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**FUNCTIONAL LITERACY OF STUDENTS IN THE PROCESS OF
TEACHING NATURAL SCIENCE SUBJECTS**

T.Zh. Shakenova, Sh.Sh. Khamzina

Innovative University of Eurasia, Pavlodar, Kazakhstan

Summary

The article considers the development of functional literacy of students using the technology of project activities in biology lessons. Design activity is one of the most effective educational technologies of a modern school. This is a purposeful, independent activity of students under the guidance of a teacher. The latter creates a positive emotional atmosphere for all students while working on the project, organizing an equal partnership of trusting communication.

Currently, preparing students for life is one of the leading priorities in the development of functional literacy. A broader interpretation of the concept of «functional literacy» is associated with the consideration of education as a creative factor, the driving force behind the socio-economic, cultural progress of society.

The current understanding of learning outcomes goes beyond the usual list of knowledge, skills and abilities associated with teaching a subject. Educational results are the end product of the process of teaching students at school and testify to qualitative changes in the personality of the student and are manifested in his behavior, interaction with the social environment.

Functional literacy is defined as the ability of an individual to function normally in the system of social relations based on knowledge, skills and abilities, to adapt as quickly as possible in a specific cultural environment.

Key words: *functional literacy, students, subject, competence, direction.*

Introduction. Modern education today faces many different problems. One of the characteristics of success in school is that it does not always mean success in life. Practice has demonstrated the ineffectiveness of the existing object or disciplinary model of the content of education, focused on knowledge, which has existed for many years. In modern conditions of socio-economic modernization, society needs a functionally competent person, capable of achieving results, capable of achieving socially significant results. These qualities are developed in the general education school. The national action plan for the development of functional literacy of students, approved for the period 2012-2016, states that «...teachers of republican secondary schools provide strong subject knowledge, but they do not teach them how to apply it in real life situations».

To teach students to independently extract, analyze, structure, and also effectively use information for maximum self-realization, useful participation in the life of society in the leading direction of modernizing the education system of many foreign countries, the CIS, including Kazakhstan.

In the context of modernization, the role of natural sciences in scientific sphere is increasing, which is many «borderline» areas of research in other disciplines, which is the most effective way to develop means of solving vital problems, problems for one person (energy production, environmental protection, health, etc.). etc.). The essence of this process is functional literacy, since it means that «a person can solve ordinary life tasks in various spheres of life and activity

on the basis of the knowledge gained.» This is due to personal characteristics, including: susceptibility to a problem (recognition, detection), fluency (speed of various ideas generation), flexibility (ease of switching methods for solving problems), originality (object improvement, new solutions, ideas), conflict of interest (non-traditional strategies for solving problems), expectation (forecasting, waiting for ways to solve problems) [1, p. 25].

Thus, problems of interdisciplinary content are vital issues. Educational science theory includes practices that use the knowledge and skills of learners in multiple subjects.

The student must have general problem solving ability. It has been proven that students who are proficient in general methods of solving problems will be able to competently solve almost any significant problem using scientific knowledge. Skills for developing problem solving in the process of solving problems on a specific topic are then generalized and replenished with specific content.

Meanwhile, the content can be related to biology, chemistry, humanities in general. There are also situations where you don't need scientific methods at all. You have to use your intuition or even guess. These challenges are difficult for our students. Most people use a simple algorithm: when we talk about science, you have to read it very carefully and take into account every detail, and when we work with literary texts or people, you can ask for a general understanding. But everyday life and modern science sometimes demand the opposite.

A real math task may simply overflow with completely unnecessary data. For example, take some articles on improving the well-being of citizens. There will be a lot of quotes from speeches, but if we drop journalism and do simple mathematical calculations, it turns out that inflation eats up all salary increases. Everything happens the other way around. The text looks like a free science fiction writer, but to understand its meaning, you need to carefully monitor every word and every comma.

The next problem is that students cannot draw on proxies under important circumstances. The only exceptions are certain constants of mathematics and physics. If knowledge of biology or history is needed to solve a physical problem, the problem usually arises. A solid concrete wall was erected between the various disciplines of education in Kazakhstan. But the world outside the window is one. Our students are not taught enough to work with texts of different genres. In the classroom, teachers work mainly with sections of textbooks, and in response they ask to write essays. At the same time, there are hundreds of different types of texts that a person has to deal with as part of solving life problems: press release, author's column in a newspaper, operating manual, scientific article in a popular or scientific journal, trade exhibition, marketing research report. ... Each is completely different from the other, requiring its own approach. Unfortunately, our students are not taught to work with them.

