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The Importance of Developing Higher-Order Cognitive Competencies via the Implementation of the Phenomenon-Based Learning Approach

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Abstract:

Developing higher-order cognitive skills through phenomenon-based learning (PhenoBL) is a highly relevant and contemporary topic in educational research, with increasing significance in today's knowledge-driven societies. The shift toward PBL as an approach for developing critical thinking, problem-solving, creativity, and other higher-order cognitive skills aligns with educational goals to prepare students for complex real-world challenges. The Role of PhenoBL in Cognitive Skill Development is to encourage students to inquire, investigate, and make sense of real-world phenomena. This process pushes students to learn content and to understand and apply it critically in varied contexts. As a result, higher-order cognitive processes such as critical thinking, creativity, and metacognition are developed. For example, when students are tasked with solving problems that do not have a clear or predefined solution, they must engage in deeper thinking, formulate hypotheses, analyze data, and synthesize information.

Keywords: Phenomenon-based learning, cross-disciplinary character, 21st-century Skills, Cognitive Performance, problem-solving, creativity, and critical thinking.

Introduction

Educational Reforms and Integration of Phenomenon-based Learning Approach: Many countries, particularly in Europe (e.g., Finland), are incorporating PhenoBL into national curricula, recognizing its potential to foster deep learning and critical cognitive skills. The Finnish education system, known for its innovative approaches, is particularly notable for integrating phenomenon-based learning. It has demonstrated promising outcomes in helping students become active, reflective learners and independent thinkers. Another noteworthy aspect of this approach in developing higher-order cognitive competencies is its **cross-disciplinary character**. In other

words, PhenoBL often requires students to apply knowledge from various subject areas to understand and address the phenomenon. This interdisciplinary approach is beneficial for developing higher-order cognitive skills, as it mirrors the complexity of real-world issues, which often do not fit neatly into single subject domains. This allows students to make connections across knowledge areas and apply their learning in new and flexible ways.

Besides that, implementing the PhenoBL approach to enhance higher-order cognitive competencies emphasizes the development of 21st-century Skills. As modern education places a growing emphasis on fostering higher-order cognitive skills, such as analysis, synthesis, evaluation, and problem-solving. Phenomenon-based learning (PBL), which focuses on exploring real-world phenomena, can achieve these goals. By engaging students with authentic problems that require interdisciplinary knowledge and critical thinking, PhenoBL aligns with the educational needs of the 21st century.

In the period of independence, while determining the main factors for the foundation of the Third Renaissance in Uzbekistan, in the words of the President, "Currently, another important Renaissance process is taking place in our country. That is why the words "New Uzbekistan" and "Third Renaissance" sound harmoniously, inspiring our people towards great goals. The proof of this is shown in the achievements of science, art, culture, and socio-economic spheres. Based on this, the lack of theoretical and practical research in methodology, namely the implementation of Phenomenon-based learning to enhance higher-order cognitive competencies at Tertiary Education specialized in language learning determines the need to research this topic. This study also highlights the demand for the research of low-order cognitive competencies and higher-order cognitive competencies. The degree of the latter competencies' development determines society's educational and economic prosperity.

The Cognitive Performance of students under a credit-module system is one of the important and multifaceted problems of pedagogy that must be solved by considering philosophical, didactic, methodological, and management aspects of learning.

Decrees of the President of the Republic of Uzbekistan No. PF-5847 dated October 8, 2019 “On approval of the Concept for the development of the higher education system of the Republic of Uzbekistan until 2030”, based on international experiences, the introduction of advanced standards of higher education, including a gradual transition from education focused on acquiring theoretical knowledge to an educational system focused on the formation of practical skills in academic programs; to raise the content of higher education to a new level in terms of quality, to establish a system of highly qualified personnel training that will make a worthy contribution to the sustainable development of the social sphere and economic sectors, and will find a place in the labor market; step-by-step introduction of the "University 3.0" concept, which provides for the interdependence of education, science, innovation and commercialization of research results in higher education institutions; development of proposals and recommendations on meaningful and purposeful organization of work on personnel training, retraining, professional development and development of scientific and innovative activities of pedagogues in the higher education system; No. PQ-3151 dated July 27, 2017 “ On measures to further expand the participation of sectors and branches of the economy in improving the quality of training specialists with higher education ”. To deepen the integration between production, science, and education, to form a base of topics dedicated to the problems of the scientific and technical development directions of the sectors (fields) belonging to the ministries and agencies within the complexes, and to discuss these issues with higher education institutions systematic involvement of their scientific potential, especially young scientists and researchers, in the solution by concluding business contracts;

Methodology: Developing Higher-Order Cognitive Competencies via the Phenomenon-Based Learning Approach

1. Research Design

This study employs a **qualitative case study approach** to explore how the Phenomenon-Based Learning (PhBL) approach fosters higher-order cognitive competencies (HOCCs) such as critical thinking, problem-solving, and creativity in students. The methodology integrates classroom observations, student and teacher interviews, and analysis of learning artifacts.

