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# Approaches and Techniques of Phenomenon-Based Learning: PheBL

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**Abstract**
**Background and Aims:** Phenomenon-Based Learning is important because it connects academic content to real-world issues, making learning more meaningful and engaging for students. It improves critical thinking and prepares students to face real-world challenges by addressing complex, multifaceted problems from multiple perspectives. This paper aims to investigate the approaches and techniques of phenomenon-based learning. PheBL
**Methodology:** The paper presents a thorough examination of various educational approaches and techniques within the PheBL framework. It systematically investigates how integrating real-world phenomena from multiple disciplines can improve teaching practices and student learning outcomes.
**Results:** The finding found that Phenomenon-Based Learning (PheBL) is a comprehensive approach to education that places real-world phenomena at the center of inquiry and learning. By combining disciplines around a common phenomenon, PheBL encourages students to investigate complex, multifaceted issues from multiple perspectives. This methodology encourages deeper comprehension and critical thinking by actively involving students in problem-solving and inquiry. Finally, PheBL's approach not only aligns educational practices with real-world contexts but also increases student engagement and comprehension by employing an interdisciplinary lens that reflects the world's interconnectedness.
**Conclusion:** The findings show that Phenomenon-Based Learning (PheBL) effectively centers education on real-world issues, bringing together multiple disciplines to foster a deeper, more critical understanding of complex topics. This approach improves student engagement and comprehension while also aligning learning practices with the interconnected nature of real-world problems.
**Keywords:** Approaches, Techniques, Phenomenon-Based Learning

## Introduction

Phenomenon-Based Learning (PhenoBL) has its roots in the pedagogical philosophies of experiential and interdisciplinary learning, which became popular in the early twentieth century. John Dewey, a well-known American philosopher and educator, established the foundation for experiential education by advocating for learning through experience and emphasizing the importance of connecting classroom instruction to real-world contexts (Dewey, 1938). His ideas influenced the development of progressive education, in which students learn by doing, completing practical tasks that draw on multiple disciplines. PhenoBL's emphasis on investigating complex, real-world phenomena expands on this foundation, with the Finnish education system pioneering its modern application (Silander, 2015).

The introduction of PhenoBL into Finland's education system in 2016 marked a significant shift in global educational paradigms. It arose as a response to the need for more relevant and integrated learning approaches that prepare students for the complexities of the contemporary world. The 2016 Finnish curriculum reform required the inclusion of "study periods" focused on real-world phenomena, in which students investigate issues from multiple disciplinary perspectives (Halinen, 2018). This reform aimed to overcome the limitations of traditional subject-based instruction, in line with Finland's long history of progressive educational reform dating back to the 1960s (Symeonidis & Schwarz, 2016).

The Finnish PhenoBL model has received international attention for its success in encouraging students to think critically, creatively, and collaboratively. Researchers have identified PhenoBL as an evolution of previous educational frameworks, such as project-based and inquiry-based learning, but with a stronger emphasis on real-world contexts and interdisciplinarity (Lonka, 2015; Naik, 2019). This approach encourages students to engage with authentic, complex problems, resulting in deeper learning and the development of important life skills such as problem-solving and teamwork (Silander, 2015). As more countries seek to reform their education systems, PhenoBL remains a model for future learning innovations.

Phenomenon-Based Learning (PhBL) is a pedagogical approach that focuses on exploring real-world phenomena to foster deep, interdisciplinary learning. Unlike traditional methods, which frequently emphasize compartmentalized subject knowledge, PhBL encourages students to investigate complex, multifaceted topics by combining multiple disciplines (Silander, 2015). This approach reflects the interconnected nature of the real world, making learning more meaningful and engaging for students. By focusing on authentic, real-world



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problems, PhBL fosters critical thinking, creativity, and problem-solving abilities, preparing students to navigate and address complex issues in a variety of settings (Leat & Reid, 2021).

One of the primary advantages of PhBL is its emphasis on student-centered learning, in which students actively participate in defining and investigating phenomena (Silander 2015). This not only increases student engagement but also promotes autonomy by encouraging students to pursue their interests within the context of the phenomenon under study. The integration of multiple subjects, such as science, history, and mathematics, into a single project encourages students to apply their knowledge holistically. Students gain a better understanding of how knowledge from various fields intersects, which improves their ability to transfer skills and information across disciplines (Leat & Reid, 2021). Additionally, PhBL supports the development of collaboration and communication skills, as students often work in teams to explore phenomena. This collaborative aspect mirrors real-world environments, where diverse perspectives and teamwork are essential for addressing complex challenges (Silander, 2015). By engaging in group work and inquiry-based projects, students learn how to share knowledge, negotiate meaning, and present their findings effectively. As a result, PhBL not only cultivates academic competencies but also essential life skills, making it a powerful tool for 21st-century education (Leat & Reid, 2021).

