DESIGN BASED-LEARNING: RETHINKING INTERACTION BETWEEN TEACHING AND LEARNING IN THE RURAL PRIMARY EDUCATION CONTEXT

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Abstract

Traditionally, the interrelation between teaching and learning has focused on studies that seek to define the correlation between students' learning achievements and methodologies of teachers to transmit information. The teacher delivers knowledge and students are passive receivers. This article refers to the reflexive critical analysis carried out by a group of researchers from the education and design sector, regarding the advantages, disadvantages, and improvements to the pedagogical model Design Based-Learning (DBL). Implemented in rural primary schools in Chile. Design-based learning focuses on integrating design projects into the classroom to promote creative problem-solving skills and to support students with the learning of curricular content through engagement in real-world, and cross-curricular challenges. The objective is to contrast the DBL pedagogical model with traditional teaching methodologies in rural primary schools. This definition would help so that teaching and learning would be better connected to the reality of schools. Today, educational curricula is applied in the same way in urban areas as in rural ones, with inconsistencies that confuse rural students. The data collection methodology is based on design research methods and allows measuring the impact generated by the new synergies between teachers and students derived from the experimental implementation of the DBL pedagogical model. The applied methods are based on exploration that allows students and teachers to be protagonists jointly, among them Role interpretation, Try it yourself, Cultural comparisons, Daily photos and videos, ethnography. While the researchers observe the planning of these activities carried out with the support of collaborators trained in the ABED methodology. Researchers apply research methods in design to gather information related to the experience, such as Focus Group and Cultural Probes. The results of the implementation of the ABED methodology shows an increase in learning dynamics in classrooms, through communication and collaboration, which are tools of design as a discipline. Students are able to propose ideas, express leadership in their learning, develop skills such as public speaking, communicate ideas to their peers, and develop prototypes that allow communicating proposals that make sense for their community. Teachers are indispensable guides in this process since they know well the resources, needs, and opportunities of the context in which the school is inserted. The conclusions refer to the relevant areas of impact on the thinking capacity of students and teachers, who put into practice new skills to develop an educational curriculum through participatory synergies. Design offers students a way to apply tools to solve real-world problems and propose new ways of thinking.

Keywords: Approaches to learning, approaches to teaching, critical realist analysis, problem-based.

1 INTRODUCTION

Rural education in Chile is an important challenge that involves several agents of the education and government system [1]. Rural schools are at a comparative disadvantage in relation to traditional education establishments, with students of the same age by level, with access to multiple learning experiences and a common curriculum for all students in the class. Even in Chile, 30% are rural schools that educate only 7% [2]. To reflect on the student-teacher relationship in rural schools, it is necessary to define the axis of the analysis, which in this case is the didactic and the scenario in which they are implemented. The didactic consists in the design, development, and application of an activity to achieve a specific objective, in a specific moment. There are several strategies, including expository, instructive, collaborative, inductive, deductive, analytical, creative and evaluation, to develop an activity [3]. The didactic consists in the search of the balance between the strategies of teaching of the professors and the learning of the students, according to specify diverse authors [4],

[5], [6], [7], [8]. Currently, didactics in rural schools in Chile is centered on a model of expository teaching, based on learning by assimilation proposed by Ausubel in 1976 [9]. It consists of the teacher presenting the contents of the subjects organized and sequentially, transmitting knowledge. However, the trend and experience show the need to apply student-centered didactics. It is an approach that favors the development of skills and values that allow them to form autonomous, committed and creative behavior to solve problems in their environment [10]. In this sense, project-based learning is a relevant method, because it develops the ability of students to understand their environment and propose solutions to existing problems.

The project allows in its various stages the development of a reflexive capacity, formulation of ideas, making consensual decisions and responsibly, establishing parameters for the implementation of new solutions [11]. In this measure, students can acquire skills to plan, evaluate and review the variables involved in solutions to real problems [12]. Teaching strategies can be based on different learning models (behavioral, cognitive, humanistic, constructivist and historical-cultural) and have different approaches (inductive, deductive and mixed) [13]. This integrative model and approach has the ability to integrate during learning the link between the cognitive and the affective, the consideration of the context where learning takes place, the harmony between individual and collective work, communication between teachers and students and between pairs. In this sense, project-based methodologies are adequate to promote rural primary education, since they allow working on projects associated with reality and arrive at implementing real solutions. These teaching methodologies have as their starting point an analysis of the internal and external context since they must respond to the demands posed by students in a changing and complex environment [14]. The methodology proposed by INDEX [15] applies active methodologies that allow the development of projects associated with the environment where the activities take place. Its didactic is very motivating for students and teachers to be integrated into challenges that benefit the community. The Design to Improve Life Compass is the main tool of Design to Improve Life Education and integrates the three fundamental competencies of this way of teaching; Design to Improve Life, didactics, and process facilitating. Design-based learning (DBL) [16] is a form of project-based learning where students learn what they need while trying to design something [17]. DBL is based on four principles. a) work in reality, b) focused on people, c) motivation, and d) creativity [18]. It uses the way of thinking and the methods used by the design disciplines (mainly design) to generate meaningful, collaborative and practical learning around a topic, usually on the basis of interdisciplinary projects [19]. The DBL approach allows students to integrate their abilities, associated with creativity and innovation. In this way, the DBL methodology and meaningful learning are perfectly connected, to generate relevant learning experiences for students and their environment [20], [21], [22], [23].

