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INVESTIGATING REDUNDANT ON-SCREEN TEXT, LEARNER CONTROL AND SELF- REGULATION IN A FOREIGN LANGUAGE LEARNING CONTEXT

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Abstract

There are not sufficient guidelines with reference to designing a multimedia learning environment for language teaching. This study aimed to examine the effects of the redundant on-screen text, learner control and self- regulatory skills on students' learning simple past tense in an online tutorial that were variably used. English as foreign language learners (n=132) with beginner level of English studying at the preparatory school of English and Vocational School of Justice participated in this quasi-experimental study. All the groups received narrated slides, but additional instructional components in four treatment conditions were changed: Text with student control, text without student control, student control without text, and without text and student control. Each participant was given a prior knowledge test, an academic self-regulation scale, a retention test and a transfer test. Statistical analysis of data designated that redundant on-screen text is not a hinder in language learning context; and that providing novice learners with a learner-controlled system would result in a deterioration in learning. Rather, it is more useful if the learners are guided through a pre-structured and controlled system, which would alleviate the cognitive burden in the novice learners with low experience and prior knowledge in the course material. Further, results for self-regulation are not congruent with each other: In some conditions students with low self-regulation outperformed students with high self-regulation in retention or transfer tests, and in some others vice versa. The study discussed findings and presented some implications.

Keywords: redundancy, learner control, self-regulation, foreign language learning

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Introduction

Many teachers, researchers and instructional designers try to make use of the advantages of today's technology to provide better teaching and learning environments. Even though it is a long process when different types of learners, limited interaction ways and the amount of course structure are considered, none of these seem unsolvable as long as there are teachers in the physical classrooms, and moderators or instructors in distant education platforms. Yet, when it comes to online tutorials in which learners try to learn and practice the subject all by themselves, degree of learner control should be considered.

To begin with how people are assumed to learn, Mayer (2017) claims that learning occurs when words and images are selected, organized and integrated with the prior domain knowledge of the learner. The presentation of the words and images might vary from one learning material to another. While words can be in a printed or narrated form, pictures can be either static like photographs, or dynamic like animations and videos. This theory is called Cognitive Theory of Multimedia Learning (CTML). According to CTML, when learning occurs with two modes of representation – verbal or pictorial – being selected, organized and integrated by the learners, the assumption that learners have limited capacity for information processing in visual and auditory channels cannot be ignored. Also, students learn better with narration and animation than narration, animation and on-screen text that duplicates the narration. What happens when the redundant on-screen text is provided in an online tutorial is an increase in the extraneous cognitive load in the working memory, difficulty in concentration, missing the visual content in the animation, all of which serve as a detriment to learning. Studies documented by Mayer (2017) reported to validate this argument. However, most of these studies utilized science course materials in the experiments. Research displays that this principle may not apply to foreign language courses (She, Wang, Chen, & Chen, 2009; Samur, 2012). In English Language Teaching (ELT), listening and reading inputs foster learners to produce speaking and writing outputs. However, the reading material which is essential in ELT can be redundant when it duplicates narration in CTML. Therefore, the on-screen text that is added to the learning material given as the treatment conditions in this study will be referred as "redundant" based on the substantial amount of literature.

Unlike the redundant on-screen text, providing students with learner control has been found to decrease cognitive load (Mayer & Chandler, 2001; Hasler, Kresten, & Sweller, 2007). By means of control given, students would have the opportunity to navigate between slides, move back and forward in an animation, thus reviewing the parts they have missed. Similarly, self-regulatory skills, which help students do their best in their learning, might be required to

overcome the problems with regard to the design of the online tutorial or the context of the learning material.

Significance of the Study

There is a lack of research on educational technology in terms of redundancy principle in a foreign language learning setting. Also, in most of the studies briefly outlined above which found on-screen text non-redundant could only help students remember words or labels. With the online tutorial designed for this study, the authors aim to test the transferable skills in language learning, the results of which will add much to the literature of CTML. Finally, many studies employed redundant on-screen text in non-user-controlled systems in the experiment phase. This study aims to contribute to this literature as well by finding out whether self-regulatory skills promote learning in an online tutorial with redundant on-screen text and learner control students are provided with.

Multimedia Learning, Cognitive Load Theory and The Redundancy Principle

CTML is a theory of learning that is based on the idea that learning occurs when verbal and pictorial information is selected by the sensory memory, organized by the working memory and integrated by the prior knowledge within the long-term memory. So as to materialize learning, there needs to be some links between the verbal and pictorial representations of the learning material. However, cognitive load theory (CLT) is based on the idea that when new information is presented to learners, the instruction should be designed in the way that it doesn't create an extraneous cognitive load in the working memory and that it should take the constraints of the working memory of the learner into account (Sweller, Ayres, & Kalyuga, 2011). The design of the learning material, therefore, should aim to decrease the extraneous cognitive load that can occur in the learning process while the learner is focusing on the new material. If the material has some distracting or extra elements on it, learners will have adversity in focusing on the material, which causes cognitive load that most probably affect learning negatively.

