

УДК 373.5.016.02.091.26:004(574)

FUNCTIONAL LITERACY ASSESSMENT TASKS FOR INFORMATICS STUDENTS

S. Avdarsol
Senior Lecturer

*Kazakh National Woven's Pedagogical
University PhD, Almaty (Kazakhstan)*

Abstract. The article considers the features of using the criterion approach in assessing the functional literacy of students in computer science.

According to the updated educational program, the system of tasks aimed at developing students' functional literacy is aimed at finding solutions to problems specific to real-life situations. This problem is usually related to new personal life, work, recreation, social life for students. The problems set in the framework of the tasks ask the student to use the ability to work with information; the requirement to manage many types of interconnected and interdependent objects and phenomena; features of developing ways to solve problems in a new context are described.

By creating a system of tasks for assessing the functional literacy of students in computer science, the possibilities of implementing a system of tasks at different levels are determined to increase the effectiveness of the lesson. In order to improve the functional literacy of students, assessment opportunities aimed at increasing the student's interest and enthusiasm are considered by creating the tasks.

Key words: criterion-referenced approach, functional literacy, graded tasks, assessment, competence, situational task, graded tasks.

Currently, in order to successfully carry out professional activities in the socio-economic conditions of the world, an individual must have knowledge, professional and general cultural competences, be able to learn independently, make reasonable decisions, and work with information. Since many professional problems are often at the intersection of disciplines, a professional needs functional literacy and the ability to work with information not only within his/her specialty, but also in other related areas.

Functional literacy is defined as a method of social orientation of an individual that combines knowledge (primarily general) with multifaceted human activities. In this regard, it is necessary to develop their critical thinking ability with functional literacy, which determines the readiness of students for life in society.

The problem of the modern education system is very relevant, because the traditional paradigm of education, preserved until recently, is primarily aimed at providing students with ready-made conclusions of science by informing them of facts, laws, principles and rules. Now there is a need to teach students to discover these principles and rules on their own, that is, to teach methods and methods of problem solving.

The concept of «critical thinking» is of increasing interest to a group of specialists, and this is not accidental. Critical thinking can be seen in all areas of human life. A person may not have an understanding of the phenomenon of critical thinking, but his/her judgment always has a critical attitude.

Collaborative research by teachers and researchers has led to the creation of critical thinking technology. This technology is a set of various methods aimed at first of all to interest the learner (to stimulate research, creative activity in him), then to help him to understand the material and, finally, to generalize the knowledge he has acquired. In other words, it is a system of strategies that combines methods of educational work by types of educational activities, regardless of specific subject content. This technology allows students to master various ways of combining information in the formation of functional literacy, develop their opinions based on understanding various experiences, ideas, create a logical sequence of conclusions and arguments, and form the ability to express their thoughts clearly, confidently and correctly in relation to others.

In high school, students should be taught functional literacy in every lesson and how to apply the skills they've learned in different critical thinking techniques to any situation. Functional literacy and their critical thinking skills do not appear automatically as a byproduct of conventional training in a particular field. To achieve the expected result, it is necessary to make systematic efforts to improve thinking. Mastering mental skills, as well as physical skills, requires special training, practical lessons, feedback and time[1].

In order to determine what tools and methods the teacher should use to form students' functional literacy and their critical thinking, it is necessary to determine what thought processes directly affect its formation.

Based on B. Bloom's taxonomy, we consider the mental activity of students. Bloom developed a system of thinking that aims to go beyond traditional memorization in education and includes «higher-level» thinking. Bloom provided a rationale for the interdependence of educational goals and the individual's cognitive domain, which he believes reflects different levels of human thinking, and identified six levels of thought processes. They noted that low-level thinking skills include skills such as «Knowing» and «Understanding», while «Application», «Analysis», «Synthesis» and «Evaluation» form the basis for the development of higher-level thinking skills.

Knowing is the lowest level of cognition and thinking. This level focuses on checking how memory is stored by repeating or recognizing information, recalling information and data.

