Article

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ICT Teachers' Vision and Experience in Developing Digital Skills of Primary School Students in Computer Science Lessons

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Abstract: The rapid development of technology sets its own rules not only for adults but also for children. At the same time, the former need to develop digital skills to improve their competitiveness in the labour market or to continue working in the changing conditions of global digitalization; for elementary schoolchildren, acquiring such skills from elementary school will give them the confidence to apply correctly in middle and high school, and at university. The development of digital literacy in elementary school students is considered relevant and timely in the article. Schools should be interested in providing the necessary conditions to develop children's digital skills. Teachers can equip them with the basic skills needed to live successfully in the digital age by teaching them digital literacy skills. They can help children move consciously in the digital environment. This article examines the vision and experiences of elementary school computer science teachers in developing students' digital skills in informatics classes. The article discusses research methods such as questionnaires, interviewing information and communication technologies (ICT) teachers, observation and participation in computer science lessons, and qualitative analysis of teachers' responses. The study's results will be helpful for schools and are suggested for improving computer science curricula.

Keywords: ICT teachers; primary school students; digital skills; digital literacy; computer science

1. Introduction

One of the priority areas of primary education in many countries is the development of students' information and communication skills and digital literacy. The acquisition of such competencies by primary schoolchildren, along with functional literacy, is a requirement of the 21st century because ICT are tools for the study of other academic subjects, providing resources and technical means for the integration of different areas of education.

The use of information technologies (IT) in primary education leads to a qualitatively new state of preparation for younger students. More and more countries are introducing computer science in primary schools as a separate subject or in conjunction with other subjects. Computer science enriches general education with new elements, without which education in a digital society based on IT is unthinkable. Therefore, the development of digital skills must begin as early as possible to socialize the child successfully. Due to the fast growth in the volume of information and the rapid development of IT, it is necessary to form digital literacy in junior school students precisely through the ability to navigate the massive flow of information and effectively and safely use new technologies to solve various tasks in everyday life and study.

Informatics as a separate subject in schools of the Republic of Kazakhstan used to be studied by students from the third grade under the name of ICT. Since January 2022, the subject has been introduced from the lower grades of elementary school, namely from the first grade, under the new name "Digital Literacy". The aim of the course is not only to instill and develop information culture

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in schoolchildren along with functional literacy, but also to develop digital literacy in them from the primary grades.

To this end, this article presents the vision and experience of Kazakhstani teachers who teach the subjects of ICT and digital literacy in primary schools (grades 1-4), particularly their direct attitude to the formation of digital literacy in elementary schoolchildren. The research results obtained from questionnaires and interviews with teachers and directly from computer science classes through observation and participation are presented.

In addition, the authors consider and use the following terms as synonyms in this article:

- schoolchildren - school students, younger students, pupils,
- elementary school - primary school.

2. A Brief Overview of Digital Literacy

Considering separately at the concept of literacy, which is a foundational skill for all areas of learning, Casey and other researchers argue that the nature of literacy is closely linked to modern technology [1], as rapidly evolving technologies are changing literacy practices along with definitions of what it means to read and write with multimedia. Exposure to a wide range of digital technologies influences young children's literacy as they observe the literacy practices of digitally dependent adults and attempt to use digital devices and the Internet to read, write, and communicate [2].

The term and definition of digital literacy is originates from the idea of computer literacy, which emerged with the introduction of computer science into schools. The learning objective was to form the information culture of students [3], one of the main components of which is an algorithmic way of thinking. Computer literacy was understood as basic knowledge of computer science (informatics), knowledge and skills in the basic use of computers, the ability to write simple programs, etc.

The methodical system of teaching informatics in schools of Kazakhstan was formed based on training programs, textbooks, methodical manuals and training equipment introduced in schools of the former Soviet Union (USSR) in 1985-1991. Numerous studies and works of S.A. Beshenkov, A.G. Gain, A.P. Ershov, A.A. Kuznetsov, E.I. Kuznetsov, A.G. Kushnirenko, E.P. Velikhov, as well as the works of Kazakh scientists, researchers and teachers E.I. Bidaibekov, S.K. Kariev, T.K. Koibagarova, Zh.K. Nurbekova and others are devoted to the state and prospects of development of the educational field of "Informatics" [3,4].

The concept of "Computer Literacy" emerged in the years of computerization of education at the end of the 1980, when the content of the concept became systemic and included an idea and understanding of new IT, basic concepts of algorithmization and programming. Then it was reflected in the state program of informatization of secondary general education (1997-2001), during the implementation of which 100% computerization of schools was carried out in 5 years. The computer equipment was used mainly to equip computer science classrooms [4].