Phenomenon-Based Learning (PhBL) approaches and techniques are important to study because they shift the focus away from traditional, siloed education and toward a more integrated and holistic learning experience. PhBL approaches, such as interdisciplinary collaboration, inquiry-based learning, and student-driven exploration, are intended to reflect the complexities of real-world problems, which rarely fit neatly into a single subject area (Silander 2015). Understanding these approaches enables educators to create more meaningful learning environments that prepare students for today's challenges while encouraging critical thinking, problem-solving, and creativity. Furthermore, PhBL techniques promote active participation and engagement, shifting from passive learning to more dynamic, student-centered classrooms in which learners actively investigate phenomena, resulting in deeper learning and knowledge retention (Leat & Reid, 2021). Furthermore, familiarity with PhBL techniques is required to promote the development of critical 21st-century skills such as collaboration, communication, and adaptability. Teachers can use these techniques to facilitate learning experiences that encourage teamwork and diverse perspectives, as students frequently collaborate to investigate and solve complex problems. Understanding these techniques also allows educators to create learning experiences that are tailored to students' specific interests and strengths, thereby increasing motivation and engagement (Silander, 2015). Mastering PhBL approaches enables educators to implement more effective, future-ready curricula, thereby making education more relevant in an increasingly interconnected and rapidly changing world.

## Objectives

This paper aims to investigate the Approaches and Techniques of Phenomenon Based Learning: PheBL.

## Approaches and Techniques of Phenomenon-Based Learning: PheBL

Phenomenon-Based Learning (PhenoBL) is an interdisciplinary approach that encourages students to investigate real-world phenomena by combining knowledge from multiple disciplines. The following are some core approaches and techniques used in PhenoBL, as gathered from various sources:

### 1. Holistic Learning

**1.1 Approach**:

Holistic learning in the context of Phenomenon-Based Learning (PhenoBL) aims to dismantle traditional subject compartmentalization by encouraging students to see learning through an interconnected lens. PhenoBL allows students to investigate real-world phenomena by combining knowledge and skills from various disciplines, resulting in a deeper, more integrated understanding of complex topics (Silander 2015). This approach challenges traditional boundaries between subjects like science, math, history, and language arts, allowing students to see the connections between them. PhenoBL promotes critical thinking and cognitive flexibility by requiring students to apply various types of knowledge in novel and meaningful ways, resulting in a more comprehensive understanding of the world.

PhenoBL's holistic approach emphasizes the importance of perspective-taking, in which students examine a single phenomenon from various angles, taking into account how different disciplines intersect and inform one another. For example, a climate change project could include scientific research (e.g., understanding greenhouse gases), mathematical analysis (e.g., calculating carbon footprints), and social studies (e.g., investigating policy responses). This multidisciplinary exploration promotes a more nuanced understanding of the phenomenon by requiring students to synthesize information from various fields, making learning more relevant and contextually rich (Leat and Reid, 2021). In this way, holistic learning goes



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beyond rote memorization and promotes higher-order thinking, requiring students to evaluate, analyze, and apply knowledge in interconnected ways.

Furthermore, PhenoBL's holistic nature encourages students to develop lifelong learning skills by teaching them how to integrate and transfer knowledge across contexts. This reflects the complexity of the real world, in which problems are rarely isolated within a single discipline and require a multifaceted approach to solve. PhenoBL's holistic framework not only improves academic understanding but also prepares students to be adaptable and innovative thinkers capable of addressing interdisciplinary challenges in their future careers and lives (Silander, 2015). In today's rapidly changing global landscape, these skills are critical for personal and professional success, making PhenoBL's holistic approach an essential component of modern education.

**1.2 Technique**:

Phenomenon-Based Learning (PhenoBL) emphasizes holistic learning, which involves combining multiple subjects to investigate complex real-world problems. Projects or modules based on a central phenomenon require students to apply knowledge from various disciplines, resulting in a deeper and more interconnected understanding of the subject.

For example, in a climate change project, students can incorporate science by researching weather patterns and the environmental impact of human activities. Simultaneously, social studies can serve as a framework for examining policy decisions, economic factors, and historical trends in climate change. Mathematics can be applied to data analysis, such as calculating carbon footprints or modeling temperature changes over time (Silander, 2015; Naik, 2019). This cross-disciplinary approach ensures that students not only learn facts from separate subjects but also synthesize knowledge from various fields to tackle complex, real-world problems.

By incorporating multiple subjects into a single project, students gain a more holistic understanding of the world while also developing skills such as critical thinking and problem-solving, both of which are essential in modern education (Halinen, 2018).

**2. Authenticity**

**2.1 Approach**: Authenticity in Learning: A Real-World Approach

Authenticity in education refers to the practice of grounding learning experiences in real-world applications rather than relying solely on theoretical or hypothetical activities. This approach encourages students to participate in authentic challenges and scenarios, making learning more relevant and meaningful. Connecting academic content to real-world contexts allows students to better understand the practical applications of their knowledge and skills (Herrington et al., 2014). For example, an environmental science student might work on a local conservation project, whereas a business student might create solutions to real-world problems faced by local entrepreneurs. This real-world engagement promotes deeper learning by encouraging students to apply their academic knowledge in ways that benefit their communities or the global context.

