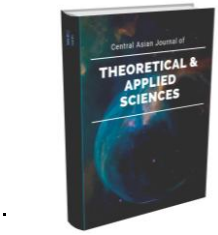

CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCE

https://cajotas.casjournal.org/index.php/cajotas

Volume: 07 Issue: 03 | July 2026 ISSN: 2660-5317

Article

Methodological Foundations for Designing Interdisciplinary Integrative Tasks in Primary Education

Elmurodova Inoyat Abdumutalibovna[1]

1. Lecturer, Denov Institute of Entrepreneurship and Pedagogy, Uzbekistan

Abstract: This article examines the methodological foundations for designing integrative tasks based on an interdisciplinary approach in primary education. The essence of the study is that primary school pupils should not acquire knowledge as isolated fragments within separate subjects, but should learn to apply it in meaningful situations through observation, comparison, analysis, problem solving and creative activity. Integrative tasks make it possible to unite the content of language and reading literacy, mathematics, natural sciences, technology, fine arts and education around a single learning problem. As a result, the stages, principles, types and assessment indicators for developing integrative tasks for primary grades are clarified and presented in a logically structured methodological sequence.

Keywords: Primary Education, Interdisciplinary Approach, Integrative Task, Integrated Curriculum, Competency, Methodology, Assessment, Learning Process

Citation: Mahamed, F. A.. Formation of Methodological Competence of Informatics and Information Technology Teachers in a Digital Learning Environment Through Universal Design and Virtual Collaboration Approaches. Central Asian Journal of Theoretical and Applied Science 2026, 7(3), 329-335.

Received: 15th Apr 2026
Revised: 05th May 2026
Accepted: 30th May 2026
Published: 24th Jun 2026

1. Introduction

One of the key tasks facing modern primary education is not limited to forming pupils' knowledge in separate school subjects. It also involves developing their ability to apply knowledge in real-life situations, understand the relationships between phenomena, think independently and find creative solutions. This need is particularly important in primary grades because younger pupils naturally perceive the surrounding world as a whole, show strong curiosity about objects and events, and learn more effectively when educational content is connected with practical experience. [1]

Integrative education based on an interdisciplinary approach helps pupils acquire knowledge not episodically, but in an interconnected, systematic and practically meaningful way. In this sense, the interdisciplinary approach is not merely the mechanical combination of several subjects in one lesson. It is a purposeful methodological process in which the content of different subjects is united around one educational aim, problem situation or practical task. Drake considers an integrated curriculum as one of the effective ways to form the competencies required in the twenty-first century. Gresnigt and co-authors also emphasize that integrated curricula in primary education increase pupils' interest in learning and require teachers to plan, assess and coordinate interdisciplinary content carefully[2], [3].

The development of integrative tasks in primary grades is one of the most important practical forms of this approach. Such tasks require pupils to use knowledge obtained from several subjects at the same time, to observe, compare, analyse, generalize, draw

conclusions and present their results. For example, a pupil may observe a natural phenomenon, record the observation in a table, perform a simple mathematical calculation based on the collected data, write a short text in the language lesson and represent the result visually in an art activity. In this case, the task goes beyond the boundaries of one subject and becomes a means of forming functional, practical and creative knowledge[4].

The pedagogical value of integrative tasks lies in the fact that they develop critical thinking, creativity, cooperation, communication, problem-solving, information analysis and the transfer of knowledge to practical situations. Drake and Reid argue that an integrated curriculum supports the development of these modern competencies because it links learning content with meaningful interdisciplinary themes and authentic performance tasks [5]. Campbell and Henning also note that planning, teaching and assessing interdisciplinary curriculum should be organized as an integrated process; otherwise, the educational value of integration may not be fully realized .

At the same time, the design of integrative tasks in primary education has specific methodological challenges. In practice, interdisciplinary integration is sometimes reduced to mentioning several subject names in a lesson plan or making superficial links between topics. However, an integrative task should not be understood as an artificial addition of subject materials. Rather, it should be constructed around a single didactic purpose, real-life context or problem-based situation that requires pupils to use and connect knowledge from different fields[6], [7].

