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Development of Online Simulators for Literary Reading in Primary School

Lera A. Kamalova* (a), Natalia U. Ozhmekova (b), Mahabbat Zh. Umbetova (c)

(a) *Kazan Federal University, 420008, Kazan (Russia), 18 Kremlyovskaya street,
leraax57@mail.ru*

(b), (c) *Arkalyk State Pedagogical Institute, 110300, Arkalyk (Kazakhstan), 17 Auelbekova
street*

Abstract

In the period of the widespread transition to a digital society, the intensity and quality of reading of modern schoolchildren are declining. Federal-state educational standards of primary general education are aimed at developing the reading competence of young schoolchildren in primary school teachers, developing the ability to read consciously and thoughtfully. This contradiction can be resolved using online literary reading simulators, which are a universal tool for the development of reading competence and the formation of digital literacy in junior schoolchildren. The purpose of the study is to develop online simulators for literary reading for primary schools. In the course of our research, we have developed online simulators for literary reading for primary schools and new content of primary literary education; we presented digital learning technologies in the form of online simulators in literary reading lessons; we created a unified digital platform for teaching primary school students literary reading based on author's online simulators. We have proved that the development and use of author's online simulators in the lessons of literary reading in primary school contribute to the shaping of reading skills; the ability to work with a book; the formation of skills and abilities of actual reading activity, providing perception, interpretation and evaluation of a work of art as the art of the word; the formation of digital literacy of younger schoolchildren. The results of the study can be used in the educational process in primary school, in the practice of primary school teachers, as well as of higher school teachers, teachers of additional education and subject teachers.

Keywords: online simulators, digital technologies, literary reading, primary school, reading competence.

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* Corresponding author. E-mail: leraax57@mail.ru

Introduction

The world has entered the era of the fourth scientific and technological revolution, which is called digital. Digital technologies are introducing a personalized, result-oriented model of education. Digital technologies in education are a way of organizing a modern educational environment based on digital technologies. Scientists consider this concept as the translation of information into a number and at the same time the infrastructural, behavioural, managerial, and cultural components of the content of education. Digital technologies allow you to individualize the learning process both at the stage of mastering new material and at the stage of monitoring individual results.

The idea of forming a younger student as a reader is expressed in the Federal State Standard of Primary General Education. According to it "the priority goal of teaching literary reading in primary school is to form the necessary level of reading competence of a younger student, to realize oneself as a literate reader, capable of using reading activities as a means of self-education"(Federal State Educational Standards, 2019).

In pedagogical theory, the problem of an integrated approach to combining two aspects in the teaching of primary school children remains underdeveloped: 1) educating a thoughtful reader and 2) teaching practical skills with digital technologies. There is an urgent need to integrate these two aspects: the development of reader independence, reader interest, and thoughtful reading through the compilation and use of online simulators based on the works of children writers. Thus, the development and use of online simulators will contribute to the formation of the interest of primary school students in reading works of art, the development of a thoughtful, competent reader.

Purpose and objectives of the study

The purpose of the study is to develop online simulators for literary reading for primary school students; to test experimentally the effectiveness of teaching primary school children using online simulators in literary reading lessons. We also seek to prove the effectiveness of the development of primary school students reading competence through the use of online simulators for literary reading, as well as to develop methodical guidelines for the use of online simulators in literary reading lessons.

Literature review

The priority goal of teaching literary reading in primary school is the shaping of the reading competence of young students, the awareness of themselves as literate readers, capable of creative activity.

The reader's competence is determined by the possession of reading techniques, the techniques of understanding the read and listened works, the knowledge of books and the ability to choose them independently (Federal State Educational Standards, 2019).

Under the reader's competence, we understand the formed knowledge and skills in the field of reading. When forming conscious reading in its various forms (out loud and to yourself), it is necessary to select texts that would provide the child with the opportunity to understand texts of different genres (Federal State Educational Standards, 2019). The problem of young learner development as a reader was raised in the 60s of the XX century in the works of Svetlovskaya (2005). Goncharova (2007) and Dobraev (2009) deal with the problem of the shaping of reading competence of primary school students. Goncharova (2007) considers reading competence as a psychological system. All components of this system are subordinated to its main function: the transformation of the content of the text into the personal, semantic, cognitive and creative experience of the reader. Dobraev (2009) writes that students must master certain mental techniques.