Furthermore, authentic experience-based learning encourages the development of critical thinking, problem-solving, and collaboration skills. Authentic learning tasks frequently require students to navigate complex, ambiguous situations without clear or predefined answers (Lombardi, 2007). This reflects the challenges they are likely to face in their future careers. Working on real-world problems helps students develop a sense of agency and responsibility, as well as an understanding that their efforts can yield tangible results. Furthermore, this approach has the potential to increase student engagement because learners are more motivated and purposeful when they perceive activities to have real-world value (Rule 2006).

Incorporating authenticity into the learning process is also consistent with the growing emphasis on experiential and service learning in education. These pedagogical approaches attempt to close the gap between theory and practice by immersing students in hands-on, community-based projects (Ash & Clayton, 2009). Students gain not only academic knowledge, but also a greater understanding of social, environmental, and economic issues through authentic tasks, preparing them to be active, informed citizens. Overall, authenticity in learning improves the educational experience by making it more practical, impactful, and relevant to the complex demands of the real world.

2.2 **Technique**: **Authenticity in Learning: Real-Life Issues and Professional Engagement**

One method for incorporating authenticity into learning is to assign students real-world problems to solve, such as urban planning or sustainable agriculture. Students are encouraged to apply their academic knowledge to practical problems that mirror what they may encounter in their future careers by engaging with complex, real-world challenges (Lombardi, 2007). This approach not only improves students' understanding of the subject matter, but also allows them to develop transferable skills like critical thinking, collaboration, and creative problem-solving. For example, in an environmental science course, students may



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be tasked with developing sustainable urban development plans for a local community, allowing them to apply classroom concepts to a tangible project with real-world implications.

Collaboration with professionals or industry partners is another way to improve educational authenticity. Teachers can invite experts in relevant fields into the classroom to provide expert insights, mentorship, and feedback on student projects (Herrington et al., 2014). This interaction enables students to learn from real-world experiences, broadening their understanding of how theoretical knowledge is put into practice. For example, in a course on sustainable agriculture, a local farmer or agribusiness professional could work with students to develop solutions to current industry challenges, making the learning experience more concrete and in line with industry standards.

Collaborations like these also help students build networks and learn about different career paths. Working with industry partners adds realism to academic tasks by providing students with guidance from experts who deal with these issues daily. Professional involvement not only motivates students but also helps them understand professional expectations, improving their academic and career readiness (Ash & Clayton, 2009). Teachers can create more authentic and meaningful learning environments for their students by incorporating real-world issues and industry expertise.

**3. Contextuality**

**3.1 Approach**: **Contextuality in Learning: Understanding Knowledge in Natural Settings**

**Approach: Learning Based on Natural Contexts**

Contextuality in education focuses on grounding learning experiences in real-world phenomena and natural contexts, allowing students to understand how knowledge is applied outside of the classroom. Students gain insights into the practical application of their knowledge and see how theoretical concepts operate in diverse settings when learning is contextualized within specific times, locations, and environments. For example, instead of simply learning about ecological principles in theory, students could conduct fieldwork to investigate local ecosystems. This hands-on approach allows them to observe and analyze how ecological concepts work in their natural environment, improving their understanding and retention of the material.

**Real-World Application and Relevance**

Integrating learning into real-world contexts not only makes academic concepts more relevant but also helps students understand their applicability and impact. Exploring phenomena in their natural settings allows students to connect academic content to everyday experiences, bridging the gap between theory and practice. For example, in an urban studies course, students may examine their own city's infrastructure and socioeconomic patterns to analyze the dynamics of city planning. This contextual approach helps students understand the complexity and interconnectedness of real-world systems, resulting in a more holistic and engaged learning experience.

**Enhanced Critical Thinking and Problem-Solving**

Learning based on contextual phenomena encourages critical thinking and problem-solving abilities. When students face real-world challenges, they must apply their knowledge in complex, often unpredictable situations (Schön, 1983). This type of learning encourages students to think critically about how theoretical principles interact with practical realities and to devise innovative solutions that are tailored to specific contexts. Students studying renewable energy, for example, may work on projects that require them to design sustainable solutions for local energy needs, honing their ability to analyze and effectively address real-world problems.

3.2 **Technique**: **Contextuality in Learning: Techniques for Real-World Engagement**

**Field Trips, Simulations, and Case Studies**

Field trips, simulations, and case studies are common techniques used by teachers to effectively integrate contextuality into learning. Field trips expose students to real-world environments and phenomena, allowing them to observe and analyze concepts in their natural context. For example, a biology class could go to a local nature reserve to study ecosystems firsthand, observing interactions between species and environmental factors that are difficult to replicate in the classroom (Kisiel, 2005). Similarly, simulations and case studies provide immersive experiences in which students interact with realistic scenarios and problem-solving tasks. These methods allow students to see how theoretical knowledge is applied in practical situations, bridging the gap between academic content and real-world applications (Kolb, 1984).