The redundancy principle of CTML is based on the idea that when written text and narrated audio give the same information and if there is an animation or image, the written text is considered redundant. However, there are not strict guidelines or standards to follow in terms of this principle as it has been found that results might change depending on the learning domain, prior knowledge or learner control. Mayer et al. (2001) have explored that there is a decrease in student learning performance when they are given narration and on-screen text at the same time. These results are consistent with what Chandler and Sweller (1991) argued when they examined the redundancy effect of CLT. Students had to read the text and watch the

animation at the same time, which causes extraneous cognitive load that in most cases hinder learning. However, it can also be specified that the setting of the experiment, the learning material and/or the fact that students had no control over the learning material might have had an influence on the results of this study.

Craig, Gholson and Driscoll (2002) tested the effectiveness of animated pedagogical agents in students' learning the formation of lightning used in Mayer et al. (2001). They spotted that it is better to present the instruction material as spoken text only rather than printed-only or printed and spoken texts combined. The spoken-only group with an agent performed better in the retention, matching and transfer tests. These results are consistent with Kalyuga et al. (1999) with an addition of animated pedagogical agents.

Another study that supports the redundancy principle of CTML (Jamet & LeBohec, 2007) revealed that when on-screen text, whether sequential or static, is added to a multimedia presentation which consists of diagrams and narration, it causes an impairment in retention and transfer tests. The researchers relate the reason for this result to the overload in the visual channel, and note that the results might differ if the students had the control of the learning process as this could contribute to the reduction of the cognitive overload. Further, Leslie, Low, Jin and Sweller (2012) revealed that when students have prior knowledge about the subject, the on-screen text is redundant: However, when the students have little or no knowledge about the subject, then the on-screen text becomes necessary, or at least as the authors suggest the visual presentation does not hinder learning performance. This study is crucial as it provides evidence for the fact that redundancy principle might not be applicable when the learners have low knowledge about the subject.

In a study conducted by Atkinson-Ari, Flores, Inan, Cheon, Crooks, Paniukov, and Kuruçay (2014), an instance of reverse redundancy was observed. Although the students in this study had the control over the learning process and the on-screen text was short, they could only perform better on labelling and reconstruction tests. Overall, the authors suggest that the redundant on-screen text does not always decrease the performance of the students, instead it may even help students improve their learning. The learning mentioned here is not comprehensive and transferable learning, but it is based on memorization and retention. It would be better to redound the settings in Atkinson-Ari et al.'s (2014) study by aiming to enhance students' amount of transferable learning in a different, e.g. EFL, context.

To sum up, when students receive an instruction material regarding a science-related lesson, where they easily apprehend the narration in their language, it has been reported in many cases (e.g. Craig, Gholson, & Driscoll, 2002; Leslie, Low, Jin, & Sweller, 2012; Pociask,

& Morrison, 2008) that the on-screen text that duplicates the narration is redundant. However, it is worth examining the redundancy principle in language learning context.

Redundancy Principle in Language Learning

Plass, Chun, Mayer, and Leutner (2003) tested the influence of different types of annotations on learners' reading comprehension and vocabulary acquisition. Overall test results demonstrate that visual only group had lower scores in the text comprehension test compared to visual-verbal group. The authors conclude that visual only annotations can hinder learning in reading comprehension, denoting that the visual annotations cause cognitive load while reading a text. The study conducted by Diao and Sweller (2007) suggests that the on-screen text is necessary, and it may facilitate learning rather than being redundant when the aim of the presentation is to improve student's EFL (English as a Foreign Language) reading comprehension. Another study which focuses on Chinese language teaching and the redundancy principle was conducted by She et al. (2009) to teach technical vocabulary items. The study revealed that the on-screen text together with narration and animation was much easier to comprehend, and the lesson was more interesting when text, animation and narration were given as an instructional tool. In contrast, Moussa, Ayres, and Sweller (2012) conducted a series of experiments to test the effects of reading and listening materials on students' listening skills in an EFL context, and showed that the read-only group did better on the listening test compared to the read and listen group. In Turkish context, Samur (2012) focused on the on-screen text and whether it is redundant or not on to teach words to non-Turkish participants. The retention results of this study are consistent with the perception study of She et al. (2009) on the instruction types. Additionally, as in Diao and Sweller's (2007) study, this study helps us see that the area of EFL may have different needs in contrast to the areas of science when a multimedia learning environment is going to be designed.

The previous research outlined above demonstrates varying results in reading comprehension, vocabulary acquisition and listening skills depending on the students' needs and prior domain knowledge. Therefore, instructional designs are not likely to be standardized due to varying students' needs when the context is learning a language unlike science lessons.

