

# Digital Literacy in Primary School

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**Abstract.** The program reveals the goals of mastering primary digital literacy by students in primary school, characterizes digital skills and determines the place of the digital literacy course in the curriculum, reveals the main approaches to the selection of course content and thematic planning, taking into account the hours chosen by the educational organization.

**Keywords:** educational program, primary general education, digital literacy, digital transformation of education.

## 1. Introduction

The sample curriculum for the subject “Digital Literacy” was developed on the basis of the Federal State Standard of Primary General Education (MERF, 2021, 2022), as well as taking into account the Federal Law on Education (FLERF, 2012) and the Strategic Direction of the Transformation of General Education in the Russian Federation (GRF, 2021).

The program sets the planned results of mastering the initial digital literacy. The program determines the content of the training course by years of study, indicating approximate hours on each topic for grades 3–4 and types of educational activities using tools of information and communication technologies.

## **2. Objectives of the Course “Digital Literacy” in Primary School**

The program of the training course “Digital Literacy” reflects the formation of children’s ideas about the high level of development of modern information technologies and their implementation in everyday life, the formation of the initial culture of the user of modern information and communication technologies, the expansion of opportunities for individual development of children through the implementation of individual curricula in an electronic learning environment using digital skills.

The content of the course reflects the skills of working with information and on the formation of information and communication technology competence as the initial digital literacy of children.

The program is focused on supporting the interdisciplinary work of students with the means of information and communication technologies in the development of programs of all academic subjects. As part of the formation of digital information skills for all subjects, it is important to develop the skills of entering, analyzing, processing, presenting, searching, transmitting digital information by computer means, and the practical use of computers, digital educational equipment, electronic information and educational environment resources and e-learning, applied means of information and communication technologies by students in the conditions of digital transformation education and the emergence of new means of information and communication technologies, that is, the need to prepare primary school graduates for competent information activities in their studies, creativity and life.

In accordance with this purposes, the course «Digital Literacy» is aimed at achieving the following goals:

- The use of digital tools and resources, tools for solving a variety of cognitive and practical tasks covering the content of all subjects studied – information retrieval; fixation (recording) information using various technical means; structuring of information, its organization and presentation in the form of simple presentations, digital information objects.
- Development of initial digital computer skills, the use of various digital learning devices, the inclusion of a computer to work with digital information of various types.
- Use of e-learning resources and digital educational environment for digital adaptation of primary school children in compliance with sanitary and hygienic standards and requirements when working with electronic learning tools.
- Formation of communicative universal educational actions: exchange of media messages; performance with audiovisual support; recording the progress of collective/personal communication; communication in a digital environment (e-mail, chat, videoconference, forum, blog, personal account, electronic diary, online contests and Olympiads) with the participation of a teacher and compliance with information security standards in a digital environment.
- Using the results of children's work posted in the information environment to evaluate and correct the work done digitally; creating a digital portfolio of personal educational achievements of the child.

### 2.1. *The Place of the Course “Initial Digital Literacy” in the Curriculum*

The course program is designed for a study load of 70 hours in grades 3 and 4 (based on the experience of mastering the primary skills of writing and reading texts, working with mathematical information in grades 1–2 by students).

The training course supports the practical work of children with information and communication technologies in all subjects of primary general education, including in interdisciplinary project work based on information and communication technologies.

### 2.2. *General Characteristics of the Course “Digital Literacy”*

Primary digital literacy is the ability to solve educational tasks using tools that are generally available in primary school, information and communication technologies on a computer, the competent inclusion of digital information and digital communication tools in the context of educational and cognitive activity in accordance with the age needs and capabilities of a younger student.

The training course should not infringe on the rights of those students who study the course in educational organizations with different levels of equipment of the information educational environment, therefore, the training course program is implemented by an educational organization taking into account the level of equipment of the information and educational environment of the educational organization and based on standard equipment, such as a student’s computer and/or a teacher’s computer workplace with presentation equipment, a printer and a webcam, as well as other devices connected to a computer, including digital laboratories for children.

