Interactive and Social Reading Intervention in Design-based Research

Intervención de lectura interactiva y social en la investigación basada en el diseño

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ABSTRACT

This study, carried out within the design-based research framework, aimed to create a digital environment for students with learning problems to read better. The social constructivist approach was used in this study, which generally focuses on the assumption that reading is an active, interactive, dynamic, and social language skill. The instructional content, built on a learning management system, was developed in line with this strategy. Focus on the problem, understand the problem, define the design goals, outline the solution, create the solution, and test the solution stages. This results in effective and efficient digital teaching material that students with learning problems can use in their reading processes. The study clearly showed the development process of digital material, as well as a deep theoretical discussion.

KEYWORDS Reading research; technology integration; constructivism; learning.

RESUMEN

Este estudio, llevado a cabo dentro del marco de investigación basado en el diseño, tuvo como objetivo crear un entorno digital para que los estudiantes con dificultades de aprendizaje lean mejor. En este estudio se utilizó el enfoque construc-tivista social, que generalmente se centra en la suposición de que la lectura es una habilidad lingüística activa, interactiva, dinámica y social. El contenido instructivo, basado en un sistema de gestión del aprendizaje, se desarrolló de acuerdo con esta estrategia. Concéntrese en el problema, comprenda el problema, defina los objetivos de diseño, describa la solución, cree la solución y pruebe las etapas de la solución. Esto da como resultado un material didáctico digital eficaz y eficiente que los estudiantes con dificultades de aprendizaje pueden utilizar en sus procesos de lectura. El estudio mostró claramen-te el proceso de elaboración del material digital, así como una profunda discusión teórica.

PALABRAS CLAVE Investigación en lectura; integración de tecnología; constructivismo; aprendizaje.

1. INTRODUCTION

Our urge to communicate gives the human being a very different dimension from other living things (Boyd, 2009). Communication is established through our excellent language skills. Reading, a language skill in-volves the conversion of symbols printed on a surface into words and the resulting understanding in simple terms. Reading is the most straightforward and least expensive approach to acquiring knowledge because it can assist in understanding the basics of more complex information (Hashemi, 2021). Reading

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

113

comprehension can be considered as the purpose of reading. Reading comprehension is a process that includes some complex processes such as word reading, vocabulary, and reading fluency and is affected by the reader's ability to perform reading tasks (Hasan et al., 2018; Reis et al., 2020; Soto et al., 2019). If we cannot understand what we are reading, the reading process is meaningless. By reading, we decipher the text's concepts, events, and relationships and try to reach the meaning. The reading process engages the reader with a complex thinking process (Rastegar et al., 2017). The primary purpose of reading is to create and derive meaning from written text, this meaning-making action should be interactive, strategic, and adaptive. Reading is a social process and should not be considered separate from society, people and interaction. According to the constructivist approach, which focuses on sociability, reading can be considered a dynamic, active, and constructive process. The reading process has different meanings for each reader, directly related to the reader's characteristics (e.g., prior knowledge, worldview, value, belief, attitude, motivation, language ability). In addition, factors such as the type of text and contextual factors affect the meaning created (Alton-Lee et al., 2012). In a constructivist approach, the reader associates their schemas with new information while producing meaning and developing their hypotheses (Bruner, 1966). Reciprocal Teaching Strategy (RTS), which is based on the social constructivist approach and focuses on understanding the text, was determined as the focus of this study. The development of knowledge through social interaction (Vygotsky, 1978) is the focus of RTS. If the reading processes of the readers are supported by interaction, an increase in reading performance is observed (Lim et al., 2021). RTS is a learning community whose participants share interactive roles that include learning interactions (Alemu, 2020). RTS is the social constructivist counterpart of the processes involved in taking and structuring meaning in the text. RTS, which overlaps with the social constructivist approach, has a structure supporting mental development (Esfendahad, 2010). In social constructivist understanding, peer support is a critical place in the learning process, and there is an effort to find meaning together with the peer (Ardiansyah, & Ujihanti, 2018). Peer support refers to helping each other in processes ranging from familiar tasks within an activity to the most difficult ones (Vygotsky, 1978). Vygotsky's idea of teaching emphasizes dialogue and the collective construction of knowledge done in a social group (Wells, 1999). The teacher or students can control learning in the context of RTS (Zendler, & Reile, 2018). The focus should be on the dialogue between the student leader and peers rather than on who is in control. RTS follows the constructivist philosophy that students should be encouraged and motivated to explore their ideas and seek explanations about complex concepts from friends or teachers without hesitation or embarrassment (Sumarmo, 2013). RTS has also been recognized for building student capacity in key competencies: thinking; use of language, symbols, and text; self-management; relating to and participating in, and contributing to others (Alton-Lee et al., 2012). In the case of RTS, the emphasis is on cooperative learning rather than independent learning. Students are taught to help each other. In this strategy, students work together as peer partners, each acting as a "doer" and a "guide" in completing the task. Peer feedback does not mean that students "grade" each other or score papers. Instead, the aim is for students to clarify what is right and wrong (Liu, & Bu, 2016). At the same time, the four stages (predicting, questioning, explaining, summarizing) collectively form a guided reading strategy that parallels Vygotsky's idea of scaffolding, defined as various teaching techniques, or learning activities used to progressively advance students towards more robust content (Erbil, 2020). RTS is an inquiry-based teaching strategy created by Palincsar and Brown (1984) to help students improve their reading comprehension skills (Pilonieta, & Medina, 2009). Teachers often administer RTS as a predetermined set of processes with little knowledge of why