**Encouraging Inquiry and Critical Thinking**

During these contextual learning activities, students are encouraged to ask questions and develop hypotheses based on their observations. This inquiry-based approach encourages critical thinking and deepens students' understanding of the subject. For example, while visiting a historical site, students may be assigned to analyze artifacts and develop theories about past societies based on their findings. Similarly, in a simulation, students could investigate various business decision outcomes, test hypotheses, and evaluate the



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impact of their choices in a controlled yet realistic setting (Garrand, 2006). By actively engaging with the material and questioning their observations, students gain a more nuanced understanding of how knowledge functions in various contexts.

**Benefits of Contextual Techniques**

The use of field trips, simulations, and case studies has several educational advantages. These techniques not only make learning more engaging and relevant, but they also help students develop practical skills that can be applied outside of the classroom. Field trips and simulations expose students to the complexities of real-world environments, helping them apply theoretical concepts in a variety of situations (Bevins & Price, 2016). Case studies, on the other hand, allow students to tackle complex problems and explore multiple perspectives, promoting a deeper understanding of the subject while also developing analytical and decision-making skills. Overall, contextual methods enrich the learning experience by placing academic content in real-world contexts, improving students' ability to connect theory and practice.

**4. Problem-Based Inquiry**

**4.1 Approach**: **Problem-Based Inquiry: The PhenoBL Approach**

**Inquiry-Based Learning and Active Investigation**

Problem-Based Inquiry (PhenoBL) emphasizes inquiry-based learning in which students actively investigate problems or questions about the phenomenon under study. This approach emphasizes in-depth exploration and critical thinking, rather than surface-level learning. By immersing students in real-world problems, PhenoBL encourages them to develop research questions, collect and analyze data, and develop solutions based on their findings. For example, in a PhenoBL scenario within a medical course, students may investigate a case study involving a complex medical condition, which will require them to research, hypothesize, and propose treatment plans based on their findings. This method not only improves their understanding of the subject but also their problem-solving abilities.

**Encouraging Deep Exploration**

PhenoBL is intended to encourage students' deep exploration of academic content by presenting them with complex, multifaceted problems that do not have simple solutions. Unlike traditional learning methods, which may focus on memorizing facts or performing routine tasks, PhenoBL encourages students to investigate the fundamental principles and real-world applications of what they are learning (Hmelo-Silver, 2004). For example, in an environmental science course, students might look into the impact of urban development on local ecosystems, which would require them to consider ecological data, policy implications, and community perspectives. This approach promotes a deeper understanding of the subject by requiring students to actively engage with and reflect on their findings.

**Benefits of the PhenoBL Approach**

The PhenoBL approach provides numerous educational advantages. For starters, it improves critical thinking and analytical skills by requiring students to evaluate various sources of information, weigh evidence, and develop reasoned arguments (Ertmer and Simons, 2006). Furthermore, this approach encourages collaborative learning because students frequently work in groups to solve complex problems, which fosters teamwork and communication skills. Furthermore, by focusing on real-world issues, PhenoBL assists students in seeing the relevance of their learning and how it can be applied in practical contexts. Overall, PhenoBL promotes more engaging and rigorous learning experiences, preparing students to face complex challenges in their academic and professional lives.

4.2 **Technique**: **Problem-Based Inquiry: Techniques for Engaging Exploration**

**Open-Ended, Exploratory Problems**

Problem-Based Inquiry (PhenoBL) teachers use open-ended, exploratory problems to promote deep learning and critical thinking. Educators encourage students to actively participate in the inquiry process by presenting them with complex, real-world problems that lack predefined solutions. A teacher, for example, might set a problem to investigate the effects of deforestation on biodiversity and climate change. Students would then be assigned to conduct experiments, research relevant policies, and develop potential solutions based on their findings (Barrows, 1996). This technique ensures that students are not passively receiving information, but are actively creating and applying knowledge in a meaningful way.

**Engaging in Multi-Faceted Investigation**

The technique of posing open-ended questions allows students to approach the problem from various angles and disciplines. For example, in the case of deforestation, students could start by conducting field experiments to monitor changes in local flora and fauna. They could then investigate existing policies and their efficacy in mitigating deforestation effects. Finally, students would be encouraged to propose solutions that incorporate scientific data and policy recommendations (Ertmer & Simons, 2006). This multifaceted approach not only broadens students' understanding of the problem but also improves their ability to synthesize data and develop comprehensive solutions.



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**Benefits of Exploratory Problem-Solving**

Using open-ended problems in PhenoBL provides several educational benefits. It encourages critical thinking and problem-solving abilities because students must analyze complex data, evaluate various solutions, and make evidence-based recommendations (Hmelo-Silver, 2004). Furthermore, this technique promotes collaborative learning because students frequently work in groups to solve problems, improving their communication and teamwork skills. Furthermore, by engaging with real-world issues, students gain a better understanding of the importance of their education and how it can be applied outside of the classroom. Overall, this technique helps students gain a more in-depth and practical understanding of academic concepts, preparing them for future academic and professional challenges.