For secondary school teachers, it seems like reading ends in elementary school. They work very superficially with the text: they make a plan, they find the main idea, they tell the content. It is very difficult for students to understand why the author wrote this text, there are no skills or abilities to identify the problem in the text. Few people realize that the facts are biased.

The separation between school and real life, according to teachers, begins in elementary grades. The child worries about why the dinosaurs died, how the caterpillar turns into a butterfly, how the English pirates ended up in the Caribbean. In the lower grades, very little time is devoted to science.

Analyzing the schedule of primary school pupils, we make the following conclusion: basically, there are no classes in nature studies, the Russian language and mathematics. It is believed that at this age it is useless to explain geography or the basics of physics. This cannot be explained «scientifically» to students, but parents must explain it differently in the family. But the definition «the end of the changing

part of the word, it serves to combine words into a sentence» a nine-year-old child must understand and then assimilate along with declensions, conjugations and other spelling rules of the language.

If you look at the physics program, you can learn today is Newton's first law, tomorrow is the second, then the third. There is no time left to seriously discuss what has been learned, to learn this knowledge not only to store it in memory as a dead weight, but to use it actively.

The problem of working with scientific knowledge still exists in adulthood. For example, a survey was conducted among the adult population, and it was proposed to confirm or deny data from the natural sciences. For example, «antibiotics equally kill all bacteria and viruses», «all radiation is the work of man», etc. Our indicators were much worse than those of the Europeans. Perhaps the graduates of Soviet schools could easily reproduce the definition of radiation that was stored at that time, or explain how the RNA virus differs from the DNA virus. But such a vital thing as the effect of antibiotics turns out to be a mystery to them. At least 45% of respondents answered this question incorrectly. This is a very real problem because we tend to heal ourselves. If a person, having caught the flu, stuffs himself with tetracycline, this at least poses a danger to health and even life.

After listing the disadvantages of the Kazakhstani school, a reaction arises in the way of «find the culprit!» The easiest way is to blame everything on foreign critics, who, as you know, adhere to double standards, do not like Kazakhstan and other complexes. Well, the Soviet school was, of course, the best in the world.

PISA is not the only international research. There are other scientists who value the level of mastery of the school curriculum. And there are really good indicators here. Our teachers honestly perform the tasks defined by the state, the whole question is what these tasks are [3, p. 21]. Many teachers are genuinely willing to recognize the importance of PISA and teach not only knowledge but also skills

that can be used in real life situations. But how can you fulfill this desire?

From the point of view of history teachers, history lessons can be conducted so as not to memorize a lot of factual material, learn how to work with documents, analyze resources and seek information, that is, form practical skills. Of course, for this you will have to complete quite a few different tasks, carefully work out the script of the lesson. According to practicing teachers, it takes several days to prepare for this type of training fully.

Another disadvantage for students is that they cannot work with information presented in the form of various blocks. For example, a description of a laptop might include a promotional article about that model, a datasheet, and a series of user reviews. To complete your purchase, you must match these receipts. Users can praise the processor's performance, but the home appliance ranking chart shows that the clock frequency is significantly lower than that of competing models. For example, the ad copy says: «Thanks to modern batteries, this laptop is indispensable for those who spend a lot of time on the road,» but many who have tried this model admit that it takes up to an hour to charge the battery. Another problem was identified by the teachers - the definition of the format of the assignment. For example, a student sees physical expressions and formulas in a problem. In his opinion, «this is a problem in physics, which must be solved by physical methods. There is no other way out».

Materials and methods. One of the methods for the formation of functional literacy is experience, experiment, modeling, which allow solving research and communication problems, form the ability to analyze various situations in the educational process, from the point of view of students' life safety. The using the virtual laboratory in the classroom significantly increases interest in the subject, contributes to the development of computer technologies. Another important method is the project method. By its didactic essence, it is aimed at developing the ability to adapt to changing conditions,

navigate in various situations, and work in various groups. To form functional literacy among students, we used this method very often in the classroom. In addition, they used educational game technologies (riddles, rebuses, crosswords, role-playing games and others) - this is a type of activity in biology lessons aimed at recreating, assimilating and increasing personal experience, in the process of which educational activities are formed and improved. All this contributes to the formation of functional literacy. A problem is always an obstacle. Overcoming obstacles is movement, a constant companion of development. The use of problematic tasks in the classroom allows you to develop such personality traits as: resourcefulness, ingenuity, the ability to non-standard solutions, problematic vision, mental flexibility, mobility, information and communicative culture.