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Seda Özer Şanal

114

strategies work (Barrett, 2003). Therefore, it is concluded that RTS is an outstanding role-playing learning strategy proven to improve reading and comprehension. RTS is best described as a conversation between teachers and students, in which each participant takes turns acting as the teacher (Munawir et al., 2022). The idea behind RTS is that the teacher instructs students on strategies until they are adept enough to shift the dialogue from student to student gradually (Clark, 2003). Through this strategy, students explain what they have learned to other students and act as a facilitator to become the teacher and help them clarify their ideas and activities. This process forces students to put their ideas into words, which helps organization and retention (Liu, & Bu, 2016). For the effective implementation of RTS, it is crucial to reveal the experiences, cultural knowledge, perspectives, and thinking strategies of the students participating in the process (Alton-Lee et al., 2012). Social dialogues about texts repeated and shared by students support students' reading comprehension performance (Dole et al., 2016). RTS is a scaffolded discussion technique built on four strategies that readers use to grasp the text: guessing, questioning, explaining, and summarizing (Yawisah et al., 2017). The more students experience analytical thinking skills for themselves, the more complex their learning skills repertoire becomes (Rattanavich, 2017). In addition, the reciprocal teaching strategy is a strategy for understanding a text that involves teachers and students working together to improve their interpretation of the text using four strategies (Oo et al., 2021; Tseng, & Yeh, 2018). RTS reduces students' position as students are fulfilled when they share their feelings, perspectives, and ideas through learning approaches in an interactive session. Learning spaces include opportunities to strengthen awareness, notice and observe misconceptions, and correct them along the way. The domain of proximal development is crucial for identifying appropriate content and device operations for enhanced learning and performance. These contents should be shared on an entirely different level, acceptable to students' learning ability and level of understanding. A framework should be available to encourage and implement feedback to end RTS practices (Oczkus, 2003). It is known that the interactions made while applying this strategy improve the students' thinking skills (Wadsworth, 2006). RTS was developed from research on tracking and structuring meaning from text. The basis of the strategy is the assumption that knowledge and understanding emerge as a result of creative socialization through conversations and negotiations between teachers and students or students and students (Pilten, 2016). Students work collaboratively on the text they are working on and try to give meaning to it. Based on the dialogue approach, this strategy makes facts and ideas feel comfortable in an open conversation process, and a collective learning process is emphasized (Ardiansyah, & Ujihanti, 2018). Learning to work is another perspective many see as a collaborative mode that focuses on discursive thinking and reasoning (Abu Hatab, 2017).