One of the ways to introduce a child to reading is to use online simulators in the literary reading lesson, which contribute to the shaping of reading competence and digital literacy of primary school students.

The works of domestic and foreign scientists explore the problems of digitalization in society, science, and education. Digital technologies in foreign education have been actively implemented since the mid-80s of the XX century. Foreign scientist Henry Jenkins (1998) writes that students should understand how digital technology and humans interact, know and understand how digital information is distributed, and what a network community is, as well as the features of social media.

Timofeeva (2015) believes that digital security is the basis of security in the Network and includes the protection of personal data, a strong password, legal content, culture of behavior, reputation, ethics, storage of information, creation of backup copies.

The effectiveness of the process of digitalization of education largely depends on the level of shaping of the digital culture of students. Olefirenko (2019) and Baklanova (2019) investigate the problems of preparing primary school teachers to use digital educational resources. Despite a fairly large number of scientific and pedagogical studies in the field of children's reading and the use of ICT technologies in teaching younger schoolchildren, the problem of creating author's online simulators and their use in literary reading lessons remains underdeveloped, affecting the shaping of reading competence of younger schoolchildren, the development of the skill of conscious and thoughtful reading, the competent use of digital technologies by students in literary reading lessons.

The process of digitalization of education affects the quality of education, allowing schoolchildren and students to get better acquainted with the real world, especially with modern technologies (Kudlaev, 2018). Digitalization makes it possible to significantly increase the number of resources available for use in the educational process (Klyachko, 2018).

Scientists Sultanov and Voskresensky (2015) explore the features and problems of generation Y in the educational space of modern Russia. Their cognitive abilities consist in the fact that they work with information successfully, have the ability to multitask-they are able to do several things at the same time, they develop quickly.

Talay (2020) considers the problem of the formation of digital competencies of primary school students in modern society. The article analyzes the relevance of the problem of formation of digital competencies in primary school students as key in the conditions of digital transformation of society.

Danielyan (2019) examines the process of formation of ICT competence in primary school children under the Federal State Educational Standard of Higher Education (2019). He carries out the analysis of what should be the result of the formation of ICT competence in primary school students.

In the article of Efanov, Budanova and Yudina (2020) is an analysis of the fundamental concepts of the study is given, the choice of online simulators as an effective Internet service with significant pedagogical potential is substantiated.

The article of Shilov and his colleagues (2019) deals with the problem of activating the cognitive activity of younger schoolchildren based on the use of ICT. There was given the analysis of the fundamental concepts of the study, the choice of online simulators as an effective Internet service with significant pedagogical potential was justified.

The works of modern foreign scientists indicate the relevance of the problem of using digital educational technologies in the process of teaching students and schoolchildren in educational institutions.

Scientist Gabel (2019) writes that the digital transformation of processes and technologies in the economy, in society, and, of course, in education is a given fact.

Scientists Furenes, Kucirkova and Bus (2021) investigated the effectiveness of teaching children using digital and paper books. An empirical study showed that children aged 1 to 8 years understand the content of stories, the meaning of new words in paper books better. Digital books have surpassed paper books in terms of improvements related to the plot of the story.

Research by Kucirkova and colleagues (2021) confirmed the benefits of joint reading of printed books by children and their parents. However, the language results of the child after reading together a personalized digital book with each child's name, photo, favorite toy, and food showed that the digital book had a greater learning result than the paper one

Méndez, Suelves and Rodrigo (2021) analyzed educational materials for preschool and school-aged children. Scientists have concluded that there are new digital didactic materials for children, designed for entertainment and educational purposes, which can be used in school and at home. The authors believe that it is necessary to train teachers to identify, select, adapt, and create resources for teaching students in their classrooms.

