

THE POSSIBILITIES OF USING ISPRING IN TEACHING SCRATCH PROGRAMMING TO ELEMENTARY SCHOOL STUDENTS

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ABSTRACT

The article discusses the experience of using the iSpring Suite program in the implementation and training of Scratch programming in the educational process of younger schoolchildren of the Republic of Kazakhstan. The theoretical foundations of the concept of computational thinking and the influence of programming in the Scratch environment on the formation and development of primary school students are also given.

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The purpose is to consider the possibilities and effectiveness of the use of Smart technology iSpring Suite 11 in the organization of Scratch programming training and to develop a methodology for preparing students for research activities in general education institutions.

Keywords: Scratch programming, elementary school, digital literacy, interactive games, course designers, smart technologies.

İLKOKUL ÖĞRENCİLERİNE SCRATCH PROGRAMLAMA ÖĞRETİMİNDE İSPRING'İ KULLANMA OLANAKLARI

ÖZET

Makale, Kazakistan Cumhuriyeti'nin küçük okul çocuklarının eğitim sürecinde Scratch programlamanın uygulanması ve eğitiminde iSpring Suite programını kullanma deneyimini tartışmaktadır. Hesaplamalı düşünme kavramının teorik temelleri ve Scratch ortamında programlamanın ilkokul öğrencilerinin oluşumu ve gelişimi üzerindeki etkisi de verilmektedir.

Bu çalışma Kazakistan Cumhuriyeti Eğitim ve Bilim Bakanlığı'ndan alınan bir hibe ile desteklenmektedir (hibe AP09260464 "İlkokul derslerinde bilgi ve eğitim ortamının geliştirilmesi"Scratch" ve "Akıllı eğitimde Robotik").

Amaç, Scratch programlama eğitiminin organizasyonunda Akıllı teknoloji iSpring Suite 11 kullanımının olanaklarını ve etkinliğini göz önünde bulundurmak ve öğrencileri genel eğitim kurumlarında araştırma faaliyetlerine hazırlamak için bir metodoloji geliştirmektir.

Anahtar Kelimeler: Scratch programlama, ilkokul, dijital okuryazarlık, interaktif oyunlar, ders tasarımcıları, akıllı teknolojiler.

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INTRODUCTION

With the continuous penetration of information technologies into people's lives, programs as the basis of artificial intelligence, computer science is increasingly strengthening its position among the main subjects of the educational curriculum, in particular, programming training is becoming more and more popular. Compared to programming for adults, programming from scratch has great advantages in interest and application. It is for this reason that in Kazakhstan, the teaching of computer science begins with the first grade, computer science is taught. At the same time, it also plays a positive role in the development of creative abilities and practical abilities of students. The main tool in the introduction to programming training is the Scratch programming environment.

Scratch is a programming language developed by the famous Massachusetts Institute of Technology in the United States, and it is suitable for teaching and working children aged 6 to 12 years. An interesting and easy-to-use scratch helps students understand the concept of algorithm and programming, and also easily solves many programming problems for adults, such as monotonous picture, logical abstraction, and so on. Thus, it was widely promoted in many schools and other educational institutions. Scratch is aimed at developing children's logical thinking, imagination, and the ability to solve problems. [1]

Scratch allows users to create their own animations, games and interactive artwork, the skills needed now.

Scratch combines constructivism and learning through action. Based on this theory, "Lifelong Kindergarten" (LLK), the Massachusetts Institute of Technology (MIT), has chosen a tool that provides development by creating learning technology resources. According to its developers, it is based on three fundamental principles, since the programming language is playful, meaningful and social. Principles:

- A programming language should be fun. The idea is that the programming language provides the game, and it can be easily tested with various options. The goal is for children to play with them from the very beginning and try to create simple programs.
- A programming language should contribute to a significant experience. Thus, when developing Scratch, its creators gave priority to two design criteria: diversity and individuality.
- Finally, the use of a programming language should promote social interaction. The development of Scratch is closely related to the development of its website.

