



INTEGRATION OF CLUSTER APPROACH WITH PROFESSIONALLY- ORIENTED TECHNOLOGY IN TEACHING ENGLISH TO BIOLOGY STUDENTS.

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ABSTRACT

Currently, the educational landscape has had a shift towards more integrated and learner-centered teaching methods. This paper investigates the cluster approach as a pedagogical strategy in teaching biology students. By emphasizing professional orientation, the cluster approach enables learners to link biological concepts to real-world implementations, increasing their involvement and understanding of the subject. This article discusses the theoretical foundations of the cluster approach, its implementation in biology education, and its implications for preparing students for professional career prosperity in biological sciences.

Biology education serves as a foundational discipline for learners pursuing careers in health sciences, environmental science, biotechnology, and other related fields. Traditional teaching methods often provides information, leading to a disjointed understanding of biological concepts. However, the cluster approach offers a solution by integrating various topics and providing a cohesive learning experience that is closely connected with professional practices in the field.

Cluster formation has emerged over last two decades as central issue. The most important characteristics of clusters are: geographical and sectoral concentration, co-operation and competition, specialization in specific kinds of economic activity, the existence of relationships between cluster actors and formal interdependence (7). In science, the cluster approach has been very fruitfully used for a long time, in which it becomes necessary to take into account the multiple interrelationships between the elements combined into one whole (7).

Nowadays there are several definitions to the notion of "an educational cluster". For example, cluster as an educational institutions association, connected together by "raw materials" supply, experience and educational standards exchange (8). M.E.Porter defined as "geographic concentration of interconnected companies, suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, and trade associations) in particular fields that compete but also cooperate". The classical definition of cluster was defined by M.Porter (9): "Educational cluster is a group of geographically neighbouring interconnected companies and organizations connected to them, working in a certain area and characterized by common activities and mutual reinforcement". "Educational

cluster" is a complex of educational institutions of all educational levels within certain geographical area, resource and employer suppliers, innovative system elements, as well as administration and government bodies, whose activity is connected with nearby industries and the development of regional innovative system" (10). "Educational cluster" is a complex of educational institutions of all educational levels, industries of correspondent government bodies, whose activity is connected with industries and is aimed at successful innovative development". "Educational cluster" is a complex of interconnected institutions of vocational education, connected branch-wise and by partnership with the industry players. Lately, educational clusters research becomes increasingly topical (11).

The cluster approach is grounded in constructivist learning theories, which advocate for active learning and knowledge construction through experiences. It emphasizes the interconnectedness of concepts, allowing students to see the relationships between different biological topics. By organizing curriculum content around clusters of related themes or challenges, educators can foster deeper understanding and relevance.

Implementing the cluster approach in biology involves the following key elements:

Topics are grouped around central themes, such as ecosystems, genetics, or human biology. This encourages students to explore connections and context.

- **Interdisciplinary Links:** The approach incorporates knowledge from other scientific disciplines, such as chemistry and physics, to present a holistic view of biological concepts. This interdisciplinary focus mirrors real-world scientific problems.
- **Problem-Based Learning (PBL):** By introducing real-world problems, learners are encouraged to apply biological concepts to solve complex issues. This enhances critical thinking and problem-solving skills, as well as, interactive communicative skills of learners.
- **Collaborative Projects:** Group work and collaborative projects promote teamwork, a crucial skill in many biological professions. Learners learn to communicate and work effectively with peers.
- **Assessment Techniques:** Alternative assessment methods, such as portfolios and presentations, are used to evaluate student understanding and application of knowledge in a professional context.

The cluster approach offers several key benefits such as:

- **Enhanced Engagement:** By linking biology to professional contexts, learners are more likely to be motivated and involved in their learning.
- **Deeper Understanding:** Learners gain experience in understanding biology as they explore connections between concepts.
- **Career Preparedness:** Exposure to real-world applications and interdisciplinary links better prepares students for their future careers in science and healthcare.
- **Development of Soft Skills:** Collaboration and communication skills are honed through group activities and problem-solving tasks.

While the cluster approach offers numerous advantages, certain challenges must be addressed:

- **Curriculum Design:** Educators must carefully design curriculum clusters that are coherent and relevant to professional practices.

- Training for Educators: Teachers may require professional development to effectively implement the cluster approach and facilitate interdisciplinary learning.
- Assessment Alignment: Traditional assessment methods may not adequately capture student learning in a cluster-based curriculum, necessitating the development of new evaluation strategies.

It is notable that the cluster in education is a recent development. But due of its diversity, it already has a prominent position and has great potential (Tereshin & Volodin, 2010). There is no denying that the education sector in the modern world carries a significant amount of risk and uncertainty regarding some operational outcomes (Asadullin, 2009). Nevertheless, by overcoming these obstacles and fostering basic and applied scientific, economic, and social progress, new integrative structures will improve education quality and university competitiveness on the market for educational services (Karamursov, 2009).

To conclude, the cluster approach represents a valuable pedagogical shift in biology education, particularly, in the context of professional orientation. By fostering connections between biological concepts and real-world implementations, educators can enhance learner involvement and prepare them for career prospects in their speciality. Continual research and implementation of this approach will be essential for overcoming facing challenges and maximizing its potential in professionally-oriented language teaching and interdisciplinary context.

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