Reciprocal Teaching Based Augmented Reality for Enhancing English Novel Reading Skills among Secondary Students

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الواقع المعزز القائم على التدريس التبادلى لتدعيم مهارات قراءة القصة باللغة الإنجليزية لدى طلاب المرحلة الثانوية

الملخص

هدفت الدراسة الحالية إلى تدعيم مهارات الاستيعاب القرائى والقراءة الناقدة لقراءة القصة باللغة الإنجليزية لدى طلاب المرحلة الثانوية. استخدمت الدراسة تصميم المجموعتين للمنهج شبه التجريبي وذلك للتحقق من الفروض. كانت عينة الدراسة ٧٢ طالب بالصف الأول الثانوى باحدى المدارس الحكوميه بمحافظة الإسماعيلية بجمهورية مصر العربية وتم تقسيمها الى مجموعة ضابطة (٣٦ طالب) ومجموعة تجريبية (٣٦ طالب). تم تقديم الفصلين الخامس والسادس لقصة اللغة الانجليزية"Oliver Twist"المقررة على الصف الأول الثانوى فى العام الدراسى ٢٠١٨–٢٠١٩ لطلاب المجموعة التجريبية بالفصل الدراسى الثانى. وكانت أداة المعالجة التجريبية لتحقيق هذا الهدف هو الواقع المعزز القائم على التدريس التبادلى. وأداة القياس للتحقق من الفروض وفاعلية تلك الاسترتيجية المقترحة هى اختبار قراءة القصة في شكلة الورقى والمكون من شقين: الأول لتقييم مهارات الاستيعاب القرائى والثانى لتقييم مهارات القراءة الناقدة. وقد تم التحقق من صدق وثبات تلك الأداة. وأسفرت نتائج الدراسة عن الأثر الإيجابي الدال للواقع المعزز القائم على التدريس التبادلى على تدعيم مهارات قراءة القصة باللغة الإنجليزية والمستهدفه لدى طلاب الصف الأول الثانوى.

الكلمات المفتاحية:

القصة، التدريس التبادلى ، الواقع المعزز ، الاستيعاب القرائى ، والقراءة الناقدة.

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Abstract

This research aimed to enhance secondary students' reading comprehension and critical reading skills within the narrative text of the assigned novel. The research design was two group pre and post-test experimental design. The participants were 72 1st year secondary school students from an Egyptian public governmental school in Ismailia governorate. They were divided into two groups: Experimental group of 36 students and Control group of 36 students. Chapters five and six in Charles Dickens' novel (Oliver Twist) assigned for the 1st grade of the secondary stage in the academic year 2018-2019, were introduced in the second term to the experimental group via reciprocal teaching based augmented reality in order to determine how far it had a positive impact on enhancing the novel reading skills of the experimental group. A novel reading test that was designed by the researcher and validated as a paper-and-pencil test for assessing the 1st year secondary students' novel reading comprehension and critical reading skills. It was divided into two parts: part one for reading comprehension skills and part two for critical reading skills. The findings revealed that reciprocal teaching based augmented reality had a significant positive effect on the 1st year secondary school students' target novel reading skills. Consequently, reciprocal teaching based augmented reality was proved to be successful when teaching reading within a narrative context.

Key Words: Novel, Reciprocal Teaching, Augmented Reality, Reading Comprehension, Critical Reading.

Background and problem

Reciprocal Teaching (RT) is an instructional activity in which students use four reading strategies of predicting, clarifying, questioning and summarizing during reading either individually, with small groups or in a whole class setting (Reading Rockets, n.d., Reciprocal Teaching, para. 1&2). It is a strategy aiming at promoting students' reading comprehension and encouraging students to think critically about a reading text (Khan, 2018, A simplified approach to reciprocal teaching, para. 2). Therefore, it can be used to teach the reading comprehension and critical reading skills within the narrative context of novels. This is in line with Putry's study (2018) which aimed to use RT to teach high school students reading a narrative text.

As a support for students' reading while using RT reading strategies, Augmented Reality (AR) can be used in the EFL classroom as it promotes communication skills and interactions between teacher and students as well as among students (Sorrentino, Spano, & Scateni, 2015). It uses new technologies such as smartphones and tablets. It is a digital media technology that enriches students' experience and interaction with the perceived physical world by adding layers with contextually useful digital information such as 2D and 3D graphics as well as audio upon certain physical surrounding like a book page (Klimova, Bilyatdinova, & Karsakov, 2018 and Kurtz, 2018).

When pointing the tablet, iPad or cell phone at a text or an image on a page in an English textbook, students can trigger further multimedia elements such as videos, images, texts, animations or vector shapes that are related to the content (Jaray-Benn, 2015, Using Augmented Reality in the EFL Classroom, para. 8). Thus, it is the future of language learning as it enhances the spatial-contextual awareness by enabling students to explore their language learning materials and their surroundings as well (Hurley, 2017, The Future of Language Learning: Augmented Reality vs Virtual Reality, para. 2). However, little research has been done into the teaching and learning via AR (Salmon, & Nyhan, 2013).

Egypt aimed to develop education by introducing technology into its public governmental schools as it planned to provide one million tablets for 1st secondary school students in the academic year 2018-2019 (El Tawil, 2018, Journey of tablets in Egyptian public schools, para. 1&2). However, the state introduced the tablets as a substitution for printing school books that cost it LE 1.2 billion per year (El Tawil, 2018, Journey of tablets in Egyptian public schools, para. 4).

As a replacement for the book, tablets are misused since learners' sense of sight is the only sense involved like reading books. Also, learners are not allowed to interact with the content since using tablets is just confined to browsing PDF textbooks for reading. Consequently, secondary school students tend to use them to play video games, watch movies or sell them (El Tawil, 2018, Journey of tablets in Egyptian public schools, para. 5).

In this respect, open interviews were conducted with 11 supervisors from English Language Inspectorate as well as 28 teachers and senior teachers of English at five public governmental secondary schools in Ismailia. Questions were asked about the required novel reading skills, how students use the tablets for novel reading and how they answer the novel reading questions. The results indicated that tablets were useless when used as a replacement for the novel book and that students did not use such tablets as they did not provide interactive language learning materials nor present the language content in different forms. Also, secondary students used to memorize the answers of the novel's questions and if there were critical reading questions or new reading comprehension questions, they could hardly give correct responses.

The unsuccessful traditional way of teaching novel at secondary schools was also revealed in such interviews. Many teachers used to read the text of the novel, ask the students to read the text by themselves and finally give the exercise. Moreover, several teachers tended to highlight difficult words and translate them into Arabic so that students could understand the text better in their mother tongue. For higher reading skills, the interviewees pinpointed that the novel reading text was difficult for the students to comprehend and they were not able to read between lines nor even think beyond the text. This way students made no progress in their achievement of novel reading skills as approved by all inspectors and senior teachers of English.

As a preliminary investigation for the problem size, a 15-item questionnaire was administered with the previously mentioned interviewees. It aimed to figure out their satisfaction level with the secondary school students' required types of necessary novel reading skills according to the 2018 Egyptian standard specifications of Ministry of Education English Language exams for the 1st and 2nd grades in the secondary stage. Results showed the interviewees' dissatisfaction with students' novel reading comprehension as well as critical reading skills.

For further investigation, a pilot novel reading test was designed in light of the 2018 Ministry of Education standard specifications of English Language exams for the 1st and 2nd secondary grades. At the end of the 1st term in the academic year 2018-2019, that pilot reading test in chapters 3 & 4 of the novel "Oliver Twist" was administered to 144 1st year secondary school students in three classes at three different public governmental secondary schools in Ismailia.

