LEARNING BASED ON DESIGN AS A DIDACTIC AND PEDAGOGICAL STRATEGY FOR THE DEVELOPMENT OF PROFESSIONAL COMPETENCES

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Abstract

The current reality means to grow economically in a sustainable way with more and better jobs and greater social cohesion. This entails a great challenge for higher education institutions, which must train professionals with the capacity to adapt to a very dynamic and demanding society. In this sense, University teaching, for some time now, tends to change the pattern of habitual functioning in university teaching, which involves an ambitious change in the teaching strategies hitherto used.

Due to the above, different methodologies such as project-based learning, problem-based learning and, ultimately, design-based learning (DBL) have been appearing and applying to the teaching and learning process, which has been successful in terms of learning outcomes and especially in the motivation of students and teachers, demonstrated in the experiences developed in the United States.

The present study, in a collaborative way between professors Industrial Design and Pedagogy of a state University, located in the south center of Chile, implements the learning strategy based on Design (DBL), from the development of a project from both disciplinary fields. The methodology is developed in the stages described for the Compass model of Index 1) prepare, 2) Perceive, 3) prototype and 4) produce, with the objective of unveiling the perceptions of Industrial Design and Pedagogy students when experimenting with the strategy DBL. For this, from the study a survey has been prepared that the students answer voluntarily and anonymously. The results obtained show the students' perception regarding their level of competence acquisition such as learning based on sustainable development, creativity, metacognition, inclusion, decision making, team work or critical reasoning in the analysis and evaluation of alternatives, so important for a satisfactory performance of the tasks of each profession. As future professionals, most of the students value the strategy in the development of quick and accurate projects. Between the two groups of students, it should be noted that in Industrial Design, the efficiency of the method is prioritized, while the pedagogy students value the didactic transposition of the latter.

In conclusion, the use of DBL as a learning strategy allows us to favor on the one hand the exercise of different transversal competences, considered fundamental in the professional development of both disciplines, and on the other hand to facilitate a constructive learning that will suppose a more significant acquisition of knowledge in the participating students. The projects and prototypes were achieved through collaborative work, which in turn implies an extraordinary coordination on the part of the students and achieves a level of involvement of all the participants, hardly observable through other traditional didactic methodologies.

Keywords: Design strategy, Professional Skills, Design Industrial, Primary Teaching.

1 INTRODUCTION

Some time ago, university teaching is in a period of transition, changing its functioning in the teaching-learning process from the academic approach to new teaching strategies that allow students to be involved in the development of knowledge and favor the development of skills Attitudinal and social, from the workplace is expected from a graduate. Accompanying the new study plans has been the development of personal and professional skills in the University in order to be in tune with a world of labor changes, which take place in an accelerated manner and the labor market demands an increasingly flexible training and with the ability to adapt to the aforementioned changes in management, distribution, technological adaptation, etc.

This new pedagogical orientation reaffirms the distancing of the most traditional teaching methodologies, which until recently have been omnipresent in practically all disciplines. As indicated by Santos Guerra (2015) [1] throughout the process the student remained in the background and, the undisputed protagonist, was the teacher who was responsible for organizing and planning the learning
of the students. This situation is changing in the university classrooms, since teaching methodologies have been developed that focus on student learning and allow their greater involvement in the teaching process (Vega et al., 2014) [2]. These are the so-called "active methodologies". The learning based on design with methodological orientations of the INDEX model, which is based mainly on the so-called Design-based Learning (DBL), which has been successful in terms of learning outcomes and especially in the motivation of students and teachers which has been demonstrated in the experiences developed in the United States and Denmark.

The Design-based Learning employs the way of thinking, the modus operandi, and the methods and tools used by the design disciplines (mainly design and architecture) to generate meaningful, collaborative and practical learning around an issue, usually about the base of interdisciplinary projects. In this way, the teachers trigger learning experiences in which the students are actors and managers of their own learning and the facilitators of these experiences. A key factor of the DBL is that teachers must master a practical teaching mode in which they must coordinate the learning objectives with the motivations of the students, favoring the 'learning to learn' rather than the delivery of disconnected disciplinary knowledge. By the same, ABED does not focus on 'knowledge without reasons' (programs based on content), but on giving students 'reasons to know' (based on motivation) (Palma & Hernández, 2018) [3]

The present study, in a collaborative way between professors Industrial Design and Pedagogy of a state University, located in the south center of Chile, implements the learning strategy based on Design (ABED), from the development of a project from both disciplinary fields.

This didactic strategy has great potential to train students with the ability to solve problems and attitudes for the planning and coordination of collaborative work teams, competences, indicated in Perrenoud (2004) [4] for the future ideal teacher, The International Council of Societies of Industrial Design (ICSD) [5] for Industrial Designers and all of them, highlighted in the Tuning for America Latina project (2007) [6].