Learner Control and Multimedia Learning

The learner control principle is based on the idea that learners are allowed to decide upon the pacing, sequencing and selecting the information in the learning material (Scheiter & Gerjets, 2007). For Scheiter (2014); If a learner does not have the basic information about the learning material, a linear environment would be a better option in terms of guiding and directing the learner. However, for a learner with high prior knowledge, it is better if they have

control over the pacing, sequencing and selecting of the instruction material. Mayer and Chandler (2001) found that when learners were given control over the material, cognitive load could be reduced during the learning process leading to higher scores in the transfer test. Similarly, in a study where learners, along with controlling the pace and order of the learner material, could interact with the agent by reflecting questions and receiving answers from it, Mayer, Dow, and Mayer (2003) observed that students performed significantly better on problem solving tests when they were provided with an interactive instructional material. The authors, therefore suggested that learners be allowed to control the pace and order of the learning material.

Hasler et al. (2007) tested the effects of learner-controlled environments on the test performances of the learners who were instructed the determinants of day and night, and the segmented and the stop-play groups outperformed the narration and system-based groups in the post-test. Thus, it can be concluded that it is better if students were provided with control over the learning material. Further, Tabbers and de Koeijer (2009) indicated that students with the learner control performed better on the transfer tests compared to the students without learner control in an experiment to test the interactivity principle. However, they also detected that the learners in the learner control group spent a lot of time on task, and they could not find a relation between interest, prior knowledge and cognitive involvement and the effectiveness of learner control. Still, it can be said that learners perform better when they have control over the learning material.

To sum up, it has been observed that learner control principle is an effective way to help reduce the cognitive load during the learning process, to help learners enhance their performances and understanding. The question is whether the integration of a linear learner-controlled environment reduces novice learners' cognitive load when learners are presented a redundant on-screen text which duplicates the narration, and which is reported to have increased cognitive load in most cases. In this study, the amount of the control given to the learners is limited to a linear control because the learning material is a detective story having a linear scenario and the participants are novice learners with low level of prior knowledge about the learning material.

Self-regulation

For students to stand out from other members in their classes, self-regulatory skills play a crucial role, claims Zimmerman (1998). The students who are considered self-regulated are, therefore, their own facilitators in their learning process, not just behaviourally, but motivationally and metacognitively as well (Zimmerman, 1986).

According to Lange and Costley (2018), intrinsic cognitive load results from distinct reasons. Amount of interaction and the complexity of the learning material are two of them. They conclude that intrinsic load can be compensated through the self-regulated effort. Therefore, the amount of self-regulated effort can be deduced to decrease the disadvantages caused by the complexity of the content and learning material.

Apart from its positive relationship with germane cognitive load, self-regulation has been reported to have been positively related to the willingness to speak in English as a foreign language (Arkavazi & Nostratinia, 2018). EFL learners usually find it somewhat more challenging to speak in conversations in the target language (Bailey & Savage, 1994). Communication in real life situations, especially in a foreign language, requires active participation of the person who speaks. MacIntyre, Dörnyei, Clement, and Noels (1998) suggested that self- confidence and readiness to speak are two essential factors that influence the willingness to speak, along with the attitude to the target language culture, the context of the conversation and other personality factors.

Ping, Baranovich, Manueli, and Siraj (2015) claim that self-regulatory strategies ought to be taught to students for vocabulary learning purposes. With the help of those strategies, awareness and effective use of vocabulary learning strategies of the students are likely to improve. Learning to use vocabulary is essential since it is considered to be the internal link between all other major language skills, and a determining factor in achieving language acquisition (Jordan, 1997). Jordan reflected that the insufficient vocabulary knowledge of the students results mainly from the deficiency in applying cognitive strategies, metacognitive control strategies such as goal- setting and planning, and low self-efficacy and motivation. These results highlight the necessity of enhancing students' self-regulation in academic environments.

Similarly, according to Kinzie (1990) for an effective interactive instruction, learner control, self-regulation and continuing motivation should be taken into consideration. Besides, learner-controlled instruction can be improved through self-regulatory strategies. Further, Kinzie claims that learner control can also assist students in developing self-regulatory strategies: When students are allowed to shape their learning in line with their personal needs and interests, they will have more opportunities to explore and practice instructional strategies which will then increase the likelihood of improvement in their self-regulation.

With the suggestion that no single cognitive learning strategy has an equal influence on students and the fact that self-regulatory skills play a major role in academic life, it is worth testing those skills in different conditions. In this study, they were tested with redundant on-

screen text and learner control variables. The question is whether self-regulatory skills help decrease the disadvantages created by redundant on-screen text and learner control given to students.

Purpose of the Study

The study aims to find out the effects of learner control over the learning material and the redundant on-screen text on students' retention and transfer performances in simple past tense in English by employing an online tutorial, and examine if self-regulation has an impact on learning. In that regard, the study aimed to find answers to the following research questions:

A. How does on-screen text affect students' retention and transfer scores on the simple past tense unit when they are

1. given learner control?
2. not given learner control?

B. How does learner control condition affect students' retention and transfer scores on the simple past tense unit when they are

3. given on-screen text?
4. not given on-screen text?

C. Is there a significant difference between the retention and transfer scores of students with high self- regulation skills (HSR) and those of students with low self-regulation (LSR) skills when they are

5. given on-screen text, but not given learner control?
6. not given on-screen text or learner control?
7. given on-screen text and learner control?
8. given learner control but not given on-screen text?