The findings showed that students' achievement was low in novel reading and that there were difficulties in comprehending the narrative reading text. Such findings were in line with the results of the questionnaire. They were also consistent with the views of the teachers and senior teachers of English during the open interviews about secondary students' poor novel reading skills because of their tendency to understand the text in their mother tongue and give meaningless answers by combining words that were irrelevant to the events.

To help students think while reading the narrative text, RT can be used as it helps students apply four thinking strategies of predicting, clarifying, questioning and summarizing (Afrizatama, 2016 and Tarchi & Pinto, 2016). In this respect, RT uses comprehension-monitoring skills to improve students' reading comprehension so that they exchange roles with the teacher for later high-order comprehension to support critical reading (Sari, 2014, pp.15-16).

To encourage students read the novel more easily to understand the narrative text deeply and critically, AR serves as a guide for the students' reading since they often suffer from a lack of sensory details when they read novel the traditional way. AR provides an exploratory experience to the students so that it gives them the option of user control at the level of viewing the mix between computer-generated virtual objects and real environment (Shilkort, Montfort, & Maes, 2014). It visualizes the invisible concepts, events and abstract concepts (Akçayır, & Akçayır, 2017). Through AR, a visual reminder can help them fully grasp the narrative text of the novel and reflect on as critical readers.

AR can add virtual reality objects (video, vector shapes, animation, etc.) to the real novel textbook pages. For instance, students can watch the novel events through movies while reading the text for prediction and clarifying. Also, students' attention can be drawn to the important details through animated colorful highlighted text and vector shapes for questioning and summarizing.

Consequently, RT can be integrated with AR to enhance secondary students' novel reading skills since AR can help students use the RT strategies independently and more effectively.

Statement of the problem

Reading comprehension and critical reading are the novel reading skills necessary for the secondary students at public governmental schools in light of the Egyptian Ministry of Education specifications for the standard secondary public-school English exams (for 1st & 2nd grades) submitted by the English Unit of Test Development Department at the National Center for Examinations & Educational Evaluation (NCEEE, 2018, p.2). However, 1st year secondary students at public governmental schools are poor at reading comprehension and critical reading skills according to the findings of the pilot studies (open interviews and standard novel reading test). Thus, this research sought to enhance such novel reading skills through reciprocal teaching based augmented reality.

Questions

This research attempted to answer the following questions:

1. What are the novel reading comprehension and critical reading skills required for the 1st year secondary students at public governmental schools?

2. What are the features of the reciprocal teaching based augmented reality for enhancing the target novel reading skills among the 1st year secondary students at public governmental schools?

3. To what extent do reciprocal teaching based augmented reality affect the target novel reading skills (Reading Comprehension and Critical Reading) among the 1st year secondary students at public governmental schools?

Hypotheses

1. There is a statistically significant difference between the experimental group's mean scores of reading comprehension skills in the pre- and post-administrations of the reading comprehension part of the novel reading test in favor of the post-administration.

2. There is a statistically significant difference between the mean scores of the experimental and control groups' reading comprehension skills in the post-administrations of the reading comprehension part of the novel reading test in favor of the experimental group.

3. There is a statistically significant difference between the experimental group's mean scores of critical reading skills in the pre- and post-administrations of the critical reading part of the novel reading test in favor of the post-administration.

4. There is a statistically significant difference between the mean scores of the experimental and control groups' critical reading skills in the post-administrations of the critical reading part of the novel reading test in favor of the experimental group.

5. There is a statistically significant difference between the experimental group's mean scores of overall reading skills in the pre- and post-administrations of the novel reading test in favor of the post-administration.

6. There is a statistically significant difference between the mean scores of the experimental and control groups' overall reading skills in the post-administrations of the novel reading test in favor of the experimental group.

Aim

This research aimed at enhancing the target novel reading skills (reading comprehension and critical reading skills) among the 1st year secondary students at public governmental schools.

Delimitations

This research was delimited to the following:

1. 72 1st year secondary students from a public governmental secondary school in Ismailia.

2. The abridged version of Charles Dickens' Oliver Twist (Chapters 5 and 6 of the mid-term exam in the Second term) since it was the English Novel assigned by the Egyptian Ministry of Education in the academic year 2018-2019 for the 1st year secondary stage at public governmental schools.

3. The two types of novel reading skills (Reading comprehension and critical reading skills) as they were required for secondary school students in light of the Egyptian Ministry of Education specifications for the standard types of novel questions in the secondary stage English Language exams (for 1st & 2nd grades) of public governmental schools (NCEEE, 2018, p.2).

Review of literature and related studies

1. Novel Reading Skills

As a branch in literature, novel is a form of narrative text (Arini, 2013, p.14). In light of the specifications for the standard secondary public-school English exams for 1st and 2nd grades (Egyptian National Center for Examinations & Educational Evaluation [NCEEE], 2018, p.2) as well as the pilot open interviews with the secondary stage inspectors, teachers and senior teachers of English, the novel reading skills needed by the secondary students are reading comprehension and critical reading.

1.1. Reading Comprehension (RC)

1.1.1. Significance of RC for novel reading

Reading comprehension (RC) is one of the most important skills that enables secondary students to deal with more sophisticated reading texts efficiently, appropriately and skillfully as well as construct meaning by interacting with the information in the reading text and by using prior knowledge and experience (Buli, Basizew, & Abdisa, 2017). RC is closely related to students' understanding of a narrative text like novel (Suryani, 2017). This is in line with Mislaini's study (2015) which aimed to improve students' RC within the narrative text of fables. When reading a narrative text, students need to predict the events to come before each paragraph, find out the main idea and important information in each paragraph as well as the moral values (Irawan, Bunau, & Suhartono, 2016). Thus, students should practice RC as much as possible for it broadens their understanding in a way that helps them read critically (Patesan, Balagiu, Zechia, & Alibec, 2014).

However, Egyptian secondary school students' novel reading comprehension is poor according to the findings of the pilot studies (standard novel reading test and open interviews) which are also pinpointed by Brown and Broemmel (2011). They state that reading comprehension almost represents the most serious problem for EFL learners. Consequently, this research aimed to develop secondary students' reading comprehension skills to help secondary students answer the novel reading comprehension questions properly and skillfully.

1.1.2. RC skills

NSW Department of Education (2011, pp. 1-2) states that RC involves the skills of sequencing, concluding, and identifying cause & effect as well

as fact & opinion. Arini (2013, p.10), Suherman (2015, p.12) and Mohamed (2016, pp. 47-51) refer to other RC skill. They are the skills of browsing (extracting specific information), skimming (getting the main idea), scanning (extracting detailed information), recognizing function as well as guessing meaning from context.

After submitting an inventory of the previously mentioned RC skills to a jury committee of University staff members of TEFL as well as EFL secondary stage inspectors and senior teachers, the following RC skills are required for the secondary students to enhance their ability to answer the novel RC questions efficiently:

1. <u>Scanning</u> for important details about the plot, incidents and characters.
2. <u>Sequencing</u> the events chronologically
3. <u>Interpreting</u> incidents.
4. <u>Drawing conclusions</u> (Extracting implicitly stated information as reading between lines)

1.2. Critical Reading (CR)

1.2.1. Significance of CR for novel reading

CR skills are extremely essential to EFL students as emphasized by the findings of Albeckay's study (2013) which proved the CR high impact on developing students' RC abilities. CR is closely related to critical thinking (Khamkhong, 2018). It is a higher level of RC in which aims at analyzing, synthesizing and evaluating the text (Ningsih, 2017, p.10). It helps students become better readers and outside-the-box thinkers (Abd Kadir, Subki, Jamal, & Ismail, 2014). Students, who have good CR skills, are only able to go beyond the narrative text by asking questions, hypothesizing, seeking evidences and checking out assumptions (Anuar & Sidhu, 2017). This is why students should not only read a narrative text just for comprehension, but they should also use CR skills to evaluate the text (Lestari, 2016). CR helps students think critically in reading EFL narrative texts as shown in Fadhillah's study (2017) with junior high school students in Indonesia.