Using this language has the advantage that it requires little programming knowledge. The developers planned that any child, teenager or adult with no programming experience would be able to learn how to create their own animations and quickly get the final product using multimedia resources. It is a visual programming language in which we do not need to write code or long lines of programming.

The project is focused on the activity and participation of students who encourage critical thinking, individual and collaborative work in the classroom. On the other hand, it encourages teamwork by promoting an interdisciplinary approach to the educational process using ICT as a tool to facilitate curriculum development [2].

This paper will present methods and technologies for teaching programming in the Scratch programming environment using smart technologies iSpring Suite 11, but the question arises whether this program is suitable for teaching programming in the modern education system. To answer this question, it is necessary to define the concept of smart learning, which is based on the education systems of many developed countries of the world, including the education system of the Republic of Kazakhstan.

LITERATURE REVIEW

Since programming in the Scratch environment is one of the main sections of the discipline "Digital Literacy", various training programs and courses for the study of this discipline are increasingly being developed.

In the article "The research basis of intellectual Education" Zhu, Z.T., Yu, M.H. and Rizebos, P. consider the concepts of the term smart, the following concept of the concept of "Smart education" was put forward: firstly, it is more focused on students and content than on devices; secondly, it is effective, intelligent, individual training based on advanced IT infrastructure[3].

Comparing the concept and orientation of smart education, and the orientation of the Scratch programming environment, we can conclude that the application of this program in teaching programming students is relevant and indisputable.

This article will present methods and technologies for teaching programming in the Scratch programming environment using the iSpring Suite course designer.

iSpring Suite is a designer of presentations and courses used in e-learning working in the Microsoft PowerPoint interface (Figure-1).

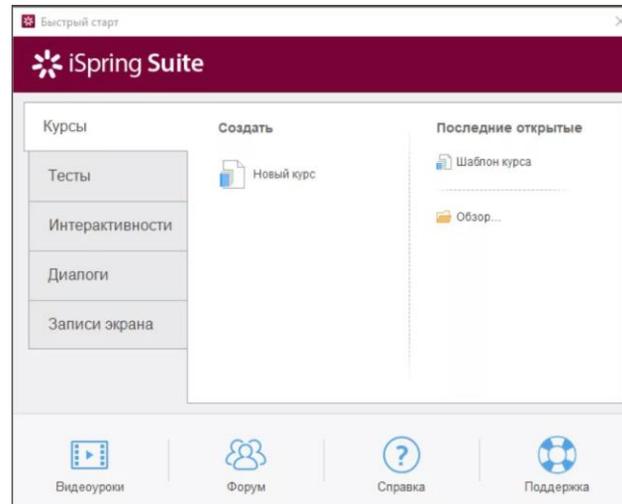


Figure 1: The Main Window of the iSpring Suite Course Designer

The main features of the iSpring Suite include:

- Support for all PowerPoint effects
- Access to an extensive library of courses:
 - 200 ready-made templates;
 - 30,000 photos of characters of different ages, nationalities and professions;
 - a collection of 230 backgrounds: shops, airports, banks, offices, hospitals, classrooms, apartments, streets, etc.;
 - 135 photos of objects: phones and tablets, pencils, pens and markers, notebooks and notebooks, mugs, flowers, paper clips and much more;
 - icon collection: navigation, text design, social networks, arrows, cars, etc.
- Creation of test tasks and simulators (14 types) to test and consolidate students' knowledge, as well as conducting surveys and collecting feedback on training.
- Work in the built-in audio and video editor:
 - recording screencasts and videos with the teacher;
 - installation from different tracks, the number of tracks is not limited.
- Working with interactivity. The iSpring Suite has built-in 14 interactivity for different learning situations;
- Creating interactive simulators:
 - creating several story branches in the dialog. Based on the answers, the student moves from one storyline to another;
 - setting up feedback to point out mistakes to the student and explain how to fix them.
- Creation of e-books
 - helps to turn documents into e-books in a few steps, upload them to a distance learning system;
 - fast loading of the book, even if it contains thousands of pages;

- automatic adaptation of the book to the size and orientation of the screen of any device.