This study aims to examine the effects of the redundant on-screen text, learner control and self-regulatory skills on students' learning in a foreign language teaching tutorial. The results are aimed to help designers to better understand what is better for language learners and the sufficient level for it.

Methodology

Research Design

The present study adopted a single group quasi-experimental design based on the quantitative research paradigm. Two types of pre- and post-tests were conducted to investigate the impact of the treatment: pre- and post- writing tasks to check the participants' writing performance development and pre- and post- questionnaires to find out students' peer feedback perception changes.

Research design and sample

The study was conducted with a pre-test and post-test quasi-experimental design (Creswell, 2012). The academic self-regulation scale scores, prior knowledge test scores, and one of the four different versions of the online tutorial acted as the independent variables of the study; the dependent variables were the students' retention and transfer test scores in the subject of simple past tense in English. The target population was students with a beginner level of English at universities in Turkey who haven't studied the unit. Convenience sampling method was implemented due to the accessibility of the students who study in a foundation university. The participants were determined with the decision of the school coordinator, who assigned the available classes to attend the experiment considering that they hadn't studied the simple past tense unit yet, so the groups were randomly assigned. Participants were students taking beginner level English courses according to their departmental programs and English Preparatory school. Data were collected on a voluntary basis from 150 students, aged 17 to 33, from 10 classes in the preparatory school of the foundation university. Eighteen students were dropped from the sample in data analysis stage because they didn't take one or more tests.

Material

All the groups in this experiment operated an online tutorial developed by the researchers on Articulate Storyline. Each group was provided with a different version of the material. The tutorial was regularly checked during the design process by one of the teacher trainers in English Language Programs in terms of context and content of the material, and by an instructional designer in terms of multimedia principles. These regular checks were made to ensure validity and effectiveness of the learning material. This tutorial aimed to teach simple past tense to the students, who then studied the subject in 15-20 minutes depending on the experimental group they were in.

There were four steps in the learning material based on the context: The introduction of the case, the presentation of the main learning gains, the practices and clues (two steps) and the conclusion. The treatment of the four groups is listed in Table 1, and examples of screen layouts are given in Figure 1.

Table 1.

Groups and Treatments

Group	Multimedia Condition	Abbreviation	Number of Participants
1	Narrated Slides with On-Screen **Text**, but **No** Learner **Control** is Given	TNC	33
2	Narrated Slides without (**No**) On-Screen **Text** and **No** Learner **Control** is Given	NTNC	33
3	Narrated Slides with On-Screen **Text**, and Learner **Control** is Given	TC	32
4	Narrated Slides **without** On-Screen **Text**, and Learner **Control** is Given	NTC	34

The material is a self-study tutorial which encapsulates a specific content and activities which are not available in the course-book the students use. However, the objectives of the course were in line with the course book used in the English Language Programs. The tutorial comprised 4 steps and 30 screens/slides in total. Eight of the slides were introductory slides in which students were explained what to do next; Ten slides were designed to ask questions to the students about the slides earlier. Eight slides embraced animations or images about the context in which students followed the story. Finally, four of the slides were conclusion slides in which students were presented the end of each step. After the completion of the prior knowledge test, students were asked to start the tutorial in the university's computer lab. About the theme and the context of the material, students were given a criminal case to be solved with the help of the clues given at each stage. Regardless of the condition, the participants were given a small introduction about the case. Then they investigated the witnesses one by one, and they did some practices by trying to question the suspects of the crime. Finally, they were expected to write the name of the person who they think was the criminal (for details, see Cananoglu, 2020).

