Improving Reading Comprehension Skills Through the SCRATCH Program*

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Abstract

The aim of this study was to reveal how reading comprehension skills of elementary fourth graders who have problems in reading comprehension can be improved by means of the SCRATCH program. The study was designed as a participant action research. It was carried out within a 15-week process at an elementary school with middle socio-economic level in the Eskisehir province in the fall term of the 2015-2016 school year. The participants of the study were eight fourth graders who had problems in reading comprehension and were selected based on the criterion sampling method. Different data gathering tools were employed in different stages of the study. These were the Informal Reading Inventory, readability assessment rubric, participant selection form and identification forms for developmental level in reading comprehension for the quantitative data, and observation notes, a researcher diary, video recordings, teacher and student observation notes, and the projects the students prepared using the SCRATCH program for the qualitative data. In the study, the analysis of the quantitative data was done with correlation analysis, and Kendall W Test that shows inter-rater reliability. In addition, the identification forms for developmental level in reading comprehension were used to reveal the improvement in reading comprehension skills, and the Informal Reading Inventory was employed to score these forms. On the other hand, the qualitative data were analysed through the thematic analysis method, and MAXQDA was used for the analysis. As a result of the analyses, it was found that the reading level of the eight students who had problems in reading comprehension went up from the anxiety level to the instructional level in some forms, and even to the independent reading level in other forms; in other words, there was an improvement in the reading comprehension skills of all eight students.

Keywords: SCRATCH program, Reading comprehension, Participant action research.

Introduction

Technological and socio-economic developments have led to drastic changes in social structures. With technological developments in particular, individuals can communicate with each other in faster and more convenient ways, and learn about what is happening in

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daily life more quickly. Technology that appeared in every area of human life has also brought improvements and changes to the field of education, and in line with these changes, how technology can be used in education has been a current issue. In this regard, educational programs and instructional methods and techniques need to be developed and renewed in order for education to adapt to technological changes; in other words, technology should be integrated into education.

Elementary school in which individuals receive basic education is the first stage of formal education, in that it has prominent roles in instructional activities. Equipping students with language skills is the most important among these roles. Teaching reading and writing in particular is of significance for individuals to acquire and develop reading comprehension skills in the next grades. Reading and writing classes in elementary school have an important function in teaching students reading comprehension skills.

The reading comprehension process is about understanding the opinions or messages that the author wants to deliver intentionally (May, & Rizzardi, 2002). Reading comprehension skills are those that individuals can not only use in their academic life, but also their whole life. Besides, these are the skills that they can use in all courses, not only the course related to their mother tongue. Students' achievement in reading comprehension forms the base for their success in other courses (Bloom, 1995). Research has revealed that reading comprehension is directly related to the achievement in science (O'Reilly, & McNamara, 2007) and mathematics (Vilenius-Tuohimaa, Aunola, & Nurmi, 2008; Walker, Zhang, & Surber, 2008). In an attempt to teach reading comprehension skills that are regarded as having great importance, educators and teachers can use different strategies, methods, techniques and tools in reading comprehension activities.

Reading comprehension is among the basic skills that should be taught to children in the first years of elementary school. If they can acquire reading comprehension skills, they can be successful in both school courses and life. Acquiring reading comprehension skills seems to be even more important and functional especially in elementary school that is the first period of children's school years. Students use these skills in all their courses, and their academic life is directly affected by such skills.

In exams that are administrated at the international level such the Programme for International Student Assessment (PISA), the Trends in International Mathematics and Science Study, (TIMMS) and the Progress in International Reading Literacy Study (PIRLS), there are questions included to measure reading comprehension skills. Moreover, the contents of the PIRLS exam consist of questions only related to reading comprehension. Additionally, in most of the exams that students are required to take throughout their academic life, it is aimed to determine whether they can use reading comprehension skills. In this respect, equipping students with these skills is of utmost importance.

According to the results of some studies, among the reasons why Turkish students get low scores in reading, mathematics and science sections of international exams (PISA, TIMMS and PIRLS) is that they are not competent in reading comprehension (Çavuşoğlu, 2010; Özçelik, 2011; Ulu, 2011; Uzun, 2010). Based on the first author's observations and experiences in his elementary school teaching process along with the feedback he received from his colleagues, it was asserted that a considerable proportion of elementary school students have negative attitudes and poor motivation towards, and they have serious problems in reading comprehension. Besides, in a literature review, it was seen that one of the major problems regarding mother tongue education is reading comprehension, and the problems experienced in reading comprehension negatively affect other courses as well (Çavuşoğlu, 2010; Karatay, 2014; O'Reilly, & McNamara, 2007; Özçelik, 2011; Ulu, 2011; Uzun, 2010; Vilenius-Tuohimaa et al., 2008; Walker et al., 2008). With the

developments in technology particularly, the idea to use technology in reading comprehension activities has come up. Consequently, the researchers thought that the use of technology in reading comprehension activities should be studied.

Although there are many studies on the use of technology in education, those that focus on using technology to improve reading comprehension skills have been limited (Berktaş-Türkmen, 2001;Brown, 2006; Doty, 1999; Maddox, 2013; Stevens, 2014; Thooft, 2011). In this regard, the use of computer programs and games that are welcomed by elementary school students in reading comprehension activities has come to fore.

There have been efforts to make computer programs and games suitable for students' grades, developmental levels and ages, and use them more effectively. In this process, computer programs have been developed which would be suitable to students' levels and ensure continuous attention, facilitate the achievement of course objectives, and enhance teacher and parent support. One of these programs, SCRATCH, is a program prepared in accordance with all age levels, and that has an educational goal. It is argued that by means of the SCRATCH program, technology can be effectively used in education, students' attention can be easily drawn to the lesson, their reading motivation can be increased, and their skills of using technology can be developed.

The SCRATCH program that is suitable to elementary school students' level and used world-wide, and also approved by the Ministry of National Education and included in its website for the use of teachers contains technical and instructional tools that can be used in reading comprehension activities. Furthermore, students who have problems in reading comprehension should be identified, and taught reading comprehension skills. In this regard, it was contemplated how the SCRATCH program can be used to improve the reading comprehension skills of students who have problems in reading comprehension. The research problem emerged based on this contemplation.

The aim of this study was to reveal how reading comprehension skills of elementary fourth graders who have problems in reading comprehension can be improved by means of the SCRATCH program. Based on this aim, the following research questions were addressed in the study:

1. What are the pre-implementation reading comprehension scores and percentages of the students who have problems in reading comprehension?
2. How is the improvement of these students' reading comprehension skills throughout the implementation process?

Method

Design

This study was conducted according to the action research design. Action research is a cooperative research approach that individuals employ with systematic actions that they perform towards the solution of certain problems. Such an approach is the one in which individuals aim to examine their problems and especially the problems affecting the society by means of reconciliatory, democratic and participatory strategies (Berg, 2001). In the field of education, action research is described as a systematic process that is conducted to solve the problems and improve the existing status (Tomal, 2010).

In the literature, action research is categorised in different ways (Berg, 2001; Bogdan, & Biklen, 2007; Hendricks, 2006; Mills; 2003; Morton, 2005; O'Brien, 2001). For instance, Berg (2001) states that action research studies are of three types that are technical action research, practical action research, and emancipating action research. Mills (2003) divides

action research into two as in critical action research and practical action research studies. Bogdan and Biklen (2007) classify action research as political action research and participant action research. Hendricks (2006) divides action research into four types including cooperative, critical, in-class and participant action research studies.

Within the scope of this study, Hendricks (2006) and Bogdan and Biklen's (2007) action research types were considered, and among these types, participant action research was preferred since the first author of the study had the practitioner role in the process, and the SCRATCH program was used in reading comprehension activities for the first time. Consequently, the study was planned and conducted in accordance with participant action research.