Many previous studies confirm that RTS is an effective reading strategy that significantly supports reading comprehension (Ahmadi, 2016; Cockerill et al., 2022; Dew et al., 2021; Hamdani, 2020; O'Hare et al., 2019; Pilten, 2016; Rojabi, 2021; Thurston et al., 2020). In addition, as in RTS, students read better in learning processes used by inquiry strategies (Ahmadi et al., 2021; Ariawan, & Winoto, 2021; Brown, & Pyle, 2021; Bui et al., 2021; Castells et al., 2021; Liu, 2021; Parjan, & Mohamad, 2021; Stuckelman et al., 2022). And peer support has been proven by convincing evidence as a strategy to support reading (Chairinkam, & Yawiloeng, 2021; Chun, & Cennamo, 2022; Ebrahimi, & Sadighi, 2022; Nguyen, 2022; Taheri, & Nazmi, 2021; Yawiloeng, 2021; Xu et al., 2022). In addition to peer support, expert/teacher support was also stated in the literature as an effective strategy for improving reading performance (Ebrahimi, & Sadighi, 2022; Li,

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

115

& Zhang, 2022; Taheri, & Nazmi, 2021; Xu et al., 2022). This study focused on the power of social constructivism to support reading and the social structure of language skills. In the context of this focus, the "Learning Disability (LD)" group, which frequently experiences inadequacy in reading skills and where this disability is formalized with a diagnosis, has been determined as the target audience. Reading skill is a prerequisite for being included in society and existing as an individual, not only in academic life but also in life. For this reason, the support of the LD group with social constructivism (based on RTS) and the digital environment adaptability of RTS are discussed together. The aim of the study; is the design an SCAFREAD (RTS-based e-learning environment) to support the reading performance of students with LD. The research questions are as follows:

1. What features of an SCAFREAD will support the reading performance of students with LD?
2. What is the experience of LD students using an SCAFREAD for their reading process?
3. Is there a change in the reading levels of students using SCAFREAD?

2. MATERIAL AND METHOD

2.1. Methodology

2.1.1 Design

Design-based research (DBR), which aims to develop research-based solutions for complex problems in educational applications or theories related to learning and teaching processes, is a multi-faceted and multi-cycle research process (Design-Based Research Collective, 2003; Dolmans, 2019). The most critical distinguishing feature of DBR is the iterative nature of its interventions. As iteration occurs, researchers examine and rework the intervention using various research methods best suited to the context. Based on collaboration between researchers and practitioners, iterative analysis design involves careful and continuous evaluation for an iteration to make these process improvements. DBR, which consists of cycles, includes continuous improvement in line with the findings obtained from product evaluations. DBR is carried out to meet local needs and advance a theoretical agenda to reveal, explore and validate theoretical relationships (Barab, & Squire, 2004). The purpose of DBR is to establish a strong link between educational research and the natural world (Amiel, & Reeves, 2008). Among the reasons for preferring DBR, it can be stated that contextual intervention is at the forefront and the necessity of an effective and collaborative communication environment between the researcher and the participants. In the study, Easterday et al. (2014) followed the stages of the DBR process: Focus on the problem, understand the problem, define the design goals, outline the solution, create the solution and test the solution. The researcher first made a detailed literature review on the reading problems of LD students. It was observed that reading skills could be supported by providing suitable environments for students with LD. She focused on the social dimension of reading as a result of intensive reflection on the best instructional technology intervention to the reading problem. She drew attention to the testability of a strategy in social constructivist identity. This strategy was RTS, based on the development of reading. The DBR process, therefore, involved developing an SCAFREAD to support LD students in their reading process.

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

116

2.1.2. Participants

The participants of this study are researchers (with a Ph.D. in instructional technologies and special education and technology studies), the evaluation committee (committee members have work and lectures on instructional design, special education, and DBR), and special education teachers and students with LD (n=11). Some criteria have been determined for students with LD:

1. The participant does not have any diagnosis other than LD,
2. The participant can touch the necessary place on a tablet or touch screen,
3. The participant can recognize and read the alphabet,
4. The age of 18 A "Family Consent Form" was prepared to be used both in the design-based research and in the experimental study, in order for the learning participants to be under the age of 18.