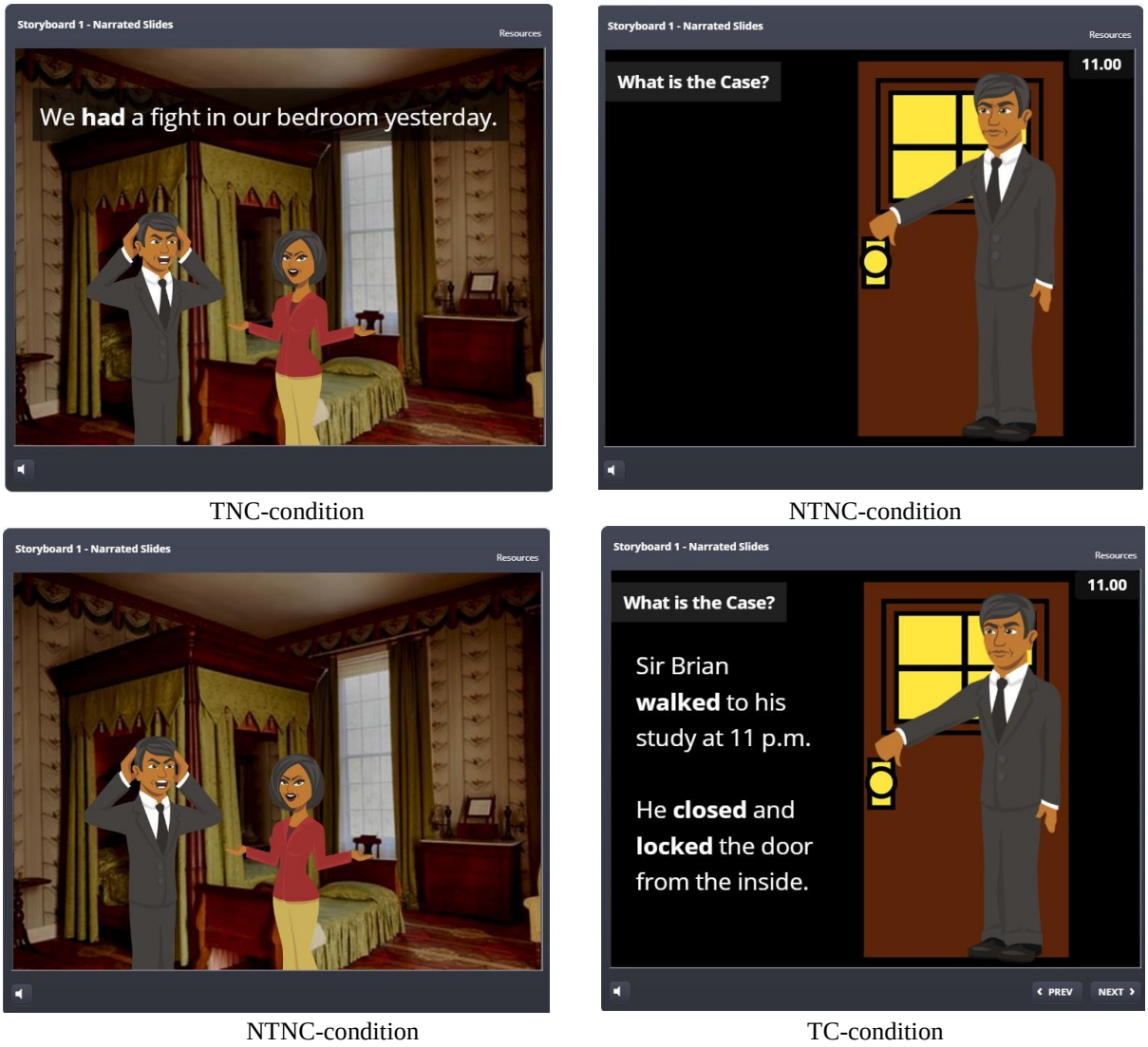

Figure 1. Screen layout examples in the four versions

Procedure and Data Collection Tools

Four data collection instruments were utilized in this study. Before the treatment, students were expected to respond to an online academic self-regulation scale (Kaplan, 2014) with a Cronbach alpha coefficient value of .969, and a prior knowledge test. After the treatment, students were given a retention test and a transfer test. The prior knowledge test, the retention test and the transfer test were developed by the researchers, and were revised by a committee of testing coordinators at the English Language Program of the university the research was conducted in. The first part of the test contains 10 fill-in the blank type of questions. However, all five questions in the second part required full-sentence answers. In total, the maximum score a student could get was 20. The retention test, with a maximum score of 10, asked to match 10 events with 5 characters to test if the on-screen text or level of learner control causes cognitive load and influenced recall of the learning material. The transfer test was designed to assess if

students would be able to transfer what they have studied in the learning material into, in this case simple past tense, a different environment: Students were expected to write 10 sentences about a person's past. In this test, with a maximum score of 20, students were asked to use 10 verbs which they had studied in the learning material.

Data collection was completed at the participants' school in one day. First, the students were given the consent form. Second, the students were told to complete the "Academic Self-Regulation Scale" online in 10 minutes. Third, the prior knowledge test was completed in 10 minutes. Subsequent to the treatment, the retention and the transfer tests were given to the students successively, respectively taking 10 and 15 minutes to complete.

Data Analysis and Results

The normality tests, conducted on the data sets, demonstrated that it is acceptable to conduct parametric tests to compare the means of prior knowledge, retention and transfer test scores of each matched group. With reference to the analysis of self-regulation variable, non-parametric tests were used, and verified with their parametric equivalent tests.

Table 2 depicts matched groups for the research questions. Table 3 demonstrates the descriptive statistics of prior knowledge test, retention test and transfer test for the treatment groups. Table 4 provides the same statistics with the self-regulation variable for the treatment groups.

Table 2.
Research questions and matched groups

Question-1	TC vs. NTC
Question-2	TNC vs. NTNC
Question-3	TC vs. TNC
Question-4	NTC vs. NTNC
Question-5	HSR + TNC vs. LSR + TNC
Question-6	HSR + NTNC vs. LSR + NTNC
Question-7	HSR + TC vs. LSR + TC
Question-8	HSR + NTC vs. LSR + NTC

Prior Knowledge, Retention and Transfer Test Comparisons

A one-way ANOVA test [F (3, 128) =.031, p=.993] showed that the means of the prior knowledge for all groups were identical. Similarly, further one-way ANOVA tests showed that there were significant differences between groups for both retention test [F (3, 128) =3.010, p=.033] and transfer test [F (3, 128) =8.205, p=.001].