The solution to any problem is a complex process that includes the mental activity of schoolchildren, the use of knowledge, whether in similar situations or involving transfer. The process of transmission, which consists in reproducing and using by the student previously acquired knowledge, techniques (reconstructing them or not, taking away the necessary knowledge, techniques from others, etc.), which processes mental activity in essence (analysis, generalization, etc.) [2, p. 47].

Students analyze an unknown situation, characterized by the presence of objects known to them, but in unknown relationships, trying to find these connections, that is, to «transfer» previously developed skills to a new situation.

Results. The problem of developing students' functional literacy in the process of natural science education should be solved from the point of view of developing

Table 1. Indicators of educational motivation of students in relation to the subject «Biology» (students of the 8th grades) (2020-2021)

Indicators of learning motivation		Control group (%)	Experimental group (%)
1. The attitude to the «Biology» subject	Positive	24	26
	Neutral	40	37
	Negative	36	37
2. The need of learning	Yes	32	34
	No	68	66
3. The possibility of using biological knowledge in subject activity	Yes	45	43
	No	55	57
4. The difficulty in learning the subject	Yes	48	47
	No	52	53

the ability to solve problems independently and apply knowledge to new situations.

In order to study the attitude of students to the subject of biology, we invited students to answer the following questions

of the questionnaire, which are reflected in Table 1.

As a result of the survey carried out in the 8th grade, it is clear that the students of

both the control and the experimental group relate to the subject of biology as follows: positively - 24% of the control and 26% of the students of the experimental group; neutral - 40% of the control group and 37% of the students in the experimental group; negative - 36% of the control and 37% of the participants in the experimental group. The need to study biology as a subject is considered only by 32% of students in the control group and 34% in the experimental group; respectively, 68% of the control and 66% of the experimental respondents believe that it is not necessary to study biology; Difficulty in studying the subject is caused in students by 48% of the control and 47% of the experimental group; for 52% of students in the control and 53% of the experimental group, the study of biology causes some difficulties.

Biology teachers believe that there are problems that hinder the development of literacy in the field of biology:

- lack of practical orientation in biology (absence of a focused approach to teaching);
- method of reproduction in teaching (solution by analogy);
- skillful organization of work on home upbringing;
- students do not perceive theoretical concepts (laws, etc.).

Today, it is necessary to focus on educational programs that result in qualifications that are comparable, transparent, therefore, traditional methods of learning knowledge or skills need to be exchanged, others that allow assessing competence, that is, the ability to practically apply knowledge when performing professional tasks. In this regard, the experience of the international study of the results of PISA (international student assessment program), which assesses the level of competence, is extremely important.

Discussion. According to most teachers, high school students are familiar with the biology curriculum, but they do not understand many issues such as GMOs, protein synthesis, etc. Therefore, students need to be taught the knowledge. The

student must study and understand the laws and their application, patterns, historical facts. It is very important to be able to solve real life problems in the classroom. This is all «functional literacy». For example, two people who are quite well versed in chemistry, one knows the laws, solves problems, and the other is good at using computation in experiments. By participating in a subject Olympiad, the one who can successfully conduct experiments becomes the winner. Thus, one has more knowledge, but the other has better use of it. Kazakhstani schoolchildren have big problems with these competencies. PISA testing, conducted in 2012 in the leading countries of the world, is one of the most reliable studies of the quality of education. The results of this study are very regrettable for our republic. In terms of scientific literacy, we were not at the top, as in math and reading literacy. At the same time, according to the level of reading competence, Kazakhstan ranks 63rd, and is among 65 countries participating in the international study.

PISA tests are based on solutions that are not sufficient to understand facts and rules. Students should also be able to use them, such as articulating their point of view in a debate about genetically modified foods or understanding an article on global warming. If we turn to research to assess the demand for various human skills in the labor market. Analyzing our failures in PISA, subject teachers enrolled in the training courses identified gaps in those skills where students are unable to solve problems successfully. For example, students use not the fact that the answer to a math task may not be a number, but a conclusion [3, p. 68].