2.1.3. Data collection tool and analysis

The study's data consisted of video recordings of students' and teachers' experiences using the material, unstructured interviews with the evaluation committee, students' behavior in the e-learning environment (log data), and a research diary. The researcher kept a diary throughout the application process. DBR was completed in about eight months. All of the qualitative data obtained were analyzed by content analysis. First, the data was transcribed. An independent researcher controlled 60 % of the transcript data. The transcribed data were organized, classified, compared, and a theoretical report was made (Cohen et al., 2017). Error analysis inventory was used to determine the reading levels of the students. In this inventory, reading levels are determined by making use of reading comprehension and reading accuracy. According to the student's score, it is determined whether it is included in the free level, the teaching level or the anxiety level. The reading levels of the students were analyzed and reported with descriptive statistics and graphics.
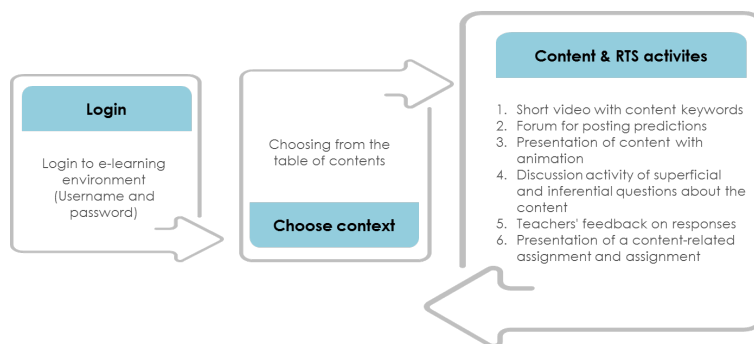
3. RESULTS

3.1. Features of an SCAFREAD

While developing the SCAFREAD, two separate stages were carried out design and improvement. During the design phase, design, development, control, application, correction, re-implementation, and evaluation processes took place over the content. Depending on the data obtained and the decisions of the evaluation committee, 29 contents were developed when the researcher decided that the design reached the best point. A module was produced for all letters of the alphabet. The flow diagram of the e-learning environment and SCAFREAD modules is shown in Figure 1 (see next page).

A total of 29 modules were produced for 29 letters in the Turkish alphabet in the e-learning environment. 1 module was added for the letter "a" for the new user to experiment, and an e-learning environment with a total of 30 modules was created. The researcher created the e-learning environment in the Articulate Storyline 360 program. The researcher wrote the stories and checked them with the evaluation committee and language experts. The texts to be used in the materials were written in the form of stories, and the length of the text and the new words used were discussed with the special education teachers. In order to have

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

117

FIGURE 1. Flowchart of SCAFREAD

standardization in the content and structure of the stories, value education is planned for each story, and it was decided that the text's readability level would be "independent reading." The readability formula developed by Çetinkaya (2010), depending on the Turkish language (Readability score = 118.823 – 25.987 x average word length–0.971x average sentence length), was used to calculate the text readability level. According to this formula, 0-34 points range means "problematic" reading, 35-50 points range means "educational," 51 and above points mean "independent" reading. All texts used in the content were arranged as "educational level" text. The contents of the stories were created from the values of love, respect, justice, benevolence, tolerance, empathy, honesty, patience, and hard work. Each module started with a short video introducing content keywords and included tips for the prediction activity. The prediction event took place in a forum. The original content was conveyed in the form of a presentation and voiced. After the presentation, students were directed to an online discussion with simple and inferential questions. The teacher gave feedback to the students and interacted actively with them students. After this process was over, students were given an assignment. Students presented their assignments by writing or recording their voices. Students were able to ask and answer questions to each other while making presentations.

3.2. Students' reading levels

When the pretest and posttest scores of 11 students from the error analysis inventory were examined, a positive change was observed in all but one student. In the pretest, all students had reading performance at the anxiety level.