2 METHODOLOGY

The methodology is developed in the stages described for the Compass model of Index 1) prepare, 2) Perceive, 3) prototype and 4) produce, with the objective of unveiling the perceptions of Industrial Design and Pedagogy students when experimenting with the strategy DBL. For this, from the study a survey has been prepared that the students answer voluntarily and anonymously.

The learning experience was developed with large groups during the second semester of 2018. It involves 39 students of Industrial Design of the Campus of Concepción and 41 of Primary Teaching, of Campus Chillán of the University of Bío-Bío. In each course the implementation of the DBL methodology was carried out, around food preparations in Industrial Design. For students of Primary Teaching, in relation to the Sustainable Development Goals (ONU, 2015) [7]

With the purpose of knowing the perception of students, a survey is developed, an open response instrument with the following questions: 1) What is Design-Based Learning (DBL) for you? 2) According to you, what would be the objectives? of Learning Based on Design ?, 3) What skills did you develop ?, 4) For your future professional practice, what would be the contribution of the Learning Based on Design strategy ?, 5) What weaknesses do you attribute to the DBL strategy ?.

Content analysis was used for the qualitative analysis (open responses of the questionnaire) with support of Atlas.Ti software 8.0.

The selection of the participants of each group was carried out from the following criteria:

- Be a student of Pedagogy or Industrial Design of the Universidad del Bío-Bío.
- Not have experience in the DBL strategy.
- Have willingness and willingness to participate in the DBL experience.

3 RESULTS

The results are expressed in dimensions referring to the characteristics of the DBL strategy (questions 1 and 2 of the questionnaire) and professional skills (questions 3 and 4 of the questionnaire), considering also some weaknesses perceived by both groups under study.
The findings were grouped into five categories with different frequency and intensity perceived by students of Industrial Design and Basic General Pedagogy (Table 1). For the first group of Industrial Design, "Effectiveness", "Organized methodology" Problem solving and "application in different subjects", correspond to the dimensions attributed to the characteristics of the methodology used Learning Based on Design (Figure 1). Whereas, the categories perceived by students in relation to professional skills were problem solving, creativity and efficiency in their use (Figure 2).

On the other hand, the meanings given to the DBL strategy by the students of Basic General Pedagogy, is mainly to work based on reality, solve problems and reflect (Figure 3). With respect to the skills that the strategy promotes to the future professional teaching exercise is creativity, collaborative work and reflection (Figure 4). Both types of students agree that the methodology allowed them to develop problem-solving skills and creativity according to the results of the instrument.

Among the weaknesses expressed is the difficulty to organize at the beginning of experimenting the strategy, stating that "it is difficult to start working" and "Difficulty when deciding as a group that designs, when working as a group it is more difficult to agree and choose they want." They also indicate that the number of participants in each group could influence decision-making and reach consensus, stating that "it plays against that, if the number of participants is very large, there could be a risk that there is no learning". The students of Pedagogy for their part affirm that it could become complex to work with very young children due to the limited prior knowledge and language skills, both in oral and written communication. "In younger children it is more difficult to develop this strategy, because they cannot read and explain." Finally, they refer to the duration of the strategy, declaring "That the form is not implemented as it should and that it costs them to carry out the project quickly".

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*Figure 1. Valuation granted to the DBL strategy by Industrial Design students*
4 CONCLUSIONS

This work aims to contribute to the formation of higher education in relation to the development of professional skills, through the use of the DBL innovation strategy, without leaving behind this new vision that fully includes the World Forum on Education 2015-2030 [8] and the Objective of sustainable development No. 4 "Guarantee an inclusive and equitable quality education and promote permanent learning opportunities for all" (ONU, 2015). The commitment to a quality education, learning opportunities throughout life, for all and in all contexts and at all educational levels. From this study it is possible to reveal the assessment that the students had with different graduation profiles, finding in both groups comparable and highly rated codes for the development of professional competences. Stresses, the assessment of the development of creativity and the resolution of problems that both groups perceived of the DBL.

The exit profile of the Industrial Designer indicates that "a professional bases his decisions on observation. He has a high domain in technical aspects related to different types of materials and industrial production processes through the use of applied technologies in the materialization of ideas, allowing to validate design proposals. Able to investigate and conceive new business scenarios for development and transfer in the fields of innovation in products, processes and services both in increasing the competitiveness of small, medium and large companies, as well as in entrepreneurship and Free exercise of the profession. Capable of working in collaborative and interdisciplinary works according to the new globalized contexts for productive development in the public and private sphere ". In part, the University Training of Designers supports the assessment that students have regarding the strategy, whose perception gives greater importance to working with a methodology that allows them to organize, to solve problems more efficiently and in different professional areas.
Meanwhile, the students of primary teaching point out that the DBL methodology allowed them to reflect, work collaboratively and develop creativity skills. Emphasis is placed here on the acquisition of competences necessary to practice as a teacher, evaluations that were focused on the positive mainly as is the future visualization of a reflective strategy, which promotes creativity and collaborative work.

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