5. **Interdisciplinary Collaboration**

**5.1 Approach**: **Interdisciplinary Collaboration in Problem-Based Inquiry**

**Blending Disciplines for Enriched Learning**

Problem-Based Inquiry (PhenoBL) emphasizes interdisciplinary collaboration, in which students and teachers from various subject areas work together to solve complex problems. This approach combines disciplines to give students a more comprehensive understanding of the issues at hand. For example, a PhenoBL project investigating the effects of climate change could include students and teachers from environmental science, economics, and social studies. By combining perspectives from these various fields, students gain a comprehensive understanding of how climate change affects ecosystems, economies, and societies, improving their problem-solving abilities and ability to apply knowledge in complex contexts (Beers, 2006).

**Enhancing Perspectives and Problem-Solving**

Interdisciplinary collaboration enriches the learning experience by exposing students to a variety of perspectives and methodologies. When students interact with experts from various disciplines, they learn different approaches to problem-solving and analysis, which broadens their understanding of the subject (Van den Akker et al., 2006). For example, urban planners, architects, environmental scientists, and sociologists may all be involved in a sustainable urban development project. From green building design to community impact analysis, each discipline offers unique insights. This collaborative approach not only broadens students' knowledge but also helps them understand the interconnectedness of various fields and the complexities of real-world problems (Beers, 2006).

**Building Collaborative Skills**

Interdisciplinary collaboration also promotes important skills like teamwork, communication, and adaptability. Working with peers and professionals from different disciplines requires students to coordinate their efforts, negotiate opposing viewpoints, and integrate various types of knowledge (Klein, 2006). These abilities are essential for success in both academic and professional environments, where problems are frequently complex and require collaborative solutions. Students who participate in interdisciplinary projects learn to approach problems from different perspectives, improving their ability to work effectively in diverse teams and adapt to changing challenges (Van den Akker et al., 2006).

5.2 **Technique**: **Interdisciplinary Collaboration: Co-Teaching Phenomenon-Based Modules**

**Co-Teaching Across Disciplines**

Co-teaching is an effective technique for fostering interdisciplinary collaboration in Problem-Based Inquiry (PhenoBL), in which multiple teachers specializing in different subjects work together on a phenomenon-based module. This method entails combining expertise from various disciplines to provide a thorough investigation of complex phenomena. For example, when studying migration, history, geography, and language teachers may collaborate to teach a module. History teachers can shed light on historical migration patterns and their consequences; geography teachers can examine the spatial and environmental aspects of migration; and language teachers can investigate the cultural and linguistic aspects of immigrant communities (Jacobs, 2009). This collaborative effort ensures that students obtain a multifaceted understanding of the topic, incorporating diverse perspectives and methodologies.

**Enhanced Learning Through Diverse Expertise**

Co-teaching provides students with a richer and more integrated learning environment by leveraging the strengths of various disciplines. This technique allows students to see how different subjects intersect and contribute to a better understanding of the phenomenon under study. For example, in a migration module, students may investigate the historical causes of migration, map migration routes using geographic tools, and assess the impact on language and culture in host countries. Students can gain a more nuanced understanding of the subject and appreciate the relevance of various academic disciplines in addressing real-world issues by engaging with it from multiple perspectives (Duguid, 2005). This interdisciplinary approach not only improves students' critical thinking skills but also helps them connect academic concepts to real-world applications.



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**Promoting Collaboration and Communication Skills**

Co-teaching encourages students to develop important collaboration and communication skills. Working within an interdisciplinary framework, students are encouraged to participate in discussions and projects that require them to synthesize data from various disciplines. This collaborative learning environment encourages teamwork because students must integrate multiple perspectives and present cohesive solutions to complex problems (Miller & Glover, 2011). Furthermore, it prepares students for real-world scenarios in which complex problems frequently require input from multiple fields. By participating in co-taught modules, students gain experience working with people with different areas of expertise, improving their ability to collaborate effectively and communicate across disciplines.

6. **Student Autonomy and Active Participation**

**6.1 Approach**: **Student Autonomy and Active Participation in Problem-Based Inquiry**

**Empowering Students to Take Control**

A key approach in Problem-Based Inquiry (PhenoBL) is to empower students to take control of their learning process. This approach promotes student autonomy by encouraging students to pursue their interests, set their learning objectives, and pursue knowledge independently. PhenoBL promotes intrinsic motivation and deeper engagement with the material by allowing students to explore topics about which they are passionate. For example, in a climate change module, students may select specific aspects of the issue to investigate, such as renewable energy solutions or the effects on biodiversity. Students' ability to direct their learning journey helps them develop critical thinking and self-regulation skills because they are responsible for managing their research and meeting their learning objectives.

**Encouraging Self-Directed Learning**

PhenoBL emphasizes self-directed learning, in which students actively participate in their educational experience rather than passively receiving information. This approach entails students taking the initiative to identify problems, formulate research questions, and seek out resources to answer their questions (Hodge and Lear, 2009). For example, students working on an urban sustainability project may conduct independent research on various sustainable practices, interview experts, and design their experiments to test solutions. This level of involvement necessitates students to be proactive and resourceful, which fosters skills such as time management, problem-solving, and critical thinking. Students gain a more profound and personalized understanding of the subject matter when they take responsibility for their education.