TABLE 1. Reading scores

Student	Pre-test scores			Post-test scores		
	Word recognition	Comprehension	Reading level	Word recognition	Comprehension	Reading level
ST1	80 %	42 %	frustrational	100 %	92 %	independent
ST2	90 %	30 %	frustrational	99 %	82 %	independent
ST3	70 %	22 %	frustrational	99 %	87 %	independent
ST4	76 %	26 %	frustrational	98 %	86 %	instructional
ST5	72 %	32 %	frustrational	95 %	79 %	instructional
ST6	80 %	20 %	frustrational	97 %	80 %	instructional
ST7	82 %	40 %	frustrational	96 %	78 %	instructional
ST8	60 %	28 %	frustrational	98 %	88 %	instructional
ST9	70 %	38 %	frustrational	96 %	89 %	instructional
ST10	72 %	36 %	frustrational	96 %	80 %	instructional
ST11	64 %	18 %	frustrational	82 %	40 %	frustrational

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

118

After SCAFREAD, 7 of the students were at instructional level, 3 at independent level, and 1 at reading level at frustrational level. Comprehension score and word recognition scores were used while calculating the reading level. The scores of the students can be examined in the Table 1. The change in students' word recognition scores can be examined in Figure 2, and the change in comprehension scores in Figure 3.
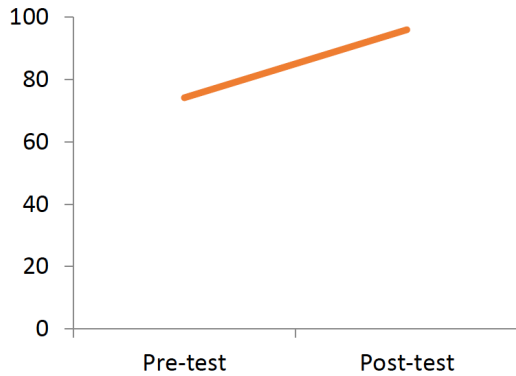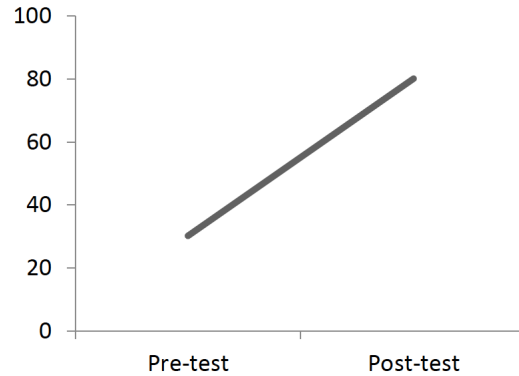
FIGURE 2. Word recognition scores

FIGURE 3. Comprehension scores

3.3. Students with LD experience using an SCAFREAD

During the design process, five primary school students with LD introduced the e-learning environment individually to the researcher students. When students could use the environment independently, they used the sample SCAFREAD module. A typical practice day and time was determined for each student. Each student used the tablet module with the same features in similar but separate classroom environments. The students made another application due to changes made to the first use of the module. Their experiences were recorded with both screen recording and video recording. While the students were using the trial module, the environment was active between 28 and 47 minutes. Each student entered the environment and study with trial module. Students progressed the activities sequentially. Students typed with the keyboard, recorded the sound, and uploaded it to the system in response. Students did not encounter any problems while using the e-learning environment. However, two students asked why they should choose only one item that appeared in the table of contents. Although two students completed the module, they wanted to listen to the lecture again. One student also listened and read his responses to the discussion and the feedback he received. Students asked questions, reinforced, confirmed, and criticized each other. It was noteworthy that there were comments explaining each other's answers in the correspondence, where the most smiley emoji were sent. They often reinforced each other's answers with expressions such as "Perfect answer" and "Great." They stated that they agreed with their friends' answers with expressions such as "I think too" and "Exactly." "No, actually not like that." They both criticized and shared their ideas. Students recorded and posted responses longer than ten words by speaking. They sent short replies either by voice or text. One student chose to write down each answer. In the predicting phase, the students made 85 % correct predictions. Students who made wrong predictions did not prefer to insist on their predictions. They explained why they made that prediction. All students watched the presentation, explaining the content

