Interdisciplinarity in a Camping Project - 4th Grade Class

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Abstract

The promotion of a school environment where learning is dynamically fostered in a cooperative and integrated manner is essential to ensure a deep and meaningful understanding of the world. The teacher's role should not be dissociated from this need, and, to this end, it is important to instill responsibility in promoting a productive relationship among students regarding the development of skills and knowledge construction [1]. Accordingly, the presented research aims to study interdisciplinarity within the context of Project-Based Learning (PBL) in a class of 24 4th-grade students (aged 9–10 years) at a school in Portugal that adopts the pedagogical model of the Modern School Movement. In this context, seven projects were developed, centered on a common theme: a Portuguese region, specifically Serra dos Candeeiros. The students camped there for five days to conduct fieldwork and collect data for their projects. The study had the following specific objectives: (i) to characterize students' perceptions of the processes of curricular integration in project-based work; (ii) to identify the impact of fieldwork and its experiential networks on the acquisition and significance of both curricular and non-curricular learning; (iii) to compare students' perceptions of the skills they developed following the camping and PBL experience.
Considering the study's objectives, a qualitative methodology was chosen, grounded in the theoretical assumptions of action research in educational contexts. Several data collection techniques were employed, including field notes and Focus Group interviews. The collected data were subsequently analyzed using content analysis techniques.
The study results demonstrate that all groups identified advantages in integrating different curricular areas within their respective projects. Curricular integration is a practice to be prioritized when conducted with meaning and intentionality, as it serves as a "means" of working rather than an "end" in itself [2].

Keywords: *Interdisciplinarity; Curriculum Integration; Project-Based Learning; 1st Cycle of Basic Education; Fieldwork.*

1. Introduction

The present study aims to explore interdisciplinarity as a fundamental pedagogical approach in the teaching-learning process, analyzing its potential through the implementation of a project conducted during a camping trip with a class of 24 4th-grade students (aged 9 to 10 years). The teacher in this context adopts the pedagogical model of the Modern School Movement.
Interdisciplinarity is widely recognized as a teaching-learning practice that enables the integration of knowledge from different curricular areas, fostering more meaningful and contextualized learning for students. In this case, the camping trip undertaken by the aforementioned class in Serra dos Candeeiros, Portugal, provided a rich context for the application of active and integrative methodologies, such as Project-Based Learning (PBL), which connected content from various disciplines, promoting collaboration, critical thinking, and student autonomy.
This article is structured into several sections. The first presents the conceptual framework and objectives of the study, followed by a description of the methodology adopted. Subsequently, the results are presented, highlighting students' perceptions and the challenges they faced during the learning process. Finally, the article concludes with a reflection on the pedagogical implications of interdisciplinarity for the development of integrated and sustainable student knowledge.

2. Theoretical Framework

Interdisciplinarity is an essential concept in promoting meaningful and contextualized learning in education. According to Heckhausen [3], interdisciplinarity is characterized by the integration of knowledge from different curricular areas, establishing connections that allow for a broader and deeper understanding of reality. It differs from concepts such as multidisciplinarity, which merely juxtaposes content from different disciplines without true integration, and transdisciplinarity, which transcends disciplinary boundaries to construct global and interconnected knowledge [4] [3].

In the educational context, interdisciplinarity emerges as a response to the demands of an increasingly complex society. Curricular integration, as a practical expression of interdisciplinarity, enables students to analyze and understand the world holistically. It also facilitates the acquisition of essential skills such as problem-solving, critical thinking, and cooperation in an articulated manner, all of which are fundamental for students' holistic development [5].

In this regard, Project-Based Learning (PBL) is an active methodology that promotes interdisciplinarity by dynamically and meaningfully integrating knowledge. According to Barrows [6], PBL is a student-centered teaching model organized around problem-solving situations that encourage cooperative and investigative learning. This approach enables students to play an active role in constructing their knowledge, developing skills such as autonomy, communication, and decision-making [7].

Within the practices of the pedagogical model of the Modern School Movement, PBL plays a central role in learning processes, as it facilitates cooperative curriculum management and the creation of learning communities. This premise is supported by Niza [8], who states that this pedagogical approach, which integrates ideation, execution, and critical reflection, allows students to actively appropriate knowledge, contributing to the construction of meaningful and emancipatory learning. The PBL methodology is organized into phases—preparation, development, communication, and evaluation—ensuring a structure that connects curricular objectives with pedagogical practice and promotes active student participation [6].

Thus, interdisciplinarity and PBL converge as pedagogical strategies that expand the possibilities for teaching and learning. Both offer a student-centered approach, connected to reality and guided by the development of transversal skills, making them indispensable to meet the demands of a more flexible and integrated curriculum, as advocated by Decree-Law N.º 55/2018 [9], which introduced the Domains of Curricular Autonomy (DAC) in Portuguese schools [1].

3. Methodology

Revisiting the general objective of the study, "To study interdisciplinarity within the context of Project-Based Learning (PBL) in a 4th-grade class (students aged 9 to 10 years)," the following specific objectives were identified:

i. To characterize students' perceptions of the processes of curricular integration in PBL;

ii. To identify the impact of fieldwork and its experiential networks on the acquisition and significance of both curricular and non-curricular learning;

iii. To compare students' perceptions of the skills developed, as identified after the camping and PBL experience.

Based on the specific objectives of the study, a qualitative methodology was chosen, supported by the theoretical and practical assumptions of action research in educational contexts. According to Amado and Cardoso [10], action research is characterized by continuous interaction between researchers and participants, enabling both a detailed analysis of the study context and the implementation of practical interventions to improve the educational process in the studied dimensions.

