EFL University Students’ Reading Comprehension through Multimedia Annotation and Writing Summary

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Abstract

The present study aimed to explore how multimedia annotation and writing summary influence the level of reading comprehension. Annotation is based on the theoretical framework of attention, which maintains that attention is critical in the acquisition process of an L2 (Robinson, 1995; Schmidt, 1995, 2001). In fact, several studies (Bowles, 2004; Chun & Plass, 1996; Jones, 2004; Jones & Plass, 2002; Lomicka, 1998; Nagata, 1999) have been done to investigate the relationships between annotation and vocabulary acquisition, instead of beginning with the perspective of the structure and organization of the text. Moreover, a summary is a shortened version of the original text and the main purpose of such a simplification is to highlight the major points. A written summary has a clearly arranged structure and is written in a logical, chronological and traceable manner. According to Trites & McGroarty (2005), asking readers to write a summary after reading the text is a better way to assess their comprehension. However, it is still not proven that such writing summary can lead to better reading comprehension. In this way, the current study tried to probe the EFL university students’ reading comprehension through online annotation and writing summary from the perspective of the organization of the text. One hundred non-English majors were invited to join the study and all participants read the online text under one of four conditions: no treatment, multimedia annotation, writing summary, and both of the two treatments. Results of quantitative analysis revealed that participants demonstrated better reading comprehension with the use of multimedia annotation and writing summary, while those who didn’t receive any application performed worse in the comprehension test.
INTRODUCTION

During the past twenty years, research has focused not only on examining the effects of teaching approaches in the classroom but also on how to engage learners in reading an abundance of texts. A considerable number of studies have investigated the effectiveness of marginal glosses under different premises (Bowles, 2004; Jones, 2004; Jones & Plass, 2002; Lomicka, 1998; Nagata, 1999) and various theoretical frameworks support their use as a valid tool for second language acquisition (SLA) (Hulstijn & Laufer, 2001; Mayer, 2001, 2005b).

Online annotation is one of the applications of computer-mediated communication (CMC), which provides interpersonal communication and offers access to authentic language input. Because of the potential of networked technology, the Web-based annotation system allows multiple readers to annotate the same text for the purpose of knowledge sharing; moreover, readers can have more opportunities for dialogues and learning through conversations. In addition, online annotations enable synchronous and asynchronous collaboration among different groups of readers (Yeh & Lo, 2004). In other words, readers are not limited to viewing online text passively.

A summary is a shortened version of the original text and the main purpose of such a simplification is to highlight the major points. A written summary has a clearly arranged structure and is written in a logical, chronological and traceable manner. Because summaries should be significantly shorter than the original, minor facts have to be left out; however, all major conclusions should remain. According to Trites & McGroarty (2005), asking readers to write a summary after reading the text is a better way to assess their comprehension. Nevertheless, it is still not proven that such writing summary can lead to better reading comprehension.

In this way, the purposes of this study are therefore twofold. First, the study aims to investigate whether multimedia annotation and writing summary have any influence on readers’ comprehension toward the texts. EFL Learners’ reading and writing behaviors through the online environment have not yet been fully explored (Huang, Chern & Lin, 2009), and having the access to know these specific behaviors may provide the washback effects to classroom instruction. The second purpose of this study is to examine to what extent and in what manner that multimedia annotation
and writing summary can affect readers’ comprehension. Most of the time, reading is an interactive process between the reader and the writer; however, seldom research has been done to investigate the interaction between online annotation (a medium of input) and writing summary (output). In addition to the two main purposes, the current study also tries to probe the perceptions and attitudes of the EFL learners about the application of online annotation and writing summary to see the strategy use during the reading process.

**LITERATURE REVIEW**

Early studies on the effectiveness of electronic glosses compared hyper-dictionaries with conventional paper dictionaries (Aust *et al.* 1993). However, most of the studies found that students preferred hyper-dictionaries than traditional, but there were no significant effects in terms of the application of the hyper-dictionaries. More recently, several studies investigated learners’ preferences regarding the types of annotations (Davis & Lyman-Hager, 1997; Lomicka, 1998; Chun, 2001; Ercetin, 2003) and they found that most learners had a strong preference for annotations providing first language (L1) translations of words, and students preferred using video annotation than other types.