The study was designed as a participant action research. The research process is presented in Figure 1.
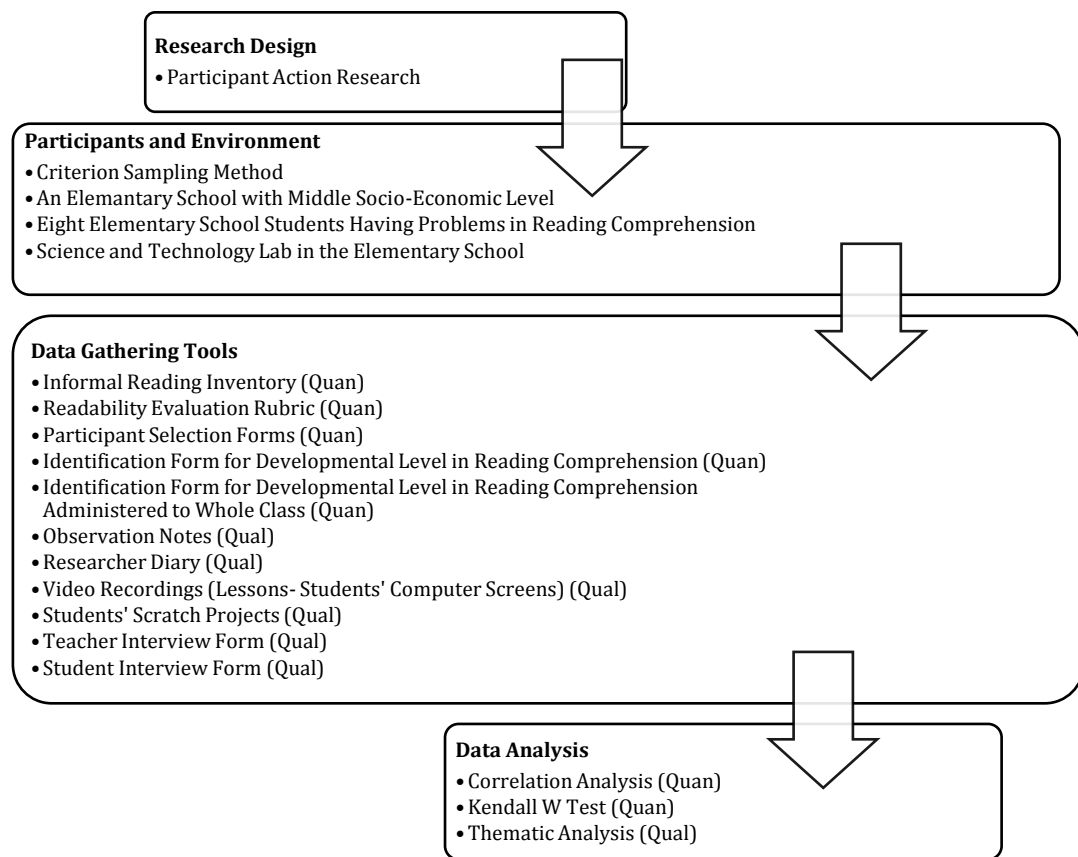

Figure 1: *Research Process*

Qual: Qualitative, Quan: Quantitative

Participants

Selection of the schools: Criterion sampling, a purposeful sampling method, was used in the selection of both the schools and students. The criterion sampling method is a common strategy for selecting a sample that emphasize reviewing and examining all cases that meet predetermined and important criteria (Patton, 2002). In the study, the schools where the study would be conducted was firstly selected. In order to determine the schools at which students have the most difficulty in reading comprehension, exploratory

observations were made in schools located in regions with high, middle and low socio-economic levels. Following these observations by the first author, three elementary schools were selected based on the criteria below:

1. Being located in the Tepebasi district of the Eskisehir province,
2. Including one school from each socio-economic level (high-middle-low),
3. Voluntary participation of administrators, teachers and students to the study,
4. Having the lowest scores according to the results of the participant selection forms.

As a result of the exploratory observations, and evaluations with colleagues and elementary school teachers regarding the research topic, the first author decided to include three elementary schools in the Eskisehir province within the research process. These schools were classified as Elementary School A (high socio-economic level), Elementary School B (middle socio-economic level) and Elementary School C (low socio-economic level). All fourth graders in these schools were administered the Participant Selection Forms developed by the researchers. At the end of these forms that consisted of a narrative text and an informative text, 10 open-ended questions were included related to each text. These forms were administered to a total of 561 fourth graders in the three schools. Correlation analysis was then conducted on the data gathered through the forms by using SPSS 22. The first author scored the students' answers in the forms, but an independent expert also evaluated these forms to ensure the objectivity and reliability of the first author's scoring. The relationship between the scores was examined to reveal the inter-rater reliability. Correlation analysis was conducted in this respect. The inter-rater correlation coefficient is presented in Table 1.

Table 1. *Correlation Between the Raters' Scores*

	n	*r*	*p*
Rater1-Rater2	561	.979**	.000

p<.01

As is seen in Table 1, it can be stated that there was a strong and positive relationship at significant level between the scores of the two raters (r=0.979, p<.01). In other words, the scorings of the raters were found to be consistent to each other, and it can be argued that the first author's scoring was reliable. At this point, it was accepted that the scores evaluated by the first author could be used in school selection. This was followed by the process of selecting the school with the lowest reading comprehension scores.

The first form administered in this process was the one with the narrative text. Based on the data gathered through this form, the reading comprehension mean scores of the schools were calculated by using SPSS 22. The results of this calculation are presented in Table 2 below.

Table 2. *Reading Comprehension Mean Scores of the Schools in the Narrative Text*

School	*n*	*M*	*sd*
B	260	12.22	5.18
C	129	13.33	5.87
A	172	16.22	4.11
Total	561	13.70	5.34

As can be seen in Table 2, Elementary School B was found to have the lowest reading comprehension mean score among the three elementary school in the narrative text type (*M*= 12.22). Based on this result, it can be argued that the students in Elementary School B had more difficulty in reading comprehension.

In the school selection, the form with the informative text was also administered. The reading comprehension mean scores of the schools in the informative text were again calculated by using SPSS 22. The results are presented in Table 3 below.

Table 3. *Reading Comprehension Mean Scores of the Schools in the Informative Text*

School	*n*	*M*	*sd*
B	260	9.64	4.717
C	129	10.84	4.831
A	172	12.45	4.504
Total	561	10.78	4.824

As is seen in Table 3, Elementary School B had the lowest reading comprehension mean score among the three elementary schools in the informative text type (*M*=9.64). In other words, it can be argued that the students in Elementary School B had more difficulty in reading comprehension. Elementary School B was found to have the lowest mean score according to the results in both the narrative text and the informative text, and it was decided to carry out the study in this school.

Selection of the students: After the school where the study would be conducted was decided, the students were selected by means of the criterion sampling method, as was the case in the previous process. The primary criterion that was required for the students was having difficulty in reading comprehension. In addition, the following criteria were also required to be selected as a participant in the study:

Students should;

1. be fourth graders,
2. have problems in reading comprehension,
3. have reading comprehension levels between 0% and 50%, or in other words, at anxiety level,
4. not have started reading and writing only just,
5. not have any mental disabilities that prevent them from comprehending what they read,
6. have their parents' voluntary approval for participating in the study,
7. be willing to participate in the study, and
8. be using tools such as a keyboard and a mouse at the basic level.

In this step, the first author went through the list of all fourth graders in Elementary School B, and identified that students whose reading comprehension was at anxiety level (i.e. between 0% and 50%). Consequently, one of the classes had 11 students whose reading comprehension was at anxiety level. The teacher of this class stated that his students indeed had serious problems in reading comprehension. For this reason, the teacher specifically asked for his students to be selected for the study. He indicated that the 11 students who had problems in reading comprehension were those with the lowest academic achievement, and he could give all kinds of support of they were to be included in the study and help the researcher to take the consent of their parents. The first author thereupon decided to select all of the participants from this class, and reflected this decision in his diary as in the following (Researcher Diary [RD], 06.11.2015):

Because the elementary school teacher complained about his students' problems in reading comprehension, and asked the study to be conducted in his class, I decided to include the first eight students from this class with the lowest reading comprehension level.

Students: Eight fourth graders who were studying in an elementary school with middle socio-economic level in the Eskisehir province, and whose reading comprehension was at anxiety level participated in the study. In the selection of the participants, the opinions of their elementary school teacher, the counselling teacher of the school and the second author were considered. The students were selected based on these opinions.

