researchers to be interviewed. These 50 were chosen on the basis that they had mentioned using games as a means of learning outside the classroom. After conducting interviews, ten students were chosen to participate in their yearlong exploratory research. “These participants were selected primarily because they were able to articulate the ways they organized their gaming practices, both for entertainment and learning and because gaming was still part of their regular routines” (p. 89). Chik engaged the

participants in writing about their gaming background, especially the role that digital games had in their L2 learning. They also had the participants join focus group discussions, write blogs, record live gaming sessions, and participate in simulated recall sessions concerning games in language learning. Through these write-ups and interviews, it was found that offline single player games limited learning to in-game texts. However, when many local and international students played multi-player games together on laptops, English became the language used for communication. These findings are interesting in that through these gaming groups students were able to extend the amount of time they used the target language outside of class with other native English speakers. This is in contrast with much of the research literature where a focus of findings is on the outcome of playing the game itself and not the interaction it can produce in some other network of native speakers.

One interesting find in Chik's (2014) study was that the amount of time some students needed to study for certain classes decreased over the course of the year. One student noted that the amount of time he spent studying vocabulary for his Criminal Psychology course went down because he already knew the terminology. The student also explained that it was by playing a crime and court game along with watching similar genre TV that he was able to learn the vocabulary needed for his Criminal Psychology course.

This study also expounded upon the strategies that students use for studying while playing games (Chik, 2014). The study found that some gamers would take the time to translate games into Chinese from English or Japanese. Participants would also often “create personal L2 learning locations by” playing in English in physical locations, through English games, and through paratext production (p. 91). Another strategy found to be used by gamers in this study was jotting down unknown words and looking them up later. One of the aspects of gaming that

game developers try to create is a sense of immersion into the gaming world. Thus this strategy of leaving unknown words to be looked up later helps those learning a language create and keep a sense of immersion in the game. This style of learning is also characteristic of traditional extensive reading activities where dictionaries are left out of the activity. This gives learners the ability to focus on the content of what they are reading rather than on each individual word.

Participants in Chik's (2014) study also noted that one reason for writing down unknown words in a game, besides for language learning, was to be able to advance in the game later on. These unknown words can become critical to advancement within digital games. Though many gamers prioritize the game over learning, it was found that some intentionally try to learn through jotting down words they do not know. Furthermore, gamers in general were not found to like educational games but were aware of the learning potential through using games in a target language. Language differences in some games also deterred some from playing the games altogether. It is interesting to note, however, that when posting this concern on an online discussion forum, many forum users commented back in support of playing games in an L2 and were willing to help the participants out. The forums and blogs these students used included “Hong Kong Discussion Forums (Hong Kong), UWants (Hong Kong), HKGolden (Hong Kong), Gamer (Taiwan), mobile01 (Taiwan), wahas (Taiwan), Netshow (China), A9VG (China), and Sina (China)” (Chik, 2014, p. 97). More research is needed in this area to expand on understanding the views of those who use games in language learning and the amount of time on task these types of learners spend using these types of digital games.

Simulation Games in Language Learning

Simulation games have been used in the past for language learning because of the amount of everyday language (vocabulary, grammar, etc.) that is used in them (Miller & Hegelheimer,

2006; Ranalli, 2008). Recent studies suggest that simulation games offer a more interesting and involving environment than other games and provide the learner with the opportunity to interact with the game environment for both learning and entertainment purposes (Peterson, 2009; Yip & Kwan, 2006). Miller and Hegelheimer (2006) studied the effects of using the popular simulation game, *The Sims*, in an effort to help eighteen intermediate adult English as a second language (ESL) learners deepen their vocabulary knowledge. For five weeks the ESL learners played the simulation game as part of the English course they were participating in. Over the five weeks participants used different sets of supplemental materials while completing tasks in the game. These supplemental materials included vocabulary lists, vocabulary exercises, grammar descriptions, grammar exercises, cultural notes, as well as an on-line dictionary. The completion of these tasks were done in three different conditions. In the first condition, learners were required to use supplementary materials while completing the in-game tasks. In the second condition, the supplementary materials were available but not mandatory. In the third condition, no supplementary materials were available. Throughout the study the learners took quizzes, completed questionnaires, as well as post-project surveys. After an analysis of the data, Miller and Hegelheimer found that there was a statistically significant increase in the vocabulary acquired while playing the game in the first condition; i.e., when the use of the given supplementary materials was required. Although the researchers acquired information on the students' perceptions of the supplementary materials, they did not include the students' perceptions of the utility of the game itself.

In a follow-up study, Ranalli (2008) was able to collect information on students' perceptions thus ameliorating one problem the original study had. In that study, Ranalli expanded on the findings of Miller and Hegelheimer by finding out how participants responded

“to the supplementary materials and modified mode of play” (p. 444). Furthermore, Ranalli explored the degree to which participants enjoyed playing *The Sims* and how the learners perceived the game’s utility in their language learning. The findings in Ranalli’s study reflected the findings of Miller and Hegelheimer’s study in that the portion of the experiment where students had access to all of the supplementary material was found to be the most effective for language learning. Moreover, “the results suggest that combining . . . supplementary materials with structured play of *The Sims* does indeed contribute to vocabulary acquisition” (Ranalli, 2008, p. 448). In answer to Ranalli’s question of the degree to which learners enjoyed the game, most participants found the game to be enjoyable. Furthermore, most participants in the study found the project to be helpful. Again, this quality of enjoyment is relatively consistent throughout the research and seems to be one important aspect of learning activities for students.

These types of perceptions have also been discussed in research by Melby (2002). When speaking about the Brigham Young University electronic film review project, Melby mentioned that “student success is strongly influenced by student interest” (p. 172). Thus, the fact that learners in Ranalli’s (2008) study, and other studies mentioned here, found the game to be enjoyable and useful is especially important for further study in this area.

Although these studies focused their research questions on vocabulary acquisition alone, they add much to the literature on the subject of games in language learning. Specifically, Miller and Hegelheimer (2006) and Ranalli (2008) added to what we know concerning the speed and amount of vocabulary acquired over a certain time (also see Akbulut, 2007; Alipour Madarsara, Youhanaee, Barati, & Nasirahmadi, 2015; Ghanbaran & Ketabi, 2014; Hemmati & Asmawi, 2015; Pulido, 2007; Rafatbakhsh & Alavi, 2014; Webb, 2008; Yip & Kwan, 2006; Yoshii,

2006). Furthermore, Neville et al. (2009) expanded their study and looked also at what is acquired in reading and cultural awareness as well.

Content-based Instruction

These types of digital games along with other authentic texts both online and in print give learners tools through which they can receive contextualized content in the L2. Furthermore, the content provided through these media types do as Met (1999) suggests, demand “a level of learner engagement” (p.150). Digital media including digital games also offer material that “extends beyond the target language or culture” that is being specifically taught in language courses (Met, 1999, p. 150). This type of learning through contextualized content is similar to that of Content-based Instruction (CBI) (Larsen-Freeman & Anderson, 2013; Shrum & Glisan, 2010).

CBI is based on the idea that one can learn a language by means of some other content not specifically related to language learning itself (Larsen-Freeman & Anderson, 2013). The content of CBI is most often based around some other academic material such as history, literature, or science (Brinton, Snow, & Wesche, 2003; Larsen-Freeman & Anderson, 2013). In the context of this study the theme of the other content is day-to-day dialogue-based digital games, as well as stories told through manga in print and fairy tales online. In their book titled *Techniques & Principles in Language Teaching*, Larsen-Freeman and Anderson (2013) argue that the use of academic material “provide natural content for language study.” This CBI style of learning provides context for the language that is being studied and helps learners gain not only language skills but also knowledge about the culture that learners must perform in.

Support for CBI comes from research based on multiple hypotheses including Stephen Krashen’s Input Hypothesis, Michael Long’s Interaction Hypothesis, Merrill Swain’s Output

Theory, and Lev Vygotsky's Sociocultural Theory (Stoller, 2008; also see Krashen, 1982; Long, 1983; Swain, 1985, 1995; Vygotsky, 1978, 1986). Specifically, Krashen's Input Hypothesis suggests extensive reading will provide many opportunities for acquiring authentic language much like CBI. Thus, learning activities similar to CBI, such as those in the current study, have also been supported through the research.

Incidental Learning

CBI often takes advantage of incidental learning. The incidental learning of language may be defined as the unintentional learning of some language aspects such as vocabulary or culture. Much of incidental language learning research concerns the acquisition of vocabulary items. Others look at what is needed for learning to occur. Specifically, Schmidt (1995) suggests that attention and noticing are necessary for learning to occur. Schmidt argues that this combination of attention to those words and patterns unfamiliar to the learner and noticing, or a "low level of awareness," is what leads to an unconscious (incidental) style of learning (p. 1). This style of learning is often what occurs during different types of reading activities.

Much of incidental learning research has suggested that incidental learning of vocabulary occurs while reading in one form or another (see for example Akbulut, 2007; Hemmati & Asmawi, 2015; Hulstijn, 2008; Krashen, 2004; Rafatbakhsh & Alavi, 2014; Waring & Takaki, 2003; Webb, 2008). Akbulut (2007) looked at the effect of multimedia annotations on incidental English vocabulary learning. The participants in Akbulut's study all used hypermedia reading software for a reading activity. This software gave the students the ability to view annotations to the reading selection. In this experiment participants were separated into three groups with different annotation forms. Some were given definitions alone for possible unknown words, while others received definitions and visual cues (e.g., pictures for one group and video for

another). Akbulut's approach to testing the incidental vocabulary learning was to purposefully not inform participants of the vocabulary test that took place immediately after the reading activity. Pre-tests, immediate post-tests, and delayed post-tests were used to ascertain the amount of incidental learning that had occurred during the reading activity. Akbulut found that the two groups that had received the visual annotations alongside the definitions (both the picture group and the video group) "had significantly higher vocabulary scores on both immediate and delayed post-tests than the definition only group" (p. 499). These findings support the idea that some type of visual aid is helpful in learning. This was taken into consideration in the current study where all media types used had some form of visual aids to help participants understand from the context of the reading material instead of the definition of words alone.

In a similar study, Rafatbakhsh and Alavi (2014) tested the effect of online reading and reading in print on incidental vocabulary learning. After separating a group of 33 English students into the online and in-print groups, the researchers had the learners take a pre-test from which the target vocabulary for the study was taken. The vocabulary items that 70% of the students didn't know were used then for both the immediate post-test as well as the delayed post-test. For up to six weeks the two groups read one "whodunit" story each week. Following the reading activity, students took a quiz that contained a vocabulary section. The vocabulary section of these quizzes was used as the immediate post-test. A delayed-post test was then conducted 5 weeks after the final reading activity. When analyzing the data, the researchers used independent samples t-tests (for comparing the two groups' incidental vocabulary acquisition at pre-tests, immediate, and delayed post-tests). For both online and in-print reading activities they found that the difference between the pre-test and the immediate, and the pre-test and the delayed post-test were both statistically significant. However, there was no practical or statistical

significance in the difference between the two groups. One may expect these results given that the difference between the experiment group and control group was the difference between a printed copy and a digital copy of the same content. More research is needed to investigate the relationship between media type and incidental second language learning. To further investigate this relationship, the present study will include similar, yet different, content between the in-print material and the digital material. Furthermore, the use of a third material type, a digital game, will be studied.

Although Rafatbakhsh & Alavi's (2014) study lacked the game comparison group, a recent study looked at the effects of playing games on incidental vocabulary learning in young English as a Foreign Language (EFL) learners (Alipour Madarsara et al., 2015). In their study, Alipour Madarsara et al. practiced vocabulary items with elementary level learners through the use of flashcards and in-class traditional games; e.g., pointing at the card that correlates with what the instructor says. To find the degree to which incidental learning had occurred throughout the study, one group was told about a vocabulary test which took place at the end of the study (which they deemed the intentional learning group) and the other group was not told about the exam (which they deemed the incidental learning group). The exam results revealed that although both groups showed an increase in vocabulary knowledge, “the incidental group outperformed the intentional group in the comprehension task” (p. 23). Furthermore, the difference between the two groups was found to be statistically significant ($p < .05$). The researchers further noted that it “should be mentioned that practicing new vocabularies through games engaged learners’ cognitive processes in which they had to select and classify the materials in their minds to carry out the task” (p. 31). Moreover, the amount of enjoyment that the learners found in playing the game as a learning activity was meaningful as the students all

sought to continue the learning activity after the activity had ended. The researchers stated that all

the young learners in both groups had a feeling of amusement and enjoyment at the end of the game. They even expressed their amusement toward the task during the treatment period for several times and asked sincerely to continue the game in the next sessions of the term. (p. 32)

Further research has also looked at the use of graded readers in incidental vocabulary learning at the high school level (Hemmati & Asmawi, 2015). In their study, Hemmati and Asmawi tested 30 Iranian high school students' abilities to recall the vocabulary that appeared in a graded reader. They were tested immediately after the reading and then again one month later. The test included three parts; a word-recognition test, a multiple-choice meaning recognition test, and a word translation test. Although statistical significance is not stated in the study, the researchers found that vocabulary gains occurred through reading, which was reflected through the given tests. These types of studies looking at learning through reading alone are also bolstered by findings found in books such as Stephen Krashen's *The Power of Reading* (Krashen, 2004).