Innoeduca. International Journal of Technology and Educational Innovation

Seda Özer Şanal

119

until the end. All of the students gave correct answers to the simple questions at the end of my end. Long and explanatory answers supported discussions that started with short answers to inferential questions. Students who answered five superficial and three inferential questions sent an average of six posts to each question. These posts were audio or textual. While evaluating the answers, the teacher took care to answer each answer. He directed the student again, explaining the wrong answers and giving hints. Reinforces correct answers. Students were given 30 minutes for the assignment given to them students. In the meantime, the students completed their homework, receiving support from the video and the responses to the discussions. Students who submitted their assignments gave feedback to each other and received feedback from their teachers. All students completed a module with 100 %. In summary, the student's behaviors in the RTS-based learning environment are as described in Table 2.

TABLE 2. Students' behavior in the trial module

Participant	Time investment	Posts on simple questions	Posts on inferential questions	Percentage of accuracy of simple questions' responses	Percentage of accuracy of inferential questions' responses
ST-1	27 min. 55 sec.	12	10	90 %	80 %
ST-2	39 min. 10 sec.	9	11	100 %	90 %
ST-3	45 min. 23 sec.	16	20	90 %	100 %
ST-4	38 min. 18 sec.	20	24	100 %	100 %
ST-5	43 min. 37 sec.	15	19	100 %	90 %
ST-6	40 min. 29 sec.	12	15	100 %	100 %
ST-7	41 min. 58 sec.	18	25	100 %	100 %
ST-8	23 min. 11 sec.	22	29	90 %	100 %
ST-9	39 min. 13 sec.	30	38	100 %	80 %
ST-10	46 min. 29 sec.	21	29	100 %	90 %
ST-11	40 min. 32 sec.	20	25	90 %	90 %

When Table 1 is examined, it is seen that; students in the trial module at least 27 min. 55 sec., maximum 46 min. 29 sec. They have had time. They sent a minimum of 9 and a maximum of 30 posts to simple questions. They sent a minimum of 10 and a maximum of 38 posts to inferential questions. While the accuracy rate in simple questions is calculated as a minimum of 90 % and a maximum of 100 %, it was calculated as a minimum of 80 % and 100 % in inferential questions.

4. DISCUSSION

The aim of the study; was the design an SCAFREAD to support the reading performance of students with LD. It was decided that this aim would be best accomplished within the scope of DBR, and a comprehensive participant group comprised of the researcher, the evaluation committee, special education teachers, and students with LD. DBR is conducted to advance a theoretical agenda, to uncover, explore and validate theoretical relationships (Barab, & Squire, 2004, p. 5), to provide an opportunity to establish a strong link