Additionally, it is possible to use personal digital devices for photo, audio and video recording and data transmission.

## 3. **The Main Digital Competencies of Primary School Students**

The structure of digital literacy of primary school students includes three groups of digital competencies:

1. **Information literacy.** (Section of the course Working with digital information): basic skills of working with text, graphics and presentations, design, input, output, fixing and editing information on a computer and using publicly available digital devices, working with hypertext, design of creative works using a computer, presentation, algorithms and control of the screen performer.
2. **Computer literacy.** (Section of the course Computer Practice and digital technology): a set of simple skills to put into practice a computer, conventional digital devices and control interfaces for these devices (as well as for children with disabilities – special digital devices and software services), the ability to turn on the computer and select a program, recognize the menu in the program and pro-

gram tools, apply experience with devices connected to a computer, the ability to use the on-screen user interface, keyboard interface, keyboard input, remote control interface, voice interface, touch interface for special devices, work with external media for storing information (in files folders), hygienic norms of the organization of work with a digital device (preventive physical exercises, culture of norms of time, breaks, workplace organization).

3. **Communication Literacy.** (Digital Communications course section): the ability to work in computer networks to search and exchange information, to work in online educational services, with e-mail, personal account and electronic diary, class forum, school website, video services for educational activities, electronic educational resources on the computer and on the Internet, to understand the purpose of registration, password and login.

Safe behavior in the digital environment is presented in primary school by a separate training course “Information Security” as the most important component of digital culture.

Thus, digital culture includes digital literacy of children (Fgosteestr, 2022) for teaching children modern digital skills and media culture (Information Security course at school) for the socialization of children in the new digital world (Fgosteestr, 2022).

### *3.1. Planned Personal and meta- Subject Competencies for the Course “Digital Literacy”*

**Personal competencies** (initial life experience of digital activity):

- To be aware of the need to master digital literacy in order to adapt to life situations, to develop a common human information culture; to develop information activities.
- Apply the rules of collective information activity with peers, show the ability to negotiate, lead, follow instructions, be aware of personal responsibility and objectively assess their contribution to the overall result.
- To master the skills of information activity on the basis of safe behavior in the information environment, to observe the norms of culture, respect for work and collective activity.
- Apply digital competencies to solve practical problems in everyday life, including when helping classmates, young children, adults and the elderly.
- Work in situations that expand the experience of applying digital skills in real life, increase interest in learning new things and creativity by means of modern information and communication technologies.
- Evaluate practical and educational situations from the point of view of the possibility of applying digital literacy competencies for rational and effective solutions to educational and life problems.
- Evaluate their success in information activities, outline ways to eliminate difficulties; strive to deepen their digital competencies, taking into account the legal norms of behavior.

- It is reasonable and safe to use a variety of information tools to solve the proposed and independently selected educational problems and tasks.

**Meta-subject competencies** (initial practical experience of digital educational work as a set of cognitive, communicative and regulatory universal educational actions) – the ability of students to use in practice the digital skills that make up:

- Universal educational cognitive actions – substitution, modeling, encoding and decoding of information, logical operations, including general methods of solving problems by means of information and communication technologies.
- Universal educational communicative actions – to organize and carry out cooperation by means of digital communications, to adequately transmit information and display the subject content and conditions of activity and speech, to argue and justify their position, to ask questions necessary for the organization of their own activities and cooperation with a partner using means of communication.
- Universal regulatory actions – in information activities, to accept and preserve the educational goal and task, plan its implementation, monitor and evaluate their actions, make appropriate adjustments to their implementation, carry out ascertaining and anticipating control over the result and method of action, actual control at the level of arbitrary attention.

These meta-subject results determine the elements of the educational experience of problem solving and creative activity of different directions.

