

Article:

Impact of iPod Touch-Supported Repeated Reading on the English Oral Reading Fluency of L2 students with Specific Learning Difficulties

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Abstract

In recent years the use of new technologies has been extensively explored in different aspects of language learning pedagogy. The objective of this research was to investigate the impact Repeated Reading activity, supported by iPod Touch could have on the English Oral Reading Fluency (ORF) of second language university students with Special Learning Difficulties (SpLD) at Cyprus University of Technology. As part of their university courses, students have two compulsory English courses. Due to their SpLD and low level of language competence, the eight participants enrolled in the English programme for students with SpLD. This programme is based on the phonological approach and the research done in methods dealing with dyslexia (Shaywitz et al., 2004). After being introduced to the iPod-supported Repeated Reading activity, students worked independently for 8 weeks. They listened and replicated three recorded texts performed by native speakers, using Voice Memo. Texts were based on specific phonetic rules the students had to master. Students recorded their best performance of each text reading, using DropVox. Curriculum-Based Measurement, adapted by Rasinski (2004), was used to measure students' automaticity (speed and accuracy), and an adapted version of Zutell and Rasinski's (1991) Multidimensional Framework to measure prosodic features of fluency. A phonemic accuracy scale was developed and used to assess students' performance related to specific phonemes students had difficulty with. Data analysis revealed that the independent out-of-class use of Repeated Reading, supported by iPod Touch technology helped in increasing students' automaticity, improving their prosodic features of fluency, including that of specific phonemes.

Keywords: Oral Reading Fluency (ORF), Special Learning Difficulties (SpLD), dyslexia, reading deficiencies, phonics, Repeated Reading, iPod Touch Technologies.

1. Introduction

In recent years the use of new technologies has been extensively explored in different aspects of language learning pedagogy. Within that context, the objective of this research was to investigate the impact Repeated Reading activity, supported by iPod Touch could have on the English Oral Reading Fluency (ORF) of second language university students with Special Learning Difficulties (SpLD) at Cyprus University of Technology.

2. The problem

During spring semester 2012, Cyprus University of Technology Language Centre realised that many English students with Special Learning Difficulties (SpLD) needed more practice in Oral Reading Fluency (ORF) and that the English for SpLD students

course lacked systematic ORF practice; therefore action needed to be taken to remedy this matter. The aim was to explore whether and in what extent the provision of after class practice through the use of repeated reading instructional technique and iPod Touch technology support could improve student ORF. Building on previous research on ORF models (The National reading Panel, 2000; Samuels, 1997), and on models based on the phonological approach and research conducted in methods dealing with dyslexia (Shaywitz et al., 2004), an autonomous learning ORF programme was developed. The *English SpLD ORF iPod Touch Programme* was designed based on Experimental Theory.

3. Oral Reading Fluency (ORF) and ORF improvement methods

According to the literature, fluency is multidimensional. Reading is the ability to read orally with automaticity (Grabe, 2004; Tompkins, 2003) and expression (Dowhower, 1987; Johns & Berglund, 2002; Osborn & Lehr, 2003; Rasinski, 2003; The National Institute of Child Health and Human Development, 2000). Automaticity involves the reading speed or rate, in other words how quickly and automatically one recognises words in connected text and Accuracy, in other words the ability to read and decode / understand words Prosody or expression is the compilation of spoken language features. These include stress or emphasis, pitch variations, intonation, reading rate and pausing. All 3 are related to one another. Accurate and automatic reading creates the conditions for expressive (prosodic) reading. All are important for effective comprehension and overall good reading (Rasinski 2004; Allington, 1983; Schreiber, 1980).

Traditionally, many teachers have relied primarily on round-robin reading to develop ORF. In round- (Rasinski, Blachowicz, & Lems, 2006) reading, students take turns reading parts of a text aloud (though usually not repeatedly). Most readers may have experienced this type of reading. This reading activity is still practised in language teaching. However, there is hardly any evidence whether round-robin reading in itself increases fluency, in other words, whether fluency improves when students only read small amounts of text, usually in small portion only once, and in round-robin style.

The literature review revealed that there are also other, more recent and more effective methods to improve ORF. These are grouped mainly in two: Independent Silent Reading and Guided Repeated Oral Reading (Samuels, 1979). These methods give students the opportunity to practise and work on all areas of reading fluency, word recognition accuracy, reading speed and prosody, elements which are used as indicators of desired fluency achievement (Samuels, 2002).