However, EFL teachers do not emphasize on CR skills when teaching reading at schools. It is of least importance in Egyptian EFL classrooms since it is considered as a challenging skill by many EFL students as shown in Abdel Latif's study (2012) aiming at teaching standard-based communicative English to secondary school students. This is in line with the

findings of the preliminary open interviews of the current research with Ismailia ELT inspectorate as well as senior teachers of English in the secondary stage. They demonstrated the correlation between CR and critical thinking. They referred to the vital role of CR in helping secondary students answer the novel's critical thinking questions. The need for effective CR skills was succinctly articulated by them.

Nevertheless, secondary students lack the critical reading skills in narrative texts as confirmed by the pilot studies (Standard novel reading test and Open Interviews). Thus, this research aimed to develop secondary students' CR skills since there are novel's critical thinking questions according to the Egyptian Ministry of Education specifications for the standard secondary public-school English exams (NCEEE, 2018, p.2).

1.2.2. CR skills

CR skills are more meaningful and beneficial for the students and they should be developed when teaching EFL reading at schools as approved in a study that was administered by Abd Kadir, Subki, Jamal, and Ismail (2014). University of Leicester (2009) and Anuar & Sidhu (2017) refer to the CR skills of making judgements & inferences, checking out evidences & validating assumptions, assessing opinions & knowledge, examining interpretations as well as analyzing, synthesizing & evaluating information. Predicting was used as a CR skill in Abu Shihab's study (2011) as well as Fadhillah's study (2017). Comparing and decision making were used by Abu Shihab (2011) as CR skills that are related to critical thinking as the skill of predicting, and involve an ongoing interaction between the students and the reading text.

After submitting an inventory of the previously mentioned CR skills to a jury committee of University staff members of TEFL as well as EFL secondary stage inspectors and senior teachers, the following CR skills are required for the secondary students to manage to read beyond the novel's narrative text in order to answer the novel critical thinking questions successfully:

1. <u>Predicting</u> events (Anticipating incidents for changing events)
2. <u>Analyzing</u> the characters (Comparing specific qualities and aspects)
3. <u>Evaluating</u> the incidents and the plot (Judging and giving opinions about incidents and solutions as well as assessing values)
4. <u>Making inferences</u> (Assuming unstated facts beyond the text by relying on facts in given situations)

2. Reciprocal Teaching (RT)

2.1. Definition

RT is an instruction of reading to make reading easier by helping students apply the independent reinforcement reading strategies of predicting, questioning, clarifying and summarizing through expert scaffolding and guided practice in order to motivate students to read, improve their reading comprehension and self-monitor their progress (Brown & Palincsar, 1989, p.3; McAllum, 2014; Goma, 2015, p.40; Afrizatama, 2016 and AlSaraireh, 2016).

RT can be operationally defined as "*An instructional process of English novel reading for helping the secondary students use the four fostering and monitoring based autonomous reading strategies of predicting, questioning, clarifying and summarizing in order to enhance their reading comprehension and critical reading skills within a narrative text.*"

2.2. RT and Reading

RT improves students' EFL reading motivation as proved by Gilakjani's study (2012) in which reciprocal teaching was revealed to be an important factor for solving the problem of poor reading motives. Accordingly, it promotes students' self-reading ability as indicated in Ahamdi's & Gilakjani's study in 2012. For narrative texts, Sari's study (2014, p.iii) proved the high impact of RT on students' reading ability.

In order for the students to read a narrative text proficiently, RT is highly recommended for use in EFL classrooms (Namaghi & Shahhosseini, 2011). In a study that was conducted by Irawan, Bunau, & Suhartono (2016), RT was proved to be effective in teaching EFL reading in a narrative text for the secondary students. Therefore, the current research aimed to use RT in combination with Augmented Reality (AR) to enhance the secondary students' novel reading skills of RC and CR.

2.2.1. RT and RC

RT enhances students' reading comprehension as shown in Ozchus's study (2013) since it depends on reading strategies that are considered comprehension fostering and comprehension monitoring (McAllum, 2014; Rosalia,2015 and McHugh, 2016). Moreover, Ahmadi & Gilakjani (2012) confirm that RT increases students' ability to resolve reading comprehension difficulties via helping them reach higher levels of thinking. This was also asserted in AlSaraireh's study (2016) which showed the positive impact of RT on developing the Jordanian students' EFL reading comprehension at Mutah University.

Within a narrative text, RT helps increase students' reading achievement as stated in Sianturi's study (2013). In particular, Doolittle, Hicks, Young, Triplett, & Nichols (2006) state that it improves students' reading comprehension of narrative text. This is confirmed by the positive findings of the studies that were conducted by Sahab (2014) as well as Puspitasari, Suparman, & Yufrizal (2018). Therefore, it helps students understand and remember what they have read as in Afrizatama's study (2016). In his study, reciprocal teaching was proved to be highly effective in teaching EFL reading to preparatory learners in Kota Cirebon since it helps them overcome the difficulties in reading comprehension through the reading strategies of predicting, clarifying, questioning and summarizing.

2.2.2. RT and CR

In novel as a literary work, there is a well-established link between RC and CR as critical thinking helps in deep understanding of the text (Aloqaili, 2012). As a high-order reading comprehension, Lestari's study (2016) shows that RT embeds critical thinking as an effective method for teaching critical reading to increase comprehension. RT involves critical thinking as it primarily depends on four reading strategies that are thinking and metacognitive based (McAllum, 2014). Thus, it promotes the critical reading skills of inferring and evaluation as revealed in Pilten's study (2016).

At the inferential and critical levels of reading comprehension, RT can also be used successfully to enhance students' EFL critical reading as approved in Al-Qatawneh's study (2007) that was conducted on Jordanian secondary school students. It activates students' critical thinking as it helps them make connections between what they read and their previous knowledge or experiences (Ramadan, 2017, p.18).

2.3. RT Reading Strategies

Palincsar & Brown (1984), Duffy (2002), Williams (2011), Sahab (2014), Goma (2015, p.41), Afrizatama (2016), AlSaraireh (2016) and Ramadan (2017, pp.18-19) refer to the following RT four main thinking strategies for students' independent reading of each paragraph in a reading text to enhance RC:

a. Predicting:

Students explore their imagination about the paragraph they are going to read by finding clues that suggest what happens next. It aims at activating students' prior knowledge and motivating them to continue reading the

paragraph to test how true their predictions are (Panmanee, 2009). It can be implemented by:

- Using the title to make initial predictions in case of the very beginning of the narrative text.
- Using clues or illustrations to make additional predictions before a new paragraph.

b. **Clarifying:**

Students find out the meaning of unknown words, unfamiliar phrases or structurally difficult sentences to restore meaning when there is a breakdown in RC. Key words are considered as a major component of reading comprehension that can hinder students' ability to comprehend the text if they have inadequate knowledge of vocabulary (Harmon, Elizabeth, & Karen 2010). It can be implemented by:

- Looking for key words to understand the meaning of unfamiliar words.
- Reading the sentences that precede and follow the sentence that doesn't make sense and/or asking for assistance after re-reading.

c. **Questioning:**

Students generate questions about important details to identify specific information in the paragraph (Doolittle et al., 2006). Ningsih (2017, pp.19-21) reveals the helpful role of explicit and implicit questioning in improving the students' ability in RC of narrative text. It aims at allowing students to self-test their understanding of the paragraph as well as helping them to identify what is important in the narrative text (Panmanee, 2009). It can be implemented by selecting important information from the paragraph and using the question words (what, who, how, when, where, and why) to make up questions, then asking such questions about the narrative text.

d. **Summarizing:**

This strategy is mainly meant for RC where students sum up the most important ideas in the paragraph and get the gist to identify the main information in their own words. It aims at improving students' understanding & memory of the reading (Doolittle et al., 2006). It can be implemented by:

- Locating the topic sentence of a paragraph.
- Combining the sentences that they have underlined as containing the most relevant ideas.
- Locating the most important details and deleting the unimportant or redundant ones.
- Restating the main idea and supporting details in their own words.