In this process, the issue of whether the students could use tools such as a keyboard and a mouse was also considered, and they were selected accordingly. All of the students were observed to have technology skills at the level of using a computer, a mouse and the Scratch program which will be employed in the study (RD, 07.10.2015). The demographic characteristics of the students who were selected as participants are presented in Table 4.

Table 4. *Demographic Characteristics of the Students*

Student Name (pseudonym)	Gender	Age
Ahmet	Male	10
Arda	Male	10
Emrah	Male	9
Mehmet	Male	10
Burhan	Male	10
Tarık	Male	10
Buket	Female	10
Yakup	Male	10

Class teacher: The class teacher had a 24-year experience. He worked in Erzurum, Yalova and Eskisehir during his professional life. Currently, he has been working as an elementary school teacher in Eskisehir for 18 years. He has been teaching in the school where he currently works for four years. He has been with this class since first grade (Teacher Interview, 04.01.2016).

First author [Researcher]: The researcher graduated from the elementary teaching undergraduate program of Trakya University, Faculty of Education, and earned his Master's degree in elementary education in the same university. He completed his doctoral studies in the PhD program on elementary teaching at the Graduate School of Educational Sciences, Anadolu University. He is mainly interested in reading comprehension as a research topic. Particularly during his experience as an elementary school teacher, he observed that students have problems mostly in reading comprehension. He also witness problems in this aspect of language use in his interviews with elementary school teachers and his observations in schools during his assistantship at the faculty. He focused on this issue in the process of choosing a topic for his PhD dissertation, and elaborated his research on reading comprehension.

Validity committee: In order to conduct the validity analyses and provide the researcher with a critical perspective within the process, a validity committee consisting of experts in qualitative research and Turkish language teaching. Three individuals took part in this committee. The meetings of the validity committee were held on Mondays every week regularly. The researcher attended the meetings of the validity committee at the beginning of the week after his application every week. The researcher conducted the macro-analyses of the videos recorded during the applications and video recording of the students' computer screens. Additionally, the researcher analysed the students' Scratch projects, pre-, during- and post-intervention interviews with the students and the teacher, and the student and researcher diaries, and obtained the data out of these analyses. All these data were presented to the validity committee. The analyses were discussed in the committee and the action plans for the following weeks were determined. These action plans were recorded in the Committee's Decision Book as the committee decisions. Besides, the committee meetings were also video-recorded. The first author transcribed

and analysed the videos after the meetings. These analyses were recorded in the Committee's Decision Book as the findings. The first of the committee meetings was held on 02.11.2015, in the week when the teaching of the Scratch program to the students finished. The last meeting was held on 21.12.2015, in the week when the application process ended, and there were eight committee meetings in total.

Thesis supervising committee: The three faculty members in the thesis supervising committee were the remaining participants of the study. One of these faculty members was the supervisor of the researcher who has expertise in qualitative research and elementary education. The second member was an expert in Turkish language teaching and elementary education. The last member was an expert in instructional strategies and educational programs.

Research Environment

The study was carried out in the science lab of Elementary School B. The lab includes two rooms, one of which is a small room and the other big. The small room was used as the research environment. It was allocated by the school administration. Four student desks, eight student chairs, one teacher's desk and one teacher's chair were put in this small room, which was normally empty. The student desks were placed to face each other in two rows. They and the teacher's desk were situated in a U-shape. The research environment is shown in Figure 2.
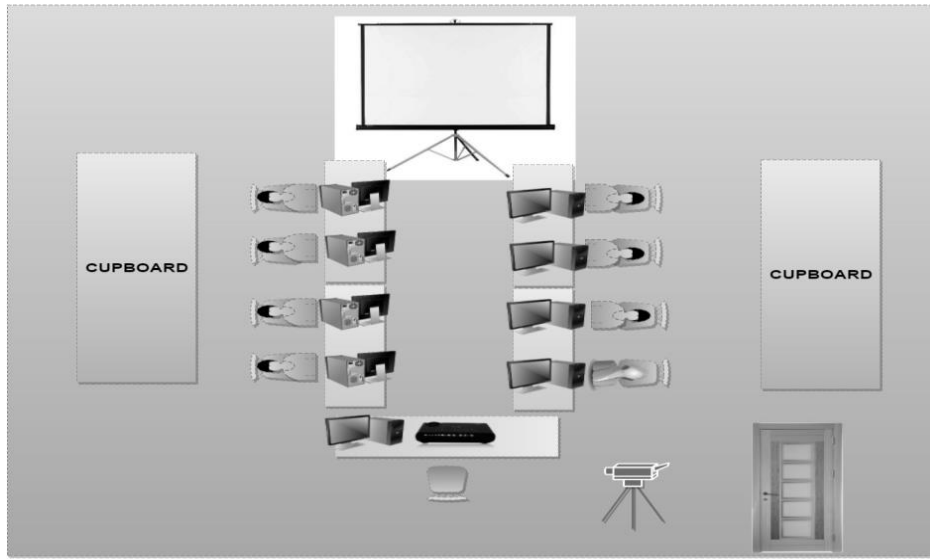

Figure 2. *Research Environment*

Preparation of the Texts

The narrative and informative texts employed in this study were prepared by the first author. After the literature review, he decided on the topic, type and theme of the texts (RD, 01.05.2015). Thirteen of the 15 texts prepared were used in the study. Three of these texts were those used in the participant selection process, two were used in the pilot study, and six were for the actual implementation. In addition to these texts, two texts were prepared to be administered to the whole class at the end of the process.

The difficulty levels of the texts were calculated by using the "readability formula" of Ateşman (1997) who adapted the Flesch formula to Turkish. In this regard, the difficulty levels of the texts were determined as easy, moderate and difficult. The opinions of academics and elementary school teachers who were experts in Turkish language teaching

were then asked. After the experts' opinions were received, the necessary modifications were made and the difficulty levels of the texts were determined, these texts were presented to ten students and they were asked to fill the readability evaluation rubric (Ateş, Çetinkaya, & Yıldırım, 2012). The students' rating on this rubric showed that all of the texts were suitable to their levels. The type of the texts, for which form they were prepared, the themes they were related to, and their difficulty levels are presented in Table 5.

Table 5. *Information Regarding the Text Types, Themes, and Forms*

Text Title	Text Type	Theme	Form for Which the Text Would be Used	Difficulty Level
Social Etiquette	Informative	Individual and Society	Participant Selection Form	Moderate
Consumer Rights	Narrative	Production, Consumption and Efficiency	Participant Selection Form	Moderate
Money Saved	Narrative	Production, Consumption and Efficiency	Participant Selection Form	Moderate
Recycling	Narrative	Production, Consumption and Efficiency	Pilot Study	Moderate
Cars of the Revolution	Narrative	Production, Consumption and Efficiency	Pilot Study	Moderate
Selim's Belongings	Narrative	Production, Consumption and Efficiency	Actual Implementation	Easy
The Farmer's Inheritance	Narrative	Production, Consumption and Efficiency	Actual Implementation	Moderate
Sevda and Aunt Nurgül	Narrative	Individual and Society	Actual Implementation	Difficult
Starfish	Informative	Health and Environment	Actual Implementation	Moderate
Journey of the Bread	Informative	Production, Consumption and Efficiency	Actual Implementation	Easy
Apricot	Informative	Turkey, My Beloved Country	Actual Implementation	Difficult
Flu	Informative	Health and Environment	To the Whole Class at the End of the Implementation	Moderate
A Day with the Germs	Narrative	Health and Environment	To the Whole Class at the End of the Implementation	Moderate