**Annotation and Second Language Reading**

Annotations are the notes or glosses a reader makes to himself or herself, such as what the students make when reading texts or researchers create when noting references they plan to pursue (Wolfe, 2002). In the past, annotations were the major source for knowledge sharing in medieval literary culture. Medieval readers used the interlinear margins of manuscripts to discuss, critique, and learn from the annotations left behind by earlier readers (Wolfe, 2001). Annotations include four main functions: remembering, thinking, clarifying and sharing (Ovsiannikov, Arbib & McNeill, 1999). Furthermore, due to the potential function of annotation, it creates functions which are unavailable to readers making annotations on paper and cope with the limitation of online texts.
It appears that the characteristics of Web-based annotation system confirm to current second language learning theories. Based on the generative hypothesis (Jonassen, 1985), reading comprehension needs the active transfer of existing background knowledge to new reading texts, and generative reading activities are those which require readers to intentionally relate new information to their prior knowledge rather than responding to the text without using their personal and contextual knowledge. Online annotations aid readers to browse reading texts through skimming user-made hyperlinks which enable them to search for information, track down answers and look back on previous reading material of the reading text (Yeh & Lo, 2004). Online annotations offer many supportive tools to enhance readers learn to move from reading to writing, such as highlight, questions, comments, examples and sharing which can scaffold various note-taking and reading strategy training (Yeh & Lo, 2004).

Many L2 research findings supported the potential use of annotations to assist second language reading. Some researchers indicated that annotation is a useful tool to promote readers’ reading comprehension. Annotations can not only enhance readers’ memory and monitor their reading comprehension, but also help to clarify the main idea of the reading passages. Kiwera (1989) investigated the influence of annotations on language teaching and indicated that annotations made while reading can aid rereading, offering readers with effective and efficient retrieval cues when they review the reading text and facilitating them to identify specific information from the reading text. Furthermore, collaborative annotation offers more efficient prompts for readers to find out important information when recall reading texts. In addition, Hulstijin, Hollander and Greidnus (1996) explored the influence of dictionary use, annotation and the reoccurrence of unknown vocabulary on incidental vocabulary. They found that incidental vocabulary learning is higher when L2 learners look up the meaning of words through annotations rather than traditional dictionary. Similarly, many studies confirmed that the use of multimedia annotation is effective in promoting different aspects of second language learning, including vocabulary, listening and general reading comprehension (Brett, 1997; Chun & Plass, 1996; Chun 2001; Lomicka, 1998; Ridder, 2002; Ercetin, 2003; Lo et al., 2005; Sakar & Ercetin, 2005).
Annotation and Vocabulary Learning

In the process of reading comprehension in a second language (L2), one of the integral components, though not the only or most important component, is the ability to decode or understand individual vocabulary items in a text. Glosses, usually placed at the margin of the text, can be textual, visual, both textual and visual, or auditory. Recent literature on glossing has provoked a controversial debate: one that remains problematic even today in foreign language (FL) reading research. Traditionally, glosses provided a short definition or note in order to facilitate reading and comprehension processes for L2 learners. Nation (1983) defined glosses as short definitions; Pak (1986) refers to them as explanations of the meanings of words. Typically located in the side or bottom margins, glosses are most often supplied for "unfamiliar" words, which may help to limit continual dictionary consultation that may hinder and interrupt the L2 reading comprehension process.