Created courses, tests, interactive simulators, interactivity, screencasts and books are published in HTML5 format, which allows them to be displayed on both desktop and mobile devices. The courses are compatible with the following standards of learning management systems: SCORM (1.2 and 2004), Tin Can API, AAC and cmi 5[4].

Using this technology, a training course on Scratch programming is being developed in the course designer iSpring Suite 11 (Figure-2).

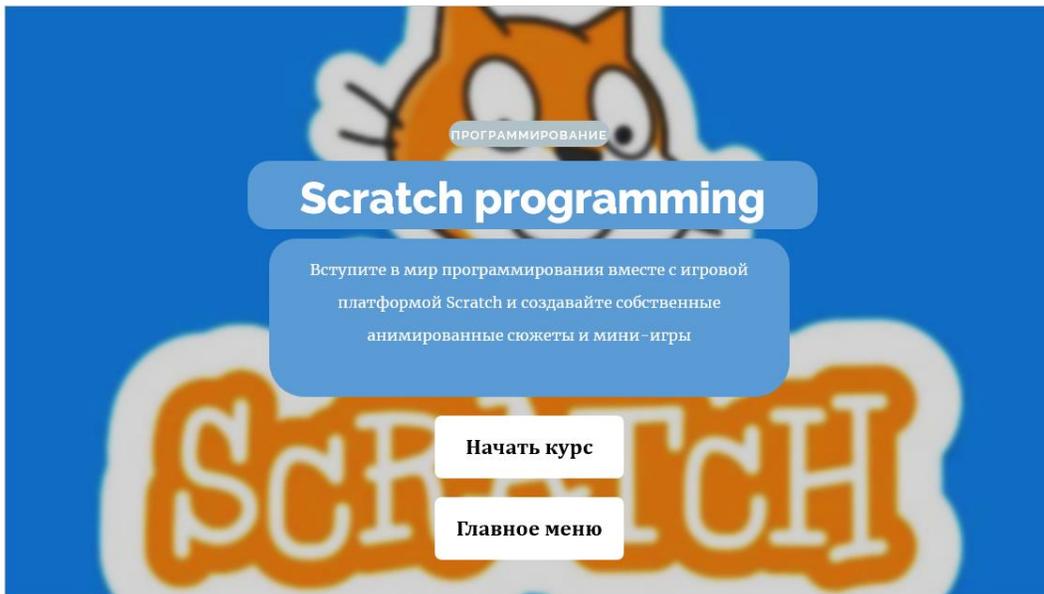


Figure 2: The course "Scratch Programming Training"

This course is based on the themes and goals of the "Standard curriculum on the subject "Digital Literacy" for grades 1-4 of the primary education level according to the updated content", so this course can be used in lessons and taught independently, it is also aimed at developing computational thinking of elementary school students[5].

To explain the theoretical material concerning the algorithm and its types, a dialog simulator is used, which is aimed at involving the child in the study of basic definitions through dialogue (Figure-3).

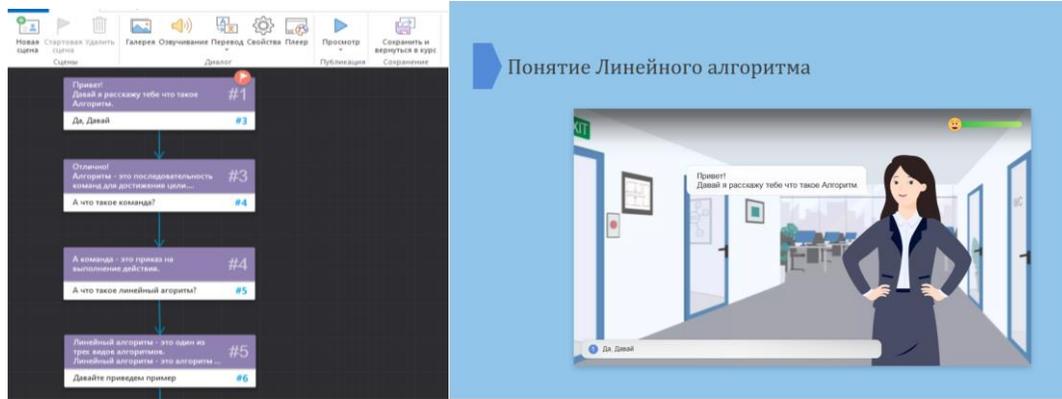


Figure 3: Interactive Simulator "The Concept of a Linear Algorithm"