2.4. RT Stages

RT often starts with a graphic organizer (Duke & Pearson, 2002 and Williams, 2002). According to Al-Qatawneh (2007), Sahab (2014) and Ramadan (2017, pp. 16-17), it goes through four main stages:

a. <u>Modeling and Direct instruction of RT reading strategies</u>: The teacher models how to use each strategy in depth (Doolittle et al., 2006).

b. <u>Guided Practice Through Teacher-Learner Groups</u>: The teacher leads discussion about the text in small groups as a scaffold to students' practice of the RT reading strategies (Doolittle et al., 2006).

c. <u>Learner-Led Groups</u>: The students take turns leading the discussions about the text so that each student in a group of four (Predictor, Clarifier, Questioner and Summarizer) uses one RT reading strategy at a time and then exchange roles.

d. <u>Learners' independent use of strategies</u>: Each student practices the four RT reading strategies with real reading independently and without worksheets.

3. Augmented Reality (AR)

3.1. Definition

Patel and Tuck (2014, p. 237) refer to AR as an interactive storytelling medium to develop an understanding of the new relationships formed between the real environment and virtual objects. It is also known as a platform for computer-based interactive narratives that obfuscates the boundary between reality and fiction (Shilkort, Montfort, & Maes, 2014). It is as a combination of virtual reality and animated visuals (Robinson, 2016). It is defined as a technology overlaying virtual objects (augmented elements) into the context of the real world (Akçayır, & Akçayır, 2017). It is an application that has a combination of virtual and real objects in a real environment, an interactive study in a real-time environment as well as a consistency between the real and virtual objects (Ozdamli, & Hursen, 2017 and Ramya, 2017). It can be described as a concept of adding virtual objects to real world to make it better and more interesting (Ycmcj EngDept, 2018). In brief, almost all AR definitions share common elements of Augment (computer-based data and interactions) to be virtually overlaid onto a Reality (a physical environment with real-world context) as shown in the following figure:

Figure (1)
What's AR?

(Marcel, 2016)

Accordingly, AR can be operationally defined as "*A hybrid (print & digital) novel reading environment where there is an integration of multimedia elements as digital supplementary annotations into physical real scenes of the novel's textbook pages with a real-time direct view to support secondary students' reading comprehension and critical reading skills.*"

3.2. Types of AR

Ramya (2017) refers to two types of AR: Location-aware AR and Vision-based AR. Location-aware AR is possible with digital devices with GPS to allow students to move around the physical world to augment it with digital information. An example of location-aware AR can be the academic information relevant to the location. Vision-based AR delivers digital media to students once they point their device camera at an object.

In this research, the second type was used since students pointed their tablet camera at the novel's textbook pages so that the narrative reading text could be augmented with digital information and relevant multimedia elements.

3.3. English language learning with AR

Ramya (2017) conducted a study to discuss the benefits of using AR and reviewed its implementation in English language learning and teaching. The findings revealed the overall positive effect of using AR on English language teaching and learning. AR improved students' English speaking and listening in real-life learning context (Marcel, 2016). This is in line with Liu's study (2009) which revealed that students who used AR outperformed other students in listening and speaking skills.

Vocabulary learning was also enhanced by incorporating AR via use of Android Smartphones in EFL classrooms as shown in Beder's study (2012, p. iii). Even students' motivation towards vocabulary learning in EFL classrooms can be increased via AR as indicated in Solak and Cakir's study (2015). For storytelling, AR promoted elementary students' narrative skills as revealed in the findings of Yilmaz's and Goktas's study (2017). It also enhanced students' vocabulary acquisition as approved in Fecich's study (2014, p. iii).

AR successfully builds students' comprehension of informational reading texts as it helps students manage complex text features within the structure of informational texts independently (Robinson, 2016). It also visualizes the events to the students (Akçayır, & Akçayır ,2017). Accordingly, it transforms reading a narrative text into a complex sense-making process by concretizing students' understanding of the text as well as a mean-making decoding based on prior knowledge, interactions and evaluation of the narrative texts (Orencia, 2018). This is in line with Kaenchan's study (2018, pp. vi-vii) which aimed to use AR in EFL English-major university students' reading classroom. It recommended students' use of AR when learning English as well as professional development and training for EFL teachers to use AR when teaching English. The findings revealed that AR increased students' engagement and motivation as well as enhanced their memory and memorization.

Moreover, Bursali and Yilmaz's study (2019) proved that secondary school students using AR showed a high level of reading comprehension and learning permanency as well as they were satisfied with their participation in AR reading activities.

In conjunction with EFL textbooks such as student practice book, course book and novel, Kurtz (2018) states that AR can help students:

- Navigate the textbook by providing proper digital assistance with the printed textbook pages
- Enrich their experience of English-speaking world by superimposing computer based virtual objects on the printed textbook page
- Discover the target functional or structural aspects of English language in real world contexts by providing supplementary and computer-generated multimodal learning content with interactional guidance for learning.

3.4. Advantages

AR reached number four in Time magazine's 10 Tech Trends list (Fletcher, 2010).   It is a tool with the ability to superimpose virtual resources such as visual images, models, animations, short videos, and additional prompts in context and, as encountered by the reader, transform static text into a comprehensive virtual environment (Robinson, 2016). Information is presented via AR in a way that makes it much more fun, useful and accessible (Sorrentino, Spano, & Scateni, 2015). Less effort and time is required to grasp the information when learning via AR which offers better presentation of information and highly complicated issues (Yip, Wong, Yick, Chan, & Wong, 2019). Thus, it enhances students' perception of real world and interaction with it (Marcel, 2016).

In AR environments supported by mobile or tablet devices, learning takes place with students involving their emotions and prior knowledge. Thus, it can create more effective learning environments. This is shown by Ozdamli and Hursen (2017) who conducted a study aiming to determine the benefits. The findings confirmed that AR applications were effective in education and by using them, students could gain the skills of interpretation, critical thinking and problem-solving. Furthermore, in their study that presented a systematic review of literature on AR uses and benefits in the educational settings, Akçayır and Akçayır (2017) revealed the increasing number of studies using AR in educational settings. They assert that AR mainly promotes students' achievement and enhances their learning since it:

- Decreases students' cognitive load
- Develops positive attitude and motivates students accordingly
- Expands interactions among students as well as between students & materials
- Visualizes the invisible concepts, events and abstract concepts
- Enables multi-sensory learning
- Combines physical and virtual worlds
- Allows for self-autonomous learning

4. Reciprocal Teaching Based Augmented Reality

4.1. Definition

In light of the procedural definitions of RT and AR, reciprocal teaching based augmented reality can be defined in this research as "*A hybrid novel reading environment (virtual multimedia & physical print) where supplementary Android based annotations and illustrations are integrated into real-time direct view of the novel's textbook pages to support secondary students' use of the four independent reading strategies of predicting, questioning, clarifying and summarizing and ,in turn, enhance their reading comprehension and critical reading skills within the narrative context.*"

4.2. Rationale for using Reciprocal Teaching Based Augmented Reality

There are two main reasons for blending RT and AR when teaching novel to secondary school students:

First, great results can be gained when applying each of them separately as shown in the previously mentioned related studies that were conducted on using RT and AR in language learning generally and teaching narrative text particularly. Hence, using RT and AR together can have possible and high positive impact on enhancing secondary students' target novel reading skills. This compatibility between RT and AR is indicated in Robinson's study (2016). In this study, he claims that when using the four best reading strategies of predicting, clarifying, questioning and summarizing to model an informational reading text, AR can be used as a support to students' reading. On the other hand, when using AR to position the students within a real-world physical context, RT can be scaffolded and facilitated (Dunleavy, & Dede, 2014). Second, the woven mix between RT and AR aims at making the best use of the benefits and features of each of them together for an appropriate and scaffolded novel reading as shown in table (1):

Table (1)
A blend between RT and AR

RT	AR
Reading Comprehension Fostering: Helping students fully understand novel's narrative reading text by allowing them to deal with it as an active reading task with the use of the four independent reading strategies.	**Fun:** Students can have a brand-new experience to read with fun when stunning, meaningful and helpful virtual multimedia objects are added to the novel's textbook pages.
Reading Comprehension Monitoring: Students can judge their progress in comprehending the novel's narrative reading text by using the four thinking-based reading strategies.	**Sensory Details:** • Events and abstract concepts are visualized by combining physical (print textbook pages) and virtual (annotations and illustrations) worlds. • Multi-sensory learning is enabled by using senses of touch, sight and hearing while reading. Interactions are allowed with the real content of the novel's reading narrative text in the assigned book so that they touch to interact with the content, see to read annotations & look at pictures and highlighting graphics as well as see and hear by watching videos.
Critical Reading as high order Reading Comprehension: RT can support students CR since it uses reading strategies that are based on critical thinking. Critical thinking is closely related to CR and there are critical thinking-based reading questions for the assigned novel in the 1st secondary grade.	**Supporting RT strategies:** AR makes reading texts more accessible to students since it replaces instructor-led modeling with independent reading and presents a scaffolding in the reading comprehension of the text (Robinson, 2016) by digital assistance with novel's textbook pages for navigation & discovery of clues.
Mastery: Students can become critical readers when they master reading comprehension.	

Self-autonomy Learning:
Students learn how to be independent readers when using the four RT strategies and, augmented reality can support students' use of such strategies.

Independent Reading:
Allowing for the support of effective teacher modeling practices as well as the gradual release to more independent reading.

4.3. Reciprocal Teaching based Augmented Reality Framework

The following figure presents a framework developed by the researcher for the proposed integrated pedagogical approach of Reciprocal Teaching (RT) and Augmented Reality (AR) to enhance secondary school students' novel Reading Comprehension (RC) and Critical Reading (CR) skills:

Figure (2)
Reciprocal Teaching Based Augmented Reality Framework
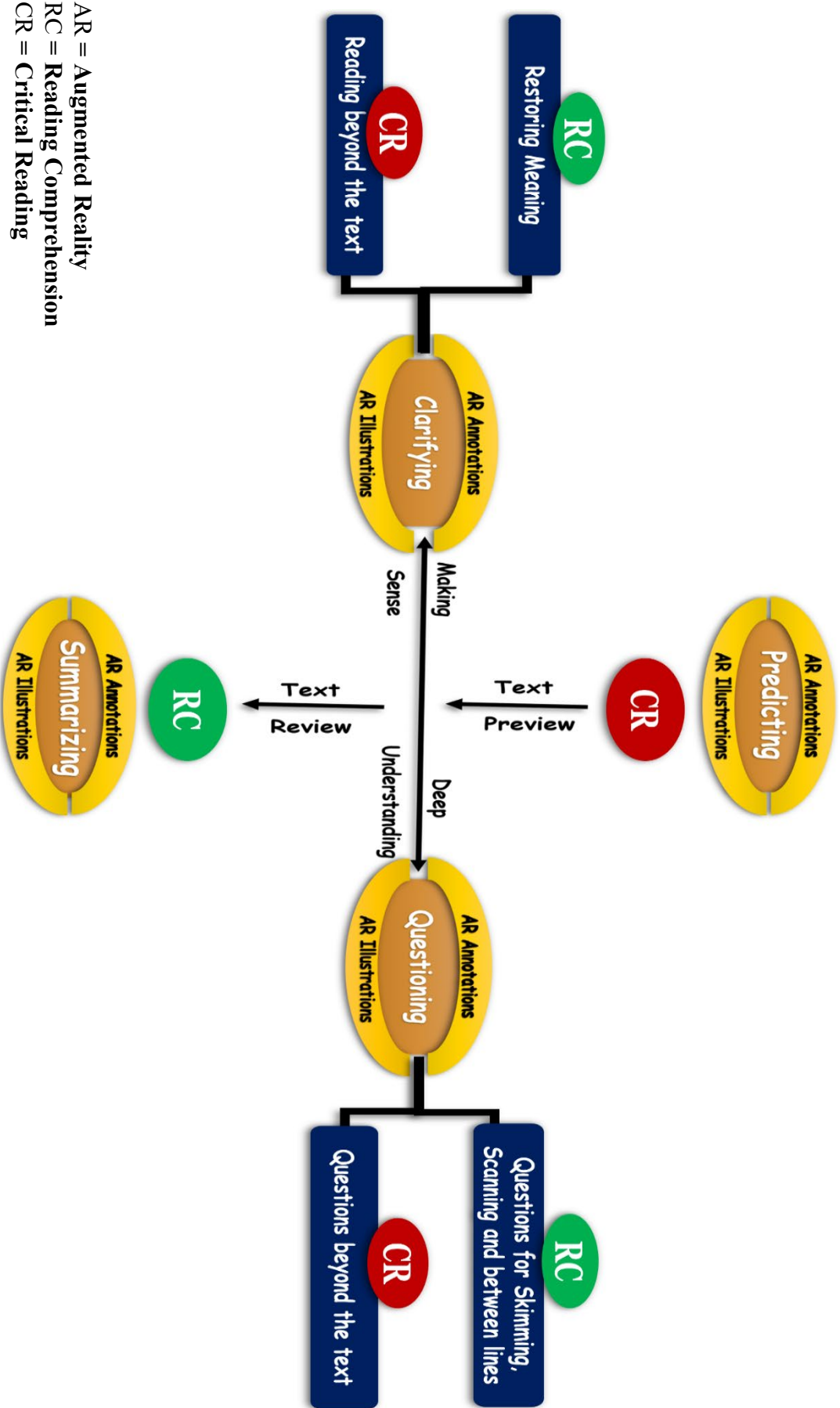
AR = **Augmented Reality**
RC = **Reading Comprehension**
CR = **Critical Reading**

According to this figure, RT is combined with AR to enhance secondary students' reading comprehension and critical reading skills in a way that allows for their successful responses to the novel's comprehension and critical thinking questions assigned by the Egyptian Ministry of Education English Language Exams for the 1st and 2nd secondary grades in public governmental schools.

Each of the novel's textbook pages is augmented by virtual multimedia-based annotations and illustrations for guidance as well as helpful and meaningful explanation. Annotations are digital text short notes for reading. Illustrations are pictures and sketches to see; videos to watch and highlighting graphics to focus students' attention to the key points. AR annotations and illustrations are placed on the physical print of the novel's textbook page once the students face their tablet camera to the page.

These AR annotations and illustrations help students use each of the four RT reading strategies (Predicting, Clarifying, Questioning and Summarizing) effectively and independently within the narrative context of the novel's reading text in each page as follows:

a. **Predicting:**

This reading strategy enhances students' CR since predicting is a CR skill. Students use this strategy at the very beginning of each page before reading the narrative text segment. Here, AR is used to help students predict in order to get a text preview and a sense of what the text is about by placing virtual annotations (digital text short notes for activating students' prior knowledge and connect it with the narrative context of the next text segment) and illustrations (graphics in form of colors and vector shapes) to highlight:

• The title or topic sentence to make initial predictions in case of the very beginning of the narrative text.