Reading. Although much of incidental learning research focuses on the learning of vocabulary, studies on reading in general, free voluntary reading (FVR), extensive reading, and sustained silent reading (SSR) show that not only vocabulary, but also grammar, writing, spelling, as well as oral and aural language abilities may be gained incidentally through reading (Greaney, 1970; Krashen, 1989, 2004). In particular, Collins (1980) and Hafiz and Tudor (1990) found that students who read extensively were more successful in spelling than those who did not read through a similar SSR program. In another similar study Elley and Mangubhai (1983)

found that elementary ESL students who participated in a FVR program far surpassed their non-FVR program peers in reading comprehension, writing, and in grammar use. A later study by Elley (1991) also found similar results with students gaining greater ability in grammar, listening comprehension, reading comprehension, oral abilities, and writing. These studies suggest that reading in general has great benefits which instructors should consider taking advantage of in their teaching. Reading can be done in many formats, not only in printed text, but also online and in digital games as well. One may also expect that the benefits of reading a printed text would also exist in reading in other material types as well.

Summary and the Present Study

In summary, much research has been done in regard to learning through digital media as well as reading online and in print, most of which has been done to reflect the use of these media types in English learning. Research on incidental learning has also been done with a focus on the incidental learning of English vocabulary. This leaves a gap of research to be done investigating digital media and the incidental learning that occurs while reading in multiple media types in other languages. More research is needed to study the relationship between media type and the amount of incidental learning of not only second language vocabulary, but also of other categories such as cultural aspects and grammar. The present study seeks to fill this gap by answering the following research questions.

Research Questions

1. Is there a relationship between media type, such as print text, digital online text, and digital simulation games, and the amount of incidental second language learning?
2. To what degree do learners enjoy reading materials presented as a print text, digital online text, and digital simulation game?
3. How do learners perceive the utility of reading materials presented as a print text, digital online text, and digital simulation game?

Chapter 3: Methodology

Participants

Participants in this study included 27 students from a single third semester Japanese course. The students' ages ranged between 17 and 24. The average age of the group was 20. Although the participants' male-to-female ratio was expected to be 1:1, it was actually 1:2 (66% female). The first language (L1) of 26 of the participants was English. The Twenty-seventh participant's L1 was Portuguese. Furthermore, 21 participants (77.78% of participants) identified themselves as Caucasian, three identified as Asian, one identified as Hispanic/Latino, and two identified as Asian-American. Two female students also reported being of Japanese descent.

Participants came from a variety of backgrounds and motivations. When asked about their background with Japan or Japanese 12 participants reported viewing anime or manga as part of their initial interest in Japanese culture and studies. Furthermore, three students reported having been to Japan previously and 11 other students reported studying Japanese prior to attending the university.

The participants were chosen based on their level of Japanese at the time of the study and the perceived level of difficulty of the media types that were used. All participants were able to read and write fairly consistently all of the characters in two Japanese alphabets, namely hiragana and katakana. Up to the time of the study, the participants had studied at least a total of 526 characters (kanji characters and compound kanji characters [*jukugo*] combined) at some time during their first two semesters of Japanese. Based on the stated outcome from student's previous classes, they would have also been expected to be able to read and understand basic

memos and letters in Japanese. Furthermore, they were expected to be able to make and receive phone calls and make orders at a restaurant.

The participants average, self-reported, university grad point average (GPA) was 3.4. The average grade the participants earned in their first-year first-semester course of Japanese was an A- (3.7 GPA, self-reported). The average grade they earned in their first-year second-semester course of Japanese was a B+ (3.4 GPA, self-reported). Furthermore, the average number of years the participants had studied Japanese up to the point of the study was 2.85 years. Both of the participants who reported being of Japanese descent reported studying Japanese for eight or more years. When these two are excluded from the calculation, the average number of years participants had studied Japanese is 1.99 years.

When asked to describe their background with reading in Japanese in print, 11 students reported that the extent of their reading in print was what they did as homework for classes. Four other students reported that they had no background experience with reading Japanese in print at all. The other 12 students reported little experience, some of which was reading children's books, manga, etc. When asked how often they read in print in Japanese, 3.70% of students answered very often, 18.52% answered fairly often, 44.44% answered sometimes, 29.63% answered almost never, and 3.70% answered never.

When asked about how often they read online in Japanese, 7.41% of students answered very often, 18.52% answered fairly often, 29.63% of students answered sometimes, 29.63% answered almost never, and 14.81% answered never. Many participants also reported that they were familiar with internet applications and websites that assist learners in their studies. In particular, many commented that they use websites and applications that help them look up and study kanji. One student noted using a website called WaniKani to study kanji. Another

mentioned using an internet browser application called Rikaisama, a pop-up dictionary for easy access to readings and translations of web-based Japanese text. Five students mentioned reading blog posts and other posts on social media in Japanese. One participant in particular noted that “[b]ecause the internet is global, [Japanese text is] common on Youtube” and other websites like Twitter. He continued saying, “I try to read [online posts written in Japanese] with my level of knowledge. I generally don't understand unless it's a common phrase.” Another student mentioned “[v]isiting Japanese websites to some of [his] favorite videogames to gather information about them while [he] wait[ed] impatiently for an American release.” Some other students mentioned going online to look up information on anime, read manga, read song lyrics, or to view dramas all in Japanese.

When asked about how often they play digital games in general, 29.63% of students answered very often, 18.52% answered fairly often, 22.22% answered sometimes, 22.22% answered almost never, and 7.41% answered never. Only one male student answered almost never, and no male students answered never. In contrast, five female students answered almost never, and 2 answered never. However, 27.78% of female students answered very often, which is more than the 16.67% of male students who also answered very often. One student who reported playing digital games in general very often commented saying, “I play games almost daily. I have imported games from Japan and enjoy playing online Japanese net games. I also watch Japanese “let's plays” on a regular basis.” (Let's play videos are videos of a person or persons playing a game while often giving commentary on their play-through. They also often give guidance to those watching on how to proceed through the game.) Some participants who reported playing video games almost never or never mentioned that they played digital games more as a teenager but no longer play them that much anymore. Many of these participants

further noted that they easily get bored with digital games. One student who reported playing digital games in general reported that he would “often force [him]self to play games like Pokémon in Japanese instead of English.” Another participant similarly commented saying, “I play a lot of video games. Most don't have an option for Japanese text or audio, but in the games that do, I nearly always use it. I enjoy using digital games to learn because I get to engage in a fun activity while trying to improve my language skills.” Many of the participants who reported playing digital games further clarified that they had been playing games since they were young and would play whenever they had free time or didn't have schoolwork.

When asked about what types of digital games the participants have played in the past, over 40% said that they had played role-playing games (RPGs), eight participants mentioned playing puzzle or strategy games, and eight had played shooter or fighting games. Six students mentioned playing games like Mario and The Legend of Zelda on a dedicated console system. Five participants also mentioned playing games online such as MMORPGs. Due to the large number of smart devices that are used daily around the world, it was surprising to find that only five students mentioned having played digital games on some type of mobile device; e.g., smart phone, etc. Furthermore, only two students mentioned playing some type of traditional game, such as the digital version of the card game Solitaire.

When asked to identify the type of game that they play the most, 10 students answered RPGs, seven answered puzzle or strategy games, and three answered console games (two specifically mentioned the Nintendo Wii console). One participant answered online games, shooter and fighter games, and mobile games each. Those participants who mentioned not playing digital games at all or almost never did not answer this question.

The researcher also asked participants what percent of the time that they play digital games is spent reading in-game text. The average was 36% of the time. The highest reported amount was 100% and the lowest was 0%.

When asked about how often they play digital games in Japanese, there were no students who answered very often, 7.41% answered fairly often, 11.11% answered sometimes, 22.22% answered almost never, and 59.26% answered never. Thirteen of the students also confirmed that they had played a digital game in Japanese before, even if only for a few minutes. Of those 13, the average number of times they had played a digital game in Japanese before was approximately three times.

Context

This study took place at Brigham Young University (BYU). BYU is a large private university located in Provo, Utah, U.S.A. BYU is owned and operated by the Church of Jesus Christ of Latter-day Saints. “BYU students come from all 50 states, the District of Columbia and 110 countries” (“Y facts,” 2014b). Between 2010 and 2014, an average of 31,835 students enrolled at BYU (“Y facts,” 2014a). Between 2010 and 2014 an average of 98.7% of enrolled students identified themselves as members of the Church of Jesus Christ of Latter-day Saints (“Y facts,” 2014c).

Instruments

Incidental learning worksheet. To measure the amount of incidental learning that occurred during each treatment, an incidental learning worksheet was used (see Appendix A). The researcher created the worksheet under the guidance of his committee. The worksheet includes four different sections, a vocabulary section, grammar section, kanji characters section, and a cultural aspects section. The researcher also provided a section for the participants to fill

in the English translation of the items they write down in the first three sections mentioned here. To quantitatively assess these worksheets, a point system was used. The researcher gave a full point for each item that was written in Japanese correctly with the correct English translation. He gave three quarters of a point for each item that had the correct English, but may have had a slight mistake in the Japanese; e.g., a missed stroke in a character, putting the character for pu instead of pe, etc. If the student just put the Japanese and no English, the researcher gave them a half a point. If the student wrote only the Japanese with a slight mistake (similar to above), or an English word that they felt they could recognize in the future, they received a single quarter point. Finally, for each accurate cultural aspect that the student provided, a full point was awarded.

Another characteristic of the Incidental Learning Worksheet is the knowledge scale. The current study uses an adaptation of the Vocabulary Knowledge Scale created by Marjorie Wesche (Paribakht & Wesche, 1993). In their 1993 study, Paribakht and Wesche tested students' knowledge of specific content vocabulary, discourse connectives and grammatical knowledge. Paribakht and Wesche chose the items that they tested specifically with the goal of creating the Vocabulary Knowledge Scale that the current study's knowledge scale is based on. In their study, 37 ESL students were presented with a list of vocabulary as part of their course, alongside an English text. Later, the students were given a cloze test based on that text and were given the vocabulary list along with multiple distractors. The students were to use this list to fill out the cloze test. Moreover, the students were asked to rate their knowledge of the vocabulary based on the Vocabulary Knowledge Scale presented in the study. The Vocabulary Knowledge Scale ranged from 1 to 5. A student who self-rated a word as a '1' indicated that they had never seen the word before. A '2' meant that they had seen the word before, but didn't know what it

meant. A '3' indicated that the student had seen the word before, and was able to write what they thought it meant. A student marking a word as a '4' showed that they knew the word and wrote its meaning. A '5' on the scale was used to indicate that the student was able to use it in a sentence. If the student were to rate the word as a 5, they would also be required to create a sentence with the word. Similarly, a 3 or 4 on the scale required the student to write the corresponding meaning as a synonym or some other translation. Although the current study did not replicate the methodology of this system exactly, the knowledge scale used here is based on this method.

In the current study, participants provided a number 1-5 that represented how confident they felt in their knowledge of each item they wrote based on the knowledge scale given at the top of the Incidental Learning Worksheet (see Appendix A). Because students were required to provide their own words that they felt they had learned during each activity, the scale was more of a confidence level rather than an ability test. Wesche (1993) originally used the scale in a test that involved using a set list of vocabulary for all participants. Other research has also used the Vocabulary Knowledge Scale in a similar fashion (Dewey, 2008). However, because the present study asked participants to provide their own list of vocabulary, grammar, and kanji items instead of providing them with a set list of items, the scoring method here differs from Wesche's original method.

Each participant filled out an incidental learning worksheet following each reading activity. They were given approximately five to ten minutes to write down all the vocabulary, grammar, kanji characters, and cultural aspects that they learned during the reading activity. Furthermore, they were asked to write down the English translation of each term for all the vocabulary, grammar, and kanji characters they were able to provide. If students believed that

they would be able to recognize a word if they heard or read it again they were asked to write that word's translation in English alone as well. Following the activity, participants filled out the worksheet and returned it to the researcher for assessment.

Survey of perceived utility and enjoyment. The researcher used a survey to measure the degree of enjoyment that participants experienced through each medium as well as to find out what the participants' perceptions of the utility of the reading materials was. The survey was administered via Qualtrics for each reading material type. (The initial demographic survey was also administered via Qualtrics.) The questions asked in the surveys are located in Appendix B. The questions that were dependent upon previous questions were only shown to those who selected certain answers as indicated in Appendix B. All other questions were shown to all participants.