Magnusson (2021) explores the relationship and interdependence between digital learning technologies and artistic activities, mathematics, and children's literacy in Swedish schools. The use of digital technologies and digital materials in the classroom to create and embody the visual and aesthetic aspects of technology is evident in the positive results in teaching writing and mathematics.

Methodology

We used theoretical methods (theoretical analysis of pedagogical, psychological, scientific and methodological literature on the research topic), empirical (analysis, comparison, generalization, choice of content, observation, questioning), pedagogical experiment (ascertaining, forming and control stages of the experiment), the method of statistical processing quantitative research results.

In 2020-2021 academic year, we conducted experimental work in Grammar school No. 5" of Zelenodolsk municipal district of the Republic of Tatarstan with students of the 4th grades of primary school. Experimental group of grade 4A – 24 participants/students, control group of grade 4B-25 people. The experiment was conducted in three stages: stating (September 2020), forming (September 2020 – March 2021) and control (March 2021).

At the first stage, we created an experimental platform based on "Grammar School No. 5" of Zelenodolsk Municipal district of the Republic of Tatarstan, we monitored the process of teaching children at literary reading lessons, and we tested the research topic at the initial stage of the ascertaining experiment.

The formative stage is necessary for the formation of reading competence and independence of primary school students, for the education of a thoughtful reader, the basics of digital literacy of primary school students.

At the second stage, we clarified and adjusted the concept of the study, and conducted a training experiment among primary school students.

The control stage involves conducting a reflection on the results of the development of online simulators for literary reading.

At the third stage, we carried out the analysis, generalization and systematization of the obtained data and the design of the study.

To diagnose the effectiveness of the development of students' reading competence, we used the following qualities of competence:

1. Meaningful reading skills;
2. Mastery of the techniques of understanding the read and listened works;
3. Knowledge of books and the ability to choose them independently;
4. Aesthetic attitude to reality, reflected in fiction;
5. Formation of moral values and aesthetic taste of young learners.

We have developed the following criteria for diagnosing the development of students' reading competence:

1. High level (75% to 100%);
2. Medium level (50% to 74%);
3. Low level (0% to 49%).

To diagnose the formation of digital literacy of students we have developed the criteria: 1. High level (75%-100%): awareness of the importance of information for solving a problem; development of information search strategy; ability to find information independently; evaluate, analyze, sort information; form one's own attitude to this information. 2. Average level (50%-74%): cannot understand completely the importance of information to solve a problem; develop a strategy for finding information; they find information based on hints, with the partial help of a teacher; they are not quite able to evaluate, analyze, sort information and form their own attitude to this information.

3. Low level (0%-49%): they do not understand the importance of information for solving any problem; they cannot develop a strategy for finding information; they find information only according to detailed instructions from the teacher; they do not know how to evaluate, analyze, sort information and form their own attitude to this information.

To diagnose the formation of reader interest, we used Nitalimova and Semenova's method (2007). We defined the criteria of reader interest:

1. Cognitive focus on reading high: children are used and taught to turn to the world of books in order to find some specific information, i.e. to find an answer to a question that interests them, to learn something new; medium: children turn to a book in order to find certain information only in cases where at this point in time this is the only way to get an answer to their questions; low: children turn to the book in order to find answers to certain questions not out of their own interest but at the behest of the teacher or parents, etc. Being in a situation of free choice, without the influence of other people, the children find a different way to get the necessary information (the Internet, a conversation with a friend).

2. Positive personal attitude to reading:

-high: children have a motive for studying certain literature, and a personal interest in reading a particular work prevails. The desire to share the impressions received before, during and after reading with other people;

- average: children have a positive attitude to independent reading activity, but the interest in reading is rather situational, that is, the interest in reading. Students do not have a personal need to read a particular work, their interest is determined by the quality of printed works that can attract attention (for example, colorful illustrations, large text, etc.);

- low: younger students perceive reading books as one of the teacher's tasks that need to be performed, i.e. to read a work in order to answer questions, complete a number of tasks, etc. Children are not interested in independent reading. Children treat reading as one of the school subjects.