According to T.V. Boyko and N.V. Skripkina, digital literacy of students is a set of knowledge and skills necessary for safe and effective use of digital technologies and Internet resources. This concept includes digital consumption, digital competence and digital security [5].

The issues of formation of digital literacy in the system of primary education in Kazakhstan are solved on the basis of an analysis of decision-making experience on this area in different countries, including the development of ICT integration in educational programs [6].

The main components of digital literacy general to future computer users are access, management, integration, creation and communication exchange of information in individual or collective work in the network, web environment for learning, work and leisure, etc. These skills are directly related to basic skills and abilities. Therefore, digital literacy is as important as the ability to read, write and think mathematically [7,8].

As a tool for information activities, the concept of digital literacy encompasses important sets of skills [8]:

- *Computer literacy* (user and technical skills to use computer equipment/facilities),

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- *ICT literacy* (skills for using services and applications on the Internet, searching and finding, obtaining, selecting, processing, transferring and using digital information).

3. Materials and Methods

The authors used the following materials and methods in the research: acquaintance and study of state educational programs on the subject of computer science, state standards of primary education, methodological recommendations of the Ministry of Education of the Republic of Kazakhstan, review of materials of international scientific conferences, scientific articles methodologically oriented to propaedeutic teaching of informatics, to solving problems of teaching and education, as well as didactic research in the field of informatics (1-4 grades).

This work involved human subjects in its research. Approval of the ethical procedures was granted by the ELTE INF Research Ethics Committee under No.: IK/5516/2/2023 and IK/294/1(2024).

A questionnaire and interviews were conducted with teachers who teach computer science in Kazakhstan's primary schools to obtain first-hand information about the development of digital literacy among primary school students and on the use of teaching and learning methods and educational tools that contribute to the successful formation of children's digital skills and competencies.

In addition, in the interviews, teachers provided detailed information about their experiences and vision in teaching the subject "Digital Literacy", "ICT" and developing children's digital skills.

The questionnaire survey was conducted from December 2022 including January 2023 and covered 289 teachers of public and private schools, school-gymnasiums, and lyceum schools in Kazakhstan. The survey was created using a Google form and distributed online. The proccess was anonymous and consisted of two main parts in which the following 20 questions focused on the development of digital skills and digital literacy of younger students:

1. Are you satisfied with the content of teaching subjects "Digital Literacy", "ICT" in accordance with the curriculum?
2. Are you satisfied with the software and educational technologies that you use/are available for teaching?
3. What instructional software, learning tools and educational technologies do you use for teaching? Name them, list them.
4. Are you satisfied with the teaching materials (textbooks, workbooks, websites, portals, software applications and other electronic sources of information)?
5. Are there enough textbooks and workbooks for all students?
   - To the previous question, you answered that there are not enough textbooks and workbooks. Please explain why?
6. What teaching materials you have at your disposal and what you use? List them.
7. Are you satisfied with the equipment of the computer science classroom (in case of the traditional form of education)?
8. Are you satisfied with the equipment of the computer science classroom (in case of distance learning)?
9. List/specify what distance learning system you have at your disposal, what you use (Microsoft Teams, Zoom, etc.).
10. Internet speed (low, medium, high)
11. What do you think digital literacy means? Give a definition.
12. What educational tools and games do you use in your lessons? Name them.
13. How useful is teaching (explicitly) computer science (digital literacy) to children (grades 1-4)?
14. What is the purpose of teaching computer science (digital literacy) to elementary schoolchildren? Explain.
15. In what grade of elementary school would you begin (explicitly) teaching algorithmization and programming? Why?
16. How do you motivate children to learn algorithms and programming? Describe. Give examples.

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17. What educational tools do you use at programming lessons? Name and describe them. Give examples.
18. What methods do you use to teach children programming? Name and describe them. Give examples.
19. What programming language/programming environment/programming tool do you use in your lessons? Name them. Give examples.
20. Do you use programmable toys and/or programmable robots? Name them and give examples.

In some questions, the Likert scale was used as a quantitative method to measure teachers' attitudes and opinions in the study. In contrast, open-ended and closed questions demonstrated confident and detailed respondents' answers and were helpful in qualitative analysis. Qualitative analysis of the responses received to the above questions was performed using MAXQDA software. MAXQDA software was chosen for systematization and text processing, namely for qualitative and statistical analysis of the available data (more than 6,000 values in the data table) by coding text sentences, words and word combinations. In this case, a simple code search was carried out first: all the answers received from the teachers in the form of a table were uploaded into the program and activated to search for intersections. In this way, a search was made for words and word combinations (teachers' answers) and word frequencies. For instance, to identify identical responses and the number and frequency of occurrence of respondents' answers according to their understanding of the meaning of "Digital Literacy".