• Other clues to make additional predictions before a new text segment.

b. **Clarifying:**

This reading strategy aims at ensuring that the text segment makes sense to the students by restoring meaning for RC and by reading beyond the text segment for CR. Students use this strategy within each page while reading the narrative text segment. Here, AR is used to help students clarify in order to:

- **Guess the meaning of unfamiliar words through meaningful explanations to the key vocabulary by placing virtual annotations (digital text short notes for word explanation) and illustrations (pictures and sketches) to the real novel textbook pages near the target key vocabulary.**
- **Look for facts in a situation by placing virtual annotations (digital text short notes for facts of the situation) and illustrations (pictures, sketches and videos) to the target text segment on which they can rely to analyze characters, make inferences as well as evaluate the incidents, solutions and values.**

c. **Questioning:**

This reading strategy deepens students' understanding in RC and CR. Students use this strategy within each page while reading the narrative text segment. Here, AR is used to assist students in selecting important information in the novel's textbook page by highlighting the main ideas and essential incidents with virtual illustrations (graphics in form of colors and vector shapes) and then make up questions by placing virtual annotations (guided digital text short notes for question words of what, who, how, when, where, and why). In this case, students can ask questions about the novel's narrative text to increase their RC to:

- **Get the explicitly stated important details (Scanning).**
- **Sequence the events chronologically.**
- **Interpret incidents**
- **Extract implicitly stated information (Drawing conclusions)**

In addition, they can ask other questions for which the novel's narrative text does not provide the answer to encourage them to use CR to:
- **Compare specific qualities and characteristics (Analyzing the characters).**
- **Judge and give opinions about incidents, solutions as well as assess values (Evaluating incidents, solutions and values).**
- **Assume unstated facts by relying on facts in situations (Making inferences).**

d. **Summarizing**

As a text review for each page in the novel's textbook, this reading strategy enhances students' RC Since summarizing is a RC skill. Students use this strategy at the very end of each page after reading the narrative text segment. Here, AR is used to guide the students towards the gist of the

narrative text for each page in the novel's textbook. Such students' informative summary can be scaffolded and facilitated by placing virtual annotations (digital text short notes for key ideas in the text segment) and illustrations (graphics in form of colors and vector shapes to highlight topic sentence, most important details and incidents).This way students can easily locate the main details, reject the unimportant ones, combine the highlighted sentences and finally restate the main details in their own words.

Method

1. Participants

72 1st year secondary students from a public governmental school in Ismailia (Om Alabtal Secondary School). They were divided into two intact groups: One class of 36 students for the experimental group and the other one of 36 students for the control group after checking out their equivalence. All the participants were not re-sitters. They were female and their ages ranged between 15 and 16 years old.

2. Design

The quasi-experimental design of two groups of 1st year secondary students

3. Instrument

A novel reading test that was designed as a paper-and-pencil test for assessing the 1st year secondary students' target novel reading comprehension and critical reading skills. The test duration is 90 minutes. It is divided into two parts: part one for reading comprehension skills and part two for critical reading skills. Part one is composed of two types of questions (15 Open-ended questions and 15 questions based on five quotations so that three questions for each quotation). Each question scores one point in case of correct answer and the total score is 30. Part two is 10 open-ended critical thinking questions. There is a critical reading scoring rubric for students' answers in part two so that the mean scores of three raters are estimated for each of the students' answers in each item with maximum score of 3 points and the total score is 30. It is a grading rubric with a four-level scale (Unrated=0, Poor=1, Fair=2 and Good=3) for students' answers to the novel reading questions related to each of the target critical reading skills. It is prepared by the researcher.

In the novel reading test, reading comprehension questions represent 75% of the novel reading questions and critical reading questions nearly represent 25% of the novel reading questions. The types of questions in both parts as well as the ratio of questions represented by each type follow the standard Egyptian Ministry of Education specifications for the novel reading questions in English Language exams of the 1st and 2nd grades in the secondary stage at public governmental schools. It was administered one week before and one week after the treatment to both experimental and control groups.

To check the validity of this test, a checklist was submitted to a jury committee of university TEFL staff members to verify each test items' representation of the target novel reading skills with their intended learning outcomes. This checklist presented the target novel reading skills with their intended learning outcomes accompanied by their related test items, and a three-level scale of consistency (Inconsistent, consistent and very consistent) between each of the target novel reading skills with their intended learning outcomes and their test items. Another checklist was also submitted to jurors of secondary stage English Language senior teachers and supervisors to provide their viewpoints for each test items' appropriateness to 1st year secondary students at public governmental schools. This checklist presented the items of each question type in the test with a two-level scale of appropriateness (Appropriate and Inappropriate).

As for the test reliability, Alpha (α) formula was used in order to estimate the reliability coefficient. The value of the reliability coefficient was (88.4%) for the novel reading test. Thus, both tests' reliability was established.

The Program [Augmented Novel Textbook Pages and Novel Reading Tasks]

Chapters five and six of the assigned novel's textbook (Oliver Twist) were divided into narrative text segments. A narrative text segment could be a stand-alone page or two pages in case of a page followed by a few lines remaining on the next page. There were five narrative text segments in chapter five and six narrative text segments in chapter six. Each narrative text segment was augmented by digital elements such as video, vector shapes and images when students faced the tablet's rear camera over the novel's textbook page. Here, AR facilitated students' use of RT reading strategies through such virtual elements placed over the textbook pages as previously explained in the Reciprocal Teaching based Augmented Reality Framework.

There was one paper-and-pencil reading task for each narrative text segment. So, there were 11 reading tasks. Each task had eight novel reading questions as follows:

- Three open-ended questions as well as three questions based on one quotation to test students' comprehension with one-point score for each correct answer.

- Two open-ended critical thinking questions to test students' critical reading with three points for each correct answer as a mean score of three raters by using the critical reading scoring rubric.

By the end of these tasks, students should be able to accomplish the following intended learning outcomes (ILOs):

1. Writing about the explicitly stated important details.	2. Sequencing the events chronologically.
3. Interpreting incidents.	4. Drawing conclusions about implicitly stated facts, incidents or events.
5. Predicting incidents for changing events.	6. Analyzing the characters' qualities, aspects and characteristics.
7. Evaluating incidents, solutions and values.	8. Making inferences about unstated facts by relying on facts in situations.

In one class period of 80 minutes, there was one narrative text segment to read by using RT based AR with one reading task to answer. There were 60 minutes for reading and 20 minutes for answering the novel reading questions of the task. This way, there were five periods for chapter five and six periods for chapter six. To ensure mastery learning and accomplishment of ILOs, students were only allowed to move on to the next narrative text segment in the following class period when getting 90% or more in the reading task of the current narrative text segment.

Treatment

Chapters five and six of the assigned novel "Oliver Twist" were taught in four weeks in the second semester of the academic year 2018-2019. The treatment started on February 17th 2019 and ended on March 14th 2019. It took place three days a week except 2 days in the last week. There was an 80-minute class period per day. In each class period, there were one page in the novel for reading by using Reciprocal Teaching Based Augmented Reality as well as one reading task for practice and mastery learning.

Results

Hypothesis I : There is a statistically significant difference between the experimental group's mean scores of reading comprehension skills in the pre- and post-administrations of the reading comprehension part of the novel reading test in favor of the post-administration. The paired samples t-Test was used to verify this hypothesis. The following tables demonstrate the experimental group's average scores of the pre- and post-administrations of the reading comprehension part of the novel reading test as well as the effect size:

Table (2)

Paired Samples t-Test value of the difference between the mean scores of the Pre-and Post-administrations of the reading comprehension part of the novel reading test for the experimental group

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Pre-administration	36	10.833333	1.444200	-27.924	.000
Post-administration		25.222222	3.163281		

Table (2) that there is a difference between the mean scores of the Pre- and Post-administrations of the reading comprehension part of the novel reading test for the experimental group. The difference was statistically significant (t= -27.924, p<0.05). Thus, hypothesis one was verified.

