

# ARCHITECTURE AND EDUCATION: "PROJECT BASED LEARNING" AS A TEACHING STRATEGY AND LEARNING OF PROJECT IN THE INTERIOR DESIGN COURSE OF THE FEDERAL INSTITUTE OF SÃO PAULO, BRAZIL

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## Abstract

This paper presents a transdisciplinary approach to teaching-learning of Project in the context of the articulations between Architecture, Interior Design and Education, from a pedagogical experience of methodology by Projects (or Project Based Learning - PBL) carried out in the higher education course of Technology in Interior Design of the Federal Institute of Education, Science and Technology of the State of São Paulo, in the city of Jacareí, São Paulo, Brazil. It aims to investigate the possibilities and effectiveness of applying the Project Based Learning (PBL) method in project teaching in the field of Architecture and Interior Design from real cases, applied in an integrated way, articulating the various components of the curriculum. It also intends to analyze the pedagogical strategies and methodologies used from the perspective of theoretical references in the field of Education that focus on active learning methods. The teaching strategy was within the scope of an extension action with the external community, inserted in the curricular components of the second year of the course, having the discipline of Project of institutional buildings as an articulator. The projects were carried out in partnership with institutional entities and social groups and consisted of low-cost interior projects in municipal public institutions, such as day care centers, public schools, and homes for the elderly, which presented demands real for the adequacy of their spaces, or had environments lacking adequate environmental quality. Initially, a pilot project was carried out throughout 2019 with a municipal public school located on the outskirts of the city of Jacareí, using the PBL methodology, and the role of the students went the to carry out the projects, from capturing information and collecting data, until the final stage of presentation of the executive project to the external community and the municipal management entities. In this way, they were able to participate in all stages of the process, so that, under the guidance of teachers and municipal technicians, they were able to experience the process of creation and elaboration in a direct relationship with the practice of execution, with all the challenges and problems arising from this reality, promoting well-being, and improving the quality of the environments for its users, providing greater quality of life, comfort and safety to the community served. It was remarkable the perception of the positive results in the students' learning process, corroborating the discussion on active methods as didactic strategies, so that the student participated as an active agent in the process of socio-spatial transformation, in addition to experiencing the "learning by doing". This transdisciplinary approach goes beyond the context of Architecture and Interior Design, as it encompasses educational concepts that engender actions for project design, trains professionals who are critical and aware of their role in society, making it possible to redesign and reconstruct the skills and abilities of designers.

Keywords: Architecture, Interior Design, PBL, project-based learning, active methods, transdisciplinary.

## 1 INTRODUCTION

The current scenario of crisis in the contemporary world demonstrates that society is going through a transition phase, with transformations and impacts significant that demand the various spheres and social aspects, demanding new ways of understanding the complexities of human life, which provoke ruptures of nature political, social, economic, technological, and existential. In this context, educational institutions at their different levels of action have fundamental role of understanding the problem and to try making possible resolution possibilities together other organizations, which places schools and their educational *modus operandi* at the center of the debates.

Changes are required that bring more effective responses to the demands that present, enabling a more humane and transformative education. It is necessary to rethink the current educational models and pedagogical strategies to meet the current needs and desires, ensuring effective teaching with the promotion of creative and innovative methodologies, which allow the student to play a more active and

autonomous role in their learning process. In Brazilian institutions, such concerns are pointed by the National Curriculum Guidelines (NCD) and have been the subject of discussions in Higher Education Institutions (HEIs) and in schools of Professional and Technological Education, demanding changes in the teaching-learning processes. In the teaching institutions of Architecture and Urbanism (AU) and Interior Design (DI) this reality is no different, opening possibilities for studies, researches and experimentations in this area.

From this discussion, to import to point alternatives and perspectives in the teaching and learning processes in courses in the creative-projectual field that establish dialogue between the different actors present in the educational universe, that prepare for the exercise of citizenship, for teamwork, for the flexibility, proposing the integration of the knowledges and the contextualization of content to real life. In this context, the active methodologies pose themselves as possibilities of consistent responses for the effectuation of these conditions and provide the necessary tools for carrying out collaborative processes.

This article presents a transdisciplinary approach to teaching and learning in the projectual field of Interior Design based on pedagogical strategies that articulate methodology by Projects (or Project Based Learning - PBL) with university extension actions, experimenting with possibilities of applying methods for the construction of innovative curriculum, which promote reflection and feed the debate on teaching and their pathways in Design. To this end, it analyzes projects linked to practice and the resolution of real problems with an emphasis on participatory processes, establishing effective links between the University and the external community.