In addition, a sophisticated search was performed: a filter was applied to search for "proximity of codes". This method allowed to find and display the parts of the text indicated by the code from window "A" and higher or lower within the specified distance from the code located in window "B". For example, this method showed how many teachers answered similarly.

The interviews were conducted online in the fall 2023 using the Zoom platform. They were attended by 14 primary school ICT teachers who had previously participated in a questionnaire survey. It was intended for those who expressed interest in participating voluntarily and anonymously. The interviews included the following 11 in-depth questions:

1. In what grade(s) do you teach the computer science?
2. What type of school? Is this an urban or rural school?
3. How do you understand the definition of digital literacy of primary school students? Explain the answer.
4. What websites/online learning platforms do you use in computer science lessons?

4.1 Why these ones?

4.2. In your opinion, what role do websites/online learning platforms play in the development of children's digital literacy?

5. What teaching methods do you use to improve children's digital skills?
6. What new modules do you find useful to include in the informatics curriculum and why?
7. What can you offer for lessons, perhaps you need to develop your own school software or methodological recommendations with new modern interesting topics that will contribute to the improvement and development of primary schoolchildren's digital skills?
8. What kind of modern online learning platform do you imagine for children? This would also be useful for distance learning.
9. What would you specifically change in the computer science curriculum and why?
10. What, in general, is missing for a computer science teacher to improve the digital literacy of primary schoolchildren?
11. Does the existing/available equipment and programming tools/robosets in the computer science classroom allow to development of primary school students' digital skills?

- If yes, how can you use it for this purpose?
- If no, explain the answer.

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The questionnaire and interviews were chosen to clearly understand what problems teachers face when teaching computer science, what makes it difficult to successfully develop children's digital skills, etc.

At the same time, observation and classroom participation were used to study computer science education in the 4th grade of a rural school in Kazakhstan. The online lessons were conducted in the 2022-2023 school year to familiarise and study the real situation in teaching informatics in elementary grade and in forming students' digital literacy: what methods and approaches to teaching children the ICT teacher used and applied, what conditions influenced the development of students' digital skills (Internet connection, classroom equipment, computer equipment, etc.).

4. Results and Discussion

The research findings indicate that informatics teachers need to consider children's psychological and age-related characteristics to facilitate the development of their digital literacy. The effective organization of learning activities and proper lessons' design based on the principles of accessibility and comprehensibility of educational and practical materials, the sequence of topics/modules studied, visibility, active learning, and individualized learning approach combined with the ability to work in a team, have been identified as key factors in this regard.

Notably, elementary school students predominantly process information visually and figuratively, underscoring the importance of engaging and visually appealing educational materials. As students' progress, they develop the capacity for intellectual reflection, which encompasses the ability to analyze and evaluate their actions and the content and process of their thinking. Integrating educational games has been identified as a pivotal strategy to facilitate this process, playing an instrumental role in developing digital skills.

In this context, it becomes imperative for educators to consider memory specifics to ensure more effective teaching methodologies. Younger students demonstrate a capacity to memorize and reproduce small portions of lesson material with relative ease. In the primary grades, memorization is mechanical through repetition.

From the teachers' perspective, effective digital literacy instruction employs teaching methods and techniques that facilitate interesting and engaging learning. This hypothesis was tested in the online ICT lessons on "Transferring Data on the Internet" and "Password Strength" topics. During the classes, fourth-grade students learned how to create strong passwords and confidently transmit information on the Internet. They gained an understanding of the importance of passwords and their role in protecting information. Another informative topic for the children was "Robot and Color Sensor." In this lesson, the students utilized the Mindstorms EV3 set to demonstrate how the robot reacts to different colors, showcasing their computational thinking and digital skills. The students checked if the robot was moving correctly along the given route and changed the program if it deviated from the route. Such lessons allowed children to consolidate knowledge and apply their digital skills.

Kazakhstani teachers, for the most part, correctly understand the concept of "Digital Literacy" and use suitable methods and teaching tools for its development among junior schoolchildren. For instance, they utilize methodological materials and electronic educational resources on websites such as "Bilimland.kz", "EducationEstonia", "BINOM", etc. among others, to facilitate the formation and development of digital literacy in elementary school students [9–12].

