



**OLIY O'QUV YURTLARIDA BOTANIKA FANINI
O'QITISH SAMARADORLIGINI OSHIRISHDA
INTEGRATIV TOPSHIRIQLARNING O'RNI**

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**THE ROLE OF INTEGRATIVE TASKS IN
ENHANCING THE EFFECTIVENESS OF
TEACHING BOTANY IN HIGHER EDUCATION
INSTITUTIONS**

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**РОЛЬ ИНТЕГРАТИВНЫХ ЗАДАНИЙ В
ПОВЫШЕНИИ ЭФФЕКТИВНОСТИ
ПРЕПОДАВАНИЯ БОТАНИКИ В ВЫСШИХ
УЧЕБНЫХ ЗАВЕДЕНИЯХ**

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Annotatsiya: Ushbu maqolada oliy ta'lim muassasalarida botanika fanini o'qitishda integrativ topshiriqlardan foydalanishning ahamiyati, ularning pedagogik ahamiyati aniq misollar orqali yoritib berilgan. Ishda botanika va tilshunoslikni uyg'unlashtirgan topshiriq namunasi keltirilgan va tahlil qilingan, uning o'quv loyihasi uslubiy jihatdan baholangan. Bundan tashqari, fanlarni o'zlashtirishda integrativ yondashuvning samaradorligini ko'rsatish uchun botanika, kimyo va matematikani o'z ichiga olgan fanlararo vazifa muhokama qilinadi. Natijalar botanikani o'qitishda chuqurroq o'rganishni rag'batlantirish va ta'lim natijalarini yaxshilashda integrativ topshiriqlarning muhimligini ta'kidlaydi.

Tayanch iboralar: Integratsiya, pedagogika, botanika, integrativ topshiriqlar, tilshunoslik, kimyo, matematika, metodik tahlil.

Аннотация: В данной статье рассматривается важность использования интегративных заданий в преподавании ботаники в высших учебных заведениях, подчеркивая их педагогическую ценность на конкретных примерах. В работе представлен и проанализирован пример задания, интегрирующего ботанику и лингвистику, и дана методическая оценка его методического оформления. Кроме того, обсуждается междисциплинарная задача, охватывающая ботанику, химию и математику, чтобы продемонстрировать эффективность этого интегративного подхода в улучшении понимания предметов. Результаты подчеркивают важность интегративных задач в развитии более глубокого обучения и улучшении результатов обучения в преподавании ботаники.

Ключевые слова: Интеграция, педагогика, ботаника, интегративные задачи, лингвистика, химия, математика, методический анализ.

Abstract: This article explores the significance of employing integrative tasks in the teaching of botany within higher education institutions, highlighting their pedagogical value through concrete examples. The paper presents and analyzes a sample task integrating botany and



linguistics, providing a methodological evaluation of its instructional design. Furthermore, an interdisciplinary task encompassing botany, chemistry, and mathematics is discussed to demonstrate the effectiveness of this integrative approach in enhancing subject comprehension. The findings underscore the importance of integrative tasks in fostering deeper learning and improving educational outcomes in the teaching of botany.

Keywords: *Integration, pedagogy, botany, integrative tasks, linguistics, chemistry, mathematics, methodological analysis.*

INTRODUCTION

Modern higher education must cultivate students' abilities to analyze and apply their own innovative ideas, solve urgent educational challenges using non-traditional approaches, and develop a culture of critical and creative thinking. To achieve highly effective learning outcomes, it is essential to implement a technological approach aligned with educational objectives and integrate it with other pedagogical methods.

In today's educational landscape, professional training is often based on a competence-oriented approach. However, applying this approach in isolation—without integration with other pedagogical strategies—may lead to the minimization of subject-specific content. Therefore, integrating pedagogical processes with appropriate technological strategies is a crucial condition for effective instruction.