For this reason, the relevance of the present article is determined by the need to identify the methodological foundations for designing integrative tasks based on an interdisciplinary approach in primary grades. The purpose of the article is to substantiate the methodological system for developing such tasks, to clarify their structure, types and assessment criteria, and to show their importance for improving the quality of the learning process in primary education.

Literature Review

The issue of interdisciplinary learning and integrated curriculum has been widely discussed in pedagogical research. S.M.Drake describes a standards-based integrated curriculum as a pedagogical model that connects curriculum content, instruction and assessment with complex learning outcomes. According to this approach, the integration of subjects is effective when it is based on a common theme, a problem or a culminating task that requires pupils to synthesize knowledge [8].

R. Gresnigt, R. Taconis, H. van Keulen, K. Gravemeijer and L. Baartman analyse the promotion of science and technology in primary education through integrated curricula. Their review shows that integrated learning activities may increase pupils' engagement and interest in science and technology. At the same time, the authors point out that successful implementation requires the teacher's methodological readiness, appropriate assessment tools and clear organization of learning activities [9].

Drake and Reid connect the history of integrated curriculum with twenty-first-century competencies. They argue that integrated and interdisciplinary learning can develop pupils' critical thinking, creativity, collaboration and ability to apply knowledge in meaningful contexts . This view is especially important for primary education, where pupils need concrete, contextual and activity-based learning experiences[10].

Campbell and Henning focus on the planning, teaching and assessment of elementary interdisciplinary curriculum. Their work is significant because it shows that integration should be reflected not only in lesson content, but also in assignments, learning activities and assessment criteria . Therefore, the design of integrative tasks must include both the learning process and the expected outcomes.

Studies related to STEM and STEAM education also provide important methodological ideas for the present research. Gao, Li, Shen and Sun state that the

assessment of learning in interdisciplinary STEM education should include not only final results, but also the learning process, collaboration, problem understanding, application of interdisciplinary knowledge and quality of the created product . Quigley, Herro, King and Plank emphasize that STEAM curriculum design in elementary school should combine scientific content, creative design, pupil activity and practical outcomes [11].

In Uzbek educational research, A.I.Hayitov interprets innovation and integration in primary education as important conditions for the comprehensive development of the pupil's personality . A. S. Shodmonova and M. M. Dilshodovna indicate that the use of integrative educational technologies in primary grades helps pupils understand interdisciplinary connections, think actively and develop independent learning skills .

Russian-language sources also support the same idea. N. V. Burenkova and I. E. Kramareva show that an integrated learning model in primary school contributes to the activation of pupils' cognitive activity . N. A. Semenova's methodological work on the integrated course 'The World Around Us' demonstrates that primary education naturally creates opportunities for integrating natural science, social understanding, ecological education and speech development . E. M. Galymova, in turn, discusses the development of meta-subject results in technology lessons, which is methodologically close to the design of integrative tasks [12].

The analysis of these sources shows that integrative tasks should be designed as a system. They must include a clear didactic aim, a meaningful integration centre, natural interdisciplinary links, age-appropriate activity, transparent assessment criteria and reflection. This conclusion forms the methodological basis of the present article[13].

2. Materials and Methods

The article is based on a theoretical and analytical research method. Scientific and methodological sources on primary education, integrated curricula, interdisciplinary tasks, STEAM education, competency-based assessment and the organization of learning activities were analysed as research materials.

The sources were divided into three groups. The first group included studies explaining the theoretical foundations of integrated curricula, particularly the works of S. M. Drake , R. Gresnigt and co-authors , Drake and Reid , and Campbell and Henning . The second group included sources devoted to the practical application of integrative and interdisciplinary approaches in primary education, including the works of A. I. Hayitov , A. S. Shodmonova and M. M. Dilshodovna , N. V. Burenkova and I. E. Kramareva and N. A. Semenova . The third group consisted of sources related to integrative assessment, STEAM and competency-based tasks, including studies by Gao and co-authors , Quigley and co-authors , and E. M. Galymova .