Conclusion. Thus, nowadays there is a need for a curriculum for preparing all students to successful learning, focusing on the skills of critical thinking, creativity and relationships. It is necessary to revise the tasks in the textbooks, create situations that require solving a specific problem, look for new solutions without providing them ready-made one. The new sections in the textbooks should not be added. And students

should be trained on PISA tests. Schools operate in accordance with textbooks that provide academic knowledge, skills and abilities. Currently, textbooks are required that contribute to the education of the competent student of the modern school.

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Жаратылыстану-ғылыми бағыттағы пәндерді оқыту процесіндегі оқушылардың функционалды сауаттылығы

Аңдапта

Мақалада биология сабақтарында жобалық қызмет технологиясы арқылы оқушылардың функционалды сауаттылығын қалыптастыру мәселелері қарастырылады. Жобалық қызмет - заманауи мектептің тиімді оқу технологияларының бірі. Мұғалімнің басшылығымен оқушылардың мақсатты, өзіндік іс-әрекеті. Мұғалім жоба бойынша жұмыс барысында барлық студенттердің жағымды эмоционалды көңіл-күйін қалыптастырады және тең серіктестік сенімді қарым-қатынасты ұйымдастырады.

Қазіргі уақытта студенттерді өмірге дайындау функционалды сауаттылықты дамытудағы жетекші басымдықтардың бірі болып табылады. «Функционалды сауаттылық» ұғымының кеңірек түсіндірілуі білім беруді шығармашылық фактор, қоғамның әлеуметтік-экономикалық, мәдени прогресінің қозғаушы күші ретінде қарастырумен байланысты.

Оқыту нәтижелерін қазіргі заманғы түсіну пәнді оқытумен байланысты білімнің, Дағдылар мен дағдылардың әдеттегі тізбесінен асып түседі. Білім беру нәтижелері оқушылардың мектептегі оқу процесінің соңғы өнімі болып табылады және оқушының жеке басындағы сапалы өзгерістерді көрсетеді және оның мінез-құлқында, әлеуметтік ортамен өзара әрекеттесуінде көрінеді.

Функционалды сауаттылық адамның белгілі бір мәдени ортаға мүмкіндігінше тез бейімделу қабілеті, білімі, дағдылары негізінде әлеуметтік қатынастар жүйесінде қалыпты жұмыс істеу қабілеті ретінде анықталады.

Түйінді сөздер: функционалды сауаттылық, оқушылар, пән, құзыреттілік, бағыт.

Функциональная грамотность учащихся в процессе преподавания предметов естественно-научного направления

Аннотация

В статье рассматривается развитие функциональной грамотности учащихся с использованием технологии проектной деятельности на уроках биологии. Проектная деятельность - одна из наиболее эффективных образовательных технологий современной школы. Это целенаправленная, самостоятельная деятельность учащихся под руководством преподавателя. Последнее создает положительную эмоциональную атмосферу для всех студентов во время работы над проектом, организуя равноправное партнерство доверительного общения.

В настоящее время подготовка студентов к жизни является одним из ведущих приоритетов в развитии функциональной грамотности. Более широкое толкование понятия «функциональная грамотность» связано с рассмотрением образования как творческого фактора, движущей силы социально-

экономического, культурного прогресса общества.

Современное понимание результатов обучения выходит за рамки обычного перечня знаний, навыков и умений, связанных с преподаванием предмета. Образовательные результаты являются конечным продуктом процесса обучения учащихся в школе и свидетельствуют о качественных изменениях личности учащегося и проявляются в его поведении, взаимодействии с социальной средой.

Функциональная грамотность определяется как способность индивида нормально функционировать в системе социальных отношений на основе знаний, навыков и умений, максимально быстро адаптироваться в определенной культурной среде.

Ключевые слова: функциональная грамотность, учащиеся, предмет, компетенция, направление.

**КЕАҚ «Павлодар педагогикалық
университеті»**
БСН 040340005741
ЖСК №KZ609650000061536309
АО ForteBank («Альянс Банк»)
БИК IRTYKZKA
ОКПО 40200973
КБЕ 16

**НАО «Павлодарский педагогический
университет»**
БИН 040340005741
ИИК №KZ609650000061536309
АО ForteBank («Альянс Банк»)
БИК IRTYKZKA
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Редакциялық-баспа бөлімі
Павлодар педагогикалық
университеті

140002, Павлодар қ., Мира к-сі, 60.
Тел. 8 (7182) 55-27-98.

Редакционно-издательский отдел
Павлодарского педагогического
университета

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Тел. 8 (7182) 55-27-98.