The sustainable development and PBL: a case study integrating students

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The aim of this paper is to present a project developed in a program created in August 2020 called Next Gen as a successful attempt to apply the Project Based Learning Methodology (PBL). The after school program was the result of a Brazilian family's desire to provide children and adolescents with an educational agenda aimed at promoting the development of skills essential for those living in the 21st century.

In Next Gen, children and adolescents experienced training processes in several areas of knowledge - STEAM, Languages, Entrepreneurship, Finance, Media & Arts, Theatre and Music - in an integrated way. Each subject was developed based on the Design Thinking approach, culminating in the formulation of prototypes that addressed the driving questions formulated by each group. By identifying concrete problems, learning about them and prototyping viable and relevant solutions, students have the opportunity to develop a set of skills, with emphasis on self-knowledge, communication, collaboration, critical thinking, problem solving and creativity. The project developed during the second half of 2022 adopted as core concept Sustainable Development Goal 2 - Zero Hunger and Sustainable Agriculture - of the 2030 Agenda of the United Nations (UN).

The students had the opportunity to visit spaces in the city, talk to people and were able to understand the harsh reality of hunger in the world. Likewise, they came into contact with a wide range of solutions that societies have built to work and reverse this context. Once sensitized, they were instigated to identify real problems and prototype solutions to them.

Over the last decade, the use of PBL methodology to improve students' knowledge has gained teachers' attention around the world. Araujo (2002) explores the potential of PBL to develop essential skills and competencies in students. According to him, "Project-Based Learning allows students to develop their ability to learn how to learn, their creativity, and critical thinking skills in a multidisciplinary context. The integration of subjects and the involvement of students in solving real-world problems are key factors to make learning more meaningful and effective" (Araujo, 2002).

The objective of this paper is to present the experience of applying PBL in two groups of students (aged 6-7 and 11-13 years old, referred to as groups 1 and 2 respectively). It

highlights the contributions of PBL in developing not only technical knowledge but also important soft skills required in today's world. Six teachers were involved as main mediators, enabling the development of integrated knowledge involving arts, languages, and STEAM. SCHMIDT et al. (2011), argue that "PBL promotes active and integrated learning, which can be expected to result in better understanding and retention of knowledge and skills". Additionally, PBL allowed for the combination of work between the two groups of students, regardless of the age differences.

The main project addressed the UN's SDG 2, 'Zero Hunger' - target 2.4: "sustainable food production systems and implementation of resilient agricultural practices that increase productivity and production (...)". As a final product, students developed an automated irrigation prototype to be used in community vegetable gardens.

Group 1 decided to design, build and plant a vertical vegetable garden. They planted over 30 vases of varied vegetables, including lettuce, carrots, and beetroot, among others.

Group 2 developed an automated irrigation system with micro.bit, using a humidity sensor to identify whether or not the soil needed watering. This required learning programming in JavaScript, designing, building, and assembling the irrigation system, figuring out how a pump works, and conducting multiple trials to determine the exact amount of water necessary to irrigate the vegetables in this project. The productions were also developed in different disciplines. Additionally, students were able to acquire vocabulary and repertoire to enrich their discussion and communication skills.

In conclusion, the PBL approach can be an effective tool to promote learning, especially when combined with an interdisciplinary approach that integrates different subjects' knowledge. By allowing students to work collaboratively on a project, the PBL methodology can foster the development of critical thinking, problem-solving, and teamwork skills. The experience described in this paper, combined with the insights of Schmidt et al. (2011) and Araujo (2002), demonstrates the value of using the PBL approach in education.

References

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