In this case, the study was carried out through the development of seven interdisciplinary projects by 24 students from a 4th-grade class (aged 9 to 10 years) in Serra dos Candeeiros. These projects involved fieldwork activities conducted during a five-day camping trip.

The choice of qualitative methodology and action research proved effective in capturing the nuances of the educational process and reflecting on the benefits and challenges of implementing interdisciplinary practices in real teaching contexts.

3.1. Data Collection Techniques

Various data collection techniques were employed to ensure methodological articulation, reliability, and validity of the information:

Field Notes: During project implementation, detailed observations were recorded about group dynamics, the challenges students faced, and the progress made concerning the pedagogical objectives outlined for each group.

Focus Group Interviews: Conducted at the end of the project with small groups of students, these interviews aimed to capture participants' perceptions of interdisciplinary learning experiences through PBL, as well as their reflections on the impact of fieldwork on the developed projects.

3.2. Data Analysis Technique

The collected data were analyzed using content analysis, as proposed by Bardin [11]. This technique allowed for the identification of patterns and common categories across different work groups, which synthesized and combined students' perceptions regarding the potentialities and limitations of PBL, the fieldwork's relevance to learning, skills development, and interdisciplinarity.

3.3. Context and Participants

The selected class comprised students with varying levels of autonomy and competence. The educational context was based on the pedagogical model of the Modern School Movement. The project was developed in close collaboration with the class teachers and followed a flexible approach to meet the students' specific needs and the challenges of the school schedule.

4. Results

The results obtained from the implementation of the interdisciplinary project revealed significant advantages for students, particularly in terms of the development of investigative skills, curricular integration, and the impact of practical activities carried out during the camp.

4.1. Students' Perception of Curricular Integration Processes through Project-Based Learning (PBL)

The collected data show that all student groups identified benefits in working with different curricular areas in an integrated manner, as learning emerged from the need to develop the project, requiring the mobilization of concepts and skills associated with various curricular areas. In this regard, Beane [2] posits that curricular integration promotes more meaningful learning, allowing students to make connections between different areas of knowledge. The projects carried out facilitated connections between several curricular areas such as Portuguese, Mathematics, Environmental Studies, Physical Education, and Artistic Expressions, reflecting a holistic and meaningful learning approach for the participants. For instance, students reported that studying salt flats and local fauna and flora helped them better understand scientific concepts, such as nomenclature, while also acquiring linguistic skills through the preparation of reports and presentations.

These results support the perspective of Cosme [1], who argues that curricular integration enables a more contextualized and comprehensive understanding of reality. This integration was facilitated by the PBL methodology, which promoted active, participatory, reflective, and integrative learning. However, students' perceptions also indicate that the relevance of different curricular areas varied depending on the project's theme. In some activities, the dominance of one curricular area over others was noted as a challenge to ensure equivalence in interdisciplinarity, highlighting the complexity of managing interdisciplinary projects.

4.2. Impact of Fieldwork and Experiential Networks on the Acquisition and Significance of Curricular Learning

The fieldwork conducted during the camp emerged as one of the most significant components of the project. Practical activities, such as visits to the Alcobertas caves and the wind farm, allowed students to apply theoretical concepts in real-world contexts, making learning more meaningful and memorable.

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Students reported that direct contact with study elements (such as plant species and geological formations) facilitated content comprehension, aligning with the principles of experiential learning proposed by Perrenoud [7].

Furthermore, it increased students' interest, resulting in greater engagement in activities. This type of practical experience was particularly effective in developing investigative skills such as observation, data collection, reflection, and critical analysis. It also had a significant impact on enhancing students' motivation and acquiring autonomy, responsibility, emotional, and interpersonal skills.

4.3. Acquisition of Skills and Perceptions Identified by Students After the Camp and PBL Experience

One of the main advantages highlighted by students was the development of transversal skills such as communication, listening, responsibility, cooperation, and autonomy. Group activities encouraged dialogue and idea sharing, while individual tasks allowed each student to reflect on their role in the project.

On the other hand, the results also highlight constraints experienced. Some students initially demonstrated difficulties in cooperative work, particularly in conflict management and task division. However, these difficulties were gradually overcome throughout the project, as students reflected on them with the support of teachers.

5. Conclusions

Overall, the results reinforce that interdisciplinarity and project-based learning are powerful tools for promoting meaningful and integrative learning and for developing essential skills such as autonomy, responsibility, and communication. They also ensure a more significant appropriation and mobilization of scientific competencies inherent to fieldwork and the investigative aspect of the developed projects. However, their implementation requires careful planning, teacher training, and continuous student support to ensure a supportive environment that promotes the success of the work developed and the corresponding meaningful learning.

Indeed, interdisciplinarity, as a pedagogical approach, presents a set of significant implications for teaching. Firstly, by connecting knowledge from different curricular areas, it allows students to develop a broader and more contextualized understanding of reality. This practice stimulates critical thinking, creativity, and problem-solving skills, which are indispensable competencies in today's world [1].

Furthermore, interdisciplinarity fosters collaboration among various stakeholders in the educational process. Teachers, students, and external communities can cooperate in constructing projects that go beyond traditional disciplinary boundaries, enriching the teaching-learning process. However, the implementation of interdisciplinary practices also poses challenges. Teachers must adapt to new working methods that require flexibility, detailed planning, and efficient time management.

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