Lyman-Hager et al. (1993) examined vocabulary acquisition and student glossing choices for intermediate level students studying French. Lyman-Hager et al. concluded that students who worked with the multimedia program were better able to retain vocabulary words than students who worked with non-computerized text. In their article exploring multimedia annotations and vocabulary acquisition, Chun and Plass (1996) present the results of three studies with students in their second year of German who used CyberBuch, a multimedia application offering annotations through pictures, text, and video. Specifically, the goals of their investigation include exploring incidental vocabulary learning, examining the effectiveness of multimedia annotations, and investigating the relationship between look-up behavior and vocabulary test performance (p. 185). Before working with the multimedia application, students were introduced to the program and watched a video which provided an overview of the story. After reading the story and using the multimedia annotations, students took a vocabulary test and wrote a recall protocol. Chun and Plass report that the recall protocol for visual annotations (i.e., words annotated with text and pictures, text, and video) was higher than for words annotated with text alone. While both Lyman-Hager et al. (1993) and Chun and Plass (1996) investigated vocabulary learning through the use of recall protocols, some researchers, such as Myers (1990), point out that recall or post-reading measures may be more representative of a
memory test used to simply "recall" knowledge (Myers, 1990).

Martínez-Lage (1997) provides examples of multimedia annotations from a project annotated through Guided Reading (Herren, 1996). She implies the usefulness of multimedia annotations in that they can "provide immediate access to textual, sound, and visual annotations" (p. 149). This immediate access is not as intrusive as the steps required in looking up words in the dictionary. Unlike traditional glossing, the use of images through multimedia annotations can be advantageous for readers (Chun & Plass, 1996; Martínez-Lage, 1997). Martínez-Lage suggests that student interaction with text facilitates understanding because students learn not only about language, but learn with language, thus promoting active reading (p. 149).

In light of the research on glossing and multimedia annotations, it can be concluded that studies have concentrated primarily on vocabulary learning, acquisition, and retention, and have only scratched the surface of research involving computer-assisted reading comprehension and multimedia annotations. Furthermore, recall protocols seem to have become the chief measure in glossing studies. Recall protocols and other post-reading tests represent an “off-line” measure of the product of comprehension (Myers, 1990). Such “comprehension tests,” as noted by Bernhardt (1991), are acceptable measures of reading comprehension and “provide a purer measure of comprehension, uncomplicated by linguistic performance and tester interference” (p. 200). However, even if the reader can answer questions or recall words, s/he may not hold a coherent understanding of the text. According to some researchers (e.g., see Myers, 1990), online measures of comprehension (reading processes and integration of text during reading), which account for reading comprehension as it is occurring, may more accurately measure comprehension.

Annotation and Reading Strategies

Research in second language reading has suggested that readers employ a wide variety of strategies to assist them with the acquisition, storage, and retrieval of information (Huang, Chern & Lin, 2009). Some studies focus on differentiating ESL/EFL learners’ online reading strategies use with qualitative investigation (Elshair, 2002; Konishi, 2003) and quantitative analysis (Anderson, 2003). Elshair (2002) examined graduate students’ online reading strategies with think-aloud protocols.
Raw data indicated two aspects of strategy use: Web-related strategies, such as searching for information, browsing, and evaluating Website design; and text-related strategies, such as paraphrasing, text-reader interaction and personal identification. Readers applied a wide variety of text-related strategies even though they were instructed to do Web-based reading. Findings revealed that readers tend to naturally transfer the reading strategies they already have from one medium to another. As a result, it is significant to incorporate both text-related and Web-related strategies while reading texts online. Furthermore, readers need to be trained with these strategies before reading texts online. In the study by Huang, Chern, and Lin (2009), they investigate patterns in the online reading strategies used by EFL learners and how reading comprehension is affected by strategy use and which strategies work best for EFL learners while reading online texts. The results revealed that students used support strategies much more often than any other available strategies and translation had shortened the time of text decoding and were helpful to students intimidated by length online articles. As for the effects of strategies on reading comprehension, global strategies can a) help readers remove the psychological barriers when reading texts beyond their own level, b) are useful for increasing comprehension scores on main ideas because previewing the text about its content and organization assists readers in detecting main ideas, and c) interestingly contribute to improved scores on the comprehension of details (Huang et al., 2009).