To create a dialog simulator, go to the iSpring Suite tab in Microsoft PowerPoint (Figure 4) and click on the dialog simulator button (Figure 5), after which the dialog simulator creation window opens (Figure 6).

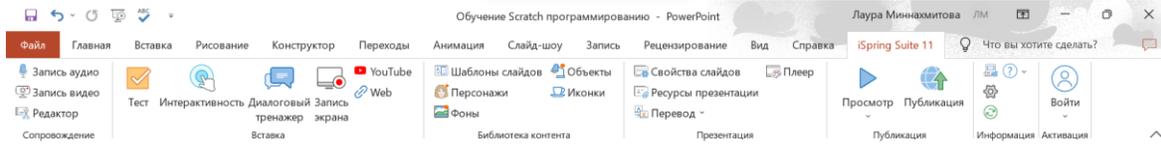


Figure 4. Menu of the iSpring Suite Tab in Microsoft PowerPoint

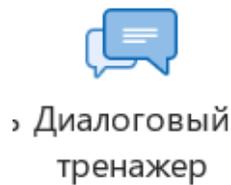


Figure 5: Button for Creating a Dialog Simulator

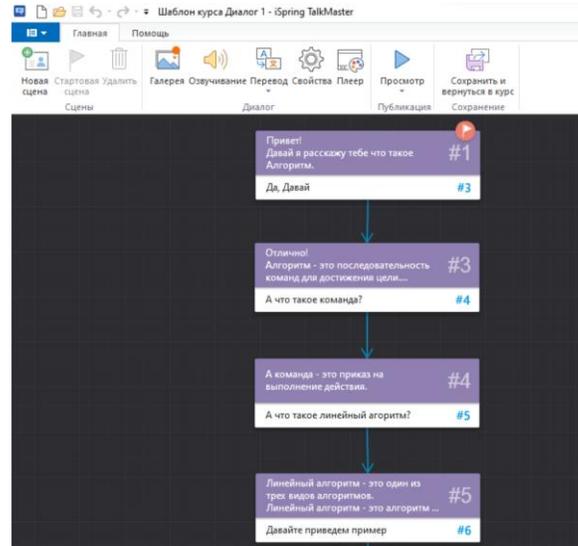


Figure 6. Window for Creating and Working With Dialog Simulators

When explaining the stages of work in the Scratch programming environment, such simulators as interactivity were used, where students can step-by-step study the program interface, the main command blocks and the stages of creating the program (Figure-7a,b,c).

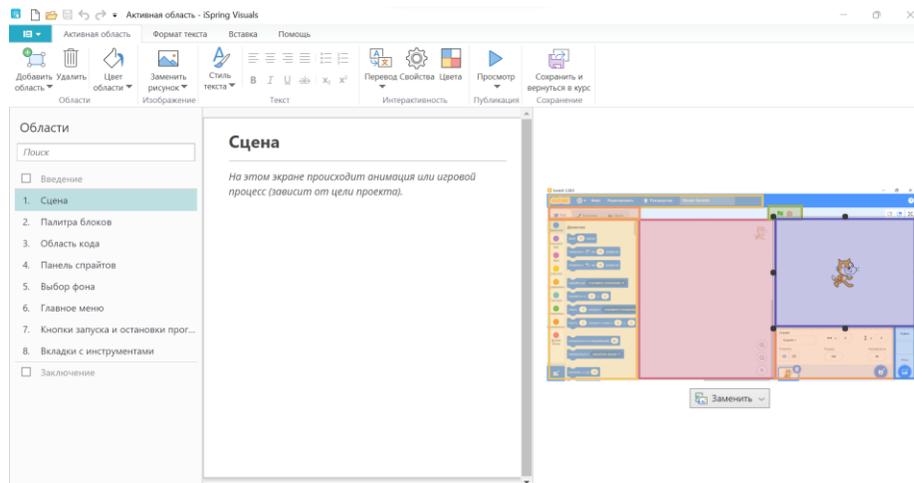


Figure 7a: Interactivity "Introduction to the Scratch Interface"