**Fostering Engagement and Responsibility**

Student autonomy in PhenoBL also increases engagement and responsibility. When students can make decisions about their learning, they are more likely to be invested in the results and accept responsibility for their work (Zimmerman, 2002). This active participation not only improves learning outcomes but also prepares students for future academic and professional challenges that require independent thinking and self-management skills. Students develop a sense of ownership and accountability as they navigate their learning paths and solve real-world problems, which contributes to their overall educational growth and readiness for complex, real-world tasks (Guskey, 2003).

**6.2 Technique**: **Student Autonomy and Active Participation: Techniques for Fostering Independence**

**Structured Guidance with Freedom of Choice**

To foster student autonomy and active participation in Problem-Based Inquiry (PhenoBL), teachers frequently use the technique of providing structured guidance while allowing students to choose the phenomena they want to investigate. This approach strikes a balance between support and independence, allowing students to delve deeply into topics they are passionate about while receiving the necessary scaffolding to guide their inquiry. For example, a teacher may outline general project parameters and key learning objectives while allowing students to choose specific research topics, such as the impact of plastic pollution on marine life or the effects of urban heat islands. This method encourages students to take responsibility for their learning while keeping them focused and organized (Deci & Ryan, 2000).

**Self-Directed Projects and Student-Led Presentations**

To increase autonomy, teachers frequently use self-directed projects or student-led presentations as common PhenoBL methods. Self-directed projects allow students to conduct independent research, analyze, and present their findings on specific phenomena, promoting critical thinking and self-management skills. For example, students may be tasked with developing a detailed proposal for a community-wide sustainable development initiative, which requires them to set goals, conduct research, and develop actionable solutions. Furthermore, student-led presentations allow students to showcase their projects to peers, allowing them to articulate their findings and participate in discussions, which strengthens their understanding and communication skills (Zimmerman, 2002). This technique not only improves their research abilities but also boosts their confidence and presentation skills.



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**Encouraging Active Participation and Responsibility**

These techniques also promote active participation and a sense of responsibility in students. Students become more invested in their learning and accept greater responsibility for their educational outcomes when they select their topics and lead their projects (Guskey, 2003). This increased engagement frequently results in a deeper and more meaningful learning experience, as students are motivated by their interests and the freedom to pursue their inquiries. Furthermore, the skills learned through self-directed projects and presentations, such as problem-solving, time management, and effective communication, are useful in future academic and professional endeavors (Hodge and Lear, 2009). Overall, these methods promote the development of self-sufficient learners who are prepared to face complex challenges both inside and outside of the classroom.

**7. Collaborative Learning**

**7.1Approach**: **Collaborative Learning in Problem-Based Inquiry**

**Fostering Teamwork and Communication**

Collaboration among students is a key component of Problem-Based Inquiry (PhenoBL), helping to develop essential skills like teamwork, communication, and problem-solving. In PhenoBL, students collaborate to solve complex, real-world problems, necessitating effective cooperation and mutual support. For example, in an urban sustainability project, students may form groups to investigate various topics such as energy efficiency, waste management, and social impacts. Working collaboratively allows students to divide tasks, share insights, and build on each other's strengths, resulting in a more comprehensive understanding of the problem. This collaborative approach not only improves their communication skills but also allows them to appreciate different perspectives and solutions (Johnson & Johnson, 1994).

**Developing Problem-Solving Skills**

Collaborative learning in PhenoBL also helps to develop problem-solving skills. Working in groups to solve real-world problems requires students to engage in collective brainstorming, critical analysis, and decision-making. For example, when addressing a climate change mitigation issue, students may work together to design and test potential interventions, analyze their effectiveness, and refine their approaches based on feedback. This group activity encourages students to approach problems from various perspectives and develop creative, well-rounded solutions (Dillenbourg, 1999). PhenoBL's collaborative nature prepares students to face complex challenges and implement solutions in both professional and community settings.

**Enhancing Interpersonal Skills and Accountability**

In addition to academic benefits, collaborative learning in PhenoBL improves interpersonal skills and fosters a sense of accountability in students. Group work requires students to negotiate roles, resolve conflicts, and support one another, all of which develop important skills for future collaborative endeavors (Guskey, 2003). Furthermore, working in groups encourages students to accept responsibility for their contributions and the overall success of the project. For example, in a research project on renewable energy solutions, each team member may be in charge of a specific aspect of the study, such as data collection, analysis, or presentation. This sense of accountability ensures that all members are actively involved and invested in the group's success, resulting in a more productive and cohesive learning environment (Slavin, 1995).

**7.2 Technique**: **Collaborative Learning Techniques in Problem-Based Inquiry**

**Emphasizing Group Work**

Group work is a key technique in Problem-Based Inquiry (PhenoBL), which emphasizes collaborative learning through team-based investigations of phenomena. Students are frequently organized into groups to investigate complex issues such as the effects of urbanization on local ecosystems or the challenges of sustainable agriculture. This technique encourages students to actively engage with the material and with one another, resulting in a deeper understanding of the subject through collaborative effort and discussion (Smith et al., 2005). Working in groups allows students to benefit from a variety of perspectives and approaches, which improves their ability to tackle complex problems more effectively.