**Reading to Learn**

The TOEFL 2000 reading construct paper (Enright et al., 1998) suggested that a “Reading to Learn” task would require students to recognize the larger rhetorical frame organizing the information in a given text and carry out a task demonstrating awareness of this larger organizing frame. Moreover, Enright et al. (1998) propose the idea that in reading to learn readers must integrate and connect information presented by the author with what they already know. In the research done by Trites and McGroarty (2005), the participants received two different reading comprehension tests: one is basic comprehension test with multiple choices and the other is “reading to learn” that required them to write summary of the texts they read to demonstrate the understanding. The results indicated that the writing summary can be better to
assess readers’ comprehension instead of the multiple choice questions. However, Trites and McGroarty (2005) did not conclude that asking readers to write a summary can enhance their understanding of the texts positively. That is to say, enhancing the reading comprehension and being better alternatives for reading assessment seem to be different ideas and it cannot be overestimated that writing summary (Reading to Learn) can not only assess readers’ understanding accurately but also enhance their comprehension positively.

The Present Study

Reading comprehension does not only occur during the reading process, it will occur after the process because the readers can try to combine and integrate the main ideas of the texts to understand the central meaning. As mentioned above, the present study will explore the effects of online annotation and writing summary on reading comprehension. Although Trites & McGroarty (2005) mentioned that asking readers to write summary after reading can specifically and accurately evaluate the reading ability, they did not mention such means can really better enhance readers’ comprehension. The value of this study is to investigate if the influences of online annotation and writing summary can interact positively to help readers have better comprehension toward the texts. The following are three research questions of the present study:

1. Do students perform differently in reading comprehension according to different treatments (multimedia annotation and writing summary) that they receive?
2. To what extent do students perform differently in reading comprehension according to the treatments (multimedia annotation and writing summary) that they receive?
3. If students perform differently in reading comprehension according to the treatments they receive, what are their attitudes to and reflections on the treatments?

METHODS
Participants

The pool of participants consists of non-English majors, a total 100 freshmen approximately, and these freshmen will be selected based on their scores of the placement test that they receive during the university orientation. The placement test, including the listening and reading ability, belongs to the norm-referenced test that relates one examinee’s performance to that of other candidates through ranking. In other words, the placement test in this study is considered as a type of test, assessment, or evaluation which yields an estimate of the position of the tested individual in a predefined population, with respect to the trait being measured. During the research experiment, all participants will be separated into four groups in order to receive different treatments to examine the effects on their reading comprehension.

Instruments

There are two main instruments in the current study:

**Multimedia Annotation (WebNotes).** This annotation system is a tool that can create highlights in multiple colors on texts from any web page or PDF file. Readers can distill important facts just as if the texts had been printed out. By doing so, the participants can make use of this annotation tool to highlight the ideas based on the importance level to comprehend the texts. Also, readers can add sticky notes with their own comments while they have any idea. Moreover, if necessary, readers can use this tool to organize, rearrange and delete the annotations of the web page or PDF file to have better understanding toward the texts or reading materials. In the current study, the participants will apply the annotation tool during the reading process.

**Writing summary/Reading to learn.** In terms of writing summary, the participants will be required to write a summary for what they have read. According to Trites & McGroarty (2005), such writing summary after reading can be considered as “Reading to Learn” because readers have to demonstrate their understanding of the texts by providing a summary. However, as mentioned above, almost none research has been done to investigate the effect of writing summary, in other words, it cannot be sure whether the writing summary can be a positive or negative factor for reading
comprehension in the current study. In this way, writing summary is the second treatment and will be carried out to investigate the effects on participants’ reading comprehension.

In this study, all participants will be divided into four groups randomly. The following table demonstrates how each group was assigned to different treatments.

Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Group 1</td>
<td>No Treatment</td>
</tr>
<tr>
<td>Group 2</td>
<td>Treatment 1: Multimedia Annotation</td>
</tr>
<tr>
<td>Group 3</td>
<td>Treatment 2: Writing Summary</td>
</tr>
<tr>
<td>Group 4</td>
<td>Combination: Treatment 1 + Treatment 2</td>
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</tbody>
</table>

Again, it cannot be sure the effects of writing summary, especially when it is combined with treatment 1 (annotation tool). So, the design is to examine the effects of different treatments. The results from group 1 can be the baseline for comparison with the results from groups with different treatments.