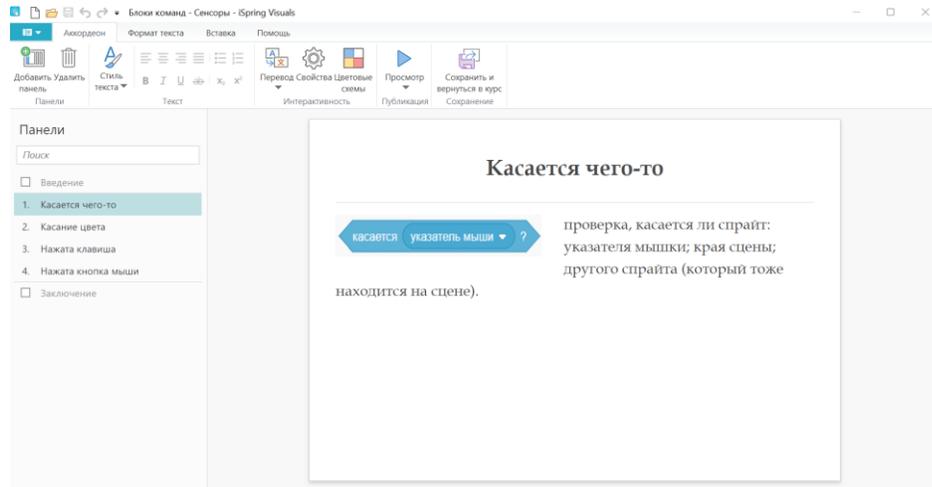


Figure 7b: Interactivity "Command Blocks Sensors"

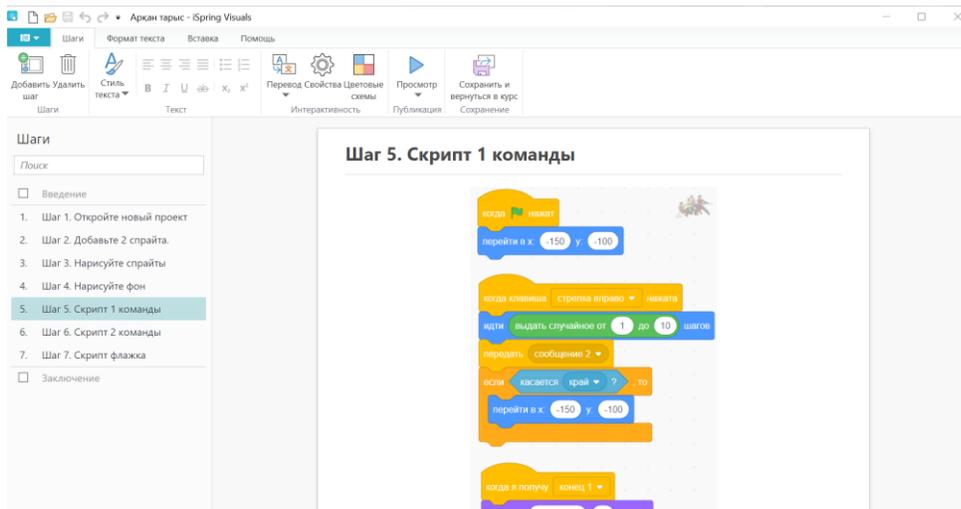


Figure 7c: Interactivity "Creating the game Arkan Tarys"

To create interactivity, go to the iSpring Suite tab in the Microsoft Power Point program and click on the "Interactivity" button (Figure 8).