Guided Repeated Oral Reading is one of the most used and most studied methods for increasing reading fluency. It emphasises practice in all areas of READING FLUENCY: Automaticity: Accuracy and rate and Prosody (Samuels, 1997, Johns & Berglund, 2002, Dowhower, 1989, Dowhower Rasinski, 2003).

4. Research in Reading Fluency

Most research in Repeated Reading / Oral Reading Fluency (ORF) has been carried out for primary students, less for secondary and even less for adults. Most research in RR / ORF has been carried out for L1 (The National Reading Panel, 2000; Carver & Hoffman, 1981; Rashotte & Torgesen, 1985; Samuels, 1979; Young et al., 1996). Relatively scant attention at all levels was directed to L2 (Blum, et al., 1995; Lems, 2005; Taguchi, 1997). Some research has been carried out for SpLD students (Mastropieri & als., 1997; Chard & als, 2002; Fuchs & als., 1996; Fuchs & Fuchs, 1998; Deno, 001; Lambert, 2008), however hardly any was carried out for L2 adult SpLD students.

5. Repeated Reading Activities

According to the literature, Repeated Reading activities are more successful than Student Individual Silent Reading. Therefore, we explored the four main different types of RR activities (Meyer & Felton, 1999; McKane & Greene, 1996; Tan et al., 1994).

1. An adult or peer reads with the student by modelling fluent reading and then asking the student to read the same passage aloud with encouragement and feedback by the adult or peer.
2. The student reads with a peer partner. Each partner takes a turn reading to the other. A more fluent reader can be paired with a less fluent reader to model fluent reading. The more fluent reader can provide feedback and encouragement to the less fluent reader. Students of similar reading skills can also be paired, particularly if the teacher has modelled fluent reading and the partner reading involves practice.
3. Readers' theatre can be a motivating way to improve fluency. Students read scripts and rehearse a play to prepare for a performance. The practice in reading and rereading the scripts provides an excellent opportunity to improve fluency skills.
4. Student listens to a tape of a fluent reader reading text at the student-independent level at a pace of about 80-100 words per minute. The student listens to the tape the first time and then practices reading along with the tape until the student is able to read fluently.

6. Technology-Enhanced literacy learning

Researchers have also claimed that new technologies have influenced and changed the definition of literacy (Leu et al., 2004). New technologies have been integrated in students' learning as indicated in repeated reading activity 4 above. More current technologies should be explored.

For the purpose of this research project we explored the use of mobile technologies, and more specifically the iPod Touch to support the practice of repeated reading. Its use would give students the opportunity to work independently and outside the class, thus extending exposure to the target language, and practise in their own time and as much as they wish.

7. Research Theory and Method

This research project was based on Appropriation Theory. This theory claims that something is foreign to us until we appropriate it. In other words, we adopt it to our own purposes and it becomes our own. In this case, it was used to find out to what extent English for Specific Purposes SpLD students' ORF improved with the use of RR and iPod Touch.

The Formative Experiment Method was used to find out to what extent the use of RR and iPod Touch has helped students gain native-like pronunciation with the use of new technologies.

8. Subjects

The subjects of this experimental research project were eight SpLD English for Academic Purposes (EAP) / English for Specific Academic Purposes (ESAP): Communication and Internet Studies (CIS) students. They had an average background learning of English of about 1 to 5 years and an average level of competence of A1-A2 CEFR level, but needed to improve their ORF in general and the pronunciation of some phonemes in particular.

A pre-questionnaire was taken by all the students in order to examine their use of the Internet, the Web and a number of specific technological tools.

8.1 Analysis of pre-questionnaire

According to the data, all the students have an Internet connection at home and a great majority of 67% has a high-speed access. Therefore the answers in question number thirteen were predictable. All of them go online several times a day and only one student several times a week. Specifically, the majority spends that time in gaming, using social media such as Facebook, making video calls, watching videos on YouTube and surfing the net in general. Regarding the use of YouTube it seems that the answers are almost divided. The 56% uses the web tool often and the other 44% uses it 4 times a week or more.