Researchers and educators have proposed a variety of definitions for digital literacy, which is defined as the set of skills necessary to navigate and interpret digital information in today's society. According to Tsvetkova M. and Kiryukhin V., the foundations of digital literacy include information competencies (working with digital information), technical digital competencies, and digital communications [13]. On the other hand, Ala-Mutka defines such literacy as the skills necessary for "navigating through network technologies and interpreting the meaning of digital messages" [14]. Bawden emphasizes that it is an awareness of digital technologies as an effective communication tool [15].

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In contrast, 289 Kazakh computer science teachers who responded to the online questionnaire provided the following answers to the question Q11 "What do you think digital literacy means?" in Table 1 and in Figure 1:

Table 1. Definition and Meaning of Digital Literacy.

Number of answers (including %)	Response codes	Answers
139 (48.10%)	R1	"A set of knowledge and skills that are essential for the safe and effective use of digital tools and technologies, as well as Internet resources"
43 (14.88%)	R2	"Familiarization and skills in the use of information equipment and ICT"
29 (10.04%)	R3	"Familiarity with computers and IT. Basic knowledge of the rules of behavior and work at the computer. Ability to work with simple programs."
21 (7.27%)	R4	"The ability to find, evaluate, and transfer information through typesetting and other mass media on a variety of digital platforms"
6 (2.08%)	R5	"How to work with websites. Ability to utilize different Internet.services."
4 (1.39%)	R6	"Work with information through different digital devices using different applications"
4 (1.39%)	R7	"Computer skills. Have an understanding of and create digital documents."
4 (1.39%)	R8	"A set of skills that enables one to exist freely and safely in the digital environment"
4 (1.39%)	R9	"Have an understanding of computer applications"
4 (1.39%)	R10	"Computer science"
3 (1.04%)	R11	"The ability to apply the acquired ICT knowledge in life"
2 (0.69%)	R12	"Structure of knowledge and skills to work with electronic data"
1 (0.35%)	R13	"First understanding of electronic tools"
1 (0.35%)	R14	"To understand what digitalization is and everything that goes with it"
1 (0.35%)	R15	"Studying the newest technologies in digitalization as well as its history. Using and applying all the tools in life and learning."
1 (0.35%)	R16	"Fundamentals of security in the information society"
1 (0.35%)	R17	"To teach children to take full advantage of the digital life of the 21st century"
1 (0.35%)	R18	"The rapidly evolving age of technology, which means teaching students how to program and operate digital devices from an early age"
1 (0.35%)	R19	"Utilizing and studying different digital platforms to develop an information-savvy individual"
1 (0.35%)	R20	"Children's ability to adapt and actively use digitalization. To be able to work easily on a computer, to navigate in the online space. To be able to determine the level of Internet safety."
1 (0.35%)	R21	"Be able to type fast"
1 (0.35%)	R22	"Understanding digital devices, information and the applications that process them. Formation of skills to work with them."
1 (0.35%)	R23	"Different programming environments"
1 (0.35%)	R24	"Be able to meet the requirements"
1 (0.35%)	R25	"Optimizing all aspects of your life"
1 (0.35%)	R26	"Computer skills from an early age and the development of critical thinking through the construction of algorithms in various programming environments"
1 (0.35%)	R27	"To create, understand, use and process information"

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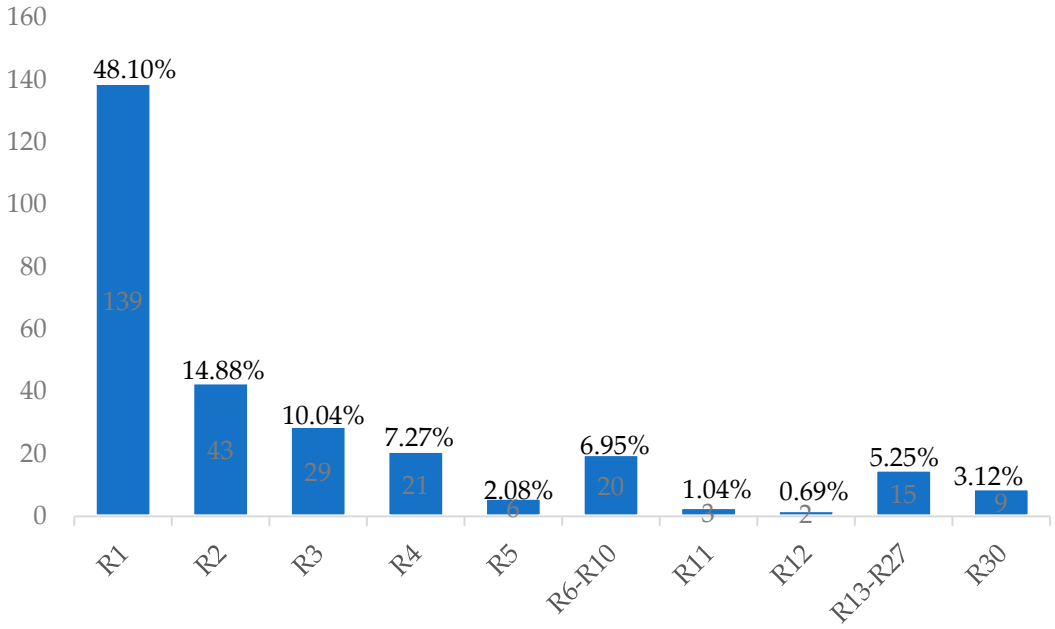