Figure 8: The Button for Creating Interactivity in The iSpring Suite

In the window that opens, interactivity templates will be provided (Figure-9), after the desired template is selected, we proceed to fill it out, save the interactivity and go back to the course.

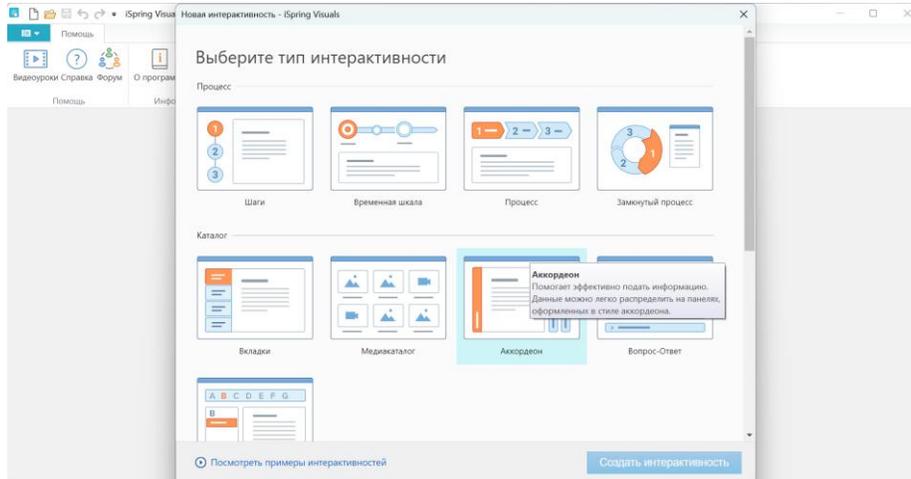


Figure 9: Interactivity Templates

And to consolidate and test students' knowledge after each interactivity, they are provided with test tasks for comparing values, the order of actions, tests with one or more correct answers, quizzes, etc.(figure-10).

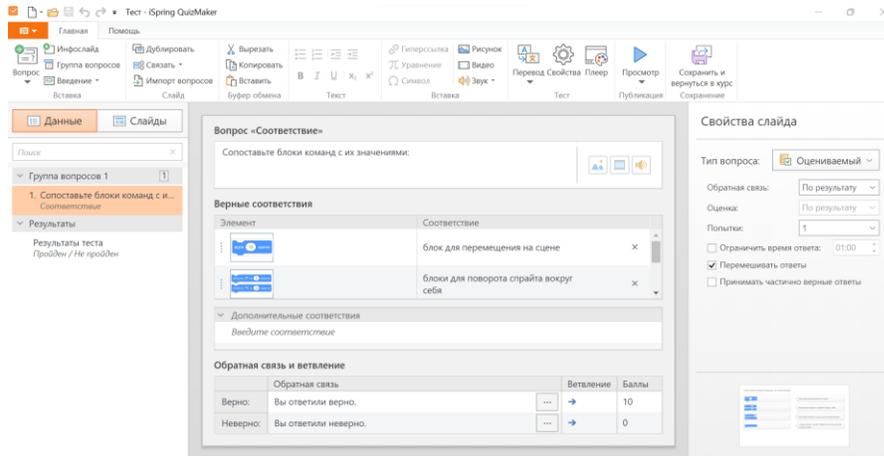


Figure-10: The "Motion Blocks in Scratch" Test

To create a test task, go to the iSpring Suite tab in the Microsoft Power Point program and click on the "Tests" button (Figure 11), after which a window for creating test tasks opens where you can choose one of 14 types of test tasks (Figure 12).