Therefore, independent t-tests were conducted to analyze each group in terms of text and control variables.

Table 3.
Descriptive statistics of prior knowledge test, retention test and transfer test

		Prior Knowledge		Retention		Transfer	
	n	Mean	*St. Dev.*	Mean	*St. Dev.*	Mean	*St. Dev.*
TNC	33	3.121	4.967	4.788	2.190	8.667	6.541
NTNC	33	2.939	4.220	3.848	1.822	7.333	5.823
TC	32	3.188	4.130	4.125	1.979	3.906	5.082
NTC	34	3.235	3.585	3.294	2.250	2.735	4.925
Total	132	3.121	4.202	4.008	2.116	5.652	6.075

Text and Control Condition Comparisons

The follow-up independent t-tests showed that mean retention scores of TNC (M=4.78; SD=2.19) and NTC (M=3.29; SD=2.25) conditions significantly differed (t=2.733; df=64; p=.008), favoring TNC condition (Cohen's d=0.67). However, the differences between mean retention scores of TC and the NTC conditions, TNC and the NTNC conditions, NTC and the NTCN conditions, and TC and the NTNC condition were not significant. Regarding transfer test scores, second series of follow-up independent t-tests showed that there was a statistically significant difference (t=3.493; df=65; p=.001) between the mean transfer test scores of NTC (M=2.73; SD=4.92) and NTNC (M=7.33; SD=5.82) conditions (Cohen's d=0.27), and (t=3.269; df=63; p=.002)between the mean transfer test scores of TC (M=3.90; SD=5.08) and NTC (M=8.66; SD=6.54) conditions (Cohen's d=0.23). Nevertheless, the differences between mean transfer scores of other condition groups were not significant. These three significant differences obtained through t tests were also confirmed considering Bonferroni correction (alpha/6=0.0083). Because Cohen's d coefficients for the transfer tests of NTC, NTNC, TC and NTC are small, depicting small effect, the significant differences obtained should be interpreted cautiously, and the findings should be replicated with larger samples.

Table 4.

Descriptive statistics of the tests based on self-regulation grouping

		Prior Knowledge		Retention		Transfer	
	n	Mean	*St. Dev.*	Mean	*St. Dev.*	Mean	*St. Dev.*
HSR-TNC	25	2.640	4.812	5.000	2.327	8.200	6.409
LSR-TNC	8	4.625	5.475	4.125	1.642	10.125	7.180
HSR-NTNC	18	3.222	4.796	3.889	1.567	6.722	5.808
LSR-NTNC	15	2.600	3.541	3.800	2.144	8.067	5.957
HSR-TC	16	2.688	3.700	3.625	1.784	2.938	3.750
LSR-TC	16	3.688	4.585	4.625	2.093	4.875	6.108
HSR-NTC	20	2.550	3.219	4.150	1.871	3.250	5.514
LSR-NTC	14	4.214	3.964	2.071	2.234	2.000	4.019
Total	132	3.121	4.202	4.008	2.116	5.652	6.075

Self-Regulation Effect

To examine whether self-regulatory skills of the participants had an influence on the retention or transfer scores, a one-way ANOVA was conducted, showing that there was no statistically significant difference on self- regulation scale scores (see Table 5) between the treatment groups [F (3, 128) =0.375, p=.771]. Further, the participants' self-regulation survey scores were divided into two groups depending on the mean (4.98) score of total participants: Low (LSR) and high (HSR). As the group sizes got smaller due to that division, data distribution in some of these small groups did not show normality, hence the follow up tests were non-parametric tests, ie., Mann-Whitney U tests.

Table 5.

Descriptive statistics for students' self-regulation scale scores

Groups	n	Mean	*St. Dev.*
TNC	33	5.152	1.101
NTNC	33	4.917	1.232
TC	32	4.941	.910
NTC	34	4.921	.973
Total	132	4.982	1.054

Retention and Transfer in LSR and HSR Groups

Mann-Whitney U tests indicated that:

i) *in text without control condition***,** high and low self-regulation groups' retention test scores [*U* (31) =75000, *z*=-1.066, *p*=.287] were similar, also both group's transfer test scores [*U* (31) =84500, *z*=-.653 *p*=.514] were identical.

ii) *in no text and no control condition,* high and low self-regulation groups' retention test scores [*U* (31) =133500, *z* =-.055, *p*=.956] were similar, and both groups' transfer test scores [*U* (31) =114500, *z* =-.747 *p*=.455] were not significantly different.

iii) *in text and control condition,* high and low self-regulation groups' retention test scores [*U* (30) =94500,*z*=-1.281, *p*=.200] were identical, and their transfer test scores [*U* (30) =114000, *z*=-.565 *p*=.572] were similar.

iv) *in no text but with control condition*, students with high self-regulatory skills outperformed the students with low self-regulatory skills in the retention test [*U* (32)=58000, *z*=-2.904, *p*=.004], (Cohen's r= .49), mean rank of HSR NTC=21.60; mean rank of LSR NTC=11.64; However, the second test indicated thatboth groups' distribution of the transfer test scores [*U* (32)=128500, *z*=-.460 *p*=.645] were similar.