Figure 1. Teachers' understanding of digital literacy.

The objective of the online questionnaire survey of computer science teachers was to find out their perceptions regarding the concept of "digital literacy," the methods they use in their lessons to develop digital literacy among pupils, and what is an obstacle in this process. As shown in Figure 1, the survey revealed that 139 teachers (48.10%) of the total number of respondents who participated in (289 people) believe that digital literacy is "A set of knowledge and skills that are necessary for safe and effective use of digital tools and technologies, as well as Internet resources". In contrast, 43 participants (14.88%) characterized it as "Familiarization and skills to use information technology and ICT." A divergent perspective was expressed by 29 teachers (10.04%), who defined it as "Familiarization with computer and IT. Basic knowledge of the rules of behavior and work at the computer. Ability to work with simple programs." The ability to find, evaluate, and clearly communicate information through typing and other media on various digital platforms was identified as a key skill by 21 computer science teachers (7.27%), suggesting a comprehensive understanding of digital literacy concepts among the teaching community. Conversely, two respondents (R28–29, 0.7%) did not know the answer or could not give a definitive answer, while nine teachers (R30, 3.12%) did not submit any answer at all.

The findings of the online interviews conducted with ICT teachers provide a basis for defining and understanding the concept of digital literacy. In the second phase of the study, 14 participants were surveyed via in-depth interviews. These participants were teaching the new computer science subject of "Digital Literacy" and were asked for the next academic year. They responded to question 3 of the interview, which inquired about their understanding of the definition of digital literacy for primary school students and requested an explanation of their response. The participants' responses indicated a comprehensive understanding of digital literacy, confident and safe handling of computers, digital devices, and online information. They emphasized the significance of proficiency in various aspects of digital literacy, including searching, finding, processing, transmitting, and storing information.

A Likert scale of 1 to 5 was used to know on how useful is teaching subject “Digital Literacy” to children of grades from one to four. The data indicates in Figure 2 that 147 (50.87%) respondents perceive teaching digital literacy to elementary school students as highly beneficial, while 8 (2.77%) participants express a lack of utility for this age group (6/7-10). Conversely, 69 (23.88%) teachers hold

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a positive view of teaching digital literacy from 1st to 4th grade in Kazakhstan's schools. Furthermore, 57 (19.72%) of the 289 educators who participated in the online questionnaire indicated a neutral position, ranging from "not at all useful" to "very useful." Additionally, 8 (2.77%) of the remaining teachers selected the "neutral" option on the scale close to the second out of five.

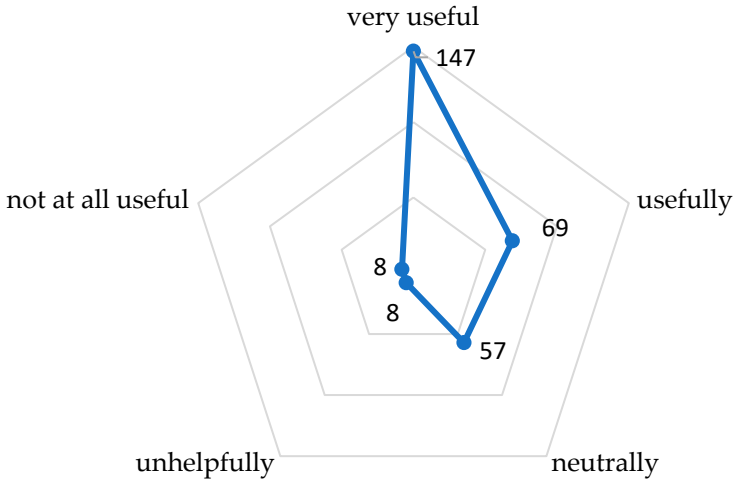

Figure 2. On the usefulness of teaching digital literacy in elementary school.