Тест

Figure 11: Button for Creating a Dialog Simulator

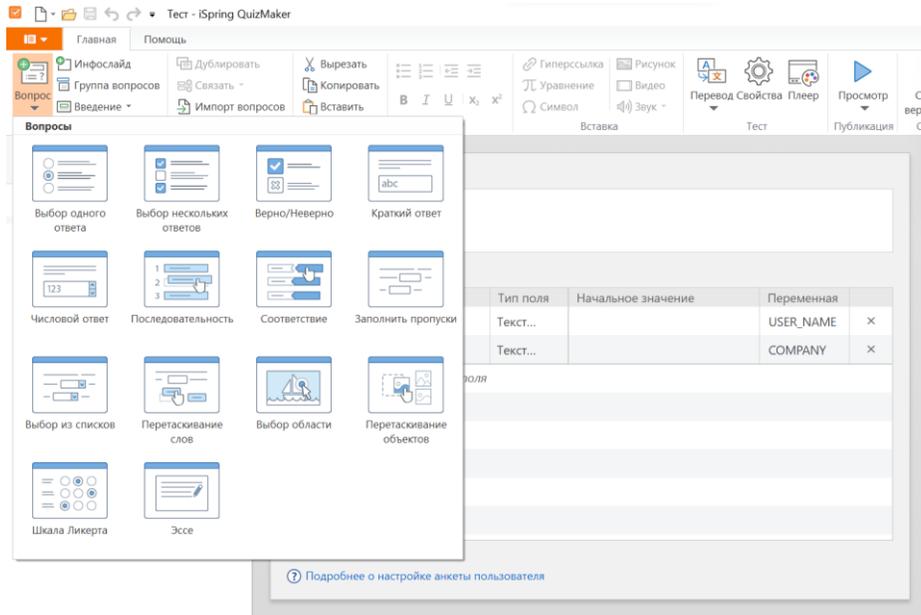


Figure 12: Window for Creating and Working With Dialog Simulators

In order to get the test results of students in the properties, go to the section "Sending a report", you need to specify the teacher's email address (Figure-13).

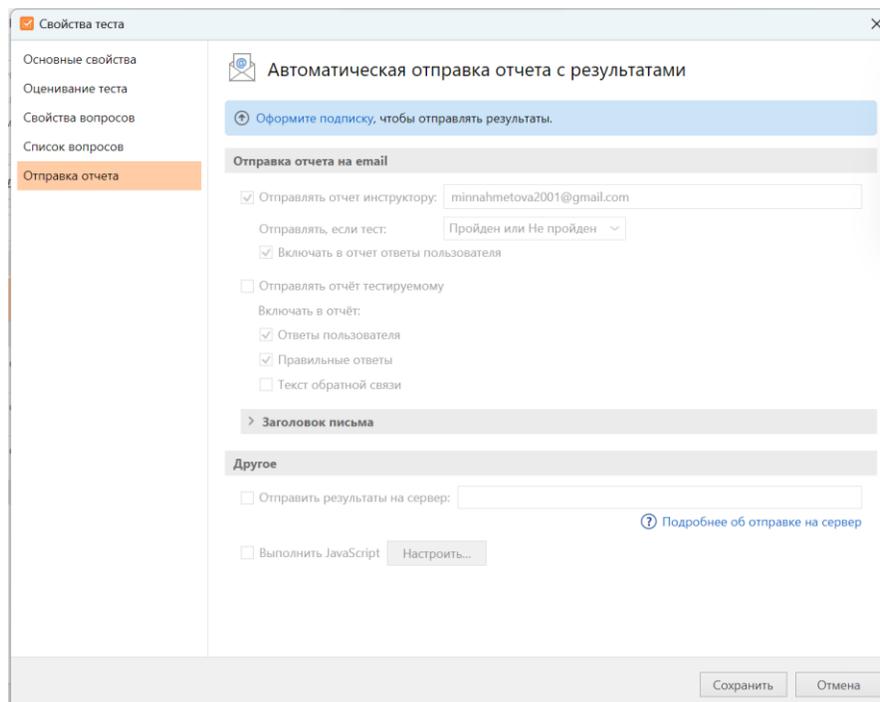


Figure 13: Section "Sending a Report" of The Test Properties Window

Thus, the course operates according to a single scenario.