The understanding of the concept of innovation within the educational universe has adopted in this approach has based on the emancipatory or edifying perspective proposed by [1] and [2], [3] and [4] which aims to "cause epistemological ruptures" [1], and part of the concept of education centered on human formation, articulated with the world of work in its multiple dimensions. Such conception integrates in the same curriculum the full education of the student, enabling constructions and appropriations of concepts necessary for conscious intervention in the social reality, that is, it understands the student as a social and historical subject, who is inserted as a protagonist within the institutional universe, but also in a broader context. This dialectical understanding is fundamental for the discussion and application of pedagogical strategies that place students and other actors in the educational universe as autonomous and active agents in the teaching and learning processes.

The pedagogical strategies mentioned here came from empirical experiences in the Higher Technology Course in Interior Design (HTC-ID) at the Federal Institute of São Paulo (IFSP), Brazil, within the scope of university extension actions with the external community, inserted in the curriculum components of the curriculum grid. The HTC-ID course has started its activities at the Jacareí Campus of IFSP in 2018, being a pioneer in the public network throughout the State of São Paulo, Brazil, and the third course of ID in the Federal Network Professional, Scientific and Technological Education; and it is in this context of updating / reformulating the curriculum to meet the current requirements and train professionals, creatives, humans, who have a multifaceted background and who are prepared for the globalized world.

The Interior Design projects presented in this article were carried out in partnership with institutional entities and social groups and consisted of low-cost interior projects in public municipal institutions, such as day care centers, public early childhood schools and elderly homes, which presented real demands of the adequacy of their spaces, or had environments lacking adequate environmental quality. Such projects also took place within the scope of political-pedagogical discussions about the possibilities of changes and guidelines that can be pointed out to guide the reformulations of the pedagogical projects of the IFSP Design courses, in the state of São Paulo, Brazil; and in other courses who work with projects at different scales, whether in Interior Design, Architecture, Urbanism or Engineering.

## **2 METHODOLOGY**

The pedagogical strategies were based on the application of the active methodology Project Based Learning (PBL), from on the articulation with real extension university projects in the teaching and learning processes along the IFST CST-DI course - Campus Jacareí, state of São Paulo, Brazil, which initiated during the academic year of 2019. The extension actions took place within the scope of notice nº 39 - Extension Projects 2019 of the IFSP Extension Dean's Office, with the external community, and were inserted in the curriculum components of the course, in the second year of the grid, with the discipline of Institutional Building Project as the articulator of the transdisciplinary proposal. The transdisciplinary approach to knowledge presupposes the integration of several sciences and knowledges aimed at facing situations and / or challenges in real life and guided the didactic strategies.

The project methodology or PBL is part of the field of active methodologies, and consists of active and collaborative learning, which emphasizes activities in a relationship knowledge-real life, which is built in a collective, transdisciplinary, and student-centered, way or that is, the student leads the teaching and learning processes in which he is inserted and builds these processes together with the teacher and colleagues. According to [5], it is a proposal that aims to incorporate into the class the question about real problems, trying to solve them, and a treatment of disciplinary knowledge based on work themes and research modalities. [5]

The active methodologies are related to strategies for meaningful learning, which make sense for the student in his learning process, so that they participate of way actively and autonomously; and for this reason, they are also called meaningful methodologies - those that mean something to him. The practices that established the active methodologies are not recent, since historically, educators such as John Dewey [6] and Paulo Freire [7] point of to the benefits of experiential and student-directed learning, however, it was only from the nineties that its theoretical scope began to be delineated and deepened by educators.

Meaningful learning is established when new information is related to some relevant pre-existing aspect in the student's cognitive structure. [6]. Bringing the concept to the Interior Design area, we can say that the theoretical approaches carried out in the classroom are put into practice in real environments and projects, bringing to light the process of "learning-by-doing" proposed by Dewey [6]. The confrontation with real situations and projects is fundamental in the exercise of project teaching and in related disciplines in the field creative-projectual, as it is part of the construction of the student's references and their relationship with previous experiences, so relevant in the project process [8].

The theoretical approaches were put into practice in a real environment, and the students were faced with the various challenges of the project and the process for its feasibility and execution. The PBL methodology does not deal with a single method, but it does mean, in fact, a change of posture and a new way of thinking about the pedagogical practice and the theories that support it, because the questions emerge as the problems appear and need to be solved by students. Therefore, the proposed methodology presupposes thinking about learning as a global, complex, and continuous process in which knowing the reality and intervening in it are inseparable attitudes, in a constant 'coming and going', from the 'Briefing' and from the context of the project to be worked on.

Based on this direction, some PBL initiatives were proposed and started in the DI course from the first semester of 2018, becoming a starting point for new practices. In the search for demands of real project in the city of Jacareí that could be these "pilot projects" of PBL, we started partnerships with institutional entities and social groups to carry out interior projects in municipal public institutions that presented real needs for the adequacy of their spaces, or had environments lacking adequate environmental quality, or even that they needed to be adapted to the updates of the NBR 9050 standard regarding accessibility.