8.2 Use of mobile phone and iPod - iPad

It is highly important to mention that none of the students own an iPod or iPad and only three out of nine have a Smartphone. Therefore the usage of mobile phones stays in its basic features such as texting, taking photos or videos and playing games. Only a few of them that have Internet access through their mobile download applications and use Facebook. Thus, the device that best suits them in connecting to the Internet is their laptop (see chart 1).

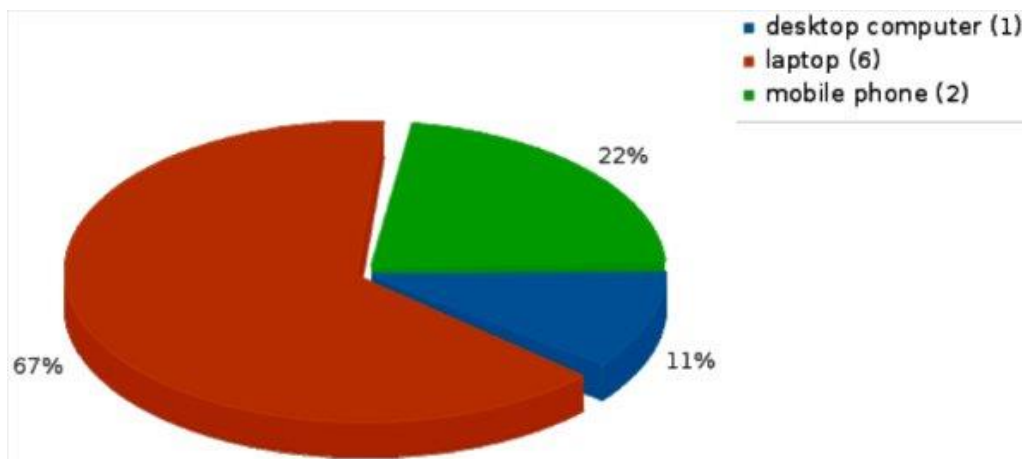


Chart 1. Q17: Which device do you use to go online MOST often?

Regarding the use of the Internet they all stated that they prefer going online at home and not at the university or in class. During a lesson they prefer taking notes by hand rather than typing. Only one student uses a technological tool to type his notes. The fact that a considerable percentage (89%) find it difficult to take notes while being active listeners highlights the reason why using a laptop or another device to type makes it even more difficult for them.

8.3 General skills

It is extremely important to highlight the fact that all of them find it difficult to read a text in English, something that will affect the results of this study significantly. Furthermore a skill that not everyone has is the ability to talk to the phone and pay attention to something else at the same time, such as watching TV. The greater part of our sample finds this difficult.

8.4 Technology use during studies

A fundamental part of someone's studies is the use of ICT as it is incorporated in their everyday workload and its use in class. A vast amount of technological tools are offered nowadays to facilitate learning and enhance the lesson. In this research the students were asked to point out the devices they use for their studies. A significant number of them use a laptop and a small amount their mobile phone and desktop computer.

However, when they had to mention which tools they would prefer to use during their studies they mentioned many more that they already use. They would like to incorporate into their studies the use of mobile phones, netbooks, iPods and iPads (see chart 2).