After being prepared, the texts were divided into sections in the SCRATCH program, and each section was situated on a single screen. Visuals were also used beside the texts. The texts were then turned into audio stories by vocalizing each screen. The students were not

given any printed materials during the implementation, and all the texts were presented on the computer environment through the program. A sample screenshot for the text 'Starfish' on the SCRATCH program is shown in Figure 3.
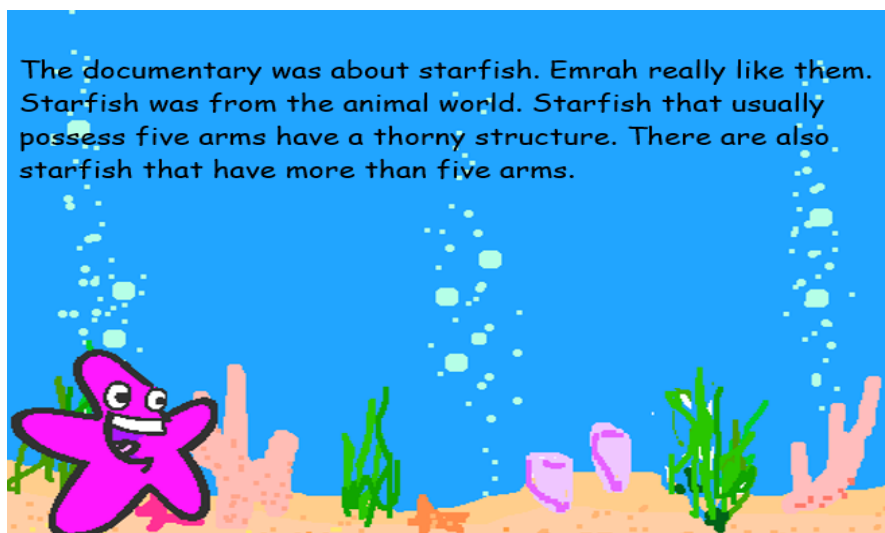

Figure 3. *A Screenshot for the Text 'Starfish'*

Data Gathering Tools

In action research, data can be gathered through interviews, observations or documents. In order to strengthen the findings, researchers may also prefer data triangulation (Berg, 2001). In the scope of this study, multiple gathering tools were employed to strengthen the findings, and enhance the validity and reliability of the study. The data gathering tools and for which purpose they were used are presented in Table 6.

Table 6. *Data Gathering Tools Used in the Study*

Researcher	Students	Teacher
➢ Observation Notes (Qual) ➢ Researcher Diary (Qual) ➢ Video Recordings (Qual)	➢ Informal Reading Inventory (Quan) ➢ Readability Evaluation Rubric (Quan) ➢ Participant Selection Forms (Quan) ➢ Identification Forms for Developmental Level in Reading Comprehension (Quan) ➢ The Identification Forms for Developmental Level in Reading Comprehension Administered to the Whole Class (Quan) ➢ Videos Recorded During the Lessons (Qual) ➢ Video Recordings of the Students' Screens (Qual) ➢ Student Interview Form (Qual) ➢ SCRATCH Projects (Qual)	➢ Teacher Interview Form (Qual)

Quantitative Data Gathering Tools

Informal Reading Inventory: The informal reading inventory was adapted by Akyol (2006a) from Haris and Sipay (1990), Ekwall and Shanker (1988) and May (1986), and is used to individually determine the reading comprehension level of a person who reads a text. This inventory aims to determine the reader's vocabulary and pronunciation knowledge based on his/her reading errors while reading aloud (shape-sound association skill), and his/her reading comprehension level through end-of-text questions about the text being read. It is not a standardized text. According to the inventory, there are three types of reading levels, which are independent level, instructional level, and anxiety level (Akyol, 2013). Independent level; students' reading and comprehending the materials that are suitable to their levels without needing any help. Instructional level; students' comprehending what they read as expected through the help of another person. Anxiety level; students' comprehending only a small part of a text and/or making too many reading errors.

The students were asked ten open-ended questions about the texts used in the study. Their answers to the questions were scored according to this inventory. After the scoring, it was determined whether the students' reading comprehension levels were at independent level, instructional level or anxiety level. In this regard, the following classification was used for the reading levels and percentages (Coşkun, 2010, p. 84):

a) Students between 0-50% are at anxiety level,
b) Students between 51-90% are at instructional level,
c) Students between 91-100% are at independent level.

Readability evaluation rubric: After the texts were prepared by the first author, experts' opinions were received and the difficulty levels were determined, the students' views on the texts were identified by using the Readability Evaluation Rubric (Ateş, Çetinkaya, & Yıldırım, 2012).

Participant selection forms: Participant selection forms are those that were used in the stage of selecting the school where the study was conducted and the participants, and were developed by the first author. These forms consist of two sections. In the first section, there is a text, and in the second section, there are 10 open-ended questions related to that text. The first six of the questions measure basic comprehension and have their answers clearly within the text. These are wh-questions. The last four of the 10 questions measure deeper comprehension. These questions mostly require summarising, finding the main idea and the topic, and associating the text with daily life.

Identification forms for developmental level in reading comprehension: These forms were developed through the same process with the participant selection forms. Ten of the 13 texts prepared at the beginning of the research process were used to determine the students' levels of reading comprehension. The remaining three were used as the Participant Selection Forms. The identification forms for developmental level in reading comprehension also consists of two sections including the text section, and the section with open-ended questions. The distribution of the questions was identical to the participant selection forms, in that the first six of the questions include basic wh-questions, and the last four questions measure deeper comprehension such as in summarising, finding the main idea and the topic, and associating the text with daily life. Reading comprehension activities were conducted with six of these forms, two forms in each of the difficulty levels, for six weeks in total during the actual implementation process. The order of implementation is presented in Table 7 based on the text types and difficulty levels.

Table 7. *Order of Implementation Based on Text Types and Difficulty Levels*

Text No.	Week	Text Title	Text Type	Difficulty Level
Text 1	Week 1	Selim's Belongings	Narrative	Easy
Text 2	Week 2	Journey of the Bread	Informative	Easy
Text 3	Week 3	The Farmer's Inheritance	Narrative	Moderate
Text 4	Week 4	Starfish	Informative	Moderate
Text 5	Week 5	Sevda and Aunt Nurgül	Narrative	Difficult
Text 6	Week 6	Apricot	Informative	Difficult

Identification forms for developmental level in reading comprehension administered to the whole class: Two of the 13 texts prepared at the beginning of the research process were administered to all students in the class of the eight student who participated in the study at the end of the implementation. These were the forms prepared in the same format with the other forms. The forms consisted of the texts titled 'A Day with the Germs and Flu.'

Qualitative Data Gathering Tools

Researcher diary: Researcher observations jotted down in a diary include his/her feelings, attitudes, perceptions, reflections, hypotheses and interpretations (McKernan, 1996). The first author kept the researcher diary on the computer environment from the beginning till the end of the research process. In this respect, the researcher kept a diary of 92 pages in total, containing 29 pages before and 63 pages after the implementation.

Observation notes: Observation notes were taken on the computer environment by the researcher during the research process. The observations started on the first day he was in the field, and ended when he left.

Video recordings of the lessons and students' computer screens: The implementation process and the meetings of the validity committee were video-recorded. The students and what they did during the process were monitored by means of the video recordings that were also used to review what was discussed, the decisions made and the action plans set in the meetings of the validity committee. The length of the recordings was 2138 minutes in total.

Interview forms: The first author conducted three semi-structured interviews with both the class teacher and the students before, at the middle and the end of the implementation process. In this way, triangulation was achieved in data sources. These interviews lasted 91 minutes with the class teacher, and 180 minutes in total with the students.

SCRATCH projects prepared by the students: The projects that the students prepared in the Scratch program during the process were gathered. For this purpose, the students' projects were copied from their computers at the end of each lesson. The quotations from these projects were used to contribute to the validity of the study.

Roles in the Implementation/Research Process

Researcher's role: The first author took part in the study as the researcher. Participant action research was adopted as the action research type, and the researcher had the practitioner role. Therefore, the researcher played a role in every stage of the research process.

Class teacher's role: In the study, the class teacher had a part in the student selection, taking the consent of parents, preparing the classroom, conducting the implementation,

the interviews, and gathering the data. In addition, he cooperated with and helped the researcher in every stage of the study.

Students' role: The eight students selected within the scope of the study played an active role in taking the consent of their parents, conducting the implementation, gathering the data, the interviews, and evaluation of the reading comprehension activities through the SCRATCH program.