### *3.2. Key Functional Skills of Students: Children's Digital Skills in Three Types of Competencies*

**Information literacy.** The section “Working with digital information” will teach the student:

- To distinguish between different types of information (text, numeric, graphic, audio), to understand the peculiarity of digital information.
- To navigate in the ways of presenting and storing information on a computer and digital environment.
- Use methods of searching for information on the table of contents in the electronic catalog of the digital resource and in the Internet search engine.
- Understand and fill in simple ready-made tables; read simple ready-made bar charts in electronic text.
- Use additional sources of information on electronic media, including the controlled Internet, to find the necessary information, analyze it.
- Work with digital information: type small texts (letters, greetings, and other small texts for specific communication situations), create graphic and small multimedia objects (audio, video, presentation slides) to present, design and transmit information.
- Enter information into a computer using various technical means (keyboard, graphics tools, photo and video cameras, microphone, etc.).

- Save the information received.
- Type small texts in your native / foreign language in the simplest text editor.
- Use the basic functions of a standard text editor, follow the basic rules of text formatting.
- Draw (create simple images) in a graphic editor.
- Create simple images using the graphical capabilities of a computer; design an image from ready-made fragments (application, collage).
- Edit texts, images, slides, video and audio recordings, photo images in accordance with a communicative or educational task.
- Prepare and conduct a presentation in front of a small audience: create a presentation plan, choose audio-visual support, write explanations and abstracts for the presentation, use simple diagrams, diagrams, plans, etc.

**Computer literacy.** Section “Digital technology and computer practice”. The student will learn:

- To perform basic actions with computers and other means of information and communication technologies based on familiarity with a personal computer (personal computer device) as a technical means.
- Use ergonomic methods of working with a computer and other means of information and communication technologies that are safe for the organs of vision, nervous system, musculoskeletal system; perform compensating physical exercises (mini-charging).
- Understand the composition of the computer and the purpose of its main devices for input, output, transmission and processing of information, know about different types of computers and digital devices for different types of work with information.
- Know about the software and its purpose, perform basic actions with the program menu, commands of the digital object management interface on the computer.
- Organize the storage of your own information in folders and files on your computer and external digital media.
- Understand the need to apply health-safe methods of working with computer devices in life, in e-learning, digital educational environment.
- To apply in life the ways of storing your own information when organizing a personal information space, a personal account, an electronic diary.
- Build a plan for the implementation of specified actions to solve a learning task using a computer and tools of simple programs.
- Understand and execute a simple algorithm for controlling the executor of commands using digital devices.
- Use a computer to solve accessible learning tasks with simple information objects (text, drawings, available electronic resources).
- To select the result of video recording and photographing suitable in terms of content and technical quality, use removable media (flash cards).
- Describe an object or process of observation according to a certain algorithm, record audio-visual and numerical information about it using information and communication technology tools.

- Collect numerical data in natural science observations and experiments using digital devices, a camera, a microphone and other means of information and communication technologies, as well as during a survey of people.

**Communication literacy.** Section “Digital Communications”. The student will learn:

- Use a computer to search and reproduce the necessary information.
- Search for information in age-appropriate digital dictionaries and reference books, electronic educational resources, controlled Internet, a search system inside a computer; compile a list of information sources used (including using links).
- Use means of communication on the example of a resource of an educational organization (e-mail, school website, means of interaction in a group on a school website).
- Understand the importance of anti-virus protection of a computer, assigning a password, rules of speech etiquette when working with means of communication on the Internet.
- Create text messages using information and communication technology tools, edit, format and send them by e-mail.
- Create simple messages in the form of audio and video clips or slide sequences using illustrations, video, sound, text; post a message in the information educational environment of an educational organization.

### 3.3. *Additional Digital Competencies in An Interdisciplinary Technologies*

Individual tracks of children in creativity with information and communication technologies are:

- Competently use a computer keyboard, use computer translation of individual words, use available techniques for working with ready-made text, visual, audio information on the Internet, available ways of obtaining, storing, processing it.; use basic means of digital communications; record the progress and results of communication on the screen and in files; competently formulate queries when searching on the Internet, evaluate, interpret and save the information found; be critical of information and the choice of the source of information, participate in collective communicative activities in the information educational environment; observe the norms of speech interaction in interactive communication: e-mail, Internet, video services and other types and methods of communication; (philological cycle).
- Present data by various means of information and communication technologies, use information and communication technology tools (photo and video camera, microphone, etc.) to record and process information, prepare small presentations based on the results of observations and experiments; (mathematical and natural science cycle).
- Perform simple drawings and ornamental compositions using a computer graphics environment; get acquainted with a graphic tablet, touch screen, voice input;

print, scan drawings and texts, use a scanned text recognition program in Russian, design sound and music fragments using a computer and a musical keyboard, collect music collections, music library, video library; (cycle of art objects).