Table (3)

The Effect Size level of reciprocal teaching based augmented reality on secondary students' novel reading comprehension skills

Independent variable	Dependent variable	t2 Value	DF	η2	Effect Size level
Reciprocal Teaching Based Augmented Reality	**Novel Reading Comprehension skills**	779.74977	35	0.95	**High**

According to Table (3), the Effect Size of the independent variable on the dependent variable was estimated by Eta-squared and it was high ($\eta2$ = 0.95).

Hypothesis II: There is a statistically significant difference between the mean scores of the experimental and control groups' reading comprehension skills in the post-administrations of the reading comprehension part of the novel reading test in favor of the experimental group. The independent samples t-Test was used to test this hypothesis. The following tables demonstrate the control and experimental groups' average scores in the post-administration of the reading comprehension part of the novel reading test as well as the effect size:

Table (4)
Independent Samples t-Test value of the difference between the mean scores of the experimental and control groups' post-administrations of the reading comprehension part of the novel reading test

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Control Group's Post-administration	**36**	**9.444444**	**1.443101**	**-27.2272**	**.000**
Experimental Group's Post-administration	**36**	**25.222222**	**3.163281**		

Table (4) shows that there is a difference between the mean scores of the experimental and control groups' post-administrations of the reading comprehension part of the novel reading test. The difference was statistically significant (t= -27.22, p<0.05). Thus, hypothesis two was verified.

Table (5)
The Effect Size level of reciprocal teaching based augmented reality on secondary students' novel reading comprehension skills

Independent variable	Dependent variable	t2 Value	DF	η2	Effect Size level
Reciprocal Teaching Based Augmented Reality	**Novel Reading Comprehension skills**	**741.32041**	**70**	**0.91**	**High**

Table (5) above illustrates the Effect Size of the independent variable on the dependent variable that was also estimated by using Eta-squared. The effect size was high ($\eta 2 = 0.91$).

In light of the large effect sizes in tables (3 & 5), reciprocal teaching based augmented reality helped enhance the 1st year secondary students' novel reading comprehension skills.

Hypothesis III: There is a statistically significant difference between the experimental group's mean scores of critical reading skills in the pre- and post-administrations of the critical reading part of the novel reading test in favor of the post-administration. The paired samples t-Test was used to verify this hypothesis. The following tables demonstrate the experimental group's average scores of the pre- and post-administrations of the critical reading part of the novel reading test as well as the effect size:

Table (6)
Paired Samples t-Test value of the difference between the mean scores of the Pre-and Post-administrations of the critical reading part of the novel reading test for the experimental group

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Pre-administration	36	9.583333	1.610235	-16.356	.000
Post-administration		21.527778	3.760594		

Table (6) shows that there is a difference between the mean scores of the Pre-and Post-administrations of the critical reading part of the novel reading test for the experimental group. The difference was statistically significant (t= -16.356, p<0.05). Thus, the third hypothesis was verified.

Table (7)
The Effect Size level of reciprocal teaching based augmented reality on secondary students' novel critical reading skills

Independent variable	Dependent variable	t2 Value	DF	$\eta 2$	Effect Size level
Reciprocal Teaching Based Augmented Reality	Novel Critical Reading skills	267.51873	35	0.88	High

As indicated in table (7), the Effect Size of the independent variable on the dependent variable was estimated by Eta-squared and it was high ($\eta2$ = 0.88).

Hypothesis IV: There is a statistically significant difference between the mean scores of the experimental and control groups' critical reading skills in the post-administrations of the critical reading part of the novel reading test in favor of the experimental group. The independent samples t-Test was used to test this hypothesis. The following tables (8&9) demonstrate the control and experimental groups' average scores in the post-administration of the critical reading part of the novel reading test:

Table (8)
Independent Samples t-Test value of the difference between the mean scores of the experimental and control groups' post-administrations of the critical reading part of the novel reading test

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Control Group's Post-administration	36	8.277778	1.666667	-19.3272	.000
Experimental Group's Post-administration	36	21.527778	3.760594		

Table (8) shows that there is a difference between the mean scores of the experimental and control groups' post-administrations of the critical reading part of the novel reading test. The difference was statistically significant (t= -19.3272, p<0.05). Accordingly, the fourth hypothesis was verified.

Table (9)
The Effect Size level of reciprocal teaching based augmented reality on secondary students' novel critical reading skills

Independent variable	Dependent variable	t2 Value	DF	$\eta2$	Effect Size level
Reciprocal Teaching Based Augmented Reality	**Novel Critical Reading skills**	373.540659	70	0.84	**High**

In table (9), the Effect Size of the independent variable on the dependent variable was estimated by using Eta-squared and it was high ($\eta2 = 0.84$).

In light of the large effect sizes in tables (7 & 9), reciprocal teaching based augmented reality helped enhance the 1st year secondary students' novel critical reading skills.

Hypothesis V: There is a statistically significant difference between the experimental group's mean scores of overall reading skills in the pre- and post-administrations of the novel reading test in favor of the post-administration. The paired samples t-Test was used to verify this hypothesis. Tables (10&11) show the experimental group's average scores of the pre- and post-administrations of the critical reading part of the novel reading test as well as the effect size:

Table (10)
Paired Samples t-Test value of the difference between the mean scores of Pre-and Post-administrations of the novel reading test for the experimental group

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Pre-administration	36	20.416667	2.322253	-28.031	.000
Post-administration		46.750000	5.061761		

Table (10) demonstrates the difference between the mean scores of the Pre-and Post-administrations of the novel reading test for the experimental group. The difference was statistically significant (t= -28.031, p<0.05). So, hypothesis five was approved.

Table (11)
The Effect Size level of reciprocal teaching based augmented reality on secondary students' overall novel reading skills

Independent variable	Dependent variable	t2 Value	DF	$\eta2$	Effect Size level
Reciprocal Teaching Based Augmented Reality	Novel Reading skills	785.73696	35	0.95	High

Table (11) point outs the Effect Size for the independent variable on the dependent variable that was estimated by using Eta-squared. The effect size was high ($\eta2 = 0.95$).

Hypothesis VI: There is a statistically significant difference between the mean scores of the experimental and control groups' overall reading skills in the post-administrations of the novel reading test in favor of the experimental group. The independent samples t-Test was used to test this hypothesis. The following tables (12 & 13) indicate the control and experimental groups' average scores in the post-administration of the novel reading test as well as the effect size:

Table (12)
Independent Samples t-Test value of the difference between the mean scores of experimental and control groups' post-administrations of novel reading test

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Control Group's Post-administration	36	17.722222	1.876336	-32.2630	.000
Experimental Group's Post-administration	36	46.750000	5.061761		

Table (12) points out the difference between the mean scores of the experimental and control groups' post-administrations of the novel reading test. The difference was statistically significant (t= -32.2630, p<0.05). Therefore, the sixth hypothesis was approved.

Table (13)
The Effect Size level of reciprocal teaching based augmented reality on secondary students' overall novel reading skills

Independent variable	Dependent variable	t2 Value	DF	$\eta2$	Effect Size level
Reciprocal Teaching Based Augmented Reality	**Novel Reading skills**	1040.90116	70	0.93	**High**

As shown in Table (11), the Effect Size for the independent variable on the dependent variable was estimated by using Eta-squared. The effect size was high ($\eta2 = 0.95$).

In light of the large effect sizes in tables (11 & 13), reciprocal teaching based augmented reality helped enhance the 1st year secondary students' overall novel reading skills. Consequently, the aim of the study was fully achieved.

Discussion of results and logs

This section dealt with two parts: Part One "Discussion of results" and Part Two "Discussion of logs".