Following the completion of the incidental learning worksheet, each participant returned to their computer and opened the Qualtrics survey that corresponded to the activity that they had just completed. The survey was presented digitally and ended with a screen expressing gratitude for the participant taking the survey and indicated that the survey had ended.

Operational Definition of Incidental Learning

Incidental learning in the context of the current study is operationalized as the ability to recall and produce vocabulary, grammar, kanji, or cultural aspects that the participants felt that they had learned during the reading activities that they participated in. Furthermore, incidental learning is not constrained to specific items or level of confidence on each item produced. Moreover, incidental learning in the current study included items that the participants may or may not have seen in the past, but which the participants felt they learned through the reading activities.

Procedures and Treatments

At the beginning of fall semester 2015, the instructor of the third semester Japanese course introduced the course outline. Included in the course outline was a course assignment to participate in the three reading activities included in this study; i.e., reading manga in print, fairy tales online, and reading in-game text by playing a digital simulation game. The students were informed that their participation in the activities was required to receive credit for the course. They were further asked to volunteer to release their data that was collected from these activities to the researcher.

The researcher coordinated with the course instructor to have students sign up for times to participate in each reading activity. The students were given multiple blocks of time each day for a week to sign-up for. The students were required to sign-up for three one-hour reading activity sessions to complete the reading activity assignment for their class. One week prior to the beginning of the actual activities, the researcher visited the participants' classroom to reintroduce the study and to receive the participants' permission to use their data from the study in his research. At this time the researcher answered any questions the participants had as well as finalized the blocks of times that would most align with the participants' schedules. This was done in an effort to get as many of the students in the class to participate fully in the research study.

Twenty-six of the twenty-seven participants were able to complete all three of the one-hour sessions within a week and a half. One participant was able to complete only one of the three sessions, specifically the reading in print session. These three one-hour sessions were completed approximately eight weeks into the semester directly following the students' mid-term exam in their Japanese 201 course. The timing for this was deliberate as to give the students

enough time to remember and review previously taught material that they may have forgotten over the summer.

The materials that the students used during these one-hour reading activity sessions included a manga in print (*Yotsubato!*), fairy tale stories online (the story of the Zodiac animals, the Beckoning Cat, and others), and a digital simulation game (*Tomodachi Korekushon*). The materials that were used in this study were chosen based on a number of characteristics and on the reactions to them after an informal pilot study that was conducted during the semester prior to the study. Some of the characteristics that made the chosen materials the best candidates include the contextualization of the text through pictures as well as the text including furigana (reading helps) above the kanji characters. Although the furigana was not available for the online reading, the students were able to quickly copy and paste any words or phrases into Google Translate. This gave participants quick access to both the reading and the translation of these words.

Print. The manga in print, *Yotsubato!*, was chosen because of the amount of everyday language available to read in the text and because it is somewhat similar to the in-game text in the digital simulation game in both content and presentation. For example, both the digital game and the manga provide furigana readings.

Yotsubato! is a Japanese manga; i.e., a Japanese comic book. The manga provided the participants with text to read along side pictures. This was to help the participants understand the text both by reading as well as seeing the text in visual context. The manga begins by introducing the main character, Yotsuba, and her father as they move to a new town. Yotsuba meets some new friends and the manga takes the reader through Yotsuba's everyday life in her new town. Yotsuba is a loud, energetic, young girl who speaks her mind with little thought as to

how it may make others feel. The reader is meant to infer that she has these traits due to her young age and growing up in the countryside. These characteristics make her stand out in stark contrast to the other more traditional Japanese, soft-spoken, respectful characters in the story, especially her next-door neighbors, with whom she often visits and plays.

Participants in the study were given a copy of the first book in the manga series and were told that they would read the manga until the session time was up. They were also told that if they finished the first book they would be able to continue with the second book. However, none of the participants were able to completely read the first book in the allotted amount of time.

Although some students were familiar with how manga are read and had even read *Yotsubato!* in English before, many others were unfamiliar or needed a reminder on how to read manga. Manga are read in quite a different way than how western books and even how comic books are read. Manga are, most often, read right to left, top down. Because the researcher felt that some sections of the manga could cause confusion to the participants, each participant was given instructions on where to start reading each page and how the flow of reading would work in the context of the manga that they read.

Online. The online stories that were chosen for the study came from a website called *Hukumusume Douwa Shuu* (Hukumusume fairy-tale collection). This website hosts hundreds of fairy-tale stories, not only Japanese stories, but also fairy-tales from other countries translated into Japanese. The stories that the students were asked to read were those that were listed under the Japanese fairy tales section and that had pictures along with the text. This was in hopes to give the students more of an image and context for what was occurring in each story, similar to the manga in print and in the digital simulation game.

The story that all students started with during the online session was a story called *Neko ga nezumi wo oikakeru wake* (Why cats chase mice). This story was about the Zodiac animals and how they came to be part of that group of animals. As part of the story the mouse tricks the cat, and is thus able to join the group of Zodiac animals. This is the reason given for cats chasing mice even today. The 701 character-long story has 15 color pictures to give context to the fairy-tale.

If students finished the story about why cats chase mice, participants were asked to move on to a story called *Maneki neko ni natta neko* (The cat that became a beckoning cat). This 761 character long story has 6 color pictures to give context to the fairy tale. The cat that became a beckoning cat is a story about a kitten with an angry face that was thought to scare customers away from a shop. The shop owner has the kitten taken to a shrine to get it away from the shop as to not scare any possible customers. Partway through the journey to the shrine a tea salesman takes the kitten as his pet, which ends up helping his business because of all the people who want to see the cat with an angry face. Many of the participants in the study were able to get through both of these stories, but not all. Some participants were also able to read both of these and were able to move on to one or two more similar stories that the researcher assigned to them as they finished each story.

Digital game. The digital simulation game, *Tomodachi Korekushon*, was chosen based on its popularity around the world, its simulation nature, and the ability of students to interact with the characters within the game, among other characteristics. *Tomodachi Korekushon* is a Nintendo 3DS game that simulates the everyday life of characters that the player can create in game. The game provides furigana readings for kanji characters making it easier for students to look up the meaning of any word presented. Furthermore, the text that comes from the

characters in the game is also presented with corresponding audio, thus giving the player both the written and spoken text. The spoken text, however, is produced using a synthesizer and is thus not exactly natural sounding speech. The spoken audio can also be adjusted to how the player wishes the character to speak. However, this feature was not introduced to the participants of this study. Finally, another feature of the written text in the game is that it is not permanent. Specifically, once a character has said something the on-screen text will disappear after a few seconds. Other on-screen text giving explanations of items and stores, however, does not disappear and the player can take as much time as they would like reading this type of text. This game is also available in English and is known as Tomodachi Life in English.

The game provides the user with a small island with a multitude of locations ranging from the apartment complex, to in-game characters that the player can interact with, to a grocery store, and concert hall. In the game, players are able to interact with characters in order to make them happier, which, in turn, rewards the player with items that they can use in the game as well as in-game currency for making purchases at the different stores on the island.

The game usually starts out with the player deciding on a name for the island and creating characters that will live on the island for the player to interact with. Furthermore, at the beginning of the game a player is limited in the amount of items they can purchase and in the degree to which they can play the game in general. Due to the limited amount of time participants were given for each reading activity, participants were not given the game in its absolute beginning state. The researcher set up the game for each participant to a point where there were many characters for the participant to interact with and many items at the shops for the students to purchase. This gave all participants a similar, fuller experience without making them spend the time creating characters to interact with. Furthermore, this gave the participants

more time reading in-game text and using the information from the text to complete tasks rather than thinking about what a certain character should look and talk like.

Prior to the research study, the researcher procured four copies of the digital game along with four Nintendo 3DS devices for the participants to use during the study. Because of the limited number of devices available during the study, students were required to sign up for specific times during the set blocks of time in order to complete the digital game session. This was not a problem with the other two sessions as there was not a limited amount of computers or copies of the manga for students to use.

Reading activities. Each reading activity took 60 minutes. The researcher randomly assigned each participant into one of three groups. The first group's first reading activity session was with the online reading. This was followed by the game and finally the manga. The second group first did the game session, followed by the manga, and then the online reading activity. The third group started with the manga, then the online, and finally the game reading activity.

For each of the media types, participants would complete the reading activities during a two to three hour block of time. These blocks of time were given each day for a week. Participants were free to come whenever they were available during these blocks of time as long as they came one hour prior to the block of time ending. This gave the participants ample time to complete the activities without cutting the time short.

The reading activities were conducted in a quiet room equipped with enough computers for each student to have access to their own computer. Each computer had access to the internet for participants to look up any words they didn't know in an online digital dictionary (Google Translate).

Each time participants came to the lab to complete one of the reading activities the researcher explained what they would be doing for that day's reading activity. This took between five and ten minutes to complete. During this time the researcher explained what type of reading they would be doing, how to use the material that they would be using that day, as well as review what they would be doing throughout the reading as well as what would transpire following the reading activity. Each participant was told that they would be doing the reading activity for 40 minutes. They were told that during this time if there was anything they didn't know and would like to look up in Google Translate they were given that option. They were told not to use any other website other than Google Translate to look up items during the activity. Also, prior to starting each reading they were reminded that they would be filling out the activity worksheet (Incidental Learning Worksheet, see Appendix A) following the reading, which would take between five and ten minutes to complete. They were also told that following the worksheet they would complete a Survey of Perceptions and Enjoyment (see Appendix B) which took them between two to five minutes to complete. The incidental learning worksheet (activity worksheet) was completed on a printout of the worksheet. The survey, on the other hand, was completed digitally using Qualtrics.

When explaining the digital game specifically, the researcher explained to each participant the goal of the game, the major activities, and how to do them. The researcher also further clarified how to use the Nintendo 3DS device at this time. The researcher also informed each participant that if they were ever confused about how to use the device during the activity that they should ask the researcher and he would further clarify how to use it. As a note, during the reading activities no participants ever needed further clarification following the initial explanation on how to use the device.

Internal Validity and Reliability

To increase internal validity and reliability an informal pilot test was conducted the semester prior to the present study. The pilot test consisted of five third semester Japanese students (three female and two male). The ages of the participants in this pilot study ranged from 20 to 24. Four of the pilot participants identified themselves as White with English as their first language. One participant from the pilot study identified himself as Asian/Pacific Islander with Korean as his first language. Four of the five pilot participants had very little experience reading in Japanese, having read only what was required of them in their Japanese courses up to the point of the pilot study. One participant reported having read some manga and the occasional book in the past.

For the pilot test, the participants received a short introduction to what they would be doing. This included a short explanation that they would be reading using different materials including a manga in print, some fairy tales online, as well as in a digital game. The printed reading medium was the manga *Yotsubato!* by Kiyohiko Azuma. The online material included three fairy tales from the hukumusume.com/douwa website. Finally, the participants played a Nintendo 3DS digital simulation game called *Tomodachi Korekushon*. The participants were all given 30 minutes for each reading material. Following the reading they were given five minutes to fill out an incidental learning worksheet. This worksheet was the same as the incidental learning worksheet found in Appendix A. However, the knowledge scale and the gridlines and numbering that now are shown in the vocabulary, grammar, and kanji columns of the worksheet were not present at that time. Finally, the participants filled out a survey of perceived utility and enjoyment. The survey was the same as what is found in Appendix B except for questions seven, eight, nine, ten, fourteen, and fifteen. These questions were added after the pilot study to

better understand the participants' perceptions of the reading activities. Furthermore, a question about whether the participant would like to continue the reading activity immediately following the survey was removed from the final survey used in the present study.

This pilot test helped the researcher adjust the instruments that were used in the present study to best help answer the research questions. Furthermore, the feedback received from the participants in the pilot study pointed out the need for more explanation of the reading media prior to the reading activity. Some of the pilot test participants expressed confusion on what it was they were to be doing within the digital game. Thus, the researcher gave a more in-depth explanation of the digital game to the participants in the actual study.

Furthermore, to address some of the types of threats to internal validity of the actual study, some controls were created. For all but one session for two participants and one session for one participant, the present study took place in the same location, the computer lab, controlling for a location threat. Furthermore, all participants used all three types of media, controlling for any possible difference in subject characteristics for participants using each media type. To offset any possibility of an ordering effect, participants were randomly assigned to three different groups, each with a different order for completing the three tasks. In an effort to control for mortality the reading activities involved in this study (digital reading, reading in print, and reading digital in-game text) were part of the participants' third semester Japanese course assignments. Moreover, the present study took place over just a one-week period, controlling for a history, maturation, and mortality threat. Finally, the implementation of each reading activity was standardized to control for any implementation threat. This was done by having each reading activity start with an explanation, followed by the reading activity, followed by the worksheet and survey. These all took the same amount of time, approximately five to ten

minutes for explanation, forty minutes for for the activity, five to ten minutes for the worksheet, and two to five minutes for the survey for a total of sixty to sixty-five minutes.