The role of the Interior Design course in these partnerships was to carry out the interior projects and adaptations of the institutions based on articulations between the extension action and the PBL methodology, intent to enable the experience of the real project, of the various challenges since the project until its execution, contextualizing the theoretical knowledges to the students' practice. Internally, the project had the support and participation of professors from the Interior Design course and the general direction of the IFSP Campus, in addition to the institution's Extension coordination. A screening was performed of the institutions for the application of pedagogical practices, and it is noteworthy that other projects are underway simultaneously, but what follows is at a more advanced stage of implementation.

## **2.1 Project Based Learning in the Interior Design course together a public municipal school for early childhood education.**

The project was carried out for a municipal public school located on the outskirts of the city of Jacareí, in the interior of São Paulo, Brazil, which required reforms and aesthetic, functional and accessibility adjustments to their environments, but which did not have the resources to realize the projects and its construction. The municipal school for early childhood education and elementary education - EMEF Presbítero Mabito Shoji was selected for this didactic-pedagogical and extension experience as the first pilot project - to direct other actions and partnerships. Located in a rural area, 11km away from the central region of the city of Jacareí - SP, on the margins of a federal highway, its surroundings are made up of factories and farms, and the school serves children from kindergarten and elementary school I, that is, from 2 to 8 years, approximately.

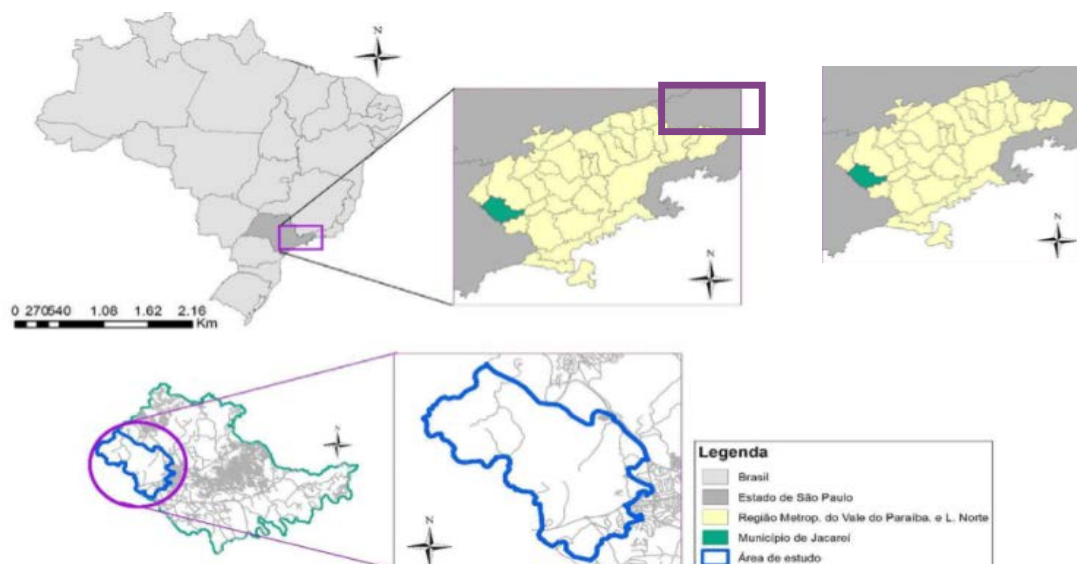


Figure 1. Location of the city of Jacareí in the state of São Paulo, Brazil.

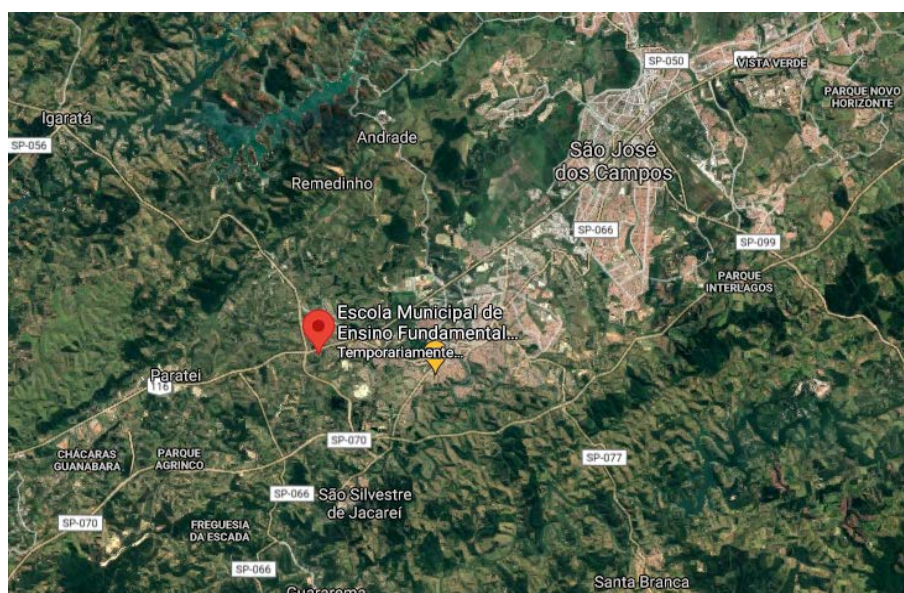


Figure 2. Location of the school in the city of Jacareí, state of São Paulo, Brazil.