Part One: Discussion of results

This part discussed the significant findings of the positive results that might be due to the combination between RT and AR for enhancing 1st year secondary students' novel RC skills, novel CR skills as well as the overall novel reading skills.

As for novel RC skills, the blend between RT and AR had a high positive effect on 1st year secondary students 'performance. This may be due to the use of RT which is highly recommended in EFL classrooms when students read narrative text as stated by Namaghi and Shahhosseini (2011) and approved by Sari's study (2014, p.iii). RT enhanced students' novel RC skills since it used comprehension fostering and comprehension monitoring reading strategies that increased students' independent reading ability to resolve reading comprehension difficulties within the narrative context. This is in line with the studies conducted by Ozchus (2013), Sahab (2014), AlSaraireh (2016) as well as Puspitasari, Suparman, & Yufrizal (2018). RT also supported students' memorization of what they read as indicated by Afrizatama's study (2016).

In addition, AR managed to build students' RC of narrative texts by visualizing the novel's incidents and abstract concepts. Here, it turned reading novel's narrative text into a sense-making process and, in turn, concretized students' understanding of the text as explained by Orencia (2018). This is also verified in Bursali and Yilmaz's study (2019). As demonstrated by Kurtz (2018), AR helped students interact with the reading narrative texts by placing supplementary and computer-generated multimodal virtual resources for guidance over the novel's physical

textbook pages. AR motivated students to read for deeper comprehension with fun, less effort and less time as stated by Sorrentino, Spano and Scateni (2015) as well as Yip, Wong, Yick, Chan and Wong (2019). Moreover, AR supported students' independent reading as it promoted their self-autonomy as asserted by Akçayır and Akçayır (2017). This, in turn, increased students' RC skills of scanning, sequencing events, interpreting incidents and drawing conclusions for implicitly stated information.

Regarding novel CR skills, they were handled in light of the Grading and Scoring Rubric for Novel Critical Reading as well as the blend between RT and AR. In the pre-administration, the results of applying this rubric revealed that students in both control and experimental groups gave no response, irrelevant answers as well as inadequate and inaccurate information without providing evidences from the novel's reading text. In the post-administration, the experimental group's mean scores were higher than in the pre-administration. No progressive accomplishments were achieved by the control group in comparison with the experimental group in the post-administration.

The scoring rubric showed the experimental group students' positive and noticeable progress in each of the target CR skills after the treatment. In the CR skill of predicting, students revealed their ability to provide adequate and relevant predictions that were logically supported by evidences from the text. For the CR skill of analysis, students could successfully provide illustrations for character qualities and compare between characters. With evaluation as a CR skill, students were capable of expressing clear corroborative viewpoints about incidents and assessing values adequately. When making inferences, they were able to give logical assumptions that were based on facts in the given situations and supported by evidences from the text.

The integration between RT and AR was approved to be effective in raising students' level of CR skills. RT had a positive impact on teaching critical reading by using its four thinking and metacognitive-based reading strategies. This is revealed in Lestari's study (2016). Mastery was the target of RT as students only became critical readers when they mastered reading comprehension. Hence, it enhanced critical reading skills such as making inferences and evaluation as in Al-Qatawneh's study (2007), Pilten's study (2016) and Ramadan's study (2017, p.18).

As an essential benefit of AR, students gained the CR skills as it helped them develop their critical thinking. This is in line with Ozdamli and Hursen's study (2017). As explained by Akçayır and Akçayır (2017), visualization of novel's invisible incidents and abstract concepts for values and characters' personal qualities offered better presentation of the narrative text with its highly complicated issues. Moreover, AR enabled students' multi-sensory reading by using sense of touch (tablet's screen), sight and hearing (pictures, highlighting graphics, annotated text and movies) to interact with the text while reading the novel. This, in turn, supported students' CR skills of prediction, analyzing characters, evaluation as well as making inferences by assuming unstated facts.

For the overall novel reading skills, positive results may be due to the compatibility between RT and AR in their woven combination of the independent comprehension fostering reading strategies of RT as well as the supporting features of AR. This is because using the four RT reading strategies can be supported by AR as indicated by Dunleavy and Dede (2014) and approved in Robinson's study (2016). To conclude, AR replaced the effective teacher modeling in RT and allowed for students' gradual release to more self-autonomous reading through the digital illustrations and annotations placed over the novel's textbook pages.

Part Two: Discussion of logs

This part manipulated the EFL teachers and 1st year secondary students' comments noticed by the researcher before, during and after the treatment.

Before the treatment, the language teachers at the school were eager to attend the class periods in which the novel was taught by RT based AR. They said, "We wonder how augmented novel textbook pages will look like". Once the secondary students were informed about the using their tablets to read the novel and interact with its augmented narrative text, they were extremely thrilled. They said, "Wow! Are we going to experience a new way for reading the novel to understand it more easily? When shall we start?"

During the treatment, the language teachers' comments about the using the tablet to help students interact with the augmented novel textbook pages were jotted down. Such comments showed how enthusiastic the

secondary students were when reading the novel by using the tablets to place virtual objects over the textbook pages. Moreover, teachers gave their comments about the proposed integrated pedagogical approach (RT and AR). They explained how students became better independent readers. In this respect, they demonstrated that reading the augmented novel's textbook pages fostered students' use of the four RT reading strategies of predicting, clarifying, questioning and summarizing.

In line with teachers' comments, the students' comments revealed their intrinsic motivation during the interesting moments they had while using the tablets to read the augmented text. They also referred to their ability to memorize the important details about incidents, plot and characters smoothly with deep understanding and critical thinking. They liked the idea of becoming independent readers to read between lines and beyond the text for the understanding the novel's narrative context.

After the treatment, the language teachers commented on the AR that added sense to the novel reading. They pointed out that AR facilitated and deepened their comprehension since it promoted multi-sensory learning. They pinpointed that the students would not easily forget what they read since they used their senses of sight and touch while reading and interacting with the novel's narrative text to figure out the implicitly and explicitly stated information. They also stated that AR decreased their cognitive load as it visualized the novel's incidents, important explicit and implicit details as well as abstract concepts about values and personal qualities.

When the secondary students were asked about how useful and interesting the use of tablets to augment the reading text while using the RT four reading strategies, their commentary replies pinpointed three main issues. First, they showed their fun with the virtual annotations and illustrations that encouraged them to form a meaningful and memorable image for the incidents and the abstract concepts in the novel. Second, they revealed their ability to be independent readers who could gasp the main ideas and think critically since AR annotations and illustrations drew students' attention to the key incidents and important details while using the RT four reading strategies. Third, they indicated their keen desire to read more easily as the narrative text made sense by AR annotations and illustrations as well as RT independent reading strategy of clarifying.

Recommendations and Suggestions

Recommendations:

The following are the recommendations of the current study:

1. A woven combination between reciprocal teaching and augmented reality should be used as it fosters learners' independent reading.

2. EFL teachers of the primary, preparatory and secondary stages can make use of the proposed framework of reciprocal teaching based augmented reality to help students interact with the narrative text, in a more memorable way that facilitates their comprehension and deepens their understanding.

3. Governmental public and experimental primary, preparatory and secondary schools should activate the use of tablets by integrating AR into their EFL classroom for better and more memorable language learning.

Suggestions:

Here are some suggestions for possible further research:

1. Augmented Reality Tasks on Secondary Students' Vocabulary Learning.

2. Augmented Reality Based Program for Developing EFL Speaking Skills for Secondary Students.

3. Conducting studies on Using Reciprocal Teaching Based Augmented Reality to Teach Prose, Poetry or Drama for the Students whose major is English at the Faculty of Arts or Faculty of Education.

4. Conducting studies on Using Augmented Reality to Improve Grammar Learning for the Learners in different Grade Levels at school.

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