Analysis

Following the week of data collection, the researcher compiled the information collected in the digital surveys and the worksheets. The researcher then separated the worksheets out into the three media types. The researcher then scored each worksheet according to the point system laid out in the Instruments section of this chapter. Furthermore, the researcher input all of the points for each medium for each section of the worksheet (vocabulary, grammar, kanji, and culture) into a digital spreadsheet. All survey data was then collected into one digital spreadsheet for easy access and viewing.

The researcher then ran descriptive and inferential statistics on the data that he collected. Descriptive statistics were run on the amount of incidental learning that occurred using the worksheet as well as for answers given in the surveys. The researcher also took the quantitative data gathered from both the worksheets and the surveys and conducted a mixed model analysis of variance (mixed model ANOVA) on the data. In contrast with an ANOVA where each group of participants are independent, a mixed model ANOVA assumes the participants in each group are the same. In coordination with a statistician, the researcher ran a mixed model ANOVA because there were three scores for each participant. The researcher collected a score for each of the three reading activities for each of the participants. Because there were three scores from the same participant the scores were not completely independent, and thus a mixed model ANOVA was required. The mixed model ANOVA was used to test if there was a relationship between the amount of incidental learning and the reading material type. This was used to answer research question number one. The mixed model ANOVA was also used to test if there was a

relationship between enjoyment and reading material type, as well as between utility and reading material type. This was used in answering research questions two and three. Furthermore, the researcher used the survey of perceptions and enjoyment to further answer research questions two and three. The findings from the mixed model ANOVA and the surveys are presented and discussed in more detail in the following chapters.

Chapter 4: Results

Research Question 1

Is there a relationship between media type, such as print text, digital online text, and digital simulation games, and the amount of incidental second language learning?

The researcher addressed this question by analyzing the data collected from the activity worksheets that the participants filled out directly following each reading activity. The researcher collected the worksheets, scored them, and ran both descriptive as well as inferential statistics on the data.

Descriptive data. Table 1 summarizes the descriptive statistics for the vocabulary score alone. Of the four groups of learning measured (vocabulary, grammar, kanji, and culture), vocabulary had the highest mean scores. The mean vocabulary scores were 5.90, 4.50, and 4.53 for the online, game, and in-print readings respectively. Participants' scores varied greatly with the lowest scores around 0 for all media types and all groups of learning. In general, the highest scores were in the vocabulary section with some getting as high as 9 to 14 points in this section alone.

Table 1

Descriptive Statistics – Vocabulary Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	13.75	.25	14	5.90	2	.53
Game	26	9	0	9	4.50	4	.53
Print	27	10	1	11	4.33	5	.52

Table 2 summarizes the descriptive statistics for the participants' grammar scores. Most participants failed to insert any items in this section of the activity worksheet as shown by the mode scores. Mean scores for this section approached one point.

Table 2

Descriptive Statistics – Grammar Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	4.50	0	4.50	.91	0	.23
Game	26	2.75	0	2.75	.84	0	.23
Print	27	4	0	4	.83	0	.22

Table 3 summarizes the descriptive statistics for the participants' kanji scores. Although the researcher expected this score to be low in general with lower scores than the grammar and culture sections, the opposite was true. The kanji mean scores were higher than both the grammar and the culture mean scores. The kanji scores also varied greatly with some students getting as many as seven or eight points in this section. However, generally scores remained at around zero to one point.

Table 3

Descriptive Statistics – Kanji Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	8	0	8	2.48	1	.32
Game	26	3	0	3	.99	0	.32
Print	27	7	0	7	1.44	0	.32

Table 4 summarizes the descriptive statistics for the culture scores. The culture scores were similar to the grammar scores with the mean at around one point for each media type. Many students similarly failed to write down any cultural aspects that they learned during the activities.

Table 4

Descriptive Statistics – Culture Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	3	0	3	1	1	.18
Game	26	3	0	3	.72	0	.18
Print	27	3	0	3	1.07	1	.18

Table 5 summarizes the descriptive statistics for the score the participants earned on the activity worksheet overall. The total score was calculated by summing the vocabulary, grammar, kanji, and culture scores on each worksheet. The total scores varied greatly having a range of 21.75, 11.50, and 31 for the online, game, and in-print reading activities respectively. The overall mean score for the online activity worksheet was 10.23, almost three points higher than the print worksheet, and over three points higher than the game. Interestingly, the lowest score for the game was roughly three times the amount of the other two type's low scores. However, the game also held the lowest max score and mean score.

Table 5

Descriptive Statistics – Total Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	21.75	1.25	23	10.23	11	.79
Game	26	11.50	3	14.50	7	3	.79
Print	27	15	1	16	7.68	8.50	.78

Inferential data. Tables 6 through 10 summarize the results of the mixed model ANOVA. In coordination with a statistician, the researcher ran a mixed model ANOVA because there were three scores for each participant. Scores were compiled for each of the three reading activities for each of the participants. Because there were three scores from the same participant the scores were not completely independent, and thus a mixed model ANOVA was required to

accurately show if there was a relationship between media type and the amount of incidental learning that occurred.

Table 6 summarizes the mixed model ANOVA results for the vocabulary scores. The difference between the vocabulary scores for the online reading and the game reading was found to be statistically significant at $p < .05$. Furthermore, the difference between the vocabulary scores for the online reading and the print reading was also found to be significant at $p < .01$. No statistically significant difference was found between the vocabulary scores for the game and in-print readings.

Table 6

Mixed Model ANOVA Results – Differences Between Vocabulary Scores for Each Media Type

Types Compared	Difference of Means	Standard Error	p
Online and Game	1.40	.47	.0129*
Online and Print	1.57	.47	.0048*
Game and Print	.16	.47	.9369

*=statistical significance

Table 7 summarizes the results of the mixed model ANOVA for the grammar scores. Table 7 shows that the difference between the means of the differing media types for the grammar scores is minimal with the difference approaching zero for all types compared. Specifically, the difference between the game and print scores was exactly zero. None of the differences here were found to be statistically significant.

Table 7

Mixed Model ANOVA Results – Differences Between Grammar Scores for Each Media Type

Types Compared	Difference of Means	Standard Error	p
Online and Game	.07	.21	.9466
Online and Print	.07	.21	.9389
Game and Print	.00	.21	.9997

Table 8 summarizes the mixed model ANOVA data for the kanji scores across the different media types. A 1.49 point difference was found between the online and game scores and a 1.04 point difference between the online and print. The difference in kanji score for the game and print was .45 points. The difference between the game and print means was not found to be statistically significant. However, the difference between the online mean and the other two types was found to be significant. The difference between the online and game kanji scores was found to be statistically significant at $p < .001$. The difference between the online and print kanji scores was also found to be statistically significant at $p < .01$.

Table 8

Mixed Model ANOVA Results – Differences Between Kanji Scores for Each Media Type

Types Compared	Difference of Means	Standard Error	<i>p</i>
Online and Game	1.49	.34	.0002*
Online and Print	1.04	.34	.0101*
Game and Print	.45	.34	.3928

*=statistical significance

Table 9 summarizes the results of the mixed model ANOVA for the culture scores. Table 9 shows that the difference between the means of the differing media types for the culture scores is minimal with the difference approaching zero for all types compared. Similar to the grammar section, none of the differences here were found to be statistically significant.

Table 9

Mixed Model ANOVA Results – Differences Between Culture Scores for Each Media Type

Types Compared	Difference of Means	Standard Error	<i>p</i>
Online and Game	.27	.22	.4596
Online and Print	.08	.22	.9271
Game and Print	.35	.22	.2643

To find a total score for each worksheet, the vocabulary, grammar, kanji, and culture scores were summed. Table 10 summarizes further the mixed model ANOVA results for the total score for the activity worksheets. The results of the mixed model ANOVA show that there was over a three-point difference between the online and game material types. Approximately half of this difference came equally from the vocabulary and the kanji scores. There was also a 2.55 point difference between the online and print scores. Most of this difference also came from the vocabulary and kanji scores. Approximately half a point difference was found between the game and print means. There was no statistically significant difference found between the game and in-print readings. However, the difference between the online and game means was found to be statistically significant at $p < .0001$. Furthermore, the difference between the online and print means was found to be statistically significant at $p < .001$.

Table 10

<i>Mixed Model ANOVA Results – Differences Between Total Scores for Each Media Type</i>			
Types Compared	Difference of Means	Standard Error	<i>p</i>
Online and Game	3.23	.62	<.0001*
Online and Print	2.55	.61	.0004*
Game and Print	.68	.61	.5146

*=statistical significance

In summary, the vocabulary and kanji scores seemed to affect the total score and statistical significance of the difference between media types the most. Statistical significance was found with the vocabulary and kanji scores as well as with the final total combined scores for the difference between the online reading and the other two media types.

Knowledge scale data. The knowledge scale in this study was part of the activity worksheets used to collect data on the amount of incidental learning that occurred during each of the activity sessions and is based on the original Vocabulary Knowledge Scale created by

Marjorie Wesche (Paribakht & Wesche, 1993). The knowledge scale used here is, however, not exactly the same due to the approach used to acquire the vocabulary and other items found on the activity worksheets. The knowledge scale was used more as a confidence interval for each participant to declare how confident they were that they knew the item following the reading activity. A more in-depth description of this knowledge scale can be found in the description of the incidental learning worksheet in Chapter 3. Reference Appendix A to see how the knowledge scale was presented to participants.

Table 11 summarizes the general frequency of the ratings in each level of the knowledge scale across the three different media types. As for the online reading worksheet, approximately 33% of items were rated as a 3 on the knowledge scale. This means that 33% of the items were those for which participants were able to write what they thought the correct translation was. Moreover, these were items (vocabulary, grammar, kanji or cultural aspects) that the participants felt that they had learned during the activity regardless of whether they had seen the item previously. Also, approximately 28% of the items were those for which participants felt they had learned the item and would now be able to use what they wrote in a sentence. Furthermore, 26% of items were those for which participants felt they had learned and knew the English translation. Only 21% of items were those for which participants had either seen before but were unsure what the meaning was, or were those that they had never seen before. As shown in Table 11, this group of items (rated a level 1 on the knowledge scale) were those that participants identified as having never seen before and were second lowest given rating on the scale after level 2.

Table 11

Descriptive Statistics – Knowledge Scale Level Frequency Across Media Types

Level	<u>Online</u>		<u>Print</u>		<u>Game</u>	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
5	66	28.33	40	21.16	46	22.77
4	62	26.61	44	23.28	53	26.24
3	76	32.62	54	28.57	47	23.27
2	16	6.87	18	9.52	16	7.92
1	32	13.73	33	17.46	45	22.28

The number of times each level on the knowledge scale was given to items on the print activity worksheets was similar to what was found on the online activity worksheets. The largest percentage of items on the print worksheets were given a level 3 rating on the knowledge scale. The level 3 items were 29% of the items, followed by level 4 items with 23%, and level 5 items with 21%. The level 1 and 2 items were similar with the lowest percentage being the level 2 items.

The frequency of each level on the knowledge scale was different, however, for the game activity worksheets. The level 4 ratings were the highest for this media type. Participants rated 26% of the items they wrote as a level 4 on the knowledge scale. This was followed by the level 3 and 5 ratings with approximately 23% each. The media type that had the most items written where the participant felt they had learned the item but had never seen the item before (a level 1 rating) was the digital game type. Participants assigned 22% of items following the game activity a knowledge scale rating of 1. This was five percent more than the amount of level 1 ratings given to items written following the print activity, and nine percent more than those from the online worksheets.

In general, students seemed most confident with the items they wrote following the online activity with 54.94% of items given the rating of 4 or 5 on the knowledge scale, whereas

only 44.44% of items from the print worksheets, and 49.01% of items from the game worksheets were in that same level range.

Research Question 2

To what degree do learners enjoy reading materials presented as a print text, digital online text, and digital simulation game?

The researcher addressed this question by analyzing the data collected from the post-activity surveys that participants completed after finishing the reading activity (see Appendix B). Participants completed this survey digitally through Qualtrics. The survey contained both Likert scale questions as well as open-ended questions. The Likert scale questions were analyzed quantitatively, and the open-ended questions were analyzed qualitatively. The quantitative data collected through these surveys can be found in Tables 12 through 17

Descriptive data. Following each reading activity, participants were asked to what degree they found the reading activity enjoyable. Table 12 summarizes the results of this question. Also, all possible options the students were given in this question are shown in Table 12. Interestingly, students did not answer ‘unenjoyable’ or ‘very unenjoyable’ for any of the media types. Furthermore, most students found all types to be ‘enjoyable’ or ‘very enjoyable.’ It was found that 50% of participants felt that the online reading was at least enjoyable, 66.67% felt that the in-print reading activity was at least enjoyable, and 61.54% felt that the reading of in-game text in the digital simulation game was at least enjoyable. The number of students who found the reading in print to be very enjoyable was almost double that of the game and almost four times that of the online reading. However, although the online ratings had the least amount of students who felt the activity was at least enjoyable, no student rated the activity as anything lower than ‘somewhat enjoyable’; i.e., all students enjoyed the online reading activity to some

degree. This is in contrast to the print and game where at least one student felt these activities were somewhat unenjoyable.