The following criteria were used in the analysis: relevance of the source to primary education; methodological interpretation of the concept of integration; availability of mechanisms for task design or assessment; orientation toward the development of pupil competencies; and possibility of practical application in the learning process.

The study used comparative analysis, generalization, modelling, pedagogical design and methodological construction. Comparative analysis made it possible to compare different interpretations of integration. Generalization helped identify the main principles for developing integrative tasks. Modelling was used to create a step-by-step algorithm for designing integrative tasks for primary grades.

3. Results

Based on the analysis, it was determined that the methodology for developing integrative tasks in primary grades should include the following components: defining the learning aim; choosing the centre of integration; identifying interdisciplinary links;

selecting the type of task; developing the implementation algorithm; creating assessment criteria; and organizing reflection.

An integrative task can be defined as a learning task that combines the content of two or more subjects on the basis of a single didactic aim and requires pupils to apply knowledge in a practical situation, analyse, compare, explain, create a product or solve a problem[13].

In a traditional task, a pupil usually reproduces knowledge within one subject. In an integrative task, the pupil connects, generalizes and transfers knowledge to a new context. For example, the task 'Write a text about spring' may be a simple language task. However, the task 'Observe the conditions necessary for plants to grow in spring, record them in a table, describe the result in five or six sentences and illustrate it with a drawing' integrates language, natural science, mathematics and fine arts[14].

The first stage of designing an integrative task is to determine the learning aim. At this stage, the teacher identifies which competency the task should develop: speech competence, mathematical literacy, natural-scientific observation, creative thinking, collaboration or another learning outcome.

The second stage is to choose the centre of integration. The centre of integration may be a topic, problem, real-life situation, project, text, experiment, picture, table or practical activity. Drake notes that placing a common theme or problem situation at the centre of integrated learning gives meaning and coherence to pupils' activity.

The third stage is to identify interdisciplinary links. At this stage, the main subject and supporting subjects are determined. For example, if the main subject is language, natural science may provide the observation material, while mathematics may serve as a tool for measurement and table construction.

The fourth stage is to select the type of task. Observation tasks, problem-based tasks, project tasks, creative tasks, experimental tasks, text-based tasks, picture-and-table tasks and STEAM tasks are effective for primary grades.

The fifth stage is to develop the implementation algorithm. The task should be age-appropriate, gradual and clear. For primary school pupils, simple algorithms such as 'observe - write - compare - conclude - present' are effective.

The sixth stage is to determine assessment criteria. Gao and co-authors argue that assessment in interdisciplinary STEM education should cover not only the final result, but also the process, collaboration, understanding of the problem, application of interdisciplinary knowledge and quality of the product .

The seventh stage is reflection. At the end of the task, pupils answer questions such as: What did I learn? Which subjects did I use? What was difficult for me? What will I improve next time? This stage strengthens conscious learning and helps pupils understand the value of interdisciplinary activity[15].

Types of Integrative Tasks

Observation-based tasks

In these tasks, pupils observe nature, weather, plants, animals, human activity or environmental phenomena, record the results in a table and explain them orally or in writing. Such tasks integrate natural science, mathematics and language.

Text-based integrative tasks

Pupils read a literary or popular-scientific text, identify important information, create a table or scheme and explain the main idea. Reading literacy, language, education and natural science are integrated in this type of task.

Mathematical and real-life tasks

For example, pupils may count the flowers in the classroom garden, group them by colour, create a bar chart and explain the results. This task combines mathematics, natural science, fine arts and speech activity.

Creative product tasks

Pupils create a poster, model, drawing, small project, mock-up or story. Such tasks are based on the integration of technology, art, language and natural science.