LITERATURE REVIEW

This study primarily relies on the instructional manual "Practical Training in Botany" by H.Q. Esanov, which serves as a methodological foundation for organizing practical sessions, designing topic-based tasks, and structuring meaningful laboratory activities in the botany curriculum. The importance of an integrative approach in education, its role in shaping students' subject-specific knowledge and competencies, and its impact on the effectiveness of instruction are discussed based on the theoretical contributions of G.Komiljonova, V.A.Kosyakov, A.G.Zavyalova and Kuzina N.A. Additionally, M.K.Qayumova's scientific research has been used to develop and assess the effectiveness of integrative tasks in botany and evaluate their didactic potential in practice.

METHODS

Integrative instruction enables students to gain a deeper understanding of specific topics and fosters a holistic scientific worldview—a fundamental objective of teaching natural sciences. Instruction organized through integrative strategies should be reinforced with interdisciplinary tasks.

1. Sample Task (Integration of Botany and Linguistics):
Task: Identify the linguistic and factual errors in the following text related to Charophytes.



The cell wall of representatives of charophytes is saturated with magnesium salts, which makes them coarse and brittle. The sexual reproduction organs of charophyte representatives differ from those of other algae due to their multicellular structure and being simply formed. In charophytes, asexual reproduction is of the oogamy type. The representatives of charophytes live attached with their roots to the sediments under puddle waters, especially in canal waters, stagnant waters, and pond bottoms. In Uzbekistan conditions, they are especially common in fields where wheat has been continuously cultivated for 3–4 years.

2. Sample Tasks (Integration of Botany, Chemistry, and Mathematics):

a) A dry sample of Charophytes obtained through experimentation weighs 10 g. Laboratory analysis shows that 30% of it consists of calcium carbonate (CaCO_3). Calculate the mass of CaCO_3 in the sample.

b) In another experiment, 5 g of Charophytes are decomposed under heat. The calcium carbonate content breaks down according to the following reaction:

$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ If 40% of the sample is CaCO_3 , calculate the volume of CO_2 released under standard conditions (273 K, 1 atm).

ANALYSIS AND RESULTS

Tasks integrating botany and linguistics promote the development of biological literacy as well as linguistic culture, terminological awareness, and analytical skills. The sample task on Charophytes is designed to foster cross-disciplinary analysis by requiring students to identify stylistic, grammatical, and scientific inaccuracies within a scientific text. This approach enhances students' analytical thinking, strengthens their grasp of interdisciplinary connections, and encourages the accurate use of terminology.

Tasks integrating botany, chemistry, and mathematics foster complex cognitive processes and interdisciplinary comprehension. For example, the given chemical calculation requires students to apply concepts of chemical equations, molar mass, and gas volume in conjunction with biological content. As a result, learners improve their ability to analyze the chemical composition of biological samples and connect theoretical knowledge with practical application.

Main advantages of such integrative tasks include:

- Development of interdisciplinary competencies (e.g., math, chemistry, botany);
- Application of theoretical knowledge to experimental and quantitative problem-solving;
- Increased motivation through engagement with real-world biological scenarios;
- Strengthening of independent analytical reasoning, inference, and explanation skills.



These cross-disciplinary tasks are particularly effective in natural science education, promoting systemic thinking and preparing students for real-world applications. However, the effectiveness of these tasks depends on their methodological design, clarity of instructions, and alignment with students' academic readiness.

CONCLUSION

Integrating pedagogical approaches in modern education reinforces interdisciplinary connections and plays a vital role in cultivating students' systemic and critical thinking skills. Specifically, the use of integrated tasks in teaching botany—combined with other natural and social sciences—enables deeper, more meaningful, and contextually relevant learning.

Such tasks facilitate the synthesis of knowledge by linking biological processes with chemical analysis, mathematical modeling, environmental awareness, and even linguistic analysis. This fosters:

- Practical application of theoretical knowledge;
- Problem-solving in real-life contexts;
- Evidence-based reasoning and conclusion-making;
- Analytical and critical thinking;
- Creative thinking and collaborative skills.

Integrative tasks in botany not only deepen subject understanding but also promote engagement in scientific research, foster ecological awareness, develop interdisciplinary thinking, support career orientation, and strengthen autonomous learning skills. Therefore, the creation and systematic implementation of such tasks represent a core indicator of modern pedagogical competence.

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