Implementing the Study

After the school where the study would be conducted, and the students who had problems in reading comprehension in this school were selected, they started to learn how to use the SCRATCH program. In the following process, they participated in the pilot study, and then the actual implementation. During the implementation, the reading comprehension activities were structured as pre-, during- and post-reading activities. It was planned to have one SCRATCH project for each reading activity. In the projects, it was aimed that the students would employ reading comprehension strategies. The project texts were presented to the students on the program.

Three types of projects were planned to be prepared in the SCRATCH program. There included creating an animation about the text, writing and answering questions, and creating a story. While preparing these projects, the students were ensured to complete the pre-, during- and post-reading activities. In order for the during-reading activities to be completed and strategies to be used, the students were asked to do the project on creating an animation at first. They tried to visualise the text to the extent they comprehended it in the animation project.

The second project was writing and answering questions. Post-reading activities were done in this project. These activities included writing questions about the text and providing answers to these questions. While working on this project, the students were asked to select high-level question types that are based on deeper comprehension such as summarising, and finding the main idea and the topic of the text through wh-questions like "What?", "Why?", "How?", "When?", "Where?" and "Who?". The students then formed questions by using one of these questions.

The last project was turning the text into a story. Within this project, the students did the post-reading activities such as summarising the text after reading it, evaluating the text, and stating the main idea and the topic of the text. In short, the reading activities were conducted based on these three projects throughout the implementation, and it was aimed to develop the students' reading comprehension skills.

Validity and Reliability of the Study

In order to ensure the validity and reliability of the study, the researchers paid attention to the concepts of trustworthiness, transferability, invariability and confirmability. In this regard, the researchers stayed in the field for a long time (i.e. 15 weeks), used multiple data gathering tools, gathered the data at different times and received the confirmation of the validity committee and the thesis supervising committee during the research process to enhance trustworthiness. To ensure transferability, the researchers reported the research process in detail, and elaborated on the research environment, participants, data gathering techniques, and data analysis steps. For invariability, the researchers organised meetings with the validity committee as far as possible during the process, shared the gathered data and the analyses with the thesis supervising committee and received its confirmation, and supported the data obtained from different data gathering tools with each other. Lastly, as for conformability, the researchers collected quantitative and qualitative data together.

Data Analysis

Analysis of the quantitative data: In order to examine the inter-rater reliability between the scores evaluated by the first author and other raters in the forms used for school selection, correlation analysis was conducted. Then, to determine which school had the lowest reading comprehension score, mean scores were calculated. Three raters, the first author and two experts, scored the identification forms for developmental level in reading comprehension. The reliability of the scores in these forms was calculated with Kendall W test.

Analysis of the qualitative data: The data of this study were analysed using thematic analysis. Braun and Clarke (2006, p. 15) states that thematic analysis consists of six steps: These steps are as follows: 1. familiarising yourself with your data, 2. generating initial codes, 3. searching for themes, 4. reviewing themes, 5. defining and naming themes, 6. producing the report

Findings

Throughout the action research process, the quantitative and qualitative data, which revealed the students' reading comprehension scores and developmental level before and after the implementation, were collected together. The findings are presented in this section.

Students' Existing Level of Reading Comprehension Before the Implementation

In order to answer the first research question of the study, which is "What are the pre-intervention reading comprehension scores and percentages of the students who have problems in reading comprehension?", three participant selection forms were administered to the participants at the beginning of the research process (28 September 2015). The students' scores in the forms, percentages and reading levels are shown in Table 8, Table 9 and Table 10.

Table 8. *Students' Reading Comprehension Scores Before the Implementation (Form 1)*

Participant name	Reading comprehension score (max. 24).	Reading comprehension percentage	Reading level
Emrah	8	33.33	Anxiety level
Ahmet	3	12.50	Anxiety level
Burhan	9	37.50	Anxiety level
Yakup	9	37.50	Anxiety level
Tarık	9	37.50	Anxiety level
Mehmet	5	20.83	Anxiety level
Buket	4	16.66	Anxiety level
Arda	3	12.50	Anxiety level

As is seen in Table 8, the students' reading comprehension scores were between 3 and 9 points. Their reading comprehension percentages ranged from 12.5% to 37.5%. According to these findings, all students' reading levels were at anxiety level, and they had problems in reading comprehension.

Table 9. *Students' Reading Comprehension Scores Before the Implementation (Form 2)*

Participant name	Reading comprehension score (max. 24).	Reading comprehension percentage	Reading level
Emrah	4	16.66	Anxiety level
Ahmet	1	4.16	Anxiety level
Burhan	7	29.16	Anxiety level
Yakup	7	29.16	Anxiety level
Tarık	5	20.83	Anxiety level
Mehmet	0	0.00	Anxiety level
Buket	3	12.50	Anxiety level
Arda	2	8.33	Anxiety level

As can be seen in Table 9, the students' reading comprehension scores were between 1 and 7 points. Their reading comprehension percentages ranged from 0% to 29.16%. These findings show that all students' reading levels were at anxiety level, and they had problems in reading comprehension.

Table 10. *Students' Reading Comprehension Scores Before the Implementation (Form 3)*

Participant name	Reading comprehension score (max. 24).	Reading comprehension percentage	Reading level
Emrah	6	25.00	Anxiety level
Ahmet	2	8.33	Anxiety level
Burhan	9	37.50	Anxiety level
Yakup	6	25.00	Anxiety level
Tarık	11	45.83	Anxiety level
Mehmet	9	37.50	Anxiety level
Buket	5	20.83	Anxiety level
Arda	5	20.83	Anxiety level

As is shown in Table 10, the students' reading comprehension scores were between 2 and 11 points. Their reading comprehension percentages ranged from 8.33% to 45.83%. According to these findings, it can again be stated that all students' reading levels were at anxiety level, and they had problems in reading comprehension.

The students' scores in each of the three texts indicate that their reading was at anxiety level and they had problems in reading comprehension. These findings meet the criterion that was used in student selection, which was "students' having problems in reading comprehension". The scores obtained through the forms administered at the beginning and end of the study reveal the improvement in the students' reading comprehension skills. The fact that the students had problems in reading comprehension was mentioned in the interview with the teacher at the very beginning. The teacher said the following with regard to the level of the students selected for the study (Pre-interview with the teacher, 16.10.2015):

> Because I have taught them since first grade, I know that they have on-going problems related to reading since that grade. When I look at the names of the students, I can say that these are the ones who also have difficulty in expressing themselves. They are the same in other courses, like in the math course, and in the Turkish course. For instance, Mehmet, Yakup and Ahmet came later, they joined the class later on. These children also have concentration problems. They are distracted very easily. It is not possible to have their attention to the lesson for a long time. For example, it is not possible for them to focus on the topic as desired and participate in the

reading class. Well, I mean, you also administered a test. You saw all these in their answers. These are the children who are not really ambitious.

The class teacher asserted that the students selected for the study had problems related to reading. His views overlap with the selection of the students by the researchers. During the process, the students were observed to have difficulty in reading the texts early on, have problems in expressing and animating the parts of texts they comprehended in their animation projects, and not to be able to form questions related to the text in the question-formation project. In the summary project in particular, the students were observed to fail utterly and could not summarise the text (RD., 13.11.2015).