Table 12

Descriptive Statistics – Enjoyment Rating Frequency Across Media Types

Rating	Online		Print		Game	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very Enjoyable	3	11.54	11	40.74	6	23.08
Enjoyable	10	38.46	7	25.93	10	38.46
Somewhat Enjoyable	13	50	7	25.93	9	34.62
Somewhat Unenjoyable	0	0	2	7.41	1	3.85
Unenjoyable	0	0	0	0	0	0
Very Unenjoyable	0	0	0	0	0	0

The researcher assigned a numerical score for each of the enjoyment ratings. Table 13 summarizes the descriptive statistics for these enjoyment ratings. The scores ranged from one to six. Each score correlated to the ratings shown in Table 13, where ‘very unenjoyable’ was one and ‘very enjoyable’ was six. The higher the score the more enjoyable the participant felt the reading activity was.

As shown in Table 13, the reading type with the highest mean score was print with a mean of five (equal to a rating of enjoyable). Both the online and the game means were at 4.60 and 4.79, respectively. It is to be noted that the most frequent scores were different for each type; with print having the highest mode of six.

Table 13

Descriptive Statistics – Enjoyment Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	2	4	6	4.60	4	.17
Game	26	3	3	6	4.79	5	.17
Print	27	3	3	6	5	6	.17

Scores 1-6 correlate with the possible enjoyment ratings Very Unenjoyable to Very Enjoyable respectively.

Inferential data. To test the statistical significance of the difference between each media type's enjoyment score, the researcher conducted a mixed model ANOVA using the scoring system outlined above. The results of this test are summarized in Table 14. Only slight score differences between each type were found. These differences were not found to be statistically significant.

Table 14

<i>Mixed Model ANOVA Results – Differences Between Enjoyment Scores for Each Media Type</i>			
Types Compared	Difference of Means	Standard Error	<i>p</i>
Online and Game	.19	.21	.6391
Online and Print	.40	.21	.1484
Game and Print	.21	.21	.5864

Qualitative data. Depending on how the participants responded to whether the activity was enjoyable or not, they were asked to describe what made each activity enjoyable or unenjoyable for them in the post-activity survey. The researcher then coded the participants' responses. To code the responses to these questions, the researcher read through each response individually. As the researcher read through the responses he assigned each response to one or more themed groups; e.g., authentic culture, entertainment, etc. Following this system of coding, the researcher observed multiple of these themes. The following is a summary of the coding results.

After coding participants' answers, the researcher found many themes throughout the eclectic mix of responses the student's gave. As for the online reading, a majority of the participants' responses shared the entertainment theme. Many of the responses in this group shared similar thoughts about the material being interesting, entertaining, and fun. One student commented that "[t]he stories themselves [were] entertaining, lighthearted, and fun to read, so even when trying to get through large portions that are particularly incomprehensible, it

remain[ed] a fun activity.” These types of comments were found throughout the participants’ remarks. One comment that stood out particularly was one where the student not only mentioned the interesting aspect of the story, but also that the ability to quickly look up words using copy and paste made the activity enjoyable. She stated that

[h]aving an interesting story to read at a level more suitable to my abilities, and being able to access instant translation rather than spending 5 minutes just looking up 2 or 3 words by hand through a dictionary [made the activity enjoyable].

Another theme that was found among many of the participants’ comments was a theme of authentic culture. Many students enjoyed reading authentic texts, specifically the Japanese fairy stories. Some of these participants commented that learning old Japanese stories was interesting and one may be able to learn Japanese culture through fairy tales. One student commented that she “loved learning about Japanese culture and the folktales that [Japanese natives grow] up hearing.”

There were many other themed groups that, unlike the two above, only had a few participants comment on. Some of these themes included cuteness, and ease of understanding. These few participants, whose comments would fall under these themes, mentioned that the cute pictures and story as well as the lower level language used in the stories helped make the activity enjoyable for them.

In the same post-activity survey, participants were also asked if they would like to do the reading again in the future as well as what age groups they felt the reading activity appealed to. Twenty-two of the twenty-six students (85%) who participated in the online reading activity expressed their desire to continue the online reading again in the future. Also, participants seemed to feel that, in general, the online reading materials appealed to those between the ages of

four and thirty. Furthermore, 25 of the 26 participants felt that the material was appropriate at least for those between the ages of 6 and 12. No participant felt that the material was only for children ages 4-5. Furthermore, those that thought the material would also be appealing to adults ages 51 and up also thought it was appealing for other age groups.

Similar themes were found throughout the comments regarding the enjoyment found in reading the manga in print. One theme that resonated throughout more than half of the participants' comments was, not unlike the online reading, the theme of entertainment. One participant commented that it was "easy to approach at most levels of Japanese, it [was] entertaining to read, and it [used] a lot of practical vocabulary." Interestingly, however, was one participant's comment that seems to draw the attention away from the media type specifically and on to the content of the reading itself. He wrote that "[p]eople read manga for fun. There are pictures. Reading a manga and looking up words is much better than reading a boring memo between two people and looking up those words."

The other main theme found in the comments of the print survey was ease of understanding. More than one third of the participants commented that the reading was easy to understand which made the activity enjoyable. About the ease of understanding the material, one participant noted that "[she] liked the story and [that] the feeling of being able to understand what [she] was reading was really gratifying."

Besides ease of understanding and entertainment, other themes such as material type, and good story line also came up in a few of the participants' responses. As for the two participants who found the material to be somewhat unenjoyable, no real theme or connection was found between the two responses. However, one of them commented that she felt the plot was slow and that she felt the material was childish.

On the in-print post-activity survey, participants were also asked if they would like to do the reading again in the future as well as what age groups they felt the reading activity appealed to. Twenty-four of the twenty-seven students (89%) who participated in the print text reading activity expressed their desire to continue the in-print text reading again in the future. Also, participants seemed to feel that, in general, the print text reading materials appealed to those between the ages of six and thirty. Furthermore, 24 of the 27 participants felt that the material was at least for those between the ages of 6 and 12. No participant felt that the material was only for children ages 4-5. However, two participants felt that it was only for children 6-12, and one participant felt that it was only for children 4-12. Furthermore, those that thought the material would also be appealing to adults ages 51 and up also thought it was appealing for other age groups.

Like the online and in-print comments, similar themes were again found regarding the enjoyment of reading in a digital game. Again, the main theme for the game was entertainment. Sixteen of the twenty-six participants commented that it was the entertainment factor that made the activity enjoyable for them. One student commented that she “like[s] playing games in general and the game was entertaining and quirky.”

Another theme, although not as common throughout, was media type. This was in contrast to the online and print comments, which seemed to focus more around the story. Many of the comments regarding the enjoyment that came from playing the game specifically stated that it was enjoyable because it was a game. For example, one representative comment was that “Videogames are fun and [an] interactive way of learning.” This comment also highlights what one may call sub-themes within the theme of “digital game.” Many of the participants commented on how the ability to interact with the characters in the game made the activity

enjoyable. Furthermore, the fact that they were able to learn as they played was another factor that made the reading in the digital game enjoyable for the participants.

There was only a single participant who felt that the game was somewhat unenjoyable, stating, “The speed and quality of the spoken Japanese [in the game] was difficult to understand, plus the written text only appeared as they spoke.”

In the digital game post-activity survey, participants were asked if they would like to do the reading again in the future as well as what age groups they felt the reading activity appealed to. Twenty-two of the twenty-six students (85%) who participated in the digital game reading activity expressed their desire to continue the reading activity again in the future. Also, participants seemed to feel that, in general, this activity appealed to those between the ages of six and thirty. Furthermore, 22 of the 26 participants felt that the material was at least for those between the ages of 13 and 17. Twenty participants felt that the material would also appeal to those ages 6-12, and nineteen participants felt that the material would appeal to those ages 18-30. No participant felt that the material was only for children ages 4-5. A single participant also felt that the material would be appealing to those ages 51 and up. Games are rarely marketed to those ages 51 and up, which makes this participant’s answer particularly interesting. Furthermore, this is reflected in that he was the only one to answer that the game would appeal to those over 51.

Research Question 3

How do learners perceive the utility of reading materials presented as a print text, digital online text, and digital simulation game?

The researcher addressed this question by further analyzing the data collected from the post-activity surveys (see Appendix B). This analysis was conducted similarly to the previous analysis for answering research question two.

Descriptive data. Table 15 shows the frequency of each utility rating participants gave. Following each reading activity, participants were asked to what degree they found the reading activity they had just finished helpful in learning Japanese. All possible options the students were given are shown in Table 15. Interestingly, students did not answer very unhelpful for any of the media types and very few answered unhelpful. Furthermore, most students found all types to be helpful or very helpful. It was found that 57.69% of participants felt that the online reading was at least helpful, 55.56% felt that the manga reading activity was at least helpful, and 50% felt that the reading of in-game text in the digital simulation game was at least helpful. The amount of students who found the reading in print to be very helpful was more than three times greater than the online and seven times greater than the game. However, the number of students who found the online reading at least helpful was greater than both the print and the game. Furthermore, all but one student rated the online activity of at least somewhat helpful. The other two media types had students rating the activity as somewhat unhelpful and unhelpful.

Table 15

Descriptive Statistics – Utility Rating Frequency Across Media Types

Rating	Online		Print		Game	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very Helpful	2	7.69	7	25.93	1	3.85
Helpful	13	50	8	29.63	12	46.15
Somewhat Helpful	10	38.46	9	33.33	9	34.62
Somewhat Unhelpful	1	3.85	2	7.41	3	11.54
Unhelpful	0	0	1	3.70	1	3.85
Very Unhelpful	0	0	0	0	0	0

Table 16 summarizes the descriptive statistics for the utility score. The researcher assigned a numerical score for each of the utility ratings. The scores ranged from one to six. Each score correlated to the ratings shown in Table 16, where very unhelpful was one and very helpful was six. The higher the score the more helpful the participant felt the reading activity was in learning Japanese.

As shown in Table 16, the reading type with the highest mean score was print with a mean of 4.67 (equal to a rating of between somewhat helpful and helpful). Both online and the game were similar in score with means at 4.58 and 4.32 respectively. Although the reading in print had the highest mean score, it had the lowest mode score of four. The most frequent of scores for the online and game reading activities was five. The print scores, however, were more spread out between four and six as shown in Table 16.

Table 16

Descriptive Statistics – Utility Score for Each Media Type

Type	N	Range	Min.	Max.	Mean	Mode	Standard Error
Online	26	3	3	6	4.58	5	.18
Game	26	4	2	6	4.32	5	.18
Print	27	4	2	6	4.67	4	.18

Scores 1 to 6 correlate with the possible utility ratings Very Unhelpful to Very Helpful respectively.

Inferential data. To test the statistical significance of the difference between each media type's utility score, the researcher conducted a mixed model ANOVA using the scoring system outlined above. The results of this test are summarized in Table 17. Very slight differences in scores between each media type were found. Furthermore, these differences were not found to be statistically significant.

Table 17

Mixed Model ANOVA Results – Differences Between Utility Scores for Each Media Type

Types Compared	Difference of Means	Standard Error	<i>p</i>
Online and Game	.27	.21	.4170
Online and Print	.08	.21	.9194
Game and Print	.35	.21	.2260

Qualitative data. Depending on how participants responded to whether the activity was helpful or not, they were asked in the post-activity survey to describe what made each activity a valuable or less valuable learning experience for them. They were also asked what it was about the online story/stories, manga, and game that helped or hindered their learning. The researcher then coded the participants' responses in the same way he coded participants' responses concerning the amount of enjoyment they received from the activities. The following is a summary of the coding results.

After coding participants' answers, the researcher found many themes throughout the eclectic mix of responses the student's gave. As for the online reading, there were a few clear themes that stood out among the comments including ability to learn and review, context, ease of translation, ease of understanding, and authentic culture. Furthermore, unlike the comments participants gave concerning the amount of enjoyment they received from the activities, only two participants noted that entertainment was what made the activity helpful.