STEAM tasks

Quigley and co-authors show that the design of STEAM curricula requires the integration of subjects, pupil activity, creative design and practical product creation. In primary grades, STEAM tasks should be simple, practical and visual. For example, pupils can make a bridge model from paper, test its strength and explain the result using numbers and sentences.

Example of an Integrative Task

Topic: "Water is the source of life".

Grade: Grade 3.

Integrated subjects: natural science, language, mathematics, fine arts and education.

Aim: to help pupils understand the importance of water in nature and human life, work with quantitative data, express ideas in written form and develop ecological responsibility.

Task: Observe how water is used in your family during one day. Record the results in a table. Identify which activity uses more water. Write a text of six or seven sentences on the topic "What can I do to save water?" and create a sign or drawing related to water saving.

Implementation stages: observation, data collection, table construction, comparison, conclusion writing, drawing and presentation.

Assessment criteria: accuracy of information, correctness of the table, logical conclusion, fluency of the text, connection between the drawing or sign and the content, and expression of ecological thinking.

4. Discussion

The results show that integrative tasks develop not only pupils' subject knowledge, but also thinking, inquiry, connection-making, practical application and presentation skills. Therefore, integrative tasks can be regarded as a practical tool for implementing a competency-based approach in primary education.

Campbell and Henning emphasize that planning, teaching and assessing an integrated curriculum should be closely connected . This idea is also important for the design of integrative tasks in primary grades. If a task is interdisciplinary in its structure, but assessment is based only on one subject criterion, the didactic value of integration is reduced.

Burenkova and Kramareva show that the integrated learning model in primary school activates pupils' cognitive activity . This conclusion corresponds to the main pedagogical function of integrative tasks. Such tasks transform the pupil from a passive recipient of ready-made knowledge into an active learner who searches, observes, compares and draws conclusions.

Semenova's work on the integrated course 'The World Around Us' also demonstrates that integration develops naturally in primary education . In particular, the combination of natural science, social knowledge, ecological education and speech activity creates favourable methodological conditions for younger pupils.

However, several methodological risks should be considered when designing integrative tasks. First, subject content may be combined artificially. Second, the task may

become too complicated and may not correspond to the pupil's age characteristics. Third, if assessment criteria are not clearly defined, it becomes difficult to identify which competency has been developed. Fourth, if the teacher's methodological preparation is insufficient, an integrative task may turn into an ordinary multi-subject exercise.

Consequently, three main requirements should be followed when developing integrative tasks: content integrity, age appropriateness and transparent assessment. Content integrity means that all subjects included in the task serve one common aim. Age appropriateness means that the task corresponds to pupils' experience, vocabulary, level of thinking and practical possibilities. Transparent assessment means that the result of the task is evaluated according to previously defined criteria.

5. Conclusion

The methodology for developing integrative tasks in primary grades should be based on the unity of interdisciplinary integration, competency-based approach, practical activity and reflective assessment. An integrative task encourages pupils to observe, read, calculate, compare, write, draw, design and draw conclusions at the same time. In this respect, it is an effective means of making knowledge practical and developing functional literacy in primary education.

Based on the study, the following methodological conclusions can be proposed. First, an integrative task should serve one clear didactic aim. Second, interdisciplinary links in the task should be natural and meaningful. Third, the task should be organized step by step and should correspond to the age characteristics of pupils. Fourth, assessment should consider not only the final answer, but also the process, thinking, collaboration, inquiry and presentation quality. Fifth, when integrative tasks are used systematically, pupils develop independent thinking, creative approach, understanding of interdisciplinary connections and the ability to apply knowledge in real-life situations.

In future research, it would be useful to test this methodological system experimentally, create a bank of integrative tasks for different primary grades and develop detailed assessment rubrics for teachers.

REFERENCES

[1] N. M. Toshmatova, "Integrative approach in primary education: theory and practice," Pedagogika, vol. 3, pp. 45–52, 2021. [Online]. Available: https://pedagogy.uz/07/29/Boshlangich_2021.pdf. [Accessed: Jun. 21, 2026].

