

METHODOLOGY FOR DEVELOPING CRITICAL THINKING IN ENGINEERS BASED ON AN INTEGRATIVE APPROACH

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Abstract. *This article highlights the importance of the integrative approach in education. In addition, the importance of developing critical thinking in engineers and the importance of an integrative approach are discussed.*

Keywords: *integration, approach, improvement, critical thinking, communication, competence, speech activities, cooperation, comparison, process, differentiation, standard.*

Introduction

In the Action Strategy for the Development of the Republic of Uzbekistan, "further improvement of the continuing education system, increasing the opportunities for quality education services, training of highly qualified personnel in accordance with the modern needs of the labor market" and "international standards for evaluating the quality of education and training" on the basis of implementation, it is indicated that "increasing the quality and efficiency of the activities of higher educational institutions" is one of the main tasks of the educational system [1].

Literature review

Integration in the science of pedagogy Since the 80s of the 20th century, scientific works using concepts such as integration, differentiation, and synthesis appeared, and the relevance of the problem of integration in the educational process began to be felt.

A.I. Avazboev, N.J. Isakulova, I.V. Makukhina, M.J. Toshov conducted research on integrated education in our republic [2;3;4].

On the advantages of organizing an integrated course M.S. Asimov, L.P. Zagorpaya, I.D. Zverev, L.F. Zenya, L.A. Korojneva, G.D. Kirillova, G.F. Fedores, V.N. The Maksimovas.

On the problems of integration in education V.S. Bezrukova, M.II. Berulava, A. Ya. The Danilyuks were working.

According to the integrative approach, I.Yu.Aleksashina, M.N. Berulava, I.D. Zverev, L.Ya. Zorina, V.D. Komissarov, N.Ye. Kuznesova, A.A. Makarenya, V.N. Maksimova, M.S. Pak, I.M. Titova conducted scientific research.

Research Methodology and Empirical Analysis

"Integration is seen in the convergence and interdependence of sciences in the processes of differentiation. The process of integration is manifested in a high form of interdependence [6]. Integration means integration, rounding up, summing up, uniting. The integrative approach reflects the objective integrity of various levels of systemic relations. And differentiation means difference, variety, that is, dividing the whole into parts, separating. So, integration and differentiation are antonyms to each other, they have opposite meanings.

It is important to ensure integration in improving the content of education. The main features of the integration are as follows:

- integration has two natures at the same time, on the one hand, it means a process, and on the other, it means a result;
- interrelatedness, cooperation, attitude factors are the main features that ensure integration;

- integration is a process that ensures their combination with new elements and their quality based on the change of the main characteristics of the elements;
- integration determines the balance of the system and the mechanism of its development [6:48].

I. Kololozhvary, L. Sechennikova in their "How to organize integrative lessons?" in his article entitled "As a result of studying the possibilities of integrated lessons throughout the year, he is convinced that the future of this method is bright, and writes the following: "Through integration, it is possible to imagine the world fully and broadly in the minds of students, and the teacher becomes a science when imparting knowledge on, comparing information about other sciences, enriches, completes and improves knowledge on the basis of comparison" [9:87].

In the course of our research, we asked professors and teachers in the questionnaires, "What do you think is the achievement of the integrated course?" to the question, the teachers answered as follows: 14 (11.2%) teachers study the topic thoroughly, 20 (16.1%) teachers develop speech activity in the same way, 15 (12%) teachers teach students different topics a general understanding of increases, 13 (10.4%) teachers have motivation for language, 16 (12.9%) teachers save time and speech activities are used in real life.

Integrative education is divided into several types, and the main ones are listed below. Because their use in English language education is of great importance. R. Mavlonova also expresses the following thoughts about integrative education: "Integrative education is created on the basis of basic sciences covering every department of modern knowledge. In integrative education, deepening and increasing of interdisciplinary knowledge (integrative knowledge) and their formation are studied" [8:258].