**Reading Materials**

1. Some reading materials from the Internet (ex. The Student Post) will be selected for instruction and let the participants know how to use the annotation tool (Appendix 2).
2. In terms of the experiment, the reading texts/materials are chosen from the retired version of General English Proficiency Test (GEPT), high-intermediate level, and these reading texts/materials will be transformed into PDF file for them to read (Appendix 3).
3. As for pre- and post-test, two different retired versions of GEPT will also be used to assess the participants’ reading ability. The pre- and post-test will be all about multiple-choice questions, including several reading texts and 20 questions. The total score is 100 with 5 points for each item.
4. The readability (Flesch/Flesch–Kincaid Readability Tests & Vocabulary Profile) will be evaluated to make sure that the difficulty level of all selected texts/articles is similar (Appendix 4).
Readability is an attempt to match the reading level of written material to the “reading with understanding” level of the reader.

**Data Collection Procedures**

The following table describes the exact procedures including 5 phases that had been applied to collect the data.

**Table 2**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1st phase (30 mins)</td>
<td>The first phase will be about the pre-test of the participants’ reading performance. The reading comprehension test is selected from the retired version of GEPT (high-intermediate level).</td>
</tr>
<tr>
<td>2nd phase (2 hours)</td>
<td>The second phase will be about the instruction of how to use the annotation tool (1 hour). The participants will be given another hour to practice and get familiar with the use of the annotation tool.</td>
</tr>
<tr>
<td>3rd phase (2 hour)</td>
<td>The third phase will be about the participants’ formal reading with the use of different treatments (2 different versions of reading materials, 1 version for 1 hour approximately).</td>
</tr>
<tr>
<td>4th phase (30 mins)</td>
<td>The fourth phase will be about the post-test of the participants’ reading performance after they use the treatments. The reading comprehension test is selected from the retired version of GEPT (high-intermediate level), but the version for the post-test is different from the pre-test with the same level.</td>
</tr>
<tr>
<td>5th phase (30 mins)</td>
<td>The last phase will be about delayed post-test.</td>
</tr>
</tbody>
</table>

**Data Analysis**

In terms of quantitative approach, one-way analysis of variance (one-way ANOVA) will be applied to calculate and compare the differences of participants’ reading performance among different groups. In this fashion, one-way ANOVA can reveal the effects of the two treatments (multimedia annotation & writing summary) to see if they are really helpful in facilitating participants’ reading comprehension.
As for qualitative approach, the interview will be used to understand the participants’ perceptions of the treatments (multimedia annotation & writing summary). More specifically, interview will be carried out to collect the participants’ perceptions and attitudes toward the treatments. In fact, it should be noted that some of the freshmen may have good reading ability based on their college entrance exam, and the qualitative approach will be valuable to collect some data that quantitative approach cannot explain.

RESULTS and DISCUSSION

In the study, as mentioned above, one hundred EFL university freshmen were invited, and these participants were randomly assigned to the four groups. Generally, the research design focused on the results and effects of different treatments (multimedia annotation & writing summary) and it’s hypothesized that these two treatments may have positive effects on helping readers’ understanding. The one-way ANOVA revealed that these one hundred participants were in the same average of reading proficiency. The results also showed that both multimedia annotation and writing summary played significant effects ($F=12.526$, $p<.000$) on facilitating participants’ reading comprehension.

According to the results of pre-test (Table 1), the mean of the four groups were between 59~61 points, and the $F$ value was not significant ($F=0.356$; $p=0.785$). This indicated that the four groups of participants were similar in English reading performance.