3. The presence of a reader's outlook

- high: children have formed an idea of the range of books available for them to read about the world of books in general. Children read a lot and often. As a rule, these are works of certain authors and genres;

- average: children read works of various genres and authors, there are no preferences in reading anything specific;
- low: children read only those books and works that are included in the school curriculum).

Results

At the stage of the ascertaining experiment, the pupils of the experimental and control groups were given tasks and questions on the literary tale of Ershov "The Little Humpbacked Horse":

1. Read the first 20 stanzas of the fairy tale "The Little Humpbacked Horse" in 1 minute. How did you feel while reading this passage?
2. Who is the main character of Ershov's fairy tale?
3. What are the similarities between Ivan the Fool and the Little Humpbacked Horse?
4. What works of painting and cinematography were created on the basis of the tale of Ershova "The Little Humpbacked Horse"?
5. What human qualities does Ivan the Fool, the Little Humpbacked Horse, the Tsar, Ivan's brothers personify?

The proposed "Diagnostics of reading competence" allows at the level of self-esteem to fix the ways of interaction of a person with the world of reading, to determine the qualities that determine the formation of reading skills.

The calculation of the effectiveness of the development of reading competence is carried out according to the following scheme: HR (reading competence) = KB (the number of points scored for this skill): per KU (the number of students in the class)

Table 1. Methodology for the effectiveness of the development of students' reading competence

Group of students	Meaningful reading skill	Proficiency in reading and listening comprehension techniques	Knowledge of books and the ability to choose them independently	Aesthetic attitude to the reality reflected in belletristic literature	Formation of moral values and aesthetic taste of young learners
Experimental	54%	56%	48%	43%	47%
Control	53%	55%	47%	44%	48%

The diagnostics showed that the level of reading competence of young learners of the experimental and control groups is approximately the same. The level of meaningful reading skills in both groups is average (54% and 53%). The level of proficiency in reading and listening comprehension techniques is average (56% and 55%). The level of knowledge of books and the ability to choose them independently is low (48% and 47%). The level of aesthetic attitude to the reality reflected in belletristic literature is low (43% and 44%). The level of the formation of moral values and aesthetic taste of primary school students is low (47% and 48%).

In the course of the experiment, we conducted a diagnosis of the formation of reader interest:

Table 2. Diagnostics of the formation of reader interest (Nitalimova & Semenova, 2007)

Level of reader interest	Experimental group	Control group	Difference in results
High level	13%	12,5%	0,5%
Average level	34,5%	36,5%	2%

Low level	52,5%	53%	0,5%
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The level of development of reading interest in the 4th grade A and 4th grade B showed a predominance of medium and low levels of reading interest of younger students in the experimental and control groups.

Children are motivated to study certain literature, personal interest in reading a particular work prevails, and this is a high level: EG-13%, CG-12.5%.

Children turn to the book in order to search for certain information only in cases when this is the only way to get the answer to their questions at this point of time, this is the average level: EG-34.5%, CG-36.5%.

Children turn to the book in order to find answers to certain questions not on their own initiative, but on the initiative of the teacher, parents, this is a low level: EG-52.5%, CG-53%.

According to the data in Table 2, we can see that students in grades 4A and 4B have approximately the same level of reader interest formation.

To determine the level of development of digital literacy of students, a survey was conducted:

1. Do you know how to use the Internet?
2. Do you know how to create your own reading algorithm?
3. Do you know how to find information on the Internet?
4. Do you know how to interpret information?
5. Do you know how to create electronic presentations, online simulators?

The digital competence index is calculated as follows. When answering questions about each component, respondents can check as many items as they see fit. Knowledge, motivation and responsibility are assessed using general questions - since they often characterize a person's global ideas and attitudes (for example, the desire to learn and develop in general). The calculation of the score for each component is carried out as follows. Each positive answer (choice) is assigned 1 point, each negative - 0 points. The sum of points for all items related to a given component or a given area is divided by the total number of items in this scale; the result of division is multiplied by 100.