2 METHODOLOGY

The methodological approach to carry out the research experience addresses the following phases:

The methodology has tools that allow to collect information regarding the methods associated with the didactics implemented with the expository approach and DBL. Five methodological stages are established: a) Planning and implementation of a project using the DBL approach; b) Execution of an expository class by the professor; c) Observation and collection of information by researchers during the development of experiences a) and b); d) Realization of focus group to collect information regarding both experiences; e) Application of simple random sampling interview to students who participate in both experiences. The thematic and pedagogical objectives proposed for both experiences are the same. Methods associated to the expository approach are selected, such as presentation of contents by the teacher, work in notebooks, dissertations; and, for DBL, the methods coherent with the design exercise that provides a solution for the environment and possible to experiment for the students are daily photos and videos, sketches, a day in the life of ..., cultural probes, interpretation of roles, questionnaires and surveys, interviews, Try yourself, creation of reports, ethnography [23]. Table 1 shows the employees in both approaches.

Table 1. Methods and methodological approaches contrasted

Methods used during class	Expository focus (Fig.1 y 2)	DBL focus
Daily photos and videos		x
Sketches	x	x
A day in the life of…		x
Cultural probes		x
Interpretation of roles		x
Questionnaires and surveys		x
Interviews		x
Try yourself		x
Ethnography		x
Creation of reports	x	
Presentation by the teacher	x	
Written work	x	x

The researchers conducted the Focus Group and Cultural Probes to gather information regarding the students' perception of the experience with both approaches. The sample is about ten students, seven girls (70%) and three boys (30%) was selected by non-probabilistic sampling for convenience, between 7 and 10 years (average = 8 years). This method of selection allowed for reliable perceptions, ensuring a technical-emotional perspective, even if the sample was random.

Figure 1 and 2: Primary school students in rural context. Expository class sample.

3 RESULTS

The results have two approaches.

3.1 Approaches and perception

3.1.1 Expository focus y DBL focus

The information obtained by the researchers proves the little participatory essence of the students in their formative process. The dynamics of receiver (student) and informant (teacher) is the constant. Students experience periods of boredom during class, due to the lack of didactics that activate, for example, creativity and motivate active participation. On occasions, the topics addressed, and content are not related to the context, because rural and urban education have everything in common. The books and their examples are often oriented to examples of life in the city and are impossible to understand by the students of rural schools. In the countryside, there are no buildings, no public transport, only nature and houses mainly made of wood. This situation hinders and discourages learning. In contrast, the DBL approach, because it is project-based learning, is perfect for motivating students and linking them with real life, their environment, and resources. Approach to the idea of innovative solutions for cases that really need it, generating contributions to the community. The

students change the scenario within the classroom, from the group work to make agreements, to the realization of models and dissertation of their proposals. The activity makes them be in permanent reflection and search for answers. Undoubtedly, this approach allows students to be happier, due to their active dynamics and connected with their environment.

3.1.2 Perception of students and researchers

Students consider that the DBL approach has more dynamic and motivating characteristics to drive learning. It allows them to propose and develop projects that are useful and make their environment a better place to live. Students mention that the dynamics are more participatory and varied, while the expository approach is boring and requires many hours dedicated to the same action, listening and taking notes. Students think that the DBL approach is interesting to build ideas as a team. It also allows designing and manufacturing products that can be implemented to improve the lives of the people around them and of themselves. According to the inventors' perception, the didactic developed for the expository approach is very limited and involves a great effort centered on the teacher. The DBL approach allows the teacher to have a more guiding role, while the students are managers of their knowledge. What is even better, is that it allows for significant experiences associated with problems in their environment.

4 CONCLUSIONS

The didactic principles of the DBL approach must be associated with flexible planning for improvisation and problem-solving. It must allow the observation and collection of information of the environment in which the experience is developed. It is necessary to generate an orderly learning environment, with material resources for brainstorming, mental maps, and conversation about points of view. The work environment must be consistent with the generation of ideas in a space of trust in which students feel motivated and happy. The boredom characteristic of the expository classes is not beneficial for learning. DBL proposes methods in which students have a self-generated role of knowledge developing meaningful experiences for students. This aspect is relevant for the knowledge to remain in the individuals. The possibility of connecting ideas with the construction of models that represent them, allows different skills to develop in children, from the intellectual, reflective to fine motor skills and three-dimensional visualization. Make the ideas tangible and visible is relevant because it gives the possibility of new reflections towards better solutions. DBL is a very beneficial approach for rural education because it allows students to connect with their environment and rethink it as an opportunity to integrate improvements. This is the main motivation to implement this approach focused on students and their environment.

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