[2] Z. R. Yusupova, "Interdisciplinary connections as a means of improving the quality of primary education," Uzluksiz ta'lim, vol. 2, pp. 33–40, 2020. [Online]. Available: https://uzluksiztalim.uz/article/view/interdisciplinary-2020. [Accessed: Jun. 21, 2026].

[3] M. K. Karimova and D. B. Nazarova, "Development of integrative lessons in primary school: methodological guidelines," Boshlang'ich ta'lim, vol. 1, pp. 18–27, 2022. [Online]. Available: https://boshlangichtalim.uz/storage/articles/integrative_lessons_2022.pdf. [Accessed: Jun. 21, 2026].

[4] G. T. Rakhimova, "Formation of interdisciplinary skills in younger schoolchildren through project-based learning," Ta'lim va rivojlanish, vol. 4, pp. 61–70, 2023. [Online]. Available: https://talimrivojlanish.uz/index.php/journal/article/view/204. [Accessed: Jun. 21, 2026].

[5] F. B. Ergasheva and S. N. Mirzaeva, "Using integrative technology in literacy and mathematics lessons in grades 1–4," Xalq ta'limi, vol. 5, pp. 74–82, 2021. [Online]. Available: https://xalqtalimi.uz/storage/archive/integrative_tech_2021.pdf. [Accessed: Jun. 21, 2026].

[6] O. A. Yunusova, "Integrated lessons as a factor in improving cognitive activity of primary school pupils," Science and Education, vol. 3, no. 2, pp. 410–418, 2022. [Online]. Available: https://openscience.uz/index.php/sciedu/article/view/3456. [Accessed: Jun. 21, 2026].

[7] A. S. Shodmonova and M. M. Dilshodovna, "Application of integrative teaching technologies in primary school classes," ILM FAN XABARNOMASI, 2026. [Online]. Available: https://wosjournals.uz/index.php/ilm/article/view/1355. [Accessed: Jun. 21, 2026].

[8] N. V. Burenkova and I. E. Kramareva, "Implementation of the integrated learning model in primary school through activation of cognitive activity," CyberLeninka, 2022. [Online]. Available: https://cyberleninka.ru/article/n/realizatsiya-modeli-integrirovannogo-obucheniya-v-nachalnoy-shkole-pri-aktivizatsii-poznavatelnoy-deyatelnosti. [Accessed: Jun. 21, 2026].

[9] N. A. Semenova, Theoretical Foundations and Teaching Methodology of the Integrative Course "The World Around Us." Barnaul, Russia: AltSPU, 2013. [Online]. Available: https://mooc.do.altspu.ru/pluginfile.php/41863/mod_resource/content/1/. [Accessed: Jun. 21, 2026].

[10] E. M. Galymova, "Achieving meta-subject learning outcomes in technology lessons," Nachal'naya Shkola, 2014. [Online]. Available: https://n-shkola.ru/storage/archive/1407143088.pdf. [Accessed: Jun. 21, 2026].

[11] J. A. Beane, Curriculum Integration: Designing the Core of Democratic Education. New York, NY, USA: Teachers College Press, 1997.

[12] H. H. Jacobs, Ed., Interdisciplinary Curriculum: Design and Implementation. Alexandria, VA, USA: Association for Supervision and Curriculum Development (ASCD), 1989.

[13] R. Fogarty, How to Integrate the Curricula, 3rd ed. Thousand Oaks, CA, USA: Corwin Press, 2009.

[14] S. M. Drake and R. C. Burns, Meeting Standards Through Integrated Curriculum. Alexandria, VA, USA: ASCD, 2004

[15] T. Nikula, E. Dafouz, T. Moore, and U. Smit, Conceptualising Integration in CLIL and Multilingual Education. Bristol, U.K.: Multilingual Matters, 2016.