The students actively participated in the entire process, from capturing information and collecting data, needs and briefing preparation, to the process creative-projectual, development of technical projects and monitoring the execution of the works; culminating in the final presentation phase of the project to the school community and the municipal management entities that made the works feasible. The students' participation took place from the integration of the subjects of the DI course, such as Construction Technology, Thermal Comfort, Applied Computer Graphics, and Interior Project of institutional buildings, among others; being the latter established as the guiding axis and articulator of curricular components and was able to contribute to the insertion of interdisciplinarity in the course.

Three technical visits to the school were made, organized with small groups of students and teachers from course of DI of the IFSP. On the first visit, it was made the recognized the local and measurements of the environments were surveyed, as well as photographs for analysis. The school has 25 employees, including 16 teachers, 4 managers, 1 secretary of municipal services, 2 school cooks and 2 cleaning ladies.

The school's physical space consists of five classrooms, a warehouse, a secretariat, a library that shares the environment with the teachers' room and a service room, four bathrooms, two for students and two for teachers, one kitchen with pantry, a feeding room of teachers, school reinforcement room, feeding room of students, central courtyard, and a space at the back of the school, where there is a deposit and an open pit.

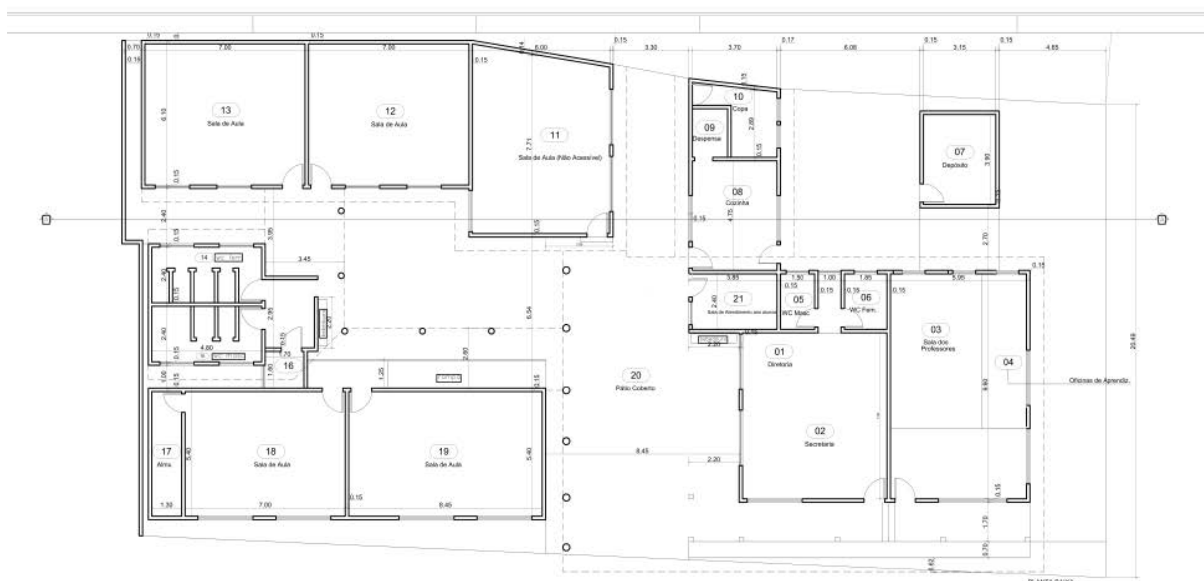


Figure 3. Original survey – “as built” EMEF school Presbítero Mabito Shoji, Jacareí-SP, 2019.

There were infiltration problems in the building, in addition to demands for repairs and adequacy of spaces and furniture. In general, the environments were cold, colorless, without functionality and lacked an educational environment aimed at children, that is, there was a lack of pleasant spaces conducive to children's teaching and learning, with creative and colorful elements. It was found that the classrooms had good natural lighting, however some had problems with infiltration, which caused discomfort and unpleasant odors, which could cause serious damage to the health of users. In addition, the furniture used by the students was ergonomically bad, creating comfort problems.

On the second visit, interviews were conducted with educational agents and managers, to survey the needs of users