According to the quantitative findings revealed, the students' scores were low in all the forms. Similarly, qualitative findings were also yielded which indicated that the students had problems in reading comprehension. Besides, it was found that the reading comprehension scores of the participants were lower than the other students in the class before the implementation. The findings regarding the participants' scores and the mean score of the class are presented in Graph 1 and Graph 2.
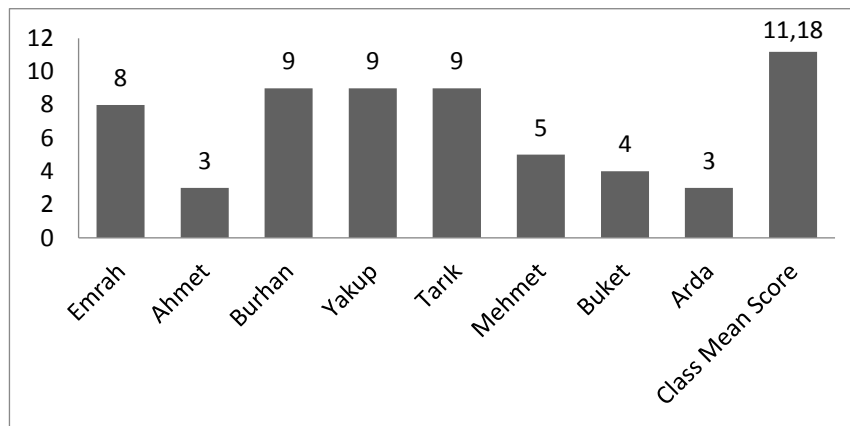
Graph 1. *The Participants' Scores and the Mean Score of the Whole Class (Form 1)*
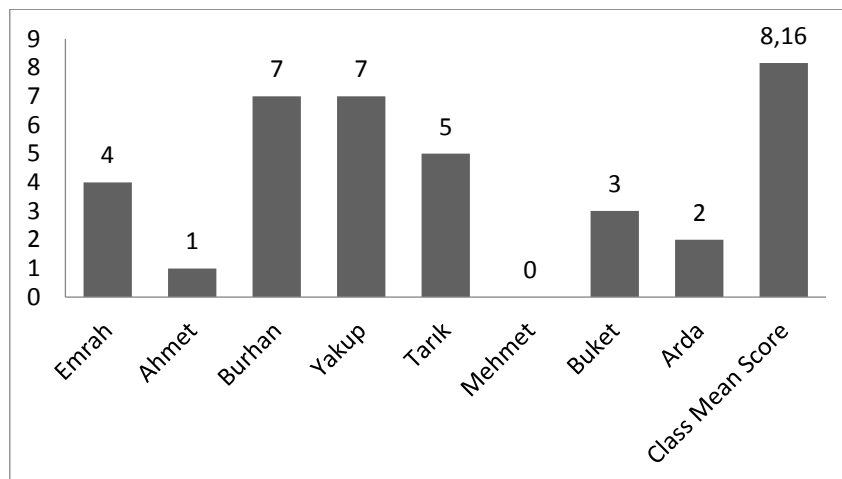
Graph 2. *The Participants' Scores and The Mean Score of the Whole Class (Form 2)*

As is seen in Graph 1 and Graph 2, the participants' reading comprehension scores were lower than the mean score of the class at the beginning of the study. Based on these

findings, it can be stated that the participants had more problems in reading comprehension than the other students in the class did.

Students' Reading Comprehension and Development at the End of the Implementation

The students were administered the identification forms for development level in reading comprehension every week during the implementation process in order to reveal their reading comprehension scores (in percentages) and developmental level during and at the end of the implementation. In addition, two of these forms were administered to the all students in the class at the end of the process. In this way, the participants' and other students' developmental levels in reading comprehension at the end of the implementation were revealed, and the findings that show the participants' status in the class were obtained.

The quantitative data regarding the students' reading comprehension scores were gathered through six identification forms for developmental level in reading comprehension throughout the implementation process. On the other hand, the qualitative data related to the students' developmental levels in reading comprehension were collected through the researcher's observations, student and teacher interviews, researcher diary, and the projects the students prepared in the SCRATCH program. The reading comprehension scores of the students in narrative and informative texts are presented together. Besides, their scores before and at the end of the implementation are given together as well. In this way, it was aimed to reveal the students' developmental levels in reading comprehension. The students' reading comprehension scores in the forms are presented in Table 11.

Table 11. *The Students' Reading Comprehension Scores in the Forms (in percentages)*

Student name	Part. Select. F. 1 (M)	Part. Select. F. 2 (M)	Part. Select. F. 3 (D)	Text 1 (E)	Text 2 (E)	Text 3 (M)	Text 4 (M)	Text 5 (D)	Text 6 (D)
Emrah	33.33	16.66	25.00	66.66	91.66	33.33	79.16	75.00	62.50
Ahmet	12.50	4.16	8.33	75.00	75.00	41.66	62.50	58.33	45.83
Burhan	37.50	29.16	37.50	Absent	83.33	91.66	83.33	83.33	66.66
Yakup	37.50	29.16	25.00	91.66	95.83	62.50	Absent	91.66	79.16
Tarık	37.50	20.83	45.83	75.00	83.33	70.83	79.16	87.50	62.50
Mehmet	20.83	0.00	37.50	91.66	87.50	87.50	54.16	91.66	66.66
Buket	16.66	12.50	20.83	75.00	79.16	54.16	75.00	58.33	Absent
Arda	12.50	8.33	20.83	50.00	70.83	41.66	62.50	70.83	45.83

Part.: Participant, Select.: Selection, F: Form, E: Easy, M: Moderate, D: Difficult.

As is seen in Table 11, Emrah's reading comprehension level in easy, moderate and difficult texts increased compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Emrah's reading level increased from anxiety level to independent level in easy texts, and from anxiety level to instructional level in moderate and difficult texts. Emrah thought that his reading skill improved and this contributed to his success in the Turkish course. A part of the interview conducted with Emrah at the middle of the implementation process is given below (Interview with Emrah, 11.12.2015):

> *Emrah:* For example, the teacher asked me a question today.
> *Researcher:* In the Turkish course?
> *Emrah:* Yes. He asked two questions, and I was able to answer them.
> *Researcher:* You could answer the questions, so you think it affects your performance in the Turkish
> course?
> *Emrah:* Yes, it does.

> *Researcher:* How does it affect?
> *Emrah:* Quite good. Excellent.

Emrah thought that he could now answer the questions the teacher asked in the Turkish course, and this was thanks to the implementation. Besides, in the interview at the end of the implementation, he stated that due to the implementation, his reading speed got faster. Quotations from this final interview are presented below (Interview with Emrah, 04.01.2016):

> *Researcher:* How do you think the program contributed to your reading performance?
> *Emrah:* It helped me read faster.
> *Researcher:* How did it happen?
> *Emrah:* It is really nice, I can read quite faster.
> *Researcher:* You can read faster now, or could you read fast back then?
> *Emrah:* I was reading very slow in the past.
> *Researcher:* How about now?
> *Emrah:* I can read faster.
> *Researcher:* How did it happen?
> *Emrah:* Thanks to these texts and forms, and the program.

As is seen in Table 11, Ahmet's reading comprehension level in easy, moderate and difficult texts was observed to increase compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Ahmet's reading level increased from anxiety level to instructional level in all texts. Apart from the identification forms in developmental level in reading comprehension, there were also qualitative findings that showed improvement in his reading comprehension skills based on observations, and the interviews with the teacher and Ahmet. In this respect, the following extract from the conversation between the researcher and Ahmet can be given as an example (Interview with Ahmet, 04.01.2016):

> *Researcher:* Do you think the activities we did in the SCRATCH program contributed to your performance in the Turkish course?
> *Ahmet:* Yes.
> *Researcher:* Can you give an example? How did it contribute?
> *Ahmet:* Like what?
> *Researcher:* For instance, there was something that you did, and thanks to that, you think you are better now.
> *Ahmet:* I raised my hand when a question was asked. I mean a couple of questions. That's why I think I was successful.

As is seen in Table 11, Burhan's reading comprehension level in easy, moderate and difficult texts increased compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Burhan's reading level increased from anxiety level to instructional level in easy texts, from anxiety level to independent level in moderate texts, and from anxiety level to instructional level difficult texts. In the interview at the middle of the process, Burhan said that the implementation made positive contributions to his performance in the Turkish course. The quotation from this interview is given below (Interview with Burhan, 11.12.2015):

> *Researcher:* How did the activities in the SCRATCH program affect your reading?
> *Burhan:* My interest in reading has increased. In fact, our teacher asked the class a question before this lesson. It was also about a narrative story. When I answered quickly, he also said "Well, those activities were beneficial for you".
> *Researcher:* Your teacher said this?
> *Burhan:* Yes.
> *Researcher:* Do you think it was beneficial?
> *Burhan:* Yes, of course.