#### 4. The Content of the Course “Digital Literacy” in Primary School

##### Section 1. “Working with digital information” (30 hours).

###### 1.1. Information.

Man and the digital environment. Digital information and a computer.

Representation of digital information, the concept of digital data. Information, its collection, analysis and systematization. Types of information: text, graphics, numbers, multimedia, sound and video.

The concept of information processes of processing, searching, transmitting, collecting, storing information.

The description of the simplest information model is a table and a diagram.

*Project.* Interpretation of table data. Reading and filling in the table. Graphical representation of numerical data in a table. Reading a bar chart or pie chart.

###### 1.2. Processing of information on a computer.

Information and computer. Working with simple information objects (text, table, drawing) on a computer in text and graphic editors: transformation, creation, saving, deletion.

Computer presentation. Preparing text, working with tables, inserting graphics and videos, recording audio.

*Project.* E-book (text, illustrations, audiobook, hypertext).

*Project.* Presentation on the topic of the project. A media book based on a presentation.

###### 1.3. Action planning and management.

Using a computer for calculations. The order of actions. Calculation algorithm on a software calculator.

Team. The executor of the commands. The algorithm for managing the performer. An algorithm with a choice of action. The algorithm with the repetition of commands.

*Project.* Computer environment for managing the performer. Implementation of the algorithm on a computer in a learning programming environment.

*Project.* Software-controlled devices (control programs for household appliances, timer/alarm clock in a digital device).

##### Section 2. “Computer practice. Digital technology” (20 hours).

###### 2.1. Familiarity with the means of information and communication technologies, hygiene of working with a computer.

Man and computer. Compliance with safe methods of working on a computer; careful attitude to electronic technical devices.

The diversity of computers and the world of professions using information and communication technologies.

The purpose of the main computer devices for input, output, and information processing. Turning on and off the computer and the devices connected to it.

Computer programs.

Graphical computer management interface. Programs. Menu

Files and folders, their storage system on the computer and external devices.

*Project.* Ergonomic methods of working with a computer and other means information and communication technologies and physical exercises (mini-charging).

*Project.* Digital sensors, digital laboratories and devices for research and recording observations.

## 2.2. **Input and output of information: text, sound, image, digital data.**

Keyboard, a general idea of the rules of keyboard writing, using a mouse to work on a computer screen, using the simplest tools of software editors. Data output to the printer. Information in the form of photos, audio and video fragments. Microphone and headphones. Photo and video camera.

*Project.* Graphic tablet, touch screen, sound synthesizer, document camera, video camera in educational creative activity.

*Project.* Digital devices for people with disabilities.

## **Section 3. “Digital communications” (20 hours).**

### 3.1. **Computer network Internet.**

Man and society. The Internet. Global computer networks. Website. Rules for a secure Internet connection, password and personal data.

### 3.2. **Transmission and retrieval of information.**

Means of communication: mobile telephony, e-mail, audio and video services. Antivirus protection of the computer.

Mass media: radio, television, press on the Internet. Selectivity in the use of mass media in order to preserve spiritual and moral health.

### 3.3. **Working with digital communications.**

Digital communication in education. Digital educational environment resources, registration, personal account, electronic diary, electronic portfolio, educational organization website, class forum, electronic reception.

Digital communications in life. Personal and collective network services: messengers, blogs, email, social network page. Network etiquette in the public space.

*Project.* Work with the means of communication – e-mail, educational sites on the Internet. Search for information. “Smart” devices connected to the Internet (Internet of Things).

*Project.* Settings tools for viewing websites for people with disabilities.