The final index of digital competence is calculated using a formula that includes the results of calculations for all four of its components:

Digital Competence Index = (Ability to create your own reading algorithm + Ability to find, use and create information + Ability to quickly create connections between ideas + Ability to effectively learn and interact in a virtual environment + Ability to protect your personal data) / 5

All components are presented in the index in equal proportions. The total values of the index and its components are expressed as a percentage of the maximum value. The calculation of the score for digital competence (CK) in each area is considered the same as the general index, but only items related to this area are included.

Table 3. Techniques for developing digital literacy of students

Group of students	Ability to create your own reading algorithm	Ability to find, correctly use and create information	Ability to create quickly connections between widely disparate ideas and areas of expertise	Ability to learn and navigate effectively online worlds and interact in virtual environments	Ability to protect your personal data from misuse by others
Experimental	44%	45%	47%	42%	41%
Control	43%	45%	46%	43%	40%

The diagnostics showed that the level of digital literacy of primary school students of the experimental and control groups is approximately at the same level. It is low (0%-49%). The difference between the results of the formation of the ability to create their own reading algorithm is 1% (44% and 43%). The ability to find, correctly use and create information is 0% (45% and 45%). The ability to create connections between widely disparate ideas and areas of experience is 1% (47% and 46%). The ability to learn and navigate online worlds effectively and interact in virtual environments is 1% (42% and 43%). The ability to protect their personal data from misuse by others is 1% (41% and 40%).

The results of the ascertaining stage of the experiment showed that special organizational and methodological work is necessary for the development of reading competence and the basics of digital literacy of younger schoolchildren.

At the stage of the formative experiment, we set the goals to teach students thoughtful reading of works; the ability to analyze a work of art; to identify the author's attitude to characters and events; to form an interest in reading a book; to form skills in using ICT in literary reading lessons; the ability to work on online simulators.

During the formative experiment, the students of the experimental class read the works of children's classics according to the program "School of Russia". A primary school teacher based on the texts of works created online simulators for twelve sections of the School of Russia curriculum. Students of the 4th grade of the experimental group were taught in the lessons of literary reading according to these simulators. The work of students using online simulators is aimed at developing reading competence. Creative work of such a plan contributed to the formation of reading competence, digital literacy of primary school students.

The responses of the students of the experimental group showed significant changes in the development of reading competence and digital literacy of students.

At the stage of the control experiment, the students of the experimental and control groups were given questions on the section of the literary reading program "Nature and Us":

1. What does the title of Mamin-Sibiryak's story "Priemysch" say?
2. What is common between the stories of Kuprin "Barbos and Zhulka" and Prishvin "Upstairs"?
3. Which of the books you have read about nature from the "Nature and Us" section would you recommend to students in grade 3 to read?

4. What books about the relationship between man and nature will you read on your own?

5. What feelings do children's writings about nature bring up?

The answers of the students of the experimental group showed significant changes in the development of the reading competence of students.

Table 4. Methodology for the effectiveness of the development of students' reading competence

Group of students	Meaningful reading skills	Proficiency in reading and listening comprehension techniques	Knowledge of books and the ability to choose them independently	Aesthetic attitude to reality reflected in belletristic literature	Formation of moral values and aesthetic taste of young learners
Experimental	65%	66%	68%	63%	65%
Control	56%	59%	50%	47%	51%

The diagnostics showed that the level of reading competence of the young learners of the experimental and control groups has changed significantly. Meaningful reading skills level was high in the EG (65%), in the CG group was average (56%). The level of proficiency in reading and listening comprehension techniques was high in the EG (66%), in the CG the level was average (59%). The level of knowledge of books and the ability to choose them independently was high in the EG-68%, in the CG the level was average 50%. The level of aesthetic attitude to the reality reflected in belletristic literature was high in the EG-63%, in the CG the level was low 47%; Formation of moral values and aesthetic taste level of the younger students was high in the EG-65%, it was low in the CG-51%.