Interdisciplinary integration is the integration of teaching of closely related subjects. Including reading, science, painting, work for primary education; biophysics, biology, geophysics, biochemistry, astrophysics, astrochemistry; pedagogy, psychology, physiology, psycholinguistics are examples. For example, R. Descartes, a philosopher, mathematician, medical scientist and methodological theorist from Farangistan, who lived in the 16th century, said "... all sciences are so closely connected with each other that it is better to master them one by one than to study them one by one is easier" [10]. L.N. Bakhareva's article entitled "Integration of primary school studies based on local studies" published in the Russian publication "Nachalnaya Shkola", looking at integration as a process of summarizing and connecting many subjects, proposed a new, whole, [10:48] [10:48] [10:48]

In the course of the task integration lesson, students are expected to perform various exercises and tasks in an integrative manner. In it, tasks are given sequentially, and they are also implemented through pedagogical and innovative technologies. This accelerates student learning and develops motivation for classes. It allows students to work individually, in pairs, and in groups, as well as to exchange ideas and help each other.

The integration of speech activities is of great importance, in which listening comprehension, speaking, reading and writing skills are combined in one lesson. The student speaks the information he understood by listening, and it is done by writing the information he got in reading. F.Alimov said that when developing speech skills suitable for the types of speech activity in a foreign language, each of them should be practiced in this type of speech activity, i.e. speaking, speaking, writing, writing, reading, listening, listening comprehension should be taught through [11:21]. The integration of speech activities allows students to learn English thoroughly and helps them develop communicative competence.

The teacher is the giver of knowledge, the students are the perceivers of knowledge, and the educational material means the movement of knowledge from the teacher to the students. Therefore, as the information content is materialized in educational materials, the management of design processes for the formation of critical thinking requires comprehensive pedagogical processing of the information content, adaptation of the selected educational materials to the real knowledge capabilities of students. In this way, the creation of compact, student-oriented assignments and educational complexes forms the ability of students to think comprehensively. Compliance with the above thesis increases the possibilities of managing the process within the studied problem, optimal selection of information, increasing the effectiveness of education and improving its quality. In order to form the critical thinking of students, it is necessary to distinguish the concepts of information content and educational content when designing the educational process. According to M. Makhmudov:

"The content of information: is a set of knowledge, skills, experience of creative activity and relationships selected with the didactic approach to the general foundations of modern science, technology, production, thinking, aimed at the education, development, education of students" . Therefore, first-year students' learning of social experience, educational content, information in the context of the educational process, knowledge, skills, methods of activity brought into the educational process for the purpose of education and development, and nature, society and a critical opinion is formed on the basis of their relationship to the emotional evaluation of thought phenomena.

In the process of forming critical thinking, educational content is brought into the educational process in the form of educational material. It is known that educational material is the last level of information content formation. It will be ready as part of various normative projects - curriculum, textbook before the beginning of education. In the educational process, educational work begins with studying the educational material. Educational material is an intermediate link between the content of information and the content of education. On the basis of the educational material, secondary projects are created: a lesson outline, a system of assignments, tests, educational benchmarks. In the process of formation of critical thinking, it is necessary to distinguish between two structural breaks of the educational material: the logical construction of the educational material; didactic construction of educational material. The didactic structure of the educational material is understood in two ways: the broad (global) structure of the educational material; narrow (local) structure of educational material.

Conclusion and discussion

It is appropriate to use pedagogical innovations in the process of forming critical thinking in engineers. During the formation of critical thinking, students acquire specific skills of independent thinking at the stage of assimilation of specific information about the text or topic. Students use the acquired knowledge in performing practical tasks in different ways.

The educational process is organized with the purpose of education, upbringing and development of engineering students. Accordingly, the formation of critical thinking in students largely depends on the design of educational material and its various forms. In order to form critical thinking in students, as a result of choosing and presenting educational tasks that are compact in terms of volume and encourage them to think coherently, their multifaceted thinking activity is determined. For this, purposeful design of educational materials is important.

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