Transforming Foreign Language Narratives into Interactive Reading Applications Designed for Comprehensibility and Interest

Pedro Furtado[✉], Tsukasa Hirashima, and Yusuke Hayashi

Hiroshima University, 1 Chome-3-2 Kagamiyama,
Higashihiroshima, Hiroshima Prefecture, Japan
gabrielpff2@gmail.com
http://www.lel.hiroshima-u.ac.jp/

Abstract. This study reports on the design and use of a second language reading application for enhanced comprehension and pleasure reading. The application combines short narratives with dialog construction tasks. Quantitative reading comprehension scores were compared between reading by using the application and reading by using regular text and it also evaluates qualitatively how users perceived the application. Preliminary results indicate that the software was successful in improving reading comprehension by guiding user behavior through its design. However, not all students were optimistic about the application as a learning tool given its implicit approach. How the work stands in relation to extensive reading is also discussed.

Keywords: CALL · DBGL · Dialog construction · Text comprehension · Extensive reading · Foreign language · L2 reading

1 Introduction

Language acquisition gains from foreign language reading have been shown in past research many times ([5,6], etc.). Pleasure reading, often using narratives, where readers engage in reading as a leisure activity, allows for reading of large volumes of content, which leads to high gains in language acquisition, but shows various problems, like in the time it takes to show those gains or in the acquisition of infrequent vocabulary [1,2]. Present research shows that the higher the understanding of the text, the higher the language acquisition gains, so higher understanding could be used to overcome the problems in pleasure reading. For example, higher understanding results in incidental vocabulary learning needing less repetitions in order to be effective. Computer-assisted language learning applications have tried to increase the gains of reading through various means but, in exchange, not being focused on recreation, they have trouble motivating students to read large volumes of content [3,4]. The problem is that, currently, present research has shown no activity that allows for pleasure reading while offering deeper understanding to overcome its shortcomings.

Our research hopes to fill that gap by creating an application that is designed to support comprehensibility and interest, which results in better language acquisition, while still being designed to use narratives to more easily allow for pleasure reading by using a structure similar to the one used in certain games. This similarity is merely structural and not based on extraneous gamification mechanics, like achievements or leader-boards, and it has been designed for taking in to account both cognition and motivation.

The application uses a combination of text and image to tell a story while also allowing users to create dialogs and then experience those created dialogs. The design of the dialog construction and its feedback is made to induce a behavior that best benefits learners who are having trouble in either comprehensibility or interest, in order to increase overall understanding of the text and help users with foreign language acquisition.

2   Methodology

Our software solution has two alternating parts:

1. Narrative segments where text is presented linearly;
2. Dialog construction segments.

For the dialog construction segments, users only construct what one character says, while what the other character says is fixed. After building it, the constructed dialog will be displayed to the user. However, should the user construct something that is not consistent with the story, then that dialog will self-adapt to offer feedback on why it is not consistent. This adaptation is based on adding a reaction to show why the user's mistake does not make sense in that context and a clue on what would be appropriate to say in that moment. Both the reaction and the clue are prepared beforehand.

When designing dialog construction activities to have influence in textual comprehension, the requirements below were found to be important:

1. The text is challenging enough for the reader that he cannot create the dialog on his first try;
2. The user actually reads the software feedback on his mistakes;
3. The feedback is helpful enough that after reading and pondering on it, they are able to move closer to create an appropriate dialog.

3   Preliminary Experiment and Results

3.1   Experiment Description

12 students from a Japanese University's Undergraduate Courses were divided into two groups, group A and group B. Both groups were asked to interact with the application and with a digital text document. Group A interacted with the application containing content 1 and, afterwards, read a document containing

content 2. Group B interacted with a text document containing content 1 and with the application containing content 2. Both content 1 and content 2 had between 15 and 20 lines of text and have had certain words replaced with dummy words. Both groups then were asked to answer the same questions of reading comprehension and of dummy word partial meaning acquisition.

Both contents had two dialog construction activities each. Going through them usually took participants between 10 and 15 min, with application use taking up more time, since users had to create the appropriate dialog. For this experiment we considered that there was no significant gap in difficulty between content 1 and content 2 and also that, since doing the application and the text does not take a lot time, the order of application-text and text-application will not significantly influence the score.

The questions both groups had to answer were divided into a remembering section, a textual interpretation section and partial dummy word comprehension section.

In the remembering section users were asked to write as much as they could remember with as much detail as possible. The textual interpretation section asked questions about the content such as "did Brian ever get angry in the story? If yes, why did he get angry?". The third section showed a small excerpt from the text which contained dummy words and asked questions related to the meaning of the words. For example, "what is the meaning of the word proard? Describe it to the best of your abilities. A vague description and guessing are both fine". Afterwards, 7 of the users were asked to answer a user perception survey.

We expect that scores related to content in the application will be higher than the ones related to textual content. For user perception, we expect for users to be positive towards the software.

3.2   Results

Of the 12 participants, only one participant scored higher by reading the text than by using the application. If it is assumed that there is no difference between the reading condition and the application condition, the probability that of 12 people 11 would score higher is 0.0063 ($p < 0.01$) by a double-sided binomial test. The results point in a positive direction. Average score and standard deviation of each group, and for the combined group, can be seen on Table 1. Calculating

Table 1. "Average scores and standard deviation for the two groups and for the combination of the groups"

	Application	Text
Group A	0.78 (SD 0.08)	0.53 (SD 0.18)
Group B	0.77 (SD 0.17)	0.44 (SD 0.21)
Combined	0.78 (SD 0.13)	0.48 (SD 0.20)

Cohen's d, for the combined group gets us an effect size of 1.78. Though the number of participants has been small to generalize, the results are promising.

As for the user perception survey results, the following trends were found:

1. in the area of interest, all users except for one had a positive opinion towards the application, with over half of the users completely favoring the application over text;
2. On perceived comprehensibility and perceived learning, half of the users had a positive opinion while the other half had a neutral opinion;
3. On usability, one user found the application a little bit hard to use, while the vast majority thought the application was easy to use;

4   Conclusion(s)

Although it's only preliminary results with a small sample size, this application has succeeded in offering a gain in reading comprehension while still having narrative content for pleasure reading. Further experimenting should be able to present an even stronger argument in favor of this design.

User's higher comprehensibility when using the application can be attributed to being able to read the feedback information to solve the dialog assembling problems. This suggests that users were performing according to our expectations, indicating that our efforts to create an activity that can only be practically solved by displaying reading and pondering on feedback have been successful. While this sort of approach is not the best for every type of application, when we talk about reading, which follows a linear path, this approach can be very successful.

References

1. Cobb, T.: Computing the vocabulary demands of L2 reading. Lang. Learn. Technol. **11**(3), 38–63 (2007)
2. Harris, S.: The role of extensive reading in the development of second language proficiency in secondary level education (2001)
3. Wang, Y.H.: Promoting contextual vocabulary learning through an adaptive computer-assisted EFL reading system. J. Comput. Assist. Learn. **32**(4), 291–303 (2016)
4. Wang, Y.H.: Developing and evaluating an adaptive business english self-learning system for EFL vocabulary learning. In: Mathematical Problems in Engineering 2014 (2014)
5. Yamashita, J.: Extensive reading and development of different aspects of L2 proficiency. System **36**(4), 661–672 (2008)
6. Yang, A.: Reading and the non-academic learner: a mystery solved. System **29**(4), 451–466 (2001)