In order to respond to the inquiry presented in question 12, which the pedagogical instruments/tools and games utilized in lessons, respondents are invited to enumerate their methodologies and specify them. As shown in Figure 3, many teachers (275 or 95.16%) use programming languages such as Scratch and Python in their computer science classes to introduce elementary students to basic problem solving topics and tasks, etc. 206 teachers (71.28%) work with digital books and textbooks with different modules for first to fourth grade. At the same time, they use notebooks, but this is not used in all schools as these learning aids are not available for all students. 20 ICT teachers (6.92%) prefer to use online platforms and draw children's attention to interesting topics on websites and platforms such as Bilimland, OnlineMektep, Topiq.kz and Liveworksheets, and only 9 respondents (3.12%) usually work on Code.org [12]. In addition to different platforms, websites, e-books and textbooks, teachers also use computer software to teach children how to work with simple applications. Children learn to color pictures and create their first presentations in Paint and PowerPoint. Regarding robotics kits, only 60 teachers (20.76%) responded that they use Lego Mindstorms EV3. 37 (12.80%) use interactive whiteboards (including Jamboard and Padlet) and projectors in their classrooms.

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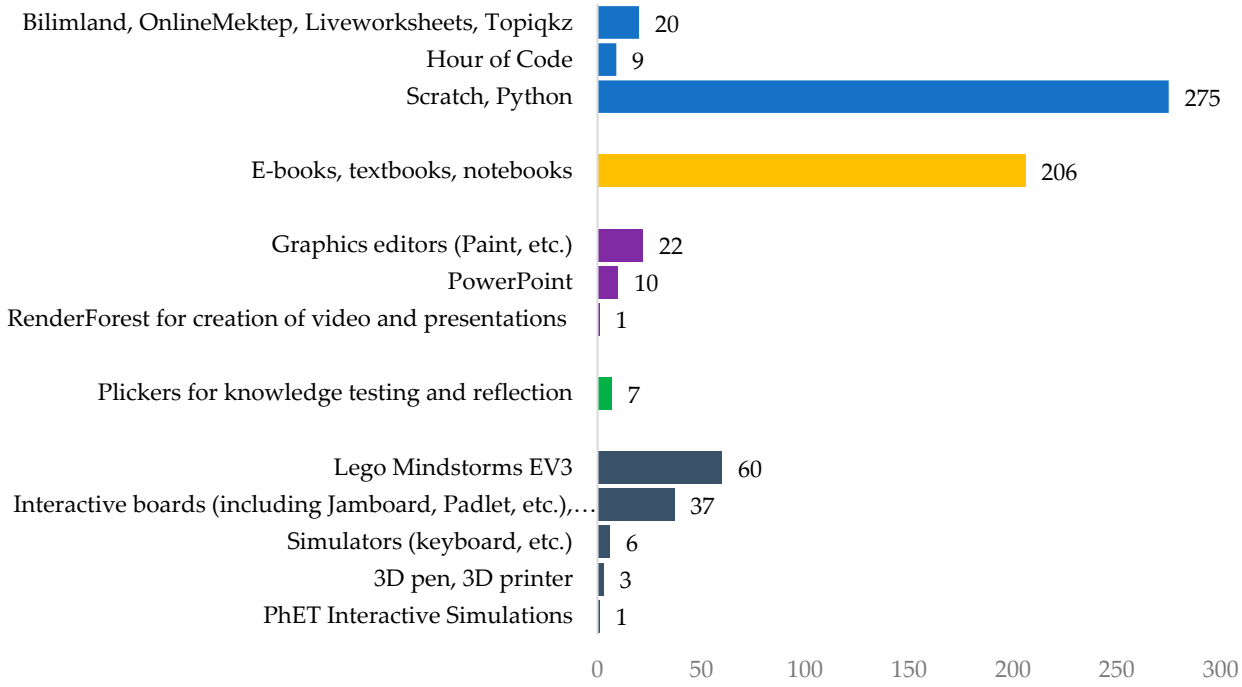

Figure 3. Use of educational/didactic tools.

If we consider simulators as teaching tools, these instruments are insufficient in schools and teachers only work with keyboard simulators, interactive PhET simulators or work on online platforms and websites. Only 3 teachers answered that they have 3D pens and 3D printers available for use in computer science classes.

Most teachers use YouTube to demonstrate video lessons to pupils and Nearpod to actively teach and engage them. According to the responses of primary school ICT teachers, they use project-based and problem-based learning methods, active learning with a student-centered approach in computer science classes.

