ISSN: 2707-1146
e-ISSN: 2709-4189

DOI: https://doi.org/10.36719/2707-1146/46/38-41

Nizami Akbarov
Azerbaijan State Pedagogical University
adpu-kimya@mail.ru
ORCID ID: 0009-0005-4611-8754
Kamala Iskandarova
Azerbaijan State Pedagogical University
kemaleisva@mail.ru

INTRA-DISCIPLINARY AND INTER-DISCIPLINARY INTEGRATION IN THE TEACHING OF THE LANGUAGE OF CHEMISTRY

Abstract

In this article, the intra- and interdisciplinary integration of chemistry language teaching is discussed in order to achieve quality education in the teaching of chemistry. It was noted that quality education in the teaching of chemistry begins with intra-subject and interdisciplinary integration, quality teaching of subjects in the teaching of chemical language. The application of chemical language in education and the correct and purposeful use of modern teaching methods have a positive effect on the mastery of chemistry.

Keywords: *chemical language, interdisciplinary integration, interdisciplinary integration education, teaching, training, subjects, teacher, student, quality education, school, university, learning, reading*

Introduction

Chemical science – since it is a natural science, it develops closely with other precise and natural sciences, in particular, mathematics, biology, geology, physics, ecology, etc. Until the 18th century that the great Russian scientist V. Lomonosov said mathematics is the eye of chemistry and physics (Guliyev, 2014: 38-45).

Many changes in nature – the formation of new substances, the transformation of which they roam in living organisms, photosynthesis, assimilation-dissimulation, and otherbiochemicall processes are chemical phenomena. As the chemistry of these processes is studied, it becomes easier to understand the nature of all biological processes that occur in the body. Therefore, chemical science, in close contact with other natural sciences, is developing faster and expanding its limits day by day (Gurbanov and et.al, 2014: 64-72; Akanbaeva, 2014: 134-135).

At present, new subject curriculums in secondary schools are based on the principles of personality, consequence, and urgency, as well as integrativity. The teaching process requires special knowledge and skills for teachers to use in place of integration. The term integration is used in most fields, and there are many approaches about it that are essentially the same, different in content. Integration is derived from the Latin words “integratio”, “integrator”, “integrations”, which means restoration, whole, whole, complete, unified.

From the given meanings, it is necessary to have integrity and integrity in every field and act accordingly. The integration is to form an integrated and indivisible image of the world in the thinking of students within a given educational system, to establish and systematize structural relationships between all content components of the training, with the aimof guiding them towards growth and self-development (Akbarov, Hasanli, 2022: 9-18).

Integration improves the learning process and serves to deepen interaction and dependence between disciplines. The use of the term integration in its broadest sense began at the end of the twentieth century. However, since the foundation of life, society itself has evolved and formed in relation to the countries of the world, not in isolation in all processes. One of these connections is

the field of study. In this regard, along with other fields, there has been a need in education to approach this relationship on an integrated basis (Aliyev, 2006:70-88).

One characteristic of subject curriculums currently practiced in secondary schools is their integrated nature. The chemistry curriculum also provides integration of content lines such as "matter and material world," "chemical phenomena," "experiment and modeling," and "chemistry and life." The knowledge components of the standards provided on those content lines are linked to the following lines of action (Aliyev, 2007:42-56):

1. Naming Substance
2. Determination
3. Compilation
4. Characterization
5. Troubleshooting
6. Performing chemical experiments
7. Solve the case and exercises, chemical calculations
8. Communicating and connecting
9. Submission Outlined action lines ensure the process of mastering content standards.

An integrative curriculum enables teachers and students to: - approach issues globally; - connect concepts (concepts); - connect subjects and topics; - use different resources at the same time, etc. An interdisciplinary curriculum phrase is often used synonymously with an integrated curriculum. Components of the integrative curriculum include the following (Alizadeh, 200l: 12-16):

- Experiential integration – experiences deepen and broaden existing insights.
- Social integration – provides an opportunity for students to share their passion through a democratic learning process.
- Knowledge integration – students take their previous knowledge, skills and skills as the basis for new studies.

Integration of education means the formation of a global way of thinking, solidarity, and responsibility for students using the connections that are naturally present between them in the teaching of different disciplines. Integration is Latin for "integrio", meaning "restoration, completion". Integration is the skillful and efficient use of intra- and interdisciplinary relations to enrich the lesson material in the teaching process (Ilyasov, 20l8: 47-49).

Providing intra-disciplinary and interdisciplinary integration in the teaching process according to educators is an essential prerequisite for easier mastering of knowledge and skills by students, establishing interesting and contentious lessons, and developing research and research trends in students. The experts cite the reasons for the need to create integrative curricula as follows (Mehrabov, 2005:24-29):

- Any form of learning can be used to teach integrated topics and concepts.
- Loaded with training material, repeated learning of the same concept through different disciplines is avoided.