According to Table 11, Yakup's reading comprehension level in easy, moderate and difficult texts was found to increase compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Emrah's reading level increased from anxiety level to independent level in easy texts, from anxiety level to instructional level in moderate texts, and from anxiety level to independent level in difficult texts. In the interview, Yakup indicated that his performance in the Turkish course got better, the implementation positively contributed to the Turkish course, he could understand what he read, and his reading speed got faster. He explained his views as in the following (Interview with Yakup, 11.12.2015):

> *Researcher:* Well, we have been doing reading comprehension activities in the SCRATCH program, how do these affect your performance in the Turkish course?
> *Yakup:* Good, affects positively.
> *Researcher:* For example?
> *Yakup:* I couldn't read properly in the past, neither could I comprehend what I read. Thanks to this program, I am now better and more successful in the Turkish course.
> *Researcher:* What else?
> *Yakup:* I started to comprehend what I read.
> *Researcher:* What else would you say?
> *Yakup:* Well, my reading speed got faster. Now, I can read faster.

Similar to what Yakup said, the class teacher also reported that there was an improvement in Yakup's reading and answering the questions asked during the lesson. The quotations from the interview with the teacher are given below (Interview with the Teacher, 11.12.2015):

> *Researcher:* Are there any other students who showed an improvement in their reading or answering the questions in the class?
> *Teacher:* It is the same with Yakup. He is also confident now, he can read well and he is willing to answer the questions.

As is seen in Table 11, Tarık's reading comprehension level in easy, moderate and difficult texts increased compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Tarık's reading level increased from anxiety level to instructional level in all of the texts. He stated that the activities positively contributed to his performance in the Turkish course. The dialogue between the researcher and Tarık is as follows (Interview with Tarık, 11.12.2015):

> *Researcher:* Tarık, do you think these activities contributed to your performance in the Turkish course?
> *Tarık:* Yes, they did. For instance, we could both have fun and form questions, play games, and do all these things I said.
> *Researcher:* How did it happen?
> *Tarık:* Here, we both play and read, and in the regular Turkish course, I attended the lessons in the same way. Then, I was comfortable.

Tarık stated that he could do the activities in the Turkish course easily considering the activities in the implementation that contributed to his performance in the Turkish course. In the last interview with Tarık, he asserted again that his reading got faster, he could then comprehend what he read, and he could summarise the texts better. The quotation from this interview is given below (Interview with Tarık, 04.01.2016):

> *Researcher:* Do you think this program contributed to your reading comprehension?
> *Tarık:* Yes.
> *Researcher:* What kind of contribution? Can you explain with an example?
> *Tarık:* For instance, my reading got faster. My listening also got faster. I can now comprehend more of what I read.

Researcher: You can comprehend more of what you read.
Tarık: Yes. Besides, I can summarise in longer texts. The same with my expressions. My expressions got longer in my homework.
Researcher: What else would you like to say?
Tarık: For example, I used to be afraid of forgetting what I read before I go to school, but I'm not now. I can tell it directly.

Tarık thought that thanks to the activities in the SCRATCH program, his reading got faster, his reading comprehension skills improved as well as his summary skill, and most importantly he went to school without being afraid of forgetting what he read. The class teacher confirmed what Tarık said in his interview, and reported the following (Interview with the Teacher, 11.12.2015):

Researcher: What would you say about the students who showed improvement in reading and reading comp skills?
Teacher: Tarık is doing pretty well, for instance.
Researcher: Doing well in what?
Teacher: In answering to questions, and reading in general.

As is seen in Table 11, Mehmet's reading comprehension level in easy, moderate and difficult texts was observed to increase compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Accordingly, Mehmet's reading level increased from anxiety level to independent level in easy texts, from anxiety level to instructional level in moderate texts, and from anxiety level to independent level in difficult texts. It was observed that Mehmet's reading comprehension skills improved. He was the student in which change was clearly observed in reading comprehension within the process. This was also realised by the class teacher. Regarding this issue, the researcher reflected the following in his diary (RD., 24.12.2015):

From the beginning till the end of the implementation process, Mehmet's performance showed the most apparent change. He even got zero points in one of the texts. However, within the process, Mehmet's reading and reading comprehension improved to a large extent. This was mentioned by the class teacher several times. The implementation was more beneficial for Mehmet than anyone else. It was a nice feeling to be beneficial for the children.

In the interview, the class teacher said, "Mehmet's reading got a lot better compared to before. He is better now. He is also more motivated in the course, as well as in reading.", emphasizing the improvement in Mehmet's reading skills (Interview with the Teacher, 04.01.2016):

According to Table 11, Buket's reading comprehension level in easy, moderate and difficult texts increased compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. In this respect, Buket's reading level increased from anxiety level to instructional level in all of the texts. Below is the conversation between the class teacher and the researcher about how Buket's reading skills improved during the implementation process (Interview with the Teacher, 11.12.2015):

Researcher: My first question is, do you think there was an improvement in the students' reading skills?
Teacher: About reading skills, I can give you names; there was a positive change in Emrah, Yakup, Tarık, Buket, Mehmet, Burhan and Arda.

As is seen in Table 11, Arda's reading comprehension level in easy, moderate and difficult texts was observed to increase compared to his scores in Participant Selection Forms 1, 2 and 3 administered at the beginning of the process. Here, Arda's reading level increased

from anxiety level to instructional level in all of the texts. The data obtained from the observations and interviews regarding Arda's reading comprehension skills overlap with the qualitative data collected through the forms. In this regard, the class teacher reported that Arda showed an improvement in reading and answering the questions asked. The quotation from the interview is given below (Interview with the Teacher, 11.12.2015):

> *Researcher:* What would you say about Arda, one of the selected students?
> *Teacher:* Arda improved a lot.
> *Researcher:* In what areas?
> *Teacher:* In reading and especially in answering the questions asked.

Similar to the class teacher's views that Arda's reading improved, Arda himself also thought that his reading showed an improvement. In a conversation with the researcher in the class, Arda said that he could comprehend what he read. The following is the dialogue between the researcher and Arda on this issue (Observation, 31.12.2015):

> *Researcher:* Arda, what do you think about the reading comprehension activities we did in the SCRATCH program?
> *Arda:* I think it was good. Really good. I couldn't comprehend what I read before, but I do now. I can understand the texts. I'm glad I participated in this and my mom signed the paper you gave me.

After the implementation process ended, 32 students in the whole class were administered two forms, one with a narrative text (A Day with the Germs) and the other with an informative text (Flu). Findings regarding the developmental level of the participants' and other students' in reading comprehension were obtained from these forms. Besides, the rankings of the students at the beginning and end of the process in terms of reading comprehension levels within the class were also revealed. As for the narrative text, the findings on the participants and the other students' developmental level in reading comprehension are presented in Table 12.

In scoring the forms, the class mean was also calculated. In this way, the developmental level of the whole class was considered, and the class mean score was found. Findings regarding the participants' ranking and their levels at the beginning within the class were revealed by comparing their scores with the mean score of the class. In the text titled Money Saved implemented at the beginning of the process, the class mean was found to be 11.18 points. According to this result, the scores of all participants in this text were below the class mean at the beginning. On the other hand, in the text titled A Day with the Germs, the class mean was 19.65 points, and thus, it can be stated that in the meantime, all of the students' scores in reading comprehension increased.

According to Table 12, the students including Mehmet (22 points, 91.66%), Buket (21 points, 87.50%), Tarık (19 points, 79.16%), Burhan (22 points, 91.66%), and Yakup (24 points, 100%) got scores above the class mean. The reading level of Mehmet, Burhan and Yakup increased from anxiety level to independent reading level, and that of Buket and Tarık from anxiety level to instructional level. The scores of Emrah (18 points, 75.00%), Ahmet (15 points, 62.50%) and Arda (16 points, 66.66%) fell below the class mean. Although the scores of these three students were below the class mean, their scores went up compared to the beginning of the study, and their reading level increased from anxiety to instructional level.