2. Participants and Sampling

- **Participants**:

- ✓ The study involves **secondary school students** (ages 13–16) and their teachers from diverse subject areas (e.g., science, history, and arts).
- ✓ A total of **30 students** and **5 teachers** from 3 different schools implementing PhBL will participate.

- **Sampling Method**:

- ✓ **Purposive Sampling**: Schools actively practicing PhBL will be selected. Teachers with at least 1 year of experience in PhBL and students involved in cross-disciplinary projects will be included.

3. Data Collection Methods

1. **Classroom Observations**:

- Observations will focus on teaching strategies, student engagement, and collaborative problem-solving activities in PhBL settings.
- A structured observation guide will track indicators of HOCCs, such as questioning, reasoning, and application of knowledge across disciplines.

2. **Interviews**:

- **Teacher Interviews**: Semi-structured interviews will explore teachers' perceptions of how PhBL facilitates HOCCs, challenges faced, and strategies used.
- **Student Interviews**: Open-ended questions will assess students' experiences, learning outcomes, and perceived development of critical thinking, creativity, and collaboration skills.

3. **Analysis of Learning Artifacts**:

- Student-produced artifacts (e.g., projects, presentations, and reflective journals) will be analyzed to assess the demonstration of HOCCs.

4. **Surveys**:

- Pre- and post-intervention surveys will measure changes in students' self-reported competencies in critical thinking, creativity, and problem-solving.

4. Intervention Description

- **PhBL Implementation**:

- ✓ Students will engage in a **6-week cross-disciplinary project** centered on a real-world phenomenon (e.g., climate change, urbanization, or global pandemics).
- ✓ Teachers will guide students to formulate research questions, conduct investigations, and present their findings collaboratively.

5. Data Analysis

1. **Qualitative Analysis**:

- ✓ Classroom observations and interview data will be coded and analyzed thematically using software like NVivo to identify recurring patterns related to HOCCs development.
- ✓ Learning artifacts will be evaluated using a rubric to assess creativity, critical thinking, and problem-solving skills.

2. **Quantitative Analysis**:

- ✓ Survey data will be analyzed statistically using paired t-tests to measure the change in students' self-reported competencies before and after the PhBL intervention.

6. Ethical Considerations

- ✓ Informed consent will be obtained from participants and their guardians.
- ✓ Anonymity and confidentiality of participants' data will be ensured.
- ✓ Ethical approval will be sought from an institutional review board (IRB).

7. Expected Outcomes

- ✓ Insights into how PhBL fosters higher-order cognitive competencies in secondary school students.
- ✓ Identification of effective teaching practices and challenges in implementing PhBL.
- ✓ Recommendations for enhancing HOCCs through cross-disciplinary, real-world learning experiences.

No. PQ-2909 dated April 20, 2017 " On measures for the further development of the higher education system ", to increase the spiritual and moral content of higher education, to inculcate in students and young people the spirit of loyalty to the ideas of independence, to the national traditions of high spirituality and humanity, to carry out large-scale educational work on strengthening their immunity to foreign ideas and ideologies and strengthening their critical thinking;

Conclusion

No. PQ-5117 dated May 19, 2021 Resolutions "On measures to bring the popularization of foreign language learning in the Republic of Uzbekistan to a qualitatively new level ", Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated May 18, 2017 No. 292 " On measures to organize the activities of newly established scientific organizations of the Academy of Sciences of the Republic of Uzbekistan ", Resolution No. 610 dated August 11, 2017 "On measures to further improve the quality of teaching foreign languages in educational institutions", Resolution No. 816 of October 10, 2018 "On providing higher education institutions with educational literature" This dissertation research will serve to a certain extent in the implementation of the tasks outlined in other regulatory and legal documents related to this activity.

Developing higher-order cognitive skills through phenomenon-based learning is a topic of great relevance in contemporary education. As the demand for skills such as problem-solving, creativity, and critical thinking increases, educational systems worldwide are seeking more effective ways to foster these competencies. Phenomenon-based learning, focusing on real-world issues and interdisciplinary thinking, offers a promising method to achieve these educational goals. As research on its effectiveness continues to grow, the approach will likely gain more traction in global educational reforms.

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