-Access to different stages of training (vertical integration) and linking concepts (horizontal integration). An integrative curriculum provides an opportunity to put in place important research questions and conduct extensive research around them. When an integrative curriculum is applied, the purpose of education here includes not only learning and knowing about events and manifestations, but also using acquired knowledge, skills, and values in different situations, improving research, understanding. Interdisciplinary curricula address issues that limit the ability of the subject and contribute to the study of a wide range of areas by linking different sides of the subject curricula. All reforms about integrated and interdisciplinary curricula are thus grouped; merging disciplines, increasing focus on creative activity, use of textbook sources, gutter relationships between concepts, changing schedules, and changing groupings of students (Weisova, 2004: 38-42).

Level of interdisciplinary integration. Special importance is given to interdisciplinary integration during the organization of integrated learning. This level of integration involves the use

of concepts and methods related to one discipline in the study of another discipline, with the synthesis of shared concepts, knowledge, and skills covered by several disciplines. Interdisciplinary integration serves to expand learning materials with content at the expense of the capabilities of other disciplines, and to provide in-depth analysis and summarization of issues. This process ensures that the same skill is improved through individual disciplines and provides an opportunity to enhance the learning process. Methodical literature talks about special skills called interdisciplinary skills. Interdisciplinary skills occur in relation to the content of several disciplines and are useful for real life situations. Because they are natural connector to integrate the subjects (Polat, 2002: 9-l7).

Interdisciplinary skills require students to perform complex activities. These skills include teaching and learning, critical approach, efficient communication, problem-solving, integrations management, etc. Here's an example of one. Teachers provide generalized knowledge of the essence and content in the classroom, depending on their expertise and skills, in the context of natural connections to students in close proximity to their subjects (relatives). However, what is new in our minds is that as the creation of these connections is considered as a principle and one of the content components in the subject curriculum in the name of integration, teachers should consider this as a state requirement in the course plan.

Teachers who teach the subject use knowledge related to other natural sciences that are directly related to chemistry in this process. In this regard, there is a need for a high degree of use of integration in the teaching of chemistry. Because the substances and combinations of chemistry studied are related to the world around them, it is important to integrate them with the development of students' ecological knowledge. This issue is reflected in the standards of the “Chemistry and Life” content line of the subject curriculum. Therefore, it is important to integrate environmental education, environmental knowledge and skills into the study and chemistry lessons on the merits and content of literature materials. In order for students to gain a deep understanding of the ecological issues they are constantly encountering, the reasons that create them should be investigated by integrating chemistry with knowledge. The integration of ecological knowledge in the teaching of chemistry has great educational value. In chemistry classes, the need to connect not only with the natural sciences but also with technical disciplines elevates the integrability of the subject to a higher level, elevates its leading role, enables effective use of different learning methods, requires more co-connections with the sciences

Interdisciplinary integration as a pedagogical problem. The political and theoretical level of education is determined by the social requirements of society and the science and technical progress. In this regard, interdisciplinary connectivity emerges as a most pressing pedagogical problem. This issue is closely related to the content and structure of education. Therefore, this should be reflected in training methods, forms, and tools. Interdisciplinary communication helps students build their knowledge, create a full picture of the real world, and form a mutual dialectic of events. The correct solution to the problems of coordination and integration of educational content is also closely related directly to interdisciplinary communication.

Coordination, when designing a curriculum of individual subjects, deals with agreements and mapping to eliminate conflicts in the teaching and learning of the same subject in different subjects. Integration, however, refers to one-quarter of the aspects of that event that are considered in individual natural sciences in order to provide a complete picture of a particular natural phenomenon being taught. Apparently both are interdisciplinary (Avidov-Ungar, 20l8: l83 -l9l).

Clarifying the interdisciplinary relationship to the end provides optimal conditions for student learning and development. Therefore, the interdisciplinary relationship is viewed as an integral part of the training. The setting of the structure of the subject is also related to the solution of this problem, where students receive systematic and solid knowledge about the fundamentals of science. The study of the relationship between physical, chemical and biological sciences is especially important. Because, a number of advanced scientific ideas, such as molecular-kinetic theory, electronic theory, electrolysis, and some other concepts that form the main content of these

ISSN: 2707-1146
e-ISSN: 2709-4189

sciences, have firmly established themselves in the natural sciences. A number of their key issues are explained on the basis of these concepts.

Conclusion

Automation and mechanization of production processes, extensive use of the working principle of living mechanisms for the future progress of the technique, and so on, require highly qualified personnel who can handle new techniques. That is why secondary schools are most important for their students to gain a wide range of knowledge and skills that can keep up with the techniques. With this in mind, it is necessary to ensure that teachers of physics, chemistry, biology, and other natural sciences communicate closely, consult, and determine the scope of application of theoretical knowledge intended to be taught, to achieve a good understanding of the educational material by students and to activate learning methods. The work of advanced teachers shows that the physics class is more efficient when the material taught in that lesson is linked to phenomena in the environment, tied to the facts of living nature, and considered as the theoretical basis for the relevant technical devices.

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Received: 15.05.2024 Accepted: 22.06.2024