The analysis of the teachers' responses confirms the lack of teaching tools, which does not contribute to the successful development of children's digital skills. For instance, rural schools in Kazakhstan are often under-equipped compared to urban schools. However, this is not the case for all rural schools; some of them are well-equipped but have poor Internet connection or speed. On the other hand, some urban schools with good Internet connections do not always have enough, for example, notebook sets and robots for students. Nonetheless, teachers are trying to use every educational tool available to develop digital literacy in younger students.

As far as educational games are concerned (Figure 4), most educators (62 or 34%) use different didactic games, quizzes and mazes on Educaplay, Blooket, Quizzlet, Flippity, and Lumio. They usually prefer to use role-playing games, presentations, and quizzes such as movable games “Who is faster?”, “Who is bigger?”, “Solve the word” and algorithm executors game. Thus, for instance, teachers use the Lumio because it is a multifunctional digital learning tool set. In addition, the Codewards educational platform for introduction to the fundamentals of programming.

46 respondents (25%) work with children on the Kahoot game learning platform, including a game and quiz builder Triventy in their classroom. 38 online questionnaire participants (21%) like to use the Learningapps interactive online exercises platform, while other 27 ICT teachers (15%) prefer to work with the WordWall platform, which facilitates quizzes and word games, among other functions. 4 educators answered they use BaamBoozle. Joyteka for games attracted other 3 people. The other four teachers use to use the Kodu game lab, CodeMonkey, ClassDojo, and Onlinetestpad for crossword puzzles, tests, and questionnaires.

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The remaining 9 teachers either did not answer the question or found it difficult to answer what pedagogical tools and educational games they use in computer science lessons that contribute to the successful development of students' digital skills. This indicates a gap in the respondents' understanding of this question.

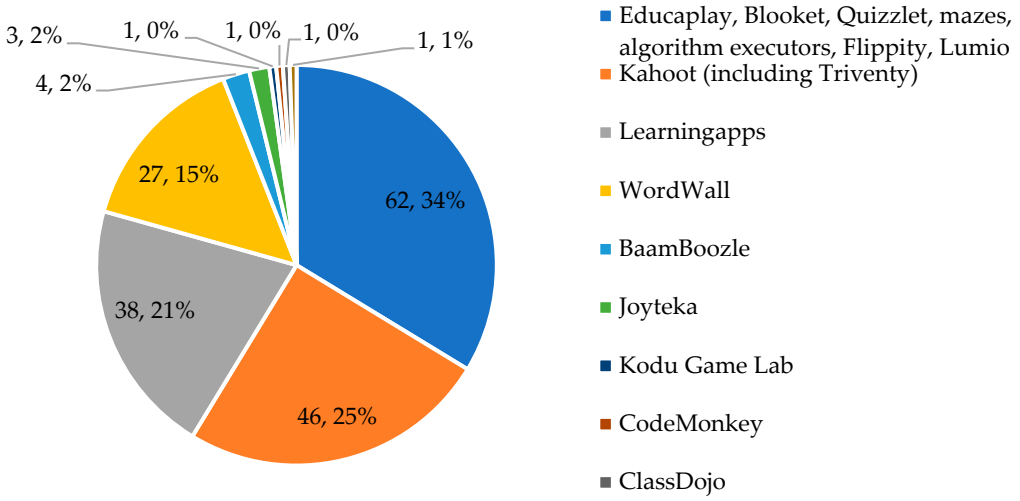

Figure 4. Using educational games.

The utilization of the mentioned above educational tools and games has been identified as a significant contributor to the successful formation and development of digital literacy skills among primary schoolchildren. It has been observed during online participation in the computer science lessons that children initially retain not the most essential elements of learning tasks, but rather what has made the greatest impression on them, often characterized by elements of interest, emotional appeal, curiosity, or unknownness. Teachers have been found to enrich their lessons by using a variety of means to present information, thereby enhancing the visibility of the material presented. In this context, the integration of technology, such as computers, laptops, gadgets, and other supplementary educational materials, serves as an effective tool and a valuable aid for primary school ICT educators.

In response to question 20, "Do you use programmable toys and/or programmable robots?", the following responses were provided by the surveyed teachers in Figure 5.