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

120

between educational research and the natural world (Amiel, & Reeves 2008), and to precede contextual intervention. It was chosen because DBR was completed in about eight months. The prediction stage was where interest and attention were drawn to the content. At this stage, we come across different models and strategies produced for learning processes. Arousing curiosity in the student about the learning content or process initiates learning by making the student activities. While it is seen that the pre-question process before reading the text supports the reading process (Ratmeilia, 2022; Riswanto, 2022; Thohidah et al., 2021), it was seen that the students' prediction strategies were not used in the reading process, except for RTS. However, it was seen that prediction systems were developed and used in reading processes with artificial intelligence applications. The questioning phase consisted of an evaluation phase. The content was repeated with both simple and inferential questions. This way, students could listen to the content again if they wanted. Alternatively, they corrected the wrong or incomplete information with the interactions of their peers. They even gave feedback to their peers. It was observed that the reading processes in which questioning strategies were used were more effective, and the readers achieved better reading scores (Ahmadi et al., 2021; Ariawan, & Winoto, 2021; Brown, & Pyle, 2021; Bui et al., 2021; Castells et al., 2021; Liu, 2021; Parjan, & Mohamad, 2021; Stuckelman et al., 2022). The explanation phase included teacher support. The teacher provided feedback on the student's responses and interactions. In this way, students had the opportunity to do it again and again. Enrichment of reading processes with peer support is already a frequently studied context that highly supports reading (Chairinkam, & Yawiloeng, 2021; Chun, & Cennamo, 2022; Ebrahimi, & Sadighi, 2022; Nguyen, 2022; Taheri, & Nazmi, 2021; Yawiloeng, 2021; Xu et al., 2022). Enriching reading processes with teacher support is also an approach that highly supports reading (Ebrahimi, & Sadighi, 2022; Li, & Zhang, 2022; Taheri, & Nazmi, 2021; Xu et al., 2022). In the summarizing phase, each student had the opportunity to share their meaning with their peers and their teacher and was in an interactive process. In some studies in the literature, it has been seen that summarizing strategies are a practical approach to reading processes and support reading skills (Solikhah, & Sari, 2022; Triana, 2021; Zahra et al., 2022). While the students were using the trial module, the environment was active between 28 and 47 minutes. Each student entered the environment and study with trial module. Students completed the activities sequentially. Students typed with the keyboard, recorded the sound, and uploaded it to the system in response. Students did not encounter any problems while using the e-learning environment. However, two students asked why they should choose only one item that appeared in the table of contents. Although two students completed the module, they wanted to listen to the lecture again. One student also listened and read his responses to the discussion and the feedback he received. Students asked questions, reinforced, confirmed, and criticized each other. It was noteworthy that there were comments explaining each other's answers in the correspondence, where the most smiley emoji were sent. They often reinforced each other's answers with expressions such as "Perfect answer" and "Great." They stated that they agreed with their friends' answers with expressions such as "I think too" and "Exactly." "No, actually not like that." They both criticized and shared their ideas. Students recorded and posted responses longer than ten words by speaking. They sent short replies either by voice or text. One student chose to write down each answer. When both the literature and the results of the current study were evaluated together, some suggestions were produced. It should include interaction with all dimensions of the learning process, which should be evaluated from a social constructivist perspective. The important thing is to choose the

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

121

most consistent approach with the content, the environment, and the target audience, rather than the most accurate, most popular, or most up-to-date strategy. It was seen that peer interaction in the reading process would support the reader's reading process. For this reason, the reader should be aware of interacting with their peers whenever they want in the classroom or in digital classrooms. Everyone in the learning process should know that he and others are trying to read. Considering the adaptability of social constructivist strategies to digital learning environments, we know that many technologies enable this. However, what should be considered is not to choose the newest, most expensive, most popular, most different technology but to design it with the right strategy and include it in the learning process. Although the study was conducted with LD students, it would not be difficult to say that RTS applies to every individual with reading difficulties.

5. CONCLUSION

As a result, this article started with the observation that while sociocultural learning has become more visible in recent years; it is still not of necessary importance. Especially after the acceptance of man as a social being, we must believe that everything humane can be built on a social basis. Constructivism should not be thought of as a middle-range learning theory. The constructivist approach offers the opportunity to approach education in a holistic, dynamic and as-is-how-it-like way. On the basis of constructivism, interaction, active learner, etc. It is very effective in designing and developing interactive teaching environments and materials, since concepts are included. It focuses on meaning, not product. For this reason, the design of the environment, interventions and processes in the identity is valuable. In this study, a learning environment supported by interaction was focused and the development of reading performance and user experiences were examined and reported to be effective.

5.1. Limitations and Recommendations

The study was carried out within the framework of some limitations. It is a limitation that the experimental results of the study were carried out with a limited number of participants. However, the main purpose of design-based research is not to reach empirical generalizable statistics. However, there is a need to examine the effectiveness of similar materials with more participants. More experimental studies can be conducted to increase the convincing data that especially the environment and materials in social constructivist identity are effective. The study was prepared for 29 letters in the Turkish alphabet and for Turkish texts. The realization of studies in different cultures in order to observe the differences arising from language differences will also enrich the literature. Collaborations between instructional designers and educators on social constructivist environments, materials and processes are very valuable. In this sense, multidisciplinary studies will also offer quite holistic perspectives.

6. ACKNOWLEDGEMENT

Innoeduca. International Journal of Technology and Educational Innovation
Seda Özer Şanal

122

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123

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125

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