*Topics of digital projects for the organization of creative interdisciplinary work in groups of students' choice.*

Work with digital educational resources, ready-made materials on electronic media. Audiobooks. E-books and textbooks. Electronic music collections. Video materials. Creating a directory of links of additional cognitive information resources to the topic of the lesson.

Observations, recording and processing of the results of observations (nature, weather) and surveys by means of information and communication technologies. Presentation. Report. Reportage.

The use of various artistic techniques in individual and collective activities by means of information and communication technologies, computer animation, video and photo shooting, computer graphics. Media book. Animation. Exhibition.

Search and listen to music from electronic collections. Creation of information support for a music project (poster, presentation, invitation cards, etc.).

## **5. Educational Activities of Children Based on Digital Competencies**

For the formation of initial digital literacy, the content of the training course is implemented using practical tasks with information and communication technologies in a group and individually, in partnership with a teacher. Practical work using a computer, presentation equipment, devices connected to a computer, as well as digital educational resources on the topics of the course (media studies) in the sections of the course content include the following types of practical information activities of children.

**Working with digital information.** Working with digital information objects that combine text, drawings, diagrams, tables, visual and graphic images (diagrams) and numerical data, fixed and moving images, sound, links and multimedia objects, digital objects for programming their management, which can be created stored on a computer and external media or posted on the Internet, transmitted via digital communications.

**Practice working on a computer. Digital technology.** Work with diagrams, descriptions and instructions, participation in explaining the purpose of various computer devices, digital environment devices, functions of household appliances with software control. Working with a computer and digital devices connected to it. The use of generally accepted programs in educational tasks for simple processing, storing information using information communication technologies: interface with the device, files and folders, selection of tools for working on a computer, input, editing of various types of information on a computer: text, sound, image, digital data; presentations. General safe and ergonomic principles of working with computers, digital devices and programs.

**Digital Communications.** Use e-mail, computer network, educational and cognitive sites in information and educational activities. To search for and transmit information, to assess the need for additional information for solving educational tasks and inde-

pendent cognitive activity; to identify possible sources of its receipt; to be critical of information and the choice of the source of information, to comply with the norms of safe behavior in the digital environment and the protection of personal data in personal network services.

## 6. Conclusion

The application of digital skills in practice in the subject education of younger school-children includes regular practical work of children based on the use of information and communication technologies in all academic subjects and in the form of interdisciplinary educational projects using digital tools and devices.

### *Types of interdisciplinary projects:*

Subjects “Mathematics and Computer science”.

- Projects related to the presentation, analysis and interpretation of data; the ability to extract the necessary data from tables and diagrams, fill out ready-made forms, explain, compare and summarize information, draw conclusions and forecasts.
- Projects for managing the work of the team executor, programming algorithmic tasks and designing information objects.

Subjects “Language. Literary reading. Native language and literature. A foreign language”.

- Projects in oral and written communication using information and communication technologies in order to present, formalize the results of the project in creative groups and search for the necessary information in various sources to complete educational tasks.

The subject “The surrounding world”.

- Projects for working with information and communication technologies-means, searching for information in electronic sources and the controlled Internet to create messages in the form of texts, audio and video fragments, presentations based on the results of observations and research.
- Projects for the development of digital laboratories.

The subject “Technology”.

- Practical work with a personal computer as a technical means, with its main devices for their intended purpose; experience of group and individual work with simple information objects: text, drawing, audio and video fragments; techniques for searching and using available electronic resources.
- Robotics projects.

Subjects “Art”.

- Projects for the use of various information and communication technology tools in creativity (graphic editors, multimedia, augmented reality, virtual reality).

The subject “Physical culture and sport”.

- Projects in support of health-saving technologies of information activities, independent planning and performing physical exercises while working on a computer.
- Projects for the development of the simplest digital health sensors.

The course is implemented using the author’s textbooks (Tsvetkova *et al.*, 2022) and books to them.

Methodological materials, work program and electronic educational resources for the training course are available on the website of the author’s workshop for textbooks (BINOM, 2022).

Additional materials on project activities can be found in publications on media education (Bondarenko *et al.*, 2018, 2020).

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