Table 1: Pre-test

<table>
<thead>
<tr>
<th></th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>59.4</td>
<td>59.0</td>
<td>59.6</td>
<td>60.8</td>
</tr>
</tbody>
</table>

In accordance with the post-test (Table 2), the groups with the help of different treatments improved their reading performance by getting much high scores than the
pre-test. More specifically, participants with multimedia annotation (G2) performed best, followed by participants with writing summary (G3), and then participants with both treatments (G4), and the control group (G1) the last. Based on the F value, these improvement were significant (F=55.716; \( P<0.0001 \)), and also showed that students benefited from the multimedia annotation and writing summary because their reading performances were improved. In other words, we can said that both multimedia annotation and writing summary can help participants improve their reading performance in the immediate post-test; however, in G4, with the help of multimedia annotation and writing summary at the same time, did not show the best effects in assisting the reading comprehension. This phenomenon still made sense because more input did not guarantee the better comprehension.

Table 2: Post-test

<table>
<thead>
<tr>
<th></th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test</td>
<td>61.2</td>
<td>88.4</td>
<td>85.8</td>
<td>84.2</td>
</tr>
<tr>
<td></td>
<td>(7.058)</td>
<td>(8.3815)</td>
<td>(8.7553)</td>
<td>(8.9457)</td>
</tr>
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</table>

As for the delayed post-test (Table 3), it can be observed that the three groups with the help of different treatments still performed better than the group without treatment; however, their scores were lower than the immediate post-test. On the one hand, the results indicated that the influences of the treatments were significant (F=18.970; \( P<0.0001 \)), which suggested that participants benefited from the use of multimedia annotation and writing summary; on the other hand, it can be found that, because of the drop of their reading performance, learning did not really equal to retention. More specifically, participants in G3 performed best in delayed post-test, followed by G4, and then G2, and G1 (control group) the last. Compared with participants in G2, those in G3 did not perform better in the immediate post-test; on the contrary, their reading performances were better in delayed post-test, which can indicate that the treatment, writing summary, required more mental and cognitive processing if participants would like to write a summary after reading, and this may lead to the situation that these participants would have longer retention than G2. In the same way, participants in G4, with the help of writing summary, performed better in delayed post-test than
G2, although they got lower scores than G2 in the immediate post-test.

Table 3: Delayed post-test

<table>
<thead>
<tr>
<th></th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed post-test</td>
<td>62.2 (7.3048)</td>
<td>75.0 (8.2421)</td>
<td>79.2 (8.3763)</td>
<td>77.2 (8.2956)</td>
</tr>
</tbody>
</table>

In the previous part, the focus lies in the between-group effects; however, another important issue which needed to be discussed is the within-group effects. In other words, it’s very important to probe if the participants in three groups with the help of various treatments really improved their reading comprehension and performance through time. In Table 4, it can be seen that the within-group effects were significant \(F(2,198)=222.13; P<0.0001\) which conveyed that idea that the participants in the three groups with the help of various treatments benefited and really improved their reading comprehension and performance through different time.

Table 4: Within-group effects

<table>
<thead>
<tr>
<th></th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within cells</td>
<td>9849.83</td>
<td>198</td>
<td>49.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>22100.17</td>
<td>2</td>
<td>11050.08</td>
<td>222.13</td>
<td>.000</td>
</tr>
</tbody>
</table>

To sum up, the results confirmed the hypothesis of this research by providing empirical evidence that multimedia annotation and writing summary can have positive effects in supporting EFL university freshmen’s reading comprehension and performance. In immediate post-test, multimedia seemed to be the most effective because it involved Schmidt’s concept of noticing (1994), which revealed the idea that students’ explicit learning through multimedia annotation can help them perform better. As for the concept of writing summary by Trites and McGroarty (2005), it can be considered that asking students’ to write summaries after reading can also assist them in reading comprehension, and this can be a potential pedagogical implication because Trites and McGroarty, as mentioned, suggested that writing summary seemed
to be a better way for reading comprehension test, and in this study, there may be a washback effects due to the positive role of writing summary. Moreover, it’s necessary to note that reading is a sophisticated process, and the purpose of this research is to provide a new means, writing summary, to help students understand the reading efficiently and comprehensively. For further research, if possible, we hope to compare more participants from diverse background, in this way we can be able to examine the effects of multimedia annotation and writing summary. Moreover, if we can combine the treatments (multimedia annotation and writing summary) together, hopefully, there will be a much better approach to improve EFL students’ reading comprehension.

REFERENCES