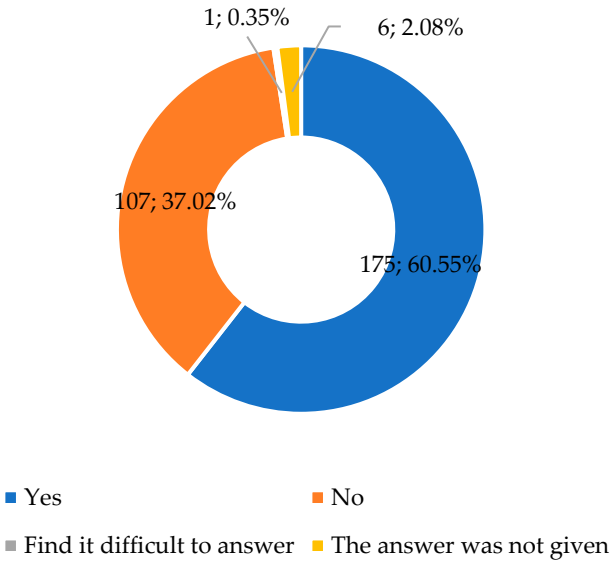

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Figure 5. Using programmable toys and/or robots in computer science lessons.

As illustrated in Figure 5, a total of 175 teachers (60.55%) reported they usually use programmable toys and/or programmable robots in their computer science lessons [16]. Students get acquainted with the operation and control of "Smart Bee", they learn the basics of robotics with the LEGO MINDSTORMS EV3 and LEGO WeDo 2.0 sets. At the same time, 107 teachers (37.02%) do not use programmable toys and/or programmable robots at all. The reason is insufficient number of robots or their schools do not have kits. For instance, teachers noted that they often have only one-unit set in the school, therefore they study it only in theory. Among the answers, it was also mentioned that there are few robots at school and they are not allowed to work with them. 6 respondents (2.08%) left the answer line blank, and one teacher (0.35%) found it difficult to answer this question. The absence and/or lack of robots and programmable toys was also confirmed by teachers during in-depth online interviews.

Among the teaching methods that teachers use in computer science lessons, they often emphasize verbal, visual, practical through demonstration of presentations, board or interactive game and using the visual block-based programming environment Scratch. Explanatory-illustrative, reproductive, problem solving through certain situations, tasks and problems, as well as research method of learning, etc. The correct utilize of such methods, which make the learning process interesting and informative, forms and develops the digital literacy of young school students. This has also been verified and confirmed from participation and observation of online ICT lessons in one Kazakhstani school.

In addition, teachers who are responsible for teaching “Digital Literacy” and “ICT” also highlighted the main challenges they face in the teaching process that do not allow for the successful development of children’s digital skills. They pointed out the following problems [7]:

- the curriculum does not correspond to the age characteristics of children, complex topics,
- poorly equipped computer science classrooms,
- poor quality of the Internet and/or its absence,
- insufficient number of textbooks, electronic notebooks,
- lack of robotics kits, Lego, Arduino,
- lack of hours for teaching computer science,
- classes are not divided into groups, especially in the 1st grade,
- lack of computers and laptops for all students,
- lack of special computer science classrooms for younger school students,
- lack of methodical aids.

Some schools still have old computers and technical equipment that need to be updated, as well as an insufficient number of interactive whiteboards. Teachers are dissatisfied with the fact that classes are not divided into subgroups (only applies to the first grade). This makes it difficult to master the educational program, as there are not enough individual workplaces (computers, laptops) for all children.

Also, teachers express their concern that not all children understand the terms and definitions of computer science, the topics are complicated for them, students are still young and most of them are beginning to learn to read and write [7].

All of these challenges and problems hinder the effective development of digital literacy among primary school students.

As part of this study, digital culture lessons were initiated for 5th-grade elementary school students at one international school. The aim of the research is to assess the level of digital skills development among primary schoolchildren.

5. Conclusions

This research article investigates ICT teachers’ vision and experiences regarding the formation of digital literacy in younger schoolchildren. As a result of the study and based on the analyzed

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research methods and online teaching and observation of computer science lessons in the 4th grade of one Kazakhstan's public school.

The study of the school subject "Digital Literacy" in elementary school contributes to the formation and development of not only digital literacy but also logical and algorithmic thinking. The digital skills of school students are considered as a set of competencies in the field of using computer technology, the Internet, and ICT confidently and safely.

In general, teachers of informatics in elementary schools in Kazakhstan know how and with what help the digital literacy of school students is formed. Teaching methods, educational tools and games that contribute to the formation and development of children's digital skills are given.

Thus, for the formation of digital literacy of students to be productive, to better organize learning activities and to properly design a lesson, the teacher needs to take into account children's individual and age characteristics.

A modern teacher needs to find and apply attractive and interesting forms and methods of teaching that will best contribute to students' development of digital literacy.

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Abbreviations

The following abbreviations are used in this manuscript:

ICT	Information and Communication Technologies
IT	Information Technologies
USSR	Soviet Union

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