Understanding - the level of knowledge and thinking - medium level. To establish the understanding of the knowledge in the new material, create a dialogical communication. Asking students' thoughts in a different way, making predictions. Ensure understanding of new material. After the new lesson has been explained, it is the period of determining how students have mastered it.

Application - knowledge and thinking level - medium level. This level refers to the application of the learning material in a real situation and in a completely new situation. It includes rules, methods, concepts, laws, principles, theories, practical application in life. Learning outcomes require deeper mastery of the material than the level of understanding.

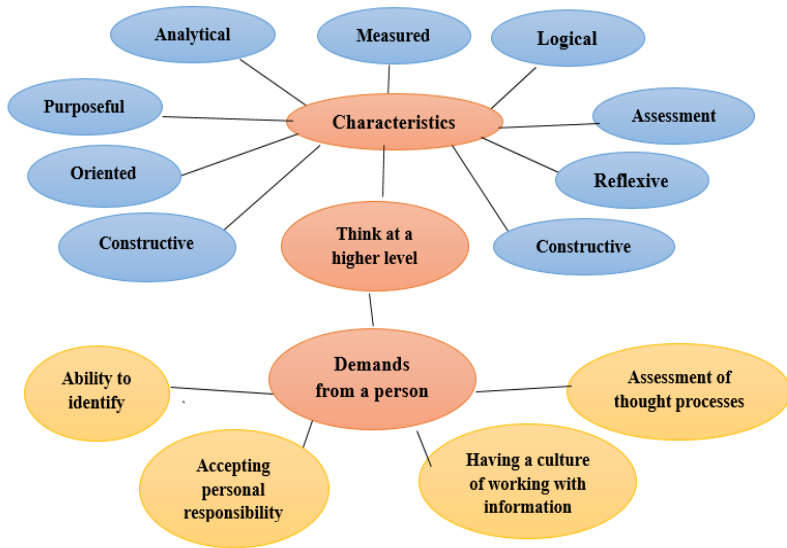
Analysis is the highest level of cognition and thinking. To make the structure of the educational material clearly visible, divide it into components: separate parts of the whole; to determine the interrelationships between the parts of the whole, to feel how the whole is organized. This level refers to the perception of the content of the learning material as well as how its internal structure is formed.

Accumulation is the highest level of knowledge and thinking. Helping to create a new one from individual parts or scattered things in the educational material. Directing from private to public. The game collects and creates its own model of problem solving.

Assessment - the level of knowledge and thinking - the highest level. Determining the importance of the educational material, giving an opinion about it, expressing an opinion. This level refers to achieving the learning outcomes of the previous ones. Determining the need and value of the material, directing judgment, exchanging ideas, choosing what is needed (1 picture).

B. Developing Bloom's idea, the didactic matrix related to the taxonomy of goals for other elements of the methodological system clearly shows the way to move from educational (flat) didactics to the three-dimensional constructive stage. Modern didactics should provide three-dimensional, «height» development, «space» search and research for students. Logical sequence: didactic matrix - a three-dimensional methodological system - three-dimensional didactics - is the most effective mechanism of transition from the «knowledge=teaching» paradigm to the «knowledge=formation» paradigm.

Since the teaching paradigm is chosen as a way of individual activity, the content of each level of the three-dimensional methodical system is formed in the form of necessary multi-level tasks that develop students' own cognitive



Picture 1. Higher level thinking

activity. They are description of the taxonomy of learning objectives; a significant description of the main properties at the relevant level; three-dimensional methodical system is developed based on the requirements for mastering the level.

In the assessment of the functional literacy of students in computer science, the features of using the criterion approach are life tasks that contribute to the formation of activity in the system of level tasks. For this purpose, students with high learning ability: control with mutual assessment (test); conducting experiments, describing life phenomena, conclusions based on observations are offered. In addition, protection, acquisition and formulation of creative (scientific) work; solve logical thinking problems; It is appropriate when solving problems in groups.