Table 5. Diagnostics of the formation of reader interest (Nitalimova & Semenova, 2007)

Reader interest level	Experimental group	Control group	Difference between results
High	67%	38%	29%
Average	29%	36%	7%
Low	4%	26%	22%

According to the data in Table 5, we can see that the level of reader interest has changed among students of grades 4 A and 4 B.

The level of development of reading interest in experimental class 4A showed the predominance of a high level of formation of reading interest in young learners, while in the control group the indicators are significantly lower.

Children have formed a theme for studying certain literature, personal interest in reading a particular work prevails-this is a high level: EG-67%, low level-KG-38%. Thus, in the experimental group, the results are 29% higher.

The average level of reader interest development was shown by 29% of the experimental group and 36% of the control group. In the experimental group the results are 7% lower.

The students of the experimental group – 4% and 26% of the control group-showed a low level of reader interest. In the control group, the results are 22% higher.

To determine the level of development of digital literacy of students, a survey was conducted on the issues of the ascertaining experiment.

To determine the level of development of digital literacy of students, a survey was conducted:

Table 6. Techniques for developing digital literacy of students

Students group	Ability to create your own reading algorithm	Ability to find, use correctly and create information	Ability to create quickly connections between widely disparate ideas and areas of expertise	Ability to learn effectively and navigate online worlds and interact in virtual environments	Ability to protect personal data from misuse by others
Experimental	76%	75%	77%	75%	76%
Control	46%	47%	48%	44%	42%

The difference between the results of the formation of the ability to create their own reading algorithm is 30% (76% and 46%), the ability to find, use correctly and create information 28% (75% and 47%), the ability to create quickly connections between widely disparate ideas and areas of experience - 29% (77% and 48%), the ability to learn effectively and navigate online worlds and interact in virtual environments-31% (75% and 44%), the ability to protect your personal data from misuse by others – 34% (76% and 42%).

Discussions

We have created online simulators for literary reading - a set of online tests to prepare younger students to make quick decisions based on the results of teaching literary reading. We placed online simulators on “OnlineTestPad”, a convenient site for creating tests and surveys online. After registrations in the menu, the student selects the appropriate column. The next item is the instructions for passing. The student then proceeds to answer the questions and answer them. The test has 10 questions, the purpose of which is to teach students the ability to think about the text they read, analyze a literary work, to determine the topic, the idea of the work, the author's point of view, the role of tropes in the work. After passing the tests, the student sees how many points out of 100 possible they scored on this topic of the simulator. The results of training on online simulators showed the following.

The students of the experimental 4A grade changed their attitude to literary reading, to reading books (from 67% to 89%). The basics of reading competence of young learners were formed (reading technique –from 56% to 72%, reading comprehension techniques - from 63% to 79%, the ability to choose books - from 54% to 77%, the exalted need for a book as a means of learning the world and self - knowledge-from 46% to 63%). The quality of teaching literary reading has improved (from 75% to 92%). The foundations of digital literacy of primary school students have been formed (from 54% to 78%).

Theoretical and practical contribution of the article materials is as follows: the study examined the educational and methodological possibilities of online simulators in the development of reading competence of primary school students. It was proved that mastering a meaningful, thoughtful reading skill is possible when using online simulators based on the works of children writers in literary reading lessons. The effectiveness of the development of reading competence of primary school students with online simulators for literary reading was proved as well. Methodical guidelines for teachers, primary school students, students' parents on the use of online simulators in the lessons of literary reading were developed.

Conclusion

In the course of our research, it was found that the development and use of online simulators in the lessons of literary reading in primary school has an effective impact on the development of reading competence of younger schoolchildren, on the formation of the qualities of a literate reader in a child, on the development of digital literacy of students. We have proved that the development and use of copyright online simulators in the lessons of literary reading in primary school contributes to the formation of reading skills; the ability to work with a book; the shaping of skills and abilities of the actual reading activity, providing perception, interpretation and evaluation of a work of art as the art of the word; the shaping of digital literacy of younger schoolchildren.

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