Discussion and Conclusion

The Redundancy Effect

In the light of the results, it can be concluded that the redundant on-screen text doesn't hinder the retention of the content presented in the material or the transfer of the new vocabulary items. According to CTML, when on- screen text duplicates the audio, the text is redundant since it causes extra visual load in the learner's mind. First of all, most studies that contradict with these results are generally those which employed science course materials in their experiments (Craig et al., 2002; Kalyuga et al., 1999; Mayer, 2001; Mayer et al., 2001). It may be interpreted that it is redundant to add a text that duplicates the narration when a student studies to learn the lightning formation or how brakes work in their mother language. Mayer et al. (2001) has spotted that the text is redundant as it makes it difficult for the learner to focus on the animation which presents the formation of a lightning. The narration already completes the animation and contributes to the creation of meaning images in students' minds with the integration of the visual and audial inputs. However, when it comes to learning a foreign language, students' needs and the efforts they make might differ, as the results in this study suggested.

Although the difference was not significant, it was reported that the mean scores of the redundant text groups were higher than the other two groups. These results are consistent with earlier studies about learning a foreign language. For instance, Garza's study (1991) concluded that subtitled videos help students integrate reading and listening inputs; Borras and Lafayette's

study (1994) demonstrated that on-screen text provides students with valuable linguistic input, resulting in communicative output. Also, Markham (1999) displayed that captioned videotapes significantly enhance EFL learners' word recognition. Further, She et al. (2009) argued that when presented together, on-screen text and narration are better for foreign language learners, and Samur (2012) supported that presenting redundant on-screen text facilitates students' vocabulary learning.

Unlike science courses, language courses rely chiefly on written and spoken inputs with neither superior to the other. In order to speak a foreign language, one needs to hear the correct pronunciation, and to write, one needs to know how words are spelled. Since the two skills speaking and writing cannot be separated while learning a language, the role of a text cannot be ignored as seen in the results. The transfer test in this study is designed in the way that asks students to write grammatically correct past tense sentences with the words practiced in the online tutorial, so not including text, even if there is narration, would cause students to spell words incorrectly and write fewer correct sentences. Overall results suggest that designing a language learning tutorial is different from designing a science course tutorial.

In addition to the different course types, students' being novices has had an impact in these results. The prior knowledge of the participants in the experiment were so low that they were considered to be novice learners. A study with low-experienced learners (Moreno & Mayer, 2002) indicated that students remembered and transferred the relevant learning inputs significantly more when they were given redundant on-screen text plus animation and narration. Therefore, this study is in consistency with Moreno and Mayer's study (2002).

Similarly, Leslie et al. (2012) concluded that adding visual information to an audio presentation would be useful and beneficial for novice learners. It could be argued that students with less knowledge about the foreign language material made use of any kind of inputs to apprehend the subject better. In this case, contrary to the expectation that the redundant text would cause cognitive load, it can be asserted that the text, the audio and the images worked together in the organization of meaning creation and in its integration of it in the students' mind. This conclusion is consistent with Persky and Robinson's (2017) suggestion that learner expertise is one substantial factor that should be taken into consideration when determining an effective instructional strategy and that integrated text with diagrams and visuals with auditory narration are two of those recommended. To conclude, considering the results in the study and the overview of the related literature, it can be reported that redundant on-screen text, although it was not significantly confirmed to enhance learning, is not a hinder in language learning context.

Learner control

Based on the results, it can be suggested that learners benefitted from the absence of a learner-controlled material. When students were given control when using the online tutorial, they did not make use of the "back" and "next" options that allowed them to read and listen to the screen one more time. In contrast, the students who were not given an opportunity to move back and forth took the advantage of being guided by the system itself.

One of the reasons why these results do not accord with CTML is the total duration of the online tutorial. As an example, to this claim, these results contradict with Mayer and Candler's (2001) results which suggest that providing learners with control would enhance learning with a significant difference. However, the total amount of time allocated to the animation was only 140 seconds in their study. Students who could not navigate between slides spent less than 3 minutes to learn about the formation of lightning. The amount of time being controversial itself must have been insufficient to the learners who were expected to understand the formation of lightning in less than three minutes. Similar to Mayer and Candler's (2001) study, the results of Hasler et al.'s (2007) study do not accord with the results found in this study. The system-based group were outperformed by the segmented and stop-play groups. The animation used in that experiment lasted 3 minutes and 45 seconds for the system- based group. Although the researchers tried to minimize the disadvantages of this unfair situation by allowing the system-based group to restudy the animation and ensuring that all groups studied the material in 10 minutes, results reflected that providing learner control affected the results significantly favoring learner-controlled groups. In contrast, students who took part in this study spent nearly 15-20 minutes to study the online tutorial. This length of time might have enabled students who were not provided with learner control to better understand the context and the learning unit. Additionally, students might have benefitted from the content of the material, which incorporated exercises and some review screens. However, this solely explains why the groups without learner control did not get lower scores than the groups with learner control. The possible reasons why they got significantly higher scores in the transfer test than learner-controlled groups are discussed below.