Comparison, evaluation, classification, generalization and clarification, analysis, creative use of knowledge in the performance of these tasks; establishing cause-and-effect relationships, making logically based conclusions that require a high level of competence. At the intermediate level, students individually compile a synopsis, a scheme; fill in the table independently; observations in groups that can be carried out individually or face-to-face. The task of such content is to

determine the completeness of knowledge due to the large number of concepts and connections in the system, to determine the in-depth explanation of each concept depending on the nature of the interrelated features that the student should learn [2].

Students with low learning abilities can be offered written dictations on facts, formulas, concepts, definitions of the studied material; terminological dictations with selective control (5-6 works); exercises with the student's survey etc.

In the process of performing these tasks, the nature of students' activities includes determining the conceptual system of the course, sections or individual topics, the signs of concepts and their relationship. Therefore, we have considered the system of functional literacy assessment tasks aimed at practice.

When organizing monitoring through the system of tasks for assessing functional literacy in computer science, it is necessary to combine its various forms. For example, if the learning material is easy, then it is better to organize pair or group work that allows students to independently check the level of their knowledge, determine the activity, learn to express their thoughts in pairs or groups, consciously accept new material and exercise self- and mutual control. Such an organization of observation allows students to conduct an in-depth inquiry with comments: one student answers, the rest complete one or another aspect of the studied material.

Comprehensive monitoring classes based on a broad combination of all forms of its organization with a level approach to determining students' knowledge are of great importance.

Therefore, the organization of monitoring the knowledge of students with different specific capabilities by the system of level tasks includes the use of appropriate forms, methods of organizing educational activities.

In the tasks for students of different levels presented in the table, the complexity of the learning activity and the increasing role of independence in its implementation are observed. The proposed distribution of forms for monitoring students' knowledge and practical skills allows the teacher to save time when planning control measures. Checking the works of students, the teacher analyzes how the student performs the proposed task. If the student does the work independently, you should choose tasks that are appropriate for the next level and make the learning activity more difficult for him/her. This creates conditions for the development of students' activity [3].

Features of tasks for assessing functional literacy in informatics

- life situations are described in each task, usually they should be close and understandable to the student;
- each project should have tasks that can be solved with the help of knowledge;

- the context of tasks should be close to the situations that arise in everyday life;
- the situation requires a conscious choice of a behavior model;
- questions should be in simple, clear language and usually have little meaning;
- information is presented in textual and non-textual form (tables, simple bar charts, advertisements, bank statements, etc.).

Evaluation criteria are developed taking into account standard requirements and methodological recommendations for the subject of study. Measurements are not absolute, the assessment of similar activities varies depending on the age of learners.

For grades 5–9 of the basic secondary education level, based on the model curriculum with updated content on the subject «Informatics», a system of level tasks for assessing functional literacy in informatics was created based on the criterion method. Let's consider an example of creating life-situational tasks in the formation of functional literacy in informatics:

Level 1:

Section «Computer systems».

1_1) Section of computer devices

Topic: «Digital carriers of information» (grade 5)

Task: Arman wrote an abstract about information. In the abstract, the modern computer can store various information in its memory: textual, graphic, digital and tabular, audio and video information. How do you understand the concept of information, what is information?

a) Describe the definition of information.



b) How do we perceive information in life?

Solution -----

Explanation -----

c) How is information given in life? Write the answer on the diagram.



Level 2:

Section «Computer systems».

1_1) Section of computer devices

Topic: «Digital carriers of information» (grade 5)

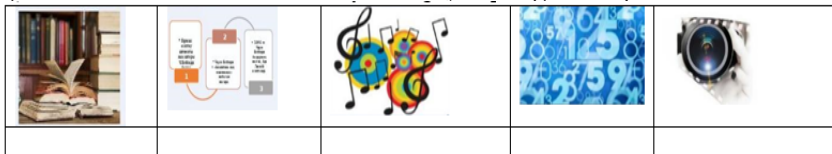
Task: Aidana reads a book. Human senses play the role of biological information channels. Read and understand how signals carry information from the senses to the brain. How does a person store information? Describe the types of information by looking at the picture.

a) Identify the media in the picture.