Table 12. *Students' Ranking in the Class, Scores and Percentages in the Narrative Text*

Student name	Ranking, score and percentage in the first form (Money Saved)	Ranking, score and percentage in the second form (A Day with the Germs)
Mehmet	22nd (5 points, 20.83%)	6th (22 points, 91.66%)
Ahmet	31st (3 points, 12.50%)	31st (15 points, 62.50%)
Arda	30th (3 points, 12.50%)	30th (16 points, 66.66%)
Buket	29th (4 points, 16.66%)	10th (21 points, 87.50%)
Emrah	26th (8 points, 33.33%)	26th (18 points, 75.00%)
Tarık	23rd (9 points, 37.50%)	22nd (19 points, 79.16%)
Burhan	25th (9 points, 37.50%)	7th (22 points, 91.66%)
Yakup	24th (9 points, 37.50%)	1st (24 points, 100%)

As for the participants' rankings within the class, among 32 students, Mehmet moved from the 28th place to the 6th place, Buket from the 29th place to the 10th place, Tarık from the 23th place to the 22nd place, Burhan from the 25th place to the 7th place and Yakup from the 24th place to the 1st place. Yakup was the only student who got the full marks, in other words 24 points. Among the rest of the students, Ahmet did not move from the 31st place, Arda from the 30th place and Emrah from the 26th place, and their rankings neither decreased nor increased. However, the reading comprehension percentages of these students were found to increase at the end of the research process.

As for the informative text, the findings on the participants and the other students' developmental level in reading comprehension are presented in Table 13.

Table 13. *Students' Ranking in the Class, Scores and Percentages in the Informative Text*

Student name	Ranking, score and percentage in the first form (Social Etiquette)	Ranking, score and percentage in the second form (Flu)
Mehmet	31st (0 points, 0%)	15th (20 points, 83.33%)
Ahmet	30th (1 point, 4.16%)	31st (9 points, 37.50%)
Arda	28th (2 points, 8.33%)	26th (14 points, 58,33%)
Buket	27th (3 points, 12.50%)	14th (20 points, 83.33%)
Emrah	24th (4 points, 16.66%)	29th (12 points, 50.00%)
Tarık	22nd (5 points, 20.83%)	12th (21 points, 87.50%)
Burhan	20th (7 points, 29.16%)	4th (23 points, 95.83%)
Yakup	19th (7 points, 29.16%)	18th (20 points, 8.33%)

In scoring the forms, the class mean was also calculated. In this way, the developmental level of the class was also considered. Findings regarding the participants' ranking and their levels at the beginning within the class were revealed by comparing their scores with the mean score of the class. While the mean score of the all students in the class was 8.16 points at the beginning, it was 19.16 points at the end of the process. In the text Social Etiquette, the class mean score was found to be 8.16 points, and thus. The scores of all participants in this text were below the class mean at the beginning. On the other hand, the class mean was 19.16 points in the text Flu. In addition, there was an accumulation between 20-24 points. According to the results in Table 13, the students including Mehmet (20 points, 83.33%), Buket (20 points, 83.33%), Tarık (21 points, 87.50%), Burhan (23 points, 95.83%), and Yakup (20 points, 83.33%) got scores above the class mean. The reading level of Burhan increased from anxiety level to independent reading level, and that of Mehmet, Buket, Tarık and Yakup from anxiety level to instructional level. The scores of Emrah (12 points, 50.00%), Ahmet (9 points, 37.50%) and Arda (14 points, 58.33%) fell below the class mean. Although the scores of these three students were below

the class mean, their scores went up compared to the beginning of the study, and the reading level of Emrah and Arda increased from anxiety to instructional level. Ahmet's reading level did not chance, but his comprehension percentage increased.

As for the participants' rankings within the whole class, Mehmet moved from the 31st place to the 15th place, Arda from the 28th place to 16th place, Buket from the 27th place to 14th place, Tarık from the 22nd place to the 12th place, Burhan from the 20th place to the 4th place, and Yakup from the 19th place to the 18th place. Among the rest of the students, Ahmet moved down from the 30th place to the 31st place, and Emrah from the 24th place to the 29th place. The rankings of these students within the class regressed, but their reading comprehension levels went up.

To sum up, the results of the forms, researcher observations, and the interviews with the participants and the teacher showed an improvement in the students' reading comprehension skills. According to the findings, the students' reading comprehension skills can be said to have improved thanks to the activities conducted with the Scratch program. This improvement showed itself in the Turkish course in particular. The fact that the teacher also thought the same way can be inferred from his views (Interview with the Teacher, 11.12.2015):

Researcher: Did you hold an examination in the Turkish course? Was there a Turkish test?

Teacher: Yes, I did.

Researcher: Is there a difference between these students' achievement last year and this year? If you consider the eight students...

Teacher: Yes, there is.

Researcher: In which ones?

Teacher: Almost all of them.

Researcher: Is there an improvement in almost all of them?

Teacher: Yes, there is.

Researcher: In the exam of the Turkish course?

Teacher: Yes, yes, there is an increase in the performance of almost all students.

Conclusion and Discussion

According to the results obtained from the identification forms for developmental level in reading comprehension administered to the students in the actual implementation, the students' reading comprehension scores and percentages increased in all of the forms. At the end of the implementation, it was found that the students' reading levels increased from "anxiety level" to "instructional level" in some forms, and to "independent reading level" in other forms. Based on the analyses of the qualitative data such as observations, diaries, video recordings and interviews, results regarding the improvement in the students' reading comprehension skills were also revealed. In short, as a result of the analyses of the quantitative and qualitative data, there was an improvement in the reading comprehension skills of all of the participants.

The researchers set the difficulty levels of the texts used throughout the research process as easy, moderate and difficult. Although the students were selected based on the texts with moderate difficulty at the beginning of the process, texts with easy, moderate and difficult level were used during the research process. In spite of the difficult texts at the end of the implementation, it was found that the students' reading comprehension scores and percentages increased. The fact that the students' reading comprehension scores and

percentages showed an increase although the difficulty levels of the texts stepped up indicates that the implementation was successful.

Throughout the research process, the students involved in pre-reading (e.g. working on a key word, guessing the content of a text), during-reading (e.g. forming questions, answering questions) and post-reading activities (summarising, stating the main idea and the topic). Besides, it was aimed to enable the students to use the reading comprehension strategies by the researchers. Through these activities, it was thought that the students' reading comprehension skills would be improved. However, it should be noted that the Scratch program made these activities possible.

There are different studies that reported similar results. Studies have also been encountered that examined the effect of using technology on reading comprehension. Berktaş-Türkmen (2001) investigated the effect of using technology in education on reading comprehension. The study found that the students were more successful in the reading comprehension activities conducted by using technology. Doty (1999) compared reading comprehension activities that used story books prepared in the electronic environment and those in printed materials, and reported that the reading comprehension activities in the electronic environment were more effective. Thooft (2011) found that audio books had a positive effect on reading comprehension. Brown (2006) concluded that computer-aided reading comprehension activities developed students reading comprehension skills. These results seem to overlap with those revealed in the current study.

Pearman (2008) examined how story books in the computer environment and those in printed materials affected reading comprehension. The reading comprehension activities conducted with the story books in the computer environment were found to be more effective. Similarly, in a study investigating the effect of online story books on reading comprehension, Ciampa (2012) demonstrated that online story books developed reading comprehension skills. Aydemir-İleri, Öztürk and Horzum (2013) focused on reading comprehension levels in reading on a screen and reading from a printed material, and found that comprehension was better in screen reading. It can be stated that the results of these studies are consistent with those of the current study.

Yaman and Dağtaş (2013) investigated whether reading on a screen and from a printed material affected reading comprehension. As a result, they concluded that neither of these modes affected reading comprehension. Ertem and Özen (2014) examined the difference of reading comprehension in screen reading and reading from a printed material, and revealed that reading from a printed material yielded better comprehension. Başbuğ and Keskin (2012) focused on how comprehension was affected in screen reading and reading from a printed material, and found that comprehension was better in reading from a printed material. Here, the results of these studies do not overlap with those reported in the current study.

In brief, it was seen that all of the students' reading comprehension skills developed thanks to the reading comprehension activities conducted through the Scratch program. Based on these results, it can be stated that this program can be used in reading comprehension activities at elementary school level.

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