First, the prior knowledge of the students was low. Research displays that students whose prior knowledge is low find it hard to navigate between slides in learner-controlled systems (Kelly, 1993; Last et al, 2001). Besides that, a learner-controlled system is reported to hinder learning and cause insufficient learning outcomes (Lawless & Brown, 1997; Potelle & Rouet, 2003). In a similar manner, Chen, Fan and Macredie (2006) have found that students with low prior knowledge need more instructional support in terms of learner control and that

it would be better if they are provided with a more structured design. Chen et al. (2006) concluded that the structured e- learning material would ensure a better opportunity for the learners to organize and integrate the input.

Considering this overview of the literature, it can be argued that the low prior knowledge of the students has been a determining factor in the results favoring the groups without learner control as they followed a structured path during the learning process.

Second, being novice learners, students had difficulty handling the online tutorial. It can be suggested that students were overloaded with the difficulty of a new content due to the fact that they were beginner level students of EFL, and it has been only 2 months since they started taking English courses at the university. Research suggests that novice learners have complications in making decisions when it comes to managing their own learning (Koriat & Bjork, 2005). In this study, there was no time limit for the groups with the learner control, so they had the chance to review the screens and benefit from the learner-controlled environment. However, it is obvious that students failed to manage their time as well. This conclusion is consistent with Brown's (2001) and Granger and Levine's (2010) study results which argue that novice learners do not necessarily use the time given to them efficiently. Also, Persky and Robinson (2017) affirm the arguments above by adding the suggestion that novice learners are not fully aware of the idea that they have mastered or understood the input provided in the online tutorial.

To conclude, it can be suggested that providing novice learners with a learner-controlled system would result in a deterioration in learning. Rather, it is more rewarding if the learners are guided through a pre-structured and controlled system, which would alleviate the cognitive burden in the novice learners with low experience and prior knowledge in the course material.

Self-regulation

The results in accordance with self-regulation presented above are not congruent with each other. In some conditions students with low self-regulation outperformed students with high self-regulation in retention or transfer tests, and in some others vice versa. The number of the participants might have had an impact on those inconsistent results. Also, the fact that students have very little prior domain knowledge relating to the course material has prevented the self-regulatory skills to become activated. This assumption accords with Moss and Azevedo's (2007) argument that self-regulated effort and prior domain knowledge are significantly related to each other. Students might have implemented some of their self-regulatory skills, but they may be overwhelmed by the amount of the input unfamiliar to them.

When students were given learner control over the material without redundant on-screen text, those with high self-regulation performed significantly better than those with low self-regulation. As discussed earlier, the presence or absence of redundant on screen-text did not make a significant difference in retention or transfer tests. However, it was also reported that students performed significantly lower in the transfer test when they were given learner control. Therefore, in this NTC condition, the students with high self-regulation outperformed the students with low self-regulation in the retention test scores (Cohen's r= .49) because they handled the controls more efficiently, being aware of the advantages offered by the control provided to them. This conclusion is consistent with Zimmerman's (1998) suggestion that learners with low self-regulation tend to depend on other factors to master the provided course material.

Overall, it was not surprising that the only significant difference concerning self-regulation group comparisons was observed in one learner-controlled group. When students have more self-regulatory skills, they have more chance to be more successful in a learner-controlled environment. It can additionally be concluded that students with high self-regulatory skills can be considered to overcome the learner control condition despite being novice learners.

Implications and Further Work

The implications of this study could be specified as follows: (1) on-screen text might be helpful for novice EFL learners, (2) a pre-structured, system-controlled online tutorial that minimizes cognitive load should be preferred by the instructional designers, (3) exercises or small tasks that activate self-regulatory skills can be integrated in the course material instead of giving students all the control over the learning material. The first limitation of the study was that it was not conducted in a true experiment design as the participants were not randomly selected. The participants of this study were preparatory school students aged between 18-33. Therefore, the results are limited to samples and populations with similar characteristics. The results of this study can be misleading in different learning and teaching contexts, so they should be generalized with caution. Second, retention and transfer tests were given to the students right after they completed the online tutorial training. Repeated or delayed tests would give further information about how much students remember and what they could transfer. Thirdly, the instruments provided to the students might have had more variation. An additional survey concerning cognitive load measurement after the treatment or concerning self-study skills would give critical information for the research. These findings of CTML should be verified in the field of ELT in augmented and virtual reality settings as emerging technology.

Availability of Data and Materials

The datasets and teaching material used during the current study are available from the corresponding author on reasonable request.

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