CONCLUSION

The developed course was applied during Scratch programming lessons in 1 "A" (Kazakh language of instruction) and 3 "A" (Russian language of instruction) classes of the "ADAN" school (Figure-14,15). Since the number of students in the class does not exceed twenty people, classes are not divided into subgroups.



Figure-14: Conducting a lesson on "Repetition in Our Life"



Figure-15: Conducting a lesson on the topic "Creating games"

The students were given the following tasks to consolidate their theoretical knowledge of Scratch:

1. Using these pictures, show the sequence of the plant growth algorithm.
2. Sort the team blocks into the correct categories.
3. Take the quiz and match the blocks of commands with a description of their actions.
4. Analyze the scripts presented below and compare them with the types of algorithms they belong to.

When completing task №. 1, students were required to understand the sequence of events, which in turn involves conducting a mental analysis of the meaning of the situation, which is set by a set of plot pictures, actions performed, and the proposed pattern.

When completing task №. 2, students were required to understand the differences between the categories of command blocks in Scratch.

Task №. 3 is aimed at comparing blocks of commands and their actions.

Task №. 4 is designed to test the formation of the ability to analyze the code and determine the type of algorithm used in the code.

The performance of current tasks and the answers of students, their independent and control work were analyzed and evaluated. The results of the proposed tasks are presented in Table 1.

Table 1: The Number of Primary School Students (in %) Who Completed The Tasks Correctly

Task numbers	№1	№2	№3	№4
% completed	45,2	47,6	40,4	38,1

To observe the students, analyze the effectiveness of techniques and methods used in lessons using this SMART technology, the teachers- observers of SKSPU - Nurmukhanbetova G.K., Kurmanbayeva Zh.I. were invited.

After each of the lessons, a creative group of teachers discussed the techniques, methods, and technologies used in the lessons, and the effectiveness of their application.

During a series of lessons, students showed fairly stable subject knowledge, thanks to the prepared course, each of the groups of primary school students showed independent activity, felt confident, actively and harmoniously participated in the work of the group. The observer noted "the ability to analyze, draw conclusions."

When evaluating the results of the experiment, the following factors were taken into account: the amount of material learned on individual topics, the depth and awareness of knowledge, the strength of assimilation of the studied concepts, practical skills of students, evaluation criteria were used. The quality of knowledge was determined by the number of students who received grades "good" and "excellent" as a percentage of the total number of students in the sample. The processing of the obtained results consisted of the material obtained during the statement of knowledge based on the results of control work.

Table 2 "Quality of knowledge" shows the results obtained from the study of four topics.

In the table: the current one is the results of control sections conducted immediately after studying the topic. Delayed – results of delayed control slices.

Table 2: Quality of Knowledge

№	Topic name	Experimental classes (in %)		Control classes (in %)	
		current	postponement	current	postponement
1	Repetitions in our lives	70,2	65,3	47,4	41,3
2	Character Movement	75,2	59,8	50	48,8
3	Cycles	78,8	72,2	49	40,8
4	Creating a game	70,4	64,2	50	40,1

The analysis of the results of the experimental training "Scratch" showed that the experimental classes revealed a higher quality of knowledge compared to the control ones, both with the current and with the delayed knowledge test; the level of special skills of schoolchildren in experimental classes is higher than in control classes (the number of errors decreased when executing the algorithm, the time spent on mastering skills decreased); the intensity of the learning process has increased and educational and cognitive activity has intensified.

The use of such SMART technology as iSpring Suite definitely helps both experienced and novice teachers to improve their lessons. Because, there is an increase in the motivation and interest of students in learning. On this basis, it can be concluded that the students took the first steps towards self-regulated learning.

After a series of lessons, students mastered the concepts of algorithm and types of algorithm, and also created full-fledged games "Zhamby atu", "Kyz kuu".

iSpring Suite provides high-speed development of educational materials. Therefore, the students mastered the basics of analysis and synthesis of the real world and modeled these actions in a computer environment, displaying the results, and all this is done in an environment with a clear and bright interface corresponding to the individual age characteristics of younger schoolchildren.

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