Explanation _____

b) Describe the sources of information by looking at the picture.



3 levels:

Section «Computer systems».

1_1) Section of computer devices

Topic: «Digital carriers of information» (grade 5)

Task: Askhat wrote an essay on the topic of human perception of information. It is necessary to write information about how a person receives information about the objects of the surrounding world with the help of his senses. Let's help Askhat write an essay. Information can be received through what senses?

a) List the senses through which a person receives information about objects in the surrounding world.

Information Type	Description	Explanation

b) Find the current means of information transfer.



c) Find the wrong answer in the drawings and fill in the table

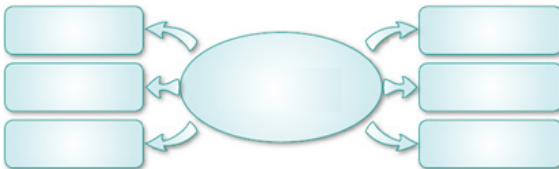
Life situation	Information carrier	Information carrier
The whole family will see the video of their favorite cartoon.		
Children will see a marble statue in the museum.		
"Soon there will be a storm at sea," someone wrote on the sand on the beach.		

- Photo paper
- Magnetic tape
- Sand
- Laser disc
- Marble

d) What were the types of information in ancient times? Describe by looking at the picture



e) Place the properties of information in the scheme and give an example



Evaluation criteria for level assignments:

№	Evaluation criterion	Descriptor	Task level complexity		
			1 level	2 levels	3 levels
1	Define the concept and types of information.	Define the amount of information;	0-3		
2	Describe the properties of information.	Define the scope of the document; Analyzes the units of measurement of information		0-3	
3	Prove the need to determine information properties.	Convert numerical values from one unit of information to another unit of measurement It examines and proves the size of files in different formats where information is stored.			0-3
General points - 9					

Note: 0 point did not complete the task, 1 point - low level of task completion, 2 points - medium level of task completion, 3 points - high level of task completion. The maximum mark for one task is 9 points.

Criterion method of student evaluation is comparison of the student's achievements with clearly defined, collectively developed criteria known in advance to all participants of the process. Evaluation criteria are developed for each subject. During the competent construction of the criterion scale, the student can independently assess the quality of his work, which contributes to the achievement of high educational results and the formation of learning independence.

The use of the criterion approach in the educational system allows to determine and improve the system of evaluating the progress of students using

certain parameters (criteria) that allow students to compete in high school with the objective goals of an individual subject.

In short, the features of using the criterial approach in assessing the functional literacy of students in computer science include self-examination through level tasks, they know their mistakes, conduct analysis, check the quality of education, clearly see the results of their acquired knowledge, perform tasks that increase thinking ability.

Thus, the student learns to act only in the learning process, and the daily work of the teacher in the classroom, the chosen educational models form the functional literacy of students. Therefore, an important task in the development of the skills of a modern teacher is the formation of his/her functional competence, including deep theoretical training and practical experience in the effective use of modern educational models in the classroom, readiness for flexibility, adaptation and transformation.

References

- 1 Avdarsol S. The role of criterion evaluation in the formation of students' functional literacy. //Newsletter, No. 2 (62), KazNPU named after Abay. Almaty. 2018. B 181-187.
- 2 Sagimbaeva A.E., Avdarsol S. Assessment of students' functional literacy in computer science based on the criteria approach // «Newsletter» of the Kazakh National Pedagogical University named after Abay. Physical and mathematical sciences» series. - Almaty. 2019. - No. 4 (68). -B. 244-249.
- 3 Basova E.A. The formation of functional literacy in teenagers in the field of communication (on the material of humanitarian subjects): dissertation. ... sugar. ped. Nauk / E.A. Basova. - St. Petersburg, 2012. - 221 p.