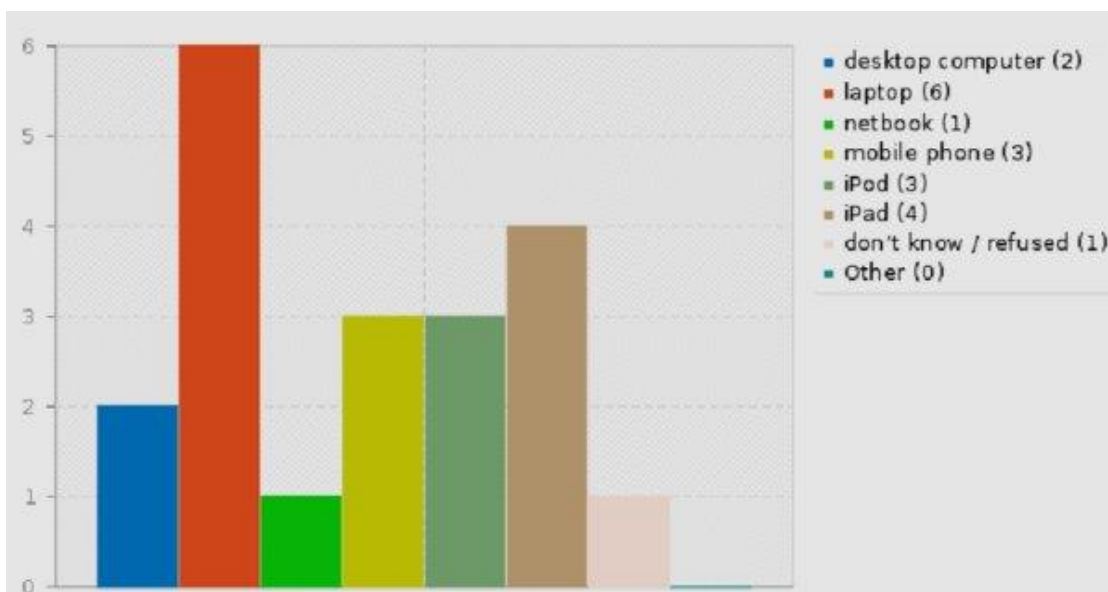


Chart 2. Q26: What devices would you like to you use for your studies?

Apart from that, the students were questioned about the technologies they would like to use during their studies, showing their opinion on what would assist their learning in general. There was a variation among the answers, but the most popular answer was "email" and Facebook. Therefore the students seem open to the use of technologies and devices that so far seemed distant from. The 3rd chart underlines the students' statements regarding these technological tools.

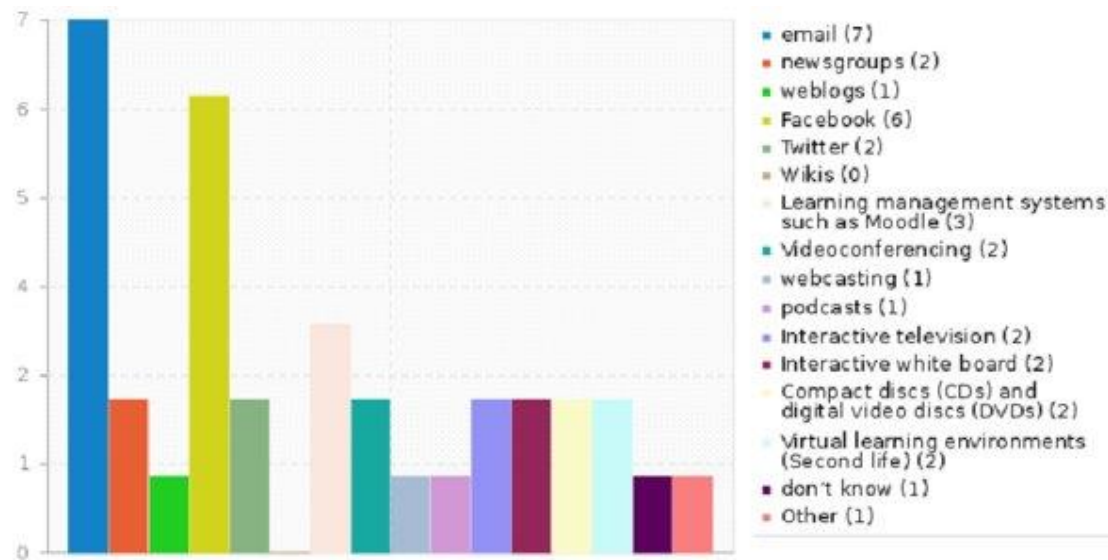


Chart 3. Q27: What technologies do you like to use for your studies? You can choose more than one option.

Apart from that, the students were questioned about the technologies they would like to use during their studies, showing their opinion on what would assist their learning in general. There was a variation among the answers, but the most popular answer was "email" and Facebook. Therefore the students seem open to the use of technologies and

devices that so far seemed distant to them. The 3rd chart underlines the students' familiarity and use regarding these technological tools.

9. Environment of project

The project was carried out in a multitude of different locations mainly because the students could listen/ read/ record their texts anywhere they had Internet access using their iPods. Also the pre and post questionnaires were taken by the students online and the iPod training took place at the Language Centre.

10. Expected outcome

One of the main goals of the project is to enhance the Oral Reading Fluency of the students as well as their vocabulary bank and their phonemic skills while improving their dexterity on the use of new technologies.