**Sharing Roles and Responsibilities**

The distribution of roles and responsibilities among team members is an important aspect of PhenoBL's collaborative learning. Each student is given a specific task or role within the group, such as data collection, analysis, or presentation. For example, in a project looking into renewable energy solutions, one student may focus on technological advancements, another on environmental impacts, and a third on policy implications. This approach ensures that all students participate in the learning process and are held accountable for their responsibilities (Johnson and Johnson, 1994). By assigning clear roles, teachers can help students understand their contributions to the group's success and promote a more organized and efficient work environment.

**Ensuring Active Contribution**



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Collaborative learning relies heavily on each student actively participating and contributing to the learning process. Teachers frequently use techniques to monitor and facilitate group dynamics, such as regular check-ins, peer assessments, and reflective activities. For example, during a collaborative project on climate change adaptation strategies, students may conduct peer reviews to evaluate each other's contributions and provide constructive feedback. This not only promotes individual accountability but also encourages students to reflect on their learning experiences and the effectiveness of their collaboration (Slavin, 1995). PhenoBL maximizes the educational benefits of group work by encouraging active participation from all students, resulting in a more inclusive and engaged learning experience.

8. **Use of Digital Tools**

**8.1 Approach**: **Use of Digital Tools in Problem-Based Inquiry**

**Enhancing Access to Information**

Technology improves the learning experience in Problem-Based Inquiry (PhenoBL) by giving students access to a wealth of information and resources. Students can use digital tools like online databases, research journals, and educational websites to delve deeper into phenomena and gather diverse perspectives. For example, in a project looking into global climate change, students can use digital platforms to access scientific studies, climate models, and real-time data from all over the world. This access to comprehensive and up-to-date information enables a more thorough investigation of the phenomena under study, as well as the incorporation of current, evidence-based knowledge into student projects (Roblyer & Doering, 2013).

**Facilitating Collaborative Work**

Digital tools also facilitate collaborative work among students, allowing them to work together more effectively on their investigations. Shared online documents, discussion forums, and collaborative platforms such as Google Workspace or Microsoft Teams enable students to collaborate in real-time, regardless of their physical location. For example, during a group project on urban planning, students can use these tools to conduct collaborative research, share findings, and effectively communicate their ideas. This technological support not only streamlines the collaborative process but also allows students to better engage with each other's contributions and work toward a common goal (Garrison & Vaughan, 2008).

**Supporting Presentation and Analysis**

The use of digital tools extends to data presentation and analysis, which enriches the PhenoBL experience. Students can use data visualization software, simulation programs, and multimedia presentation tools to analyze complex data and engagingly present their findings. For example, students working on a renewable energy project may use software to create interactive simulations of various energy systems, as well as graphs and charts to illustrate their findings. These digital tools enable students to analyze information more effectively, present their findings clearly, and communicate their conclusions in a professional manner (Mishra & Koehler, 2006).

8.2 **Technique**: **Use of Digital Tools in Problem-Based Inquiry: Techniques and Applications**

**Enhancing Inquiry with Digital Platforms and Simulations**

The use of digital tools in Problem-Based Inquiry (PhenoBL) improves student inquiry by giving them access to advanced platforms, simulations, and virtual labs. Digital platforms, such as online research databases and educational websites, provide students with a wealth of resources for conducting thorough investigations into phenomena. For example, in an environmental sustainability project, students may use simulations to model the ecological impacts of various human activities or virtual labs to conduct experiments that would be impractical in a traditional classroom setting (Mishra & Koehler, 2006). These digital tools allow students to explore complex systems and scenarios in a controlled environment, facilitating a deeper understanding of the subject matter and effectively testing hypotheses and visualizing outcomes.

**Utilizing Digital Portfolios and Online Collaboration**

Teachers can improve the PhenoBL experience by assigning digital portfolios and using online collaboration tools to monitor student progress. Digital portfolios enable students to document their research process, reflect on their learning, and present their findings in a multimedia format. This not only helps students organize and present their work, but it also gives teachers a comprehensive picture of each student's growth and contributions (Roblyer and Doering, 2013). Furthermore, online collaboration tools like Google Workspace and Microsoft Teams allow students to work together in real time, share resources, and communicate effectively. For example, in a renewable energy group project, students can use these platforms to collaboratively draft reports, share research, and provide feedback, ensuring ongoing engagement and effective teamwork (Garrison & Vaughan, 2008).

**Tracking Progress and Providing Feedback**

The use of digital tools also helps to track student progress and provide timely feedback. Teachers can use digital platforms to track individual and group contributions, evaluate ongoing projects, and provide constructive feedback. Teachers can use online tools to review student submissions, track changes, and



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provide direct feedback on digital documents. This method helps to keep an organized record of student progress and encourages iterative improvement. For example, teachers could use a learning management system (LMS) to set milestones for an urban development project and review student contributions regularly, ensuring that each student stays on track and receives guidance throughout the inquiry process (Dabbagh & Kitsantas, 2012). This continuous feedback loop improves the learning experience by gradually refining and developing students' skills.