The theme of learning and review was the most obvious throughout the participants' comments with over half of the participants commenting that this is what made the online reading valuable and helped their learning. Many of these participants specifically noted the ability to review vocabulary and kanji they had previously known as well as learn new vocabulary and kanji made the activity valuable and helpful. One student wrote, "[t]here was a

lot of vocabulary I wasn't quite as familiar with.” He continued, saying that “[i]t was good to brush up on those areas where my current vocabulary is lacking.”

Another theme brought out in the comments was that of context. The context seemed to make the activity particularly helpful and valuable to near half of the participants. They often commented on the ability to see vocabulary and kanji in context was helpful as well as having pictures to give context to the written text was helpful. One student noted that “[i]t was good seeing words and kanji in context that would be hard to understand [on] their own.” Another commented, saying “[t]he pictures helped me understand the meaning of the story better.”

The third theme that was common among the comments was that of ease of translation. Many participants commented on how easy it was for them to just copy and paste vocabulary, kanji, or other items straight from their internet browser into the online dictionary. This seemed to be one of the most helpful and valuable characteristics of the online reading activity. Concerning the ease of translation during this activity one student wrote the following.

Being able to quickly access [G]oogle [T]ranslate within seconds made it easier to read and get the translation for unknown words. I liked being able to spend more time reading [J]apanese, something which we don't get to do much of in class.

Many other participants made similar comments.

Ease of understanding also became a theme throughout. Many participants felt that because the text was simple enough for them to understand it was valuable and helpful to them. Concerning this one participant noted, “[t]he simplicity allowed me to practice and learn without growing frustrated.”

The final large theme that was found among the comments was that of authentic culture. Many of the participants felt that it was the ability to learn more about authentic Japanese

culture, and that the stories were filled with it, is what made the activity helpful and valuable to them. One participant mentioned the following concerning authentic culture. “The stories used proper Japanese and gave insight to the culture of Japan.” Another student also said, “these stories are obviously a big part of Japanese culture so it's good to be familiar with them.”

Although most participants found the online reading activity to be at least somewhat helpful, there was one participant that felt the activity was somewhat unhelpful. In stark contrast with the comments praising the ease of translation, this student felt that the ability to use it so easily hindered her learning. She wrote concerning this “I ended up relying on the [G]oogle [T]ranslate a lot. While it was convenient to copy and paste the language for instant translation, it took away the learning aspect and I didn't feel like I learned as much.”

Many of the same themes were found throughout the comments on how the reading in print was helpful and valuable to the participants. There were about three main themes in the in-print reading comments. The first main theme was that of learning and review. Most of the participants felt that the ability to learn new vocabulary, kanji, and other items throughout the reading was valuable and helpful to their learning. One participant felt that the in-print text “brought [her] into contact with new words that are useful, and helped [her] to remember old words.”

Another main theme was the ease of understanding. This stood out particularly with comments that because there were furigana readings above all the kanji characters it made it much easier to understand and therefore more valuable and helpful to their learning. Multiple participants stated that the ability to look up words because of the furigana made the activity helpful. One participant mentioned that the reason he felt the activity was helpful was because “the [k]anji [had] the furigana so [he was able to] actually learn a few new [kanji] as [he] read.”

The last main theme found throughout the comments was the context. Almost as many students that noted the ease of understanding and the ability to learn and review, also mentioned that having pictures provide context to the text, as well as having a story to give context to the vocabulary and kanji made the reading in print helpful and valuable. Some comments concerning the helpful nature of the context include the following. “The pictures helped me discern the meaning.” “[There were] [l]ots of words I didn't already know that were pretty easy to understand in context.” “[The] [c]ontext of the story helped me guess what some things meant.”

Some other topics that many participants also commented on were the ability to read at their own pace (without the text disappearing), naturalistic language, authentic culture, and entertainment. Interestingly, a couple of students particularly pointed out that they felt the text in print was helpful because “the sentences didn't disappear before [they] could comprehend them” and that they “could spend time dissecting what [they were] reading without having to struggle to keep up.”

In contrast to some of the comments regarding why the reading in print was helpful, some others felt directly opposite. For example, one student who felt the activity was somewhat unhelpful remarked that she does “better when [she] can hear and see what [she is] reading at the same time, so not being able to hear the story being read to [her] from a different source just made it more difficult. The video game did that much better.” The participant who felt the reading in print was unhelpful stated that, “because the main character was a young child, her manner of speaking was different from what [he had] previously learned.” Another participant who felt the activity was somewhat unhelpful remarked that she had difficulty reading the text because of the font type used in the manga.

As for the reading in the game, the themes that stood out were ease of understanding, interaction, and audio/visual help. The most common theme among the comments was that of the ease of understanding. Many of the participants mentioned specifically that because the game had furigana above all the kanji it was easier to read, look up, and understand kanji and words in general. One participant mentioned that “[w]hile reading the [k]anji, [he was able to] read the furigana above it so [he] could quickly and more efficiently look up what [the kanji] meant.”

Another theme throughout students’ comments was that of interaction. Many students mentioned that the ability to interact with the characters, and make decisions on their own that would affect what happened in-game made the game helpful and valuable to their learning. One student commented that “[l]earning what the buttons say helped [her] to understand what [she] should click.” She continued saying that “[s]ince the game is also very conversational it’s important to know what your responses are.” Another participant noted that because “[i]t was a full-immersion activity . . . it forced you to learn a little bit in order to play the game.”

The last main theme found among the comments regarding the game was that of the audio/visual helps. Frequently participants mentioned that the combination of both the spoken audio and written text helped them learn and was valuable to them. This is in contrast to the other two media types, which did not have spoken audio along with the written text. One participant wrote, “Being able to read Japanese subtitles of what’s being said makes both the text and audio easier to follow.” Another also commented, “Hearing the words and seeing them at the same time helps a lot.”

Some other topics that many participants brought up in their comments included the natural language in the game, the entertainment factor, the amount of context individual words

and characters have (as well as the context the visuals provide), the ability to learn and practice new vocabulary and kanji, and the amount of repetition which solidified some terms for the participants. One participant commenting about the repetitiveness of the activity said that “[b]eing able to see the same characters repeatedly from similar activities & [with] frequent exposure” was helpful and valuable to his learning.

Although 85% of participants felt that the game was at least somewhat helpful, three participants felt that it was somewhat unhelpful, and one felt that it was unhelpful. The common theme among these participants was the in-game-text speed. These four participants all commented that the text moved too fast (at the speed at which the characters spoke), and that once the text was all spoken it would disappear. They all mentioned that the inability to take their time reading the text and looking up words from that text made the activity less valuable and unhelpful. One of these participants wrote the following.

I didn't have enough time to analyze [the] dialogue or subtitles. I couldn't keep up with what was going on and I was then unable to properly play the game, which seems to rely on the vocal requests of the characters.

Furthermore, the participants who felt the game was somewhat unhelpful and unhelpful weren't the only ones who mentioned in their responses that it was difficult to follow the text. Some of the participants who felt the game was valuable and helpful to their learning also commented that because the text moved too quickly it was sometimes difficult for them to follow. One of these students further commented saying,

The dialog is computer generated, so I didn't understand what was said nor did I get a feel for how Japanese people would speak. Another problem was, the text would disappear quickly, so there was no review of what was said.

In summary, this chapter has presented the results collected in this study. It was found that the difference in the means between the online reading and the other two media types was statistically significant. Specifically, the participants in the study were able to produce significantly more on the activity worksheet following the online activity than the other two activity types. Furthermore, there was no statistically significant difference found between the amount of enjoyment and utility participants perceived and the media types. However, most students seemed to enjoy all the reading activities, with the in-print media type receiving the most 'very enjoyable' and 'very helpful' ratings.

Chapter 5: Discussion and Conclusion

Discussion

Differing amounts of incidental learning across media types. The results of this study suggest that participants learned more vocabulary and kanji through the online media. The vocabulary score difference between the online media and the other two media types was equivalent to approximately two more items on the online worksheets than the other two media types. Although this difference at first may not seem extremely meaningful, the difference was found to be statistically significant. Furthermore, this was the vocabulary score alone, and not the total score. This may indicate that when conducting learning activities similar to the methodology used here, learners may pick up more vocabulary using an online system rather than in print or in a game. The attribute of being able to look up unknown words quickly could have been an attribute of online learning that potentially led to this finding. This finding is in contrast to what Rafatbakhsh and Alavi (2014) found in a similar study looking at the incidental learning of vocabulary through reading online and in print. They found that there was no statistically significant difference between reading in print and reading online. However, their study looked at the exact same reading sample with the online version just being a copy of the print version viewed digitally. The findings here are also similar to Hemmati and Asmawi (2015) in that vocabulary learning seemed to occur throughout each media type. No direct comparison to previous research can be found for the game in this context as, to the researcher's knowledge, it has yet to be used as a comparison media type in other studies. However, Yip and Kwan (2006) compared vocabulary acquisition through an online game and traditional methods and found that participants learned more through the online game. The nature of the game in the present study may have affected participants abilities to learn in a similar manner to Yip and

Kwan's participants in that the game used in the present study was not online nor was it conducted through a computer. Furthermore, the gaming device was small which seemed to affect at least one participant. Concerning the size of the device one participant commented saying "I was using the small 3ds, so it was very hard to read the [f]urigana and even the kanji."

Participants in this study failed to learn a significant amount of grammar and culture. The low number of items participants wrote on the activity worksheets under the grammar and culture sections may be the reason for the lack of significance across media types in these categories. Specifically, most participants failed to write any grammar and culture items on the worksheets, which indicates that grammar and culture were not learned incidentally during these activities. This is interesting however, because of the number of participants who, when responding to questions about how enjoyable or helpful each media type was, indicated that authentic culture was one of the aspects of the reading that made the activity valuable to them. One possibility for this discrepancy may be that the readings, themselves, were cultural activities for the participants. A further explanation is that participants may have been pressed for time. If given more time or if asked further regarding culture, participants may have produced more items in the culture category. A final explanation may be that there was an issue with the testing instrument. The column where participants wrote the cultural aspects they learned was the last column on the worksheet. Furthermore, the culture column was narrow and it may have seemed difficult to write in it freely. Also, all other columns on the activity worksheet were filled with numbered cells, thus the open nature of the culture column may have been confusing. Rearranging the column to be a large open cell stretching from left to right at the bottom of the worksheet may have ameliorated this problem.

Participants also learned significantly more kanji through the online media. This indicates that if activities were conducted in a similar method as was done in this study, learners may gain the most from reading online when compared to game and in-print reading. As will be discussed below, this may have been due to the fact that participants were able to look up characters more easily than with the other two media types.

During the reading activities, all participants for every media type sat at a desktop computer with access to an online dictionary. Throughout the reading time (40 minutes) participants were given the ability to look up any words, phrases, kanji, etc. that they desired using the online dictionary. Those using the game and in-print media types were required to manually type in any words they wished to translate using the computer's keyboard. However, those using the online media had the ability to easily copy and paste any items from the story directly into the online dictionary. This ability to quickly copy and paste from the online stories may have given participants who were reading online the ability to look up quite a bit more than they could with the other two media types.

As for the total scores across media types, it was found that the online total scores were significantly greater than the other groups. Most of the difference between the media types seemed to come from the vocabulary and kanji scores. These findings, although not directly comparable, seem to contradict those of Sylvén and Sundqvist (2012). Sylvén and Sundqvist found that students who played games outperformed those who chose other activities such as reading books in print or online. This is in contrast to the present study in which no statistically significant difference between the game and the reading in print was found. However, this may have been due to many factors. Some of the factors that may have affected the outcome of the present study include the difference in reading content itself, the apparently quick speed at which

the game's text would move and disappear, as well as lacking furigana readings in the online stories. More will be discussed concerning these differences in the Limitations section below.

Participants were most confident with the answers they gave for the online media. This was shown by the number of items to which they gave high knowledge scale ratings. This seems to contradict findings on confidence from Neville et al. (2009). Neville et al. found that participants were most confident with the reading in print. One possible reason why participants in the current study were more confident with the online media may be the ability they had to copy and paste words quickly between the story and the online dictionary. A further possible reason is the amount of single simple vocabulary items repeated throughout the story. Many participants were able to write down the many different animal names from one of the stories they read online. Many of these animal names may have already been familiar with the students, and reading the story may have helped them relearn these words. Because the animal names were also somewhat like a list in the story, this too may have boosted the online reading scores.

The content of the in-print reading and game reading were somewhat different in that there was not a list of simple vocabulary such as animal names throughout the story. Although there are lists of items in the game in particular, these items were most likely unfamiliar to the participants in the first place, thus a relearning of the words may not have happened. Another factor that possibly affected the lower print and game scores may have been the amount of items participants reported on the worksheets that they felt they had never seen before the activity. In particular, 22.28 percent of the items participants wrote on the game worksheet were those they felt they had never seen before playing the game. Thus, it would seem these would be items participants would not get correct as often as those that they felt they really knew following the

activity. These may have been some of the largest contributing factors in the higher online scores.