11. Tools and Materials

Three authentic text types of A1 Common European Framework of Reference (CEFR) level were used. They were presented in video form. They included phonemes which students had most difficulty with during the course. According to Antunez (2002), "Phonemic awareness refers to the ability to identify and manipulate these phonemes in spoken words. It is also the understanding that the sounds of spoken language work together to make words." The texts were phonetically based on specific rules that were taught in class and thematically corresponded to the ESAP curriculum and field of study. Apple iPod Touch technology and a selection of software were used during the eight-week project. This technology allowed the eight students to have access to native-speaker models, to practise, record, and upload their readings using VoiceMemo, Dropbox and DropVox.

12. Measurement

To determine whether students' ORF improved, including specific phonemes requiring additional attention by SpLD students, their reading Automaticity and Prosody had to be assessed.

Ways to measure the ORF in order to determine whether students' ORF improved were explored. After a thorough literature review on measurement tools, we decided to use Curriculum Based Measurement (CBM) and Multidimensional Fluency Scale (MFS), and come up with a phonemic accuracy scale which was used to measure students' pronunciation of specific phonemes.

13. Method

At week five of the fall semester 2012 the students underwent a training session with an iPod Touch which was used to listen, read and record three different texts. On weeks 6, 8 and 10 a new text, based on new phonetic rules, was uploaded to their Dropbox account and the subjects had to record the text using the DropVox application on their iPods. During weeks 7,9 and 11 they could listen to the text being read by a native speaker and then using the application Voice Memo they could practise it as many times as they saw fit to master it and once they felt ready they could record their final reading using again Drop Box.

The Repeated Reading iPod Touch supported activity was carried out during 8 weeks. Students worked independently out of class (at home or any other place they liked). They used one text for every two weeks. During the first week, they did a first reading of the text loudly, recorded it and uploaded it in DropVox. During the second week, they listened to the text (which was in a video clip form), performed by a native speaker, and repeated after the speaker, recorded and listened again and again, using the iPod Touch software Voice Memo, for as many times as they needed to, until they felt their

oral reading fluency was as close as possible to the native speaker. Then they recorded and uploaded it using DropVox. This was repeated three times with three different texts, relevant to the students' field of study.

At the end of the recordings, students' reading fluency was evaluated: The changes in pronunciation / fluency from the first to the last recording were compared.

14. Discussion

14.1. Automaticity

Broadly accepted measure of ORF, CBM measures two aspects of automaticity:

Speed or rate of correct words per minute (CWPM) quantitatively;

Accuracy, both quantitatively, by establishing the number of correct words decoded and recognised per minute, and qualitatively by establishing the types of errors student make while reading (Rasinski, 2004).

14.1.1. Rate

Participants showed moderate reading rate growth from the first (R1) to the second (R2) reading of each text in Words Per Minute (WPM) and CWPM. This was also evident from the average WPM and WCPM from R1 to R2 of all three texts:

	Average WPM		Average CWPM	
	R1	R2	R1	R2
1st text	55	85	48	77
2nd text	51	68	42	57
3rd text	63	74	52	66
All texts	56	75	47	67

Table 1. Average Words Per Minute and Correct Words Per Minute.

14.1.2. Accuracy

(a) CWPM

The Curriculum Based Measurement (CBM) measuring tool was used to measure Word Decoding ACCURACY quantitatively by measuring the students' reading level of performance:

According to the literature, there are three types of levels of performance, which reflect various levels of word decoding accuracy (CWPM). When the level of performance is between 97 to 100%, student ORF is at Independent level. When the level of performance is between 90 to 96%, student ORF is at Instructional level; and when the level of performance is lower than 90%, student ORF is at Frustration level (Rasinski, 2004).



Graph 1. Levels of performance for word decoding – Accuracy (all texts).

English SpLD students' level of performance for word decoding from the first to their second reading improved slightly: The percentage of English SpLD students at Frustration reading level, who found texts too challenging to read decreased; although the percentage of students at Instructional level, who were able to read texts with some assistance increased somewhat, there were no students at Independent level, able to read texts without assistance (Rasinski, 2004):

(b) Accuracy: types of errors – the CWPM quantitatively.

According to the literature, these are the main different types of errors readers make:

- Mispronunciations - count only first time the error is made
- Substitutions
- Insertions
- Omissions
- Supplied words
- Not Real Errors
- Self-corrections
- Repetitions
- Errors in word endings: -ing, -ed, -s
- Pronunciation errors in proper nouns

As we have seen, although the level of word decoding accuracy increased, we were interested in analysing qualitatively the different types of errors made. We used Curriculum Based Measurement (CBM) to measure Accuracy qualitatively.