**Knowledge Contribution**

Phenomenon-Based Learning (PheBL) is a transformative approach to education that places the exploration of real-world phenomena at the center of the learning process. By focusing lessons on tangible and relevant issues, PheBL bridges the gap between theoretical knowledge and practical application, encouraging students to engage in interdisciplinary inquiry and collaborative problem-solving. This method not only increases the relevance of educational content but also promotes a deeper, more integrated understanding of complex concepts. Furthermore, PheBL's emphasis on real-world contexts and student-driven exploration is consistent with current educational goals of developing critical thinking and adaptability. As students investigate and solve real-world problems, they develop important skills like critical thinking, creativity, and teamwork. This holistic and inquiry-based model not only prepares students for future academic and professional challenges but also provides them with the practical skills required to effectively navigate and impact the world.

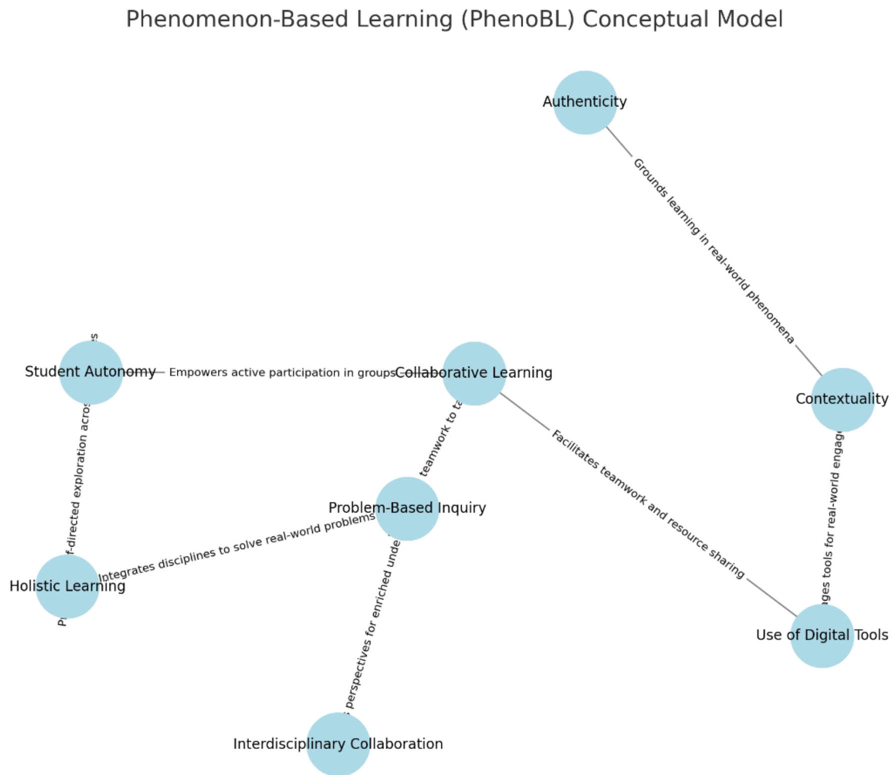


Figure 1 Phenomenon-Based Learning (PheBL)

Holistic learning, authenticity, contextualization, problem-based inquiry, interdisciplinary collaboration, student autonomy, collaborative learning, and the use of digital tools are some of the fundamental elements that work together to improve learning outcomes in the Phenomenon-Based Learning (PhenoBL) conceptual model. Each element reinforces the others to create a dynamic ecosystem that promotes multidisciplinary research, practical application, and critical thinking. For example, Holistic Learning incorporates information from multiple fields to facilitate Problem-Based Inquiry, while Contextuality and Authenticity anchor learning in real-world situations. Interdisciplinary collaboration and collaborative learning encourage teamwork, which is reinforced by digital tools that facilitate resource analysis and sharing. By enabling students to take charge of their education, student autonomy fosters a self-


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directed, interesting, and fulfilling learning environment that equips them to handle challenging real-world situations.

## Recommendation

### Practice Recommendation

To effectively implement Phenomenon-Based Learning (PheBL) in educational settings, educators should concentrate on creating interdisciplinary projects that connect multiple subjects using real-world phenomena. This entails collaborating with colleagues from various fields to design comprehensive learning experiences that reflect the complexities of real-world problems. Teachers should also invest in professional development to gain the skills required to facilitate inquiry-based learning and manage diverse viewpoints in the classroom.

### Further Research Recommendation

Future research should look into the long-term effects of Phenomenon-Based Learning on student outcomes like critical thinking, problem-solving abilities, and academic performance. Studies could look into how PheBL affects student engagement and motivation compared to traditional teaching methods. Furthermore, research should look into the challenges and best practices associated with implementing PheBL across different educational contexts and age groups to gain a better understanding of its effectiveness and scalability.

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