In summary, the worksheets following the online media type had significantly more written on them when compared with the other two media types. Furthermore, participants were most confident with the online media. Moreover, there was no statistically significant difference between the game and in-print media types. These results could be explained by the fact that the items participants produced on the online worksheet may have been more familiar to the participants prior to the activity than those they produced on the print and game worksheets. This may indicate that the online readings were closer to their level of ability at the time of the study than the content of the other two media types, which may have affected their ability to produce items on the incidental learning worksheets. Another possible explanation is that because the animal names came up multiple times they may have been easier for students to remember. These findings are in contrast to the findings of Rafatbakhsh and Alavi (2014) and seem to contradict those of Sylvén and Sundqvist (2012). However, the results do seem to reflect those of Hemmati and Asmawi (2015).

Differing levels of enjoyment across media types. The current study found that although there were varying levels of enjoyment across the different media types, there was no statistically significant difference between the three. The difference of the means between media types were all less than half a point. However, it is interesting to note that the media type with the highest frequency of participants rating it as very enjoyable was the reading in print. It also had the highest percentage (88%) of participants who reported that they would like to continue the reading in the future. Furthermore, the in-print mean enjoyment score was also the highest followed by the game.

Although the in-print enjoyment score was the highest, the game score was similarly high. These results are similar to the findings of Alipour Madarsara et al. (2015) and deHaan (2005). The researchers in these two studies also found that learners “had a feeling of amusement and enjoyment at the end of the game” (Alipour Madarsara et al., 2015, p. 32). Furthermore, they felt it was meaningful as the students all sought to continue the learning activity after the activity had ended. This desire to continue the activity after it had ended was also present in this study, with 84% of participants reporting that they would like to continue the game in the future.

It is also interesting that although participants enjoyed the online reading, they were not as enthusiastic about it as they were with the other media types. This was shown by the number of participants (88%) who felt the online reading was just enjoyable or somewhat enjoyable. On the other hand, 41% of participants felt strongly about the reading in print saying that it was very enjoyable. This may have been due to the participants’ prior experience with reading in Japanese. Most of the participants’ prior reading experience was almost all done in print. The familiarity of the media type may have made the activity that much more enjoyable for some students, and thus the print had the highest amount of participants who reported wanting to continue the activity. Another possible reason for the high amount of very enjoyable ratings for the in-print reading may have been because it was a manga and was entertaining. Many participants commented that this entertainment factor was what made the activity enjoyable. In particular, this type of reading contrasts greatly with what most participants are used to in their classes where reading practice is often limited to reading letters or business memos with no pictures. However, the familiarity factor is not a requirement for high enjoyment or utility. The data shows that most of the students also enjoyed and felt all the materials were helpful.

In summary, the results of this study are consistent with those of Alipour Madarsara et al. (2015) indicating that learners at this level do enjoy games in learning and would like to use games in learning in their own time. Furthermore, one possible reason why participants seemed more enthusiastic about the reading in print could be their past experience with reading. Moreover, some participants mentioned that the manga style of the reading in print was entertaining, making it enjoyable for them.

Differing levels of utility across media types. As part of the study, participants were asked to what degree they found the media types helpful and valuable to their learning. The answers participants gave indicate the level of utility participants received through the reading media types. The results of the study indicate that although there were varying levels of utility across the different media types, there was no statistically significant difference between the three. The difference of the means between media types were all less than half a point. However, it is interesting to note that the media type with the highest frequency of participants rating it as very helpful was the reading in print. This is shown by the seven participants who indicated that they felt the reading in print was very helpful. Furthermore, the mean utility score for the in-print activity was also the highest, followed by the online, and the game. These results are similar to Neville et al. (2009). In their study, Neville et al. also found that the utility scores students gave for the traditional reading materials was higher than those they gave to the game materials. Although students in their study felt that the traditional materials were more helpful, the amount of language acquisition that occurred using the game was significantly higher than the traditional materials, which is also similar to the current study.

As for the game and online reading, one possible reason the online utility score was higher than the game may have been the ease of translation as well as the seemingly quick speed

at which the game's text would move. Many participants reported that because it was easy to copy and paste the words into the online dictionary it made the activity more helpful to their learning, whereas many also commented that the games text moved to fast for them which hindered their ability to learn. Some of the participants who said that the game was helpful also commented similarly. This combination of factors seems to have affected the scores participants gave for the utility of the online and game readings.

Although the reading online had the highest level of incidental learning, participants felt most strongly that the reading in print was most helpful. One possible explanation for this may be because of the simplicity and type of language used in the two media types. The content of the online reading was fairy tale stories with which participants may not have been very familiar with. The type of language used in the stories is not everyday conversation-style language. Rather, it is a narrative style of speech with some words and phrases with which some participants may have not been familiar. This may have made the reading online more complex. The in-print reading on the other hand seemed to be more simple for the participants. Following reading the manga, participants often mentioned that because the story itself was easy to understand it helped them learn. It seems that participants felt they were learning more with the manga because a more conversation-style of language that was used in it. Furthermore, many of the participants in this study seemed most familiar with this media type. It is possible that because we start to learn to read using books from such a young age that our background knowledge and familiarity with the media type is helpful in incidental learning.

The affordances of each of the media types helped students learn from and enjoy the reading activities. One affordance that reading online provides is the ability to copy and paste from the story to the dictionary quickly. This aspect of the online media type seems to have

given the participants the feeling that it was more useful than the game. Furthermore, the fact that participants are familiar with how to use a computer made it easy for them to quickly use the device. This aspect of familiarity also seemed to make the computer (online) media type more useful for the participants. The fact that the game's text would disappear quicker than many participants were able to completely read it seems to have hindered their perceptions on the utility of the game. However, the game did provide some affordances the other media types didn't. For example, the game provided what Long (1983) asserts is necessary for learning a language, interaction. Although many games lack human interaction (some do; e.g., MMORPGs), games often do require the user to interact with characters in the game. In these interactions users must understand what is going on in order to play the game successfully. The other two media types in this study lack this attribute. The static nature of the book in print is one of the affordances this media type provides. It provides a familiar way of learning that is easy to use and requires no technical skills to use it. Although there are some differing thoughts on mediums of learning and the affordances they provide (Clark, 1983; Kozma, 1994) it does seem that the aspects of the media types used here help provide opportunities to learning in different ways.

Implications

Much has been done in the field of research concerning digital games in learning, and incidental learning across media types. Although this study has added to the conversation on these topics, much is still to be researched.

This study has looked at the amount of incidental learning that occurs while reading in three different media types. It was found that the difference in scores between the online reading media type and the other two media types (i.e., in-print and in a digital game) was statistically

significant with the online reading media having the highest scores. This was true for specifically the vocabulary and kanji scores. This would imply that when using reading as a learning tool, similar to the present study, to study vocabulary and kanji, the online media type may help beginning Japanese learners gain more vocabulary and kanji knowledge at least immediately following the reading activity. Because this study did not look at the long-term recall abilities of the participants it can not be implied that this method of learning online is better long-term than the other two media types.

As for the pedagogical implications, instructors of beginning Japanese classes may wish to advise students to use a resource online through which they can quickly look up unknown terms or use a pop-up dictionary as they read. Furthermore, instructors wishing to conduct activities similar to those in this study may wish to do so with resources that are online and at the student's level. It may also be beneficial for instructors to consider students' individual backgrounds. Much of the qualitative data here suggests that based on the participants background they felt more strongly about one media than another. For example, some students with more extensive background playing games felt the game was more helpful to them than the other media types. The same goes for the other media types. Familiarity with the media type becomes quite important when it comes to student's personal feelings regarding each reading activity style. The results further suggest that there is a greater need to teach grammar and culture explicitly, due to the lack of data and confusion that students had with these two sections in particular.

Although no implications can be directly drawn from the inferential data on the amount of enjoyment and utility participants received from these activities, it does seem that second-year language learners may enjoy and get more utility out of activities done with a media type that

they are familiar with, are easy to understand, and contain visual cues as to what the context of the reading is. For many of the participants in this study that was reading the manga in print.

Limitations and Suggestions for Future Research

The current study was limited in particular by the number of times students participated in the activities. More participants and more time on task may show differences. Because the participants were given only one opportunity to complete each activity, it was not possible to see the amount of incidental learning that occurred after reading in the three different media types over time. It would be beneficial in future studies to look at the amount of incidental learning that occurs through each media over multiple treatments.

This study was further limited by the characteristics of the media types and the content of each. Each of the media types had differing content. The online media type had fairy tale stories, which differed in content from the continuous story of a little girl in the manga and the types of conversations held with the characters within the game. The content of these media types further differed in that the online reading lacked furigana readings and the other two had them. Because of the difference in the content of the three media types, we can not truly know if the difference in the amount of learning was caused directly by the media type or the content of the stories. It would be beneficial in future studies to look at the amount of incidental learning, enjoyment, and utility students get from these media types while specifically looking at the individual and unique affordances of each.

One interesting aspect of the perceived utility measured for each media was the feeling participants got that the reading in print was the most helpful. This is contrary to the actual results where it was found that the reading online was most helpful in learning. These findings are quite similar to those found in Neville et al. (2009). Neville et al. also found that participants

felt the reading in print was most helpful, whereas, in reality, those who used the digital game performed the best. It would be beneficial in future research to look at why participants feel the print is more helpful than these other media types when in actuality it is these other types that were more successful in helping participants learn.

This study was further limited in how the media types presented the reading materials. One of the seemingly largest limitations to the game was the speed at which the text of the game would enter and exit the screen. This seemed to limit the amount of content the participants were able to read in general and thus may have limited their ability to learn as much. In future research, it is suggested that selecting a game in which the user is in control of when the text enters and exits is preferable. This would give the user the ability to go at their own pace and to analyze the text as much as desired.

Another aspect that seemingly held the game and manga back was the inability to just copy and paste the material from the source into the online dictionary. This may have limited the ability of the students to learn from these two sources as much as they were able to with the online reading. In future research, it would be beneficial to look at a computer-based game where students can quickly look up words directly online, similar to this study's online reading, instead of having to type out each word individually. One may also consider the use of a pop-up dictionary to achieve the same end goal.

There were also limitations to the worksheets and the knowledge scale used in the current study. As for the content of the activity worksheets themselves, one interesting find among the knowledge scale ratings was the fact that some participants were able to correctly write both the English and Japanese (in characters) despite some being a level 1 on the knowledge scale and others a level 2, and level 3 (for both vocabulary and grammar). This suggests that some

participants may have either been confused with what each level of the knowledge scale represented, or they treated it completely as a confidence interval regardless of each level's description on the activity worksheet.

Another curious thing regarding the use of the knowledge scale was the range and accuracy of items. One participant was able to record nine separate vocabulary items following the game reading activity. The participant rated these nine vocabulary items with varying levels on the knowledge scale. Although each had different levels on the knowledge scale, the participant wrote them all correctly with their correct English translation, again indicating that the knowledge scale was indeed used completely as a level of confidence. Although in the current study the researcher reviewed the knowledge scale with each participant, future studies may need more reviews and more explanations on how to use the knowledge scale as it is described.

Some interesting mistakes some participants made on the activity worksheet itself included some of the following. Participants sometimes would be able to correctly write the kanji, but would then incorrectly write the okurigana (i.e., the characters that follow the kanji in a vocabulary item). One participant also wrote a grammar item that they rated as a 5 on the knowledge scale, however, they mixed up the English meaning (they wrote that it was an honorific style of speech, when in reality it was a word used in humble style speech). This may be a common error among learners of Japanese; it's interesting, though, that the participant felt so strongly that he absolutely knew the English translation. Participants would also often make minor mistakes on their writing of kanji across different levels of the knowledge scale. For example, participants would sometimes incorrectly write a piece of the kanji (a radical) or a single stroke.

Some of what participants felt they learned about Japanese culture was also interesting. Some participants' comments written in the cultural aspects section of the activity worksheet were not really cultural aspects. This included a misconception that something from the stories or game was completely applicable to Japanese life. For example, one participant misread one of the fairy tale stories online and seemed to think that throwing cats in lakes was a cultural norm in Japan. In the story there is a cat that is taken to a lake where the cat gets a new owner. This story focuses on one explanation for the beckoning cats in Japan. However, there is no part of the story that talks about throwing cats in lakes, nor does it imply it. Items like these were not counted towards the participants' scores.

As the researcher graded the worksheets he also noticed that many students would write in a mix of characters (hiragana, katakana, kanji) and Romanization. This is interesting because they show they can write in Japanese characters alone, and yet they seem to sometimes prefer the Romanized characters. This may have been due to a lack of time and the speed at which they wanted to complete the worksheets. These participants may have felt they could write quicker in Romanized characters instead of the Japanese characters. However, it may also indicate that after two and a half semesters of Japanese these participants may still be struggling with Japanese characters and/or feel more confident with Romanized characters. In future studies it would be beneficial to make sure participants all fill out the worksheets completely in Japanese to reduce the amount of varying writing styles.

Conclusion

This study has attempted to answer the following key question. Is there a relationship between media type, such as print text, digital text, and digital simulation games, and the amount of incidental second language learning? The present study found that students who participated

in reading through these media types learned significantly more from the online reading than the other two media types. These results suggest that there is a relationship and that reading online may produce a greater amount of incidentally learned language than reading in print or in a digital game. This adds contrast to the results which have been found in other studies (Neville et al., 2009; Rafatbakhsh & Alavi, 2014; Sylvén & Sundqvist, 2012)

This study also found that participants produced mostly vocabulary and kanji following the reading activities across all media types. It was also found that participants' confidence in what they wrote was highest for those items written following the online reading activity.

At the beginning of the study, the researcher felt that participants would feel most strongly about the amount of enjoyment they received from the digital simulation game. However, it was found that participants rated the enjoyment and utility of the reading in print as the highest. The difference, however, between media types was not found to be statistically significant. These results suggest that the level of enjoyment and utility that the students in this study received was not related to the media type. However, when considering enjoyment and utility, the participants in this study felt most strongly about the reading in print.

Given these results, instructors may wish to include more digital online-based reading activities in their classes. The affordances that online reading provides, as outlined in this study, may help students learn more incidentally. Furthermore, when advising students on different activities that may be useful and enjoyable to them, instructors should take into account the interests and experiences of the individual students. These experiences may shape how students perceive the utility of materials and the amount of enjoyment they can get from them.

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Appendix A

Activity Worksheet (used for students to list words, characters, etc. that they learn during the reading activities)

Instructions: Please fill out this work sheet with **all** the vocabulary words, grammar patterns, kanji, and cultural aspects that you learned during the reading activity. In the small box in the corner of the numbered cells, please write a number corresponding to the following Knowledge Scale.

Knowledge Scale: **1-** I have never seen this before. **2-** I have seen this before, but I don't know what it means. **3-** I have or haven't seen this before and I have written what I think it means. **4-** I know this and have written its meaning. **5-** I can use this in a sentence.

*For more space, use reverse side of sheet.

Name _____ Reading Material Used _____

<u>Vocabulary</u>		<u>English Translation</u>		<u>Grammar</u>		<u>English Translation</u>		<u>Kanji</u>		<u>English Translation</u>		<u>Cultural Aspects</u>
1.	<input type="text"/>	<input type="text"/>		1.	<input type="text"/>	<input type="text"/>		1.	<input type="text"/>	<input type="text"/>		
2.	<input type="text"/>	<input type="text"/>		2	<input type="text"/>	<input type="text"/>		2	<input type="text"/>	<input type="text"/>		
3.	<input type="text"/>	<input type="text"/>		3	<input type="text"/>	<input type="text"/>		3	<input type="text"/>	<input type="text"/>		
4.	<input type="text"/>	<input type="text"/>		4	<input type="text"/>	<input type="text"/>		4	<input type="text"/>	<input type="text"/>		
5.	<input type="text"/>	<input type="text"/>		5	<input type="text"/>	<input type="text"/>		5	<input type="text"/>	<input type="text"/>		
6.	<input type="text"/>	<input type="text"/>		6	<input type="text"/>	<input type="text"/>		6	<input type="text"/>	<input type="text"/>		
7.	<input type="text"/>	<input type="text"/>		7	<input type="text"/>	<input type="text"/>		7	<input type="text"/>	<input type="text"/>		
8.	<input type="text"/>	<input type="text"/>		8	<input type="text"/>	<input type="text"/>		8	<input type="text"/>	<input type="text"/>		
9.	<input type="text"/>	<input type="text"/>		9	<input type="text"/>	<input type="text"/>		9	<input type="text"/>	<input type="text"/>		
10.	<input type="text"/>	<input type="text"/>		10	<input type="text"/>	<input type="text"/>		10	<input type="text"/>	<input type="text"/>		
11.	<input type="text"/>	<input type="text"/>		11	<input type="text"/>	<input type="text"/>		11	<input type="text"/>	<input type="text"/>		
12.	<input type="text"/>	<input type="text"/>		12	<input type="text"/>	<input type="text"/>		12	<input type="text"/>	<input type="text"/>		

Appendix B

Demographic Survey

(Answer options are given in parentheses)

1. What is your name?
2. What is your age?
3. What is your gender? (Male, Female)
4. What is your first language?
5. What is your ethnicity or race? (White, Asian, Hispanic/Latino, Black or African American, Other ____)
6. What is your GPA?
7. What was your Japanese 102 grade?
8. What was your Japanese 101 grade?
9. Are you of Japanese descent? (Yes, No)
10. What is your background with Japanese/Japan?
11. How long have you been studying Japanese?
12. Please explain your background with reading Japanese in print (not digital).
13. How often do you read in Japanese in print? (Very often, Fairly often, Sometimes, Almost never, Never)
14. Please explain your background with reading Japanese online.
15. How often do you read in Japanese online? (Very often, Fairly often, Sometimes, Almost never, Never)
16. Please explain your background with digital games.
17. How often do you play digital games? (Very often, Fairly often, Sometimes, Almost never, Never)
18. What types of digital games have you played before?
19. What type(s) of digital game(s) do you play most often?
20. What percent of the time you play digital games is spent reading in-game text? (0-100 slider used in Qualtrics)
21. Have you ever played a digital game in Japanese before? If so, please explain.
22. How often do you play video games in Japanese? (Very often, Fairly often, Sometimes, Almost never, Never)
23. How many times have you played a digital game in Japanese before?

Survey of Perceptions and Enjoyment – for Digital Game Reading Activity

(Answer options are given in parentheses)

1. What is your name?
2. Prior to this activity had you ever heard of the digital game “Tomodachi Korekushon” before? (Yes, No)
 - a. If yes, please explain what your prior knowledge of the game was.
3. Prior to this activity had you ever played Tomodachi Korekushon before? (Yes, No)
 - a. If yes, how much had you played the game before?
4. Prior to this activity had you ever heard of the digital game “Tomodachi Life” before? (Yes, No)
 - a. If yes, please explain what your prior knowledge of the game was.
5. Prior to this activity had you ever played Tomodachi Life before? (Yes, No)
 - a. If yes, how much had you played the game before?
6. To what degree did you find this reading activity helpful in learning Japanese? (Very helpful, Helpful, Somewhat helpful, Somewhat unhelpful, Unhelpful, Very unhelpful)
7. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What made this game a valuable learning experience for you?
8. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What about the game helped you learn?
9. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What made this game a less valuable learning experience for you?
10. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What about the game hindered your learning?
11. In general, how would you rate the difficulty of this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
12. How would you rate the difficulty of learning Japanese with this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
13. To what degree did you find this reading activity enjoyable? (Very enjoyable, Enjoyable, Somewhat enjoyable, Somewhat unenjoyable, Unenjoyable, Very unenjoyable)
14. *[If the participant rated the activity as Very enjoyable, Enjoyable, or Somewhat enjoyable the following question was asked]* What made this game enjoyable for you?
15. *[If the participant rated the activity as Very unenjoyable, Unenjoyable, or Somewhat unenjoyable the following question was asked]* What made this game unenjoyable for you?
16. Would you like to do this reading activity again in the future?
17. What group(s) do you think this reading activity appeals to? Check all that apply. (Adults (51 and up), Adults (31-50), Adults 18-30), Teenagers (13-17), Children (6-12), Children (4-5), Other)

Survey of Perceptions and Enjoyment – for Print Reading Activity

(Answer options are given in parentheses)

1. What is your name?
2. Prior to this activity had you ever heard of the manga “Yotsubato!” before? (Yes, No)
 - a. If yes, please explain what your prior knowledge of Yotsubato was.
3. Prior to this activity had you ever read Yotsubato before? (Yes, No)
 - a. If yes, how much of Yotsubato had you read before? Please explain how much and in what language(s).
4. To what degree did you find this reading activity helpful in learning Japanese? (Very helpful, Helpful, Somewhat helpful, Somewhat unhelpful, Unhelpful, Very unhelpful)
5. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What made this activity a valuable learning experience for you?
6. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What about the manga helped you learn?
7. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What made this activity a less valuable learning experience for you?
8. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What about the manga hindered your learning?
9. In general, how would you rate the difficulty of this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
10. How would you rate the difficulty of learning Japanese with this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
11. To what degree did you find this reading activity enjoyable? (Very enjoyable, Enjoyable, Somewhat enjoyable, Somewhat unenjoyable, Unenjoyable, Very unenjoyable)
12. *[If the participant rated the activity as Very enjoyable, Enjoyable, or Somewhat enjoyable the following question was asked]* What made this manga enjoyable for you?
13. *[If the participant rated the activity as Very unenjoyable, Unenjoyable, or Somewhat unenjoyable the following question was asked]* What made this manga unenjoyable for you?
14. Would you like to do this reading activity again in the future?
15. What group(s) do you think this reading activity appeals to? Check all that apply. (Adults (51 and up), Adults (31-50), Adults 18-30), Teenagers (13-17), Children (6-12), Children (4-5), Other)

Survey of Perceptions and Enjoyment – for Online Reading Activity

(Answer options are given in parentheses)

1. What is your name?
2. Prior to this activity had you ever heard of any of the stories you read before? (Yes, No)
 - a. If yes, please explain what your prior knowledge of the story (or stories) was (were).
3. Prior to this activity had you ever read any of the stories before? (Yes, No)
 - a. If yes, how much of the story/stories had you read before? Please explain how much and in what language(s).
4. To what degree did you find this reading activity helpful in learning Japanese? (Very helpful, Helpful, Somewhat helpful, Somewhat unhelpful, Unhelpful, Very unhelpful)
5. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What made this activity a valuable learning experience for you?
6. *[If the participant rated the activity as Very helpful, Helpful, or Somewhat helpful the following question was asked]* What about the online story/stories helped you learn?
7. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What made this activity a less valuable learning experience for you?
8. *[If the participant rated the activity as Very unhelpful, Unhelpful, or Somewhat unhelpful the following question was asked]* What about the online story/stories hindered your learning?
9. In general, how would you rate the difficulty of this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
10. How would you rate the difficulty of learning Japanese with this reading activity? (Very easy, Easy, Somewhat easy, Somewhat difficult, Difficult, Very difficult)
11. To what degree did you find this reading activity enjoyable? (Very enjoyable, Enjoyable, Somewhat enjoyable, Somewhat unenjoyable, Unenjoyable, Very unenjoyable)
12. *[If the participant rated the activity as Very enjoyable, Enjoyable, or Somewhat enjoyable the following question was asked]* What made the online story/stories enjoyable for you?
13. *[If the participant rated the activity as Very unenjoyable, Unenjoyable, or Somewhat unenjoyable the following question was asked]* What made the online story/stories unenjoyable for you?
14. Would you like to do this reading activity again in the future?
15. What group(s) do you think this reading activity appeals to? Check all that apply. (Adults (51 and up), Adults (31-50), Adults 18-30), Teenagers (13-17), Children (6-12), Children (4-5), Other)

Appendix C

Themes Found in Qualitative Analysis (Enjoyment)

Online:

- Entertainment
- Authentic Culture
- Cuteness
- Ease of Understanding
- Abundance of New Language (Kanji, etc.)
- Appealing to Young Audience

Print:

- Entertainment
- Ease of Understanding
- Material Type
- Good Story Line
- Everyday Language
- Abundance of New Language (Kanji, etc.)
- Authentic Culture
- Cuteness

Game:

- Entertainment
- Media Type
 - ◆ Digital Game
 - ◆ Interaction
 - ◆ Game-enhanced Learning
- Abundance of New Language (Kanji, etc.)
- Culturally Contrastive
- Abundance of Aspects of Everyday Life (Food, etc.)
- Cuteness

Themes Found in Qualitative Analysis (Utility)

Online:

- Ability to Learn and Review
- Context
- Ease of Translation
- Ease of Understanding
- Authentic culture
- Entertainment
- Impetus for Further Reading/Learning
- Prior Knowledge
- Necessity for Completion (Reading the Whole Story)

Print:

- Ability to Learn and Review
- Context
- Ease of Understanding
- Paced Reading
- Natural Language
- Authentic culture
- Entertainment
- Ease of Translation
- Impetus for Further Reading/Learning
- Necessity for Completion (Reading the Whole Story)

Game:

- Ease of Understanding
- Interaction
- Abundance of Audio/Visual Help
- Natural language
- Entertainment
- Context
- Abundance of New Language (Kanji, Vocabulary, etc.)
- Learning and Review
 - ◆ Learning without Trying
- Repetition
- Authentic Culture
- Fast Pace
- Memory Creation