Five different types of errors (Hasbrouck, 2005) were identified. The most common type made by the participants was mispronunciation (44%), hesitations or no attempts (25%) and word substitution (15%). There was a small percentage of omission (8%) and some word reversals (6%). It was interesting to notice that the results in the first three categories rose during the second reading instead of reducing; that is thought to be due to the high percentage of mistakes made by specific students, which affected the results of the whole group. Also, all students showed more hesitation during the second reading. This is believed to be mainly because of their strong wish to be more accurate in their second readings.

	R1	R2	Total
	(All texts)		
Mispronunciation	42%	46%	44%
Hesitation /	17%	26%	25%

No attempts			
Substitution	15%	16%	15%
Omissions	11%	4%	8%
Word Reversal	6%	5%	6%

Table 2. Types of errors.

14.2. Reading Prosody

Prosody, the second dimension of ORF, is the rhythmic and tonal aspect of speech: the “music” of oral language.

Prosodic features include:

- (a) Variations in pitch (intonation),
- (b) Stress patterns (syllable prominence), and
- (c) Duration of time (length of time)

These contribute to the expressive reading of a text. These elements signal question, surprise, exclamation, and other meanings beyond the semantic of the words being spoken. Correct prosody is reading that sounds like speaking. Prosodic reading provides evidence that the reader understands what is being read (Kuhn & Stahl, 2000).

The adapted version of Zutell and Rasinski’s (1991) Multidimensional Fluency Scale (MFS) of 1 to 4, with 1 being the lowest and 4 being the highest was used to measure qualitatively ESAP students’ prosodic features of fluency. On the whole, students’ prosody improved from the first to the second reading of each text: expression and volume, smoothness, and pace percentages moved from all four levels to the last three levels. However, although in some areas they reached number 4 of the scale, the percentage was not very high.

Dimensions	1	2	3	4
Expression and volume				
First reading*	49%	42%	9%	-
Second reading*	24%	28%	36%	12%
Phrasing and information				
First reading*	60%	36%	4%	-
Second reading*	47%	33%	20%	-
Smoothness				
First reading*	80%	20%	-	-
Second reading*	54%	36%	-	10%

Pace				
First reading*	54%	36%	10%	-
Second reading*	25%	45%	15%	15%

*all texts

Table 3 Prosodic Dimension of Fluency.

14.3. Phonemes

In order to examine the student’s phonological processing abilities based on phonetic principles taught in class, two specific phonemes (ight sound / gh sound) the students found the most difficult to master were chosen as a basis of measuring their skills. At the first reading of the third text, the number of mistakes on these phonemes was quite high (18); however the number of mistakes (6) at the second reading was significantly lower.

Mispronunciation of ght / gh sounds	R1	R2
Text 3 (all students)	18	6

Table 4. Phonemes mispronunciation.

15. Limitations

There were, of course, a number of limitations in this project. The factors which influenced the validity of the study were:

- a) The small number of students and
- b) The need to further develop self-management skills and responsibility of own learning

16. Future possible directions

Taking into account the positive and profitable findings of the ORF iPod Touch programme, it is important to work out ways of encouraging all first year students to practise their ORF. Some ways could be to:

- Incorporate ORF programme in all courses.
- Use other Technologies for ORF improvement apart from iPod Touch such as student own Smart Phones, Tablets or Laptops.
- Use iPod Touch programme with other types of students, e.g. Special Learning Difficulties (SpLD) students.

17. Conclusions

This research revealed that the provision of out-of-class support through the use of an iPod technology-based independent, Repeated Reading instructional technique had an impact on English SpLD students’ Oral Reading Fluency. Student automaticity (speed and accuracy) increased over the period of the iPod project, the prosodic features of students’ fluency, including pronunciation of specific phonemes, improved. However, this impact was less than the one on English for Specific Purposes students of the same university who were not SpLD students (Papadima-Sophocleous, et al. 2012). It is hoped that this research project has shed some light into the area of the use of Guided Repeated Reading, supported by New Technologies to improve University level English

SpLD students' ORF. Further research needs to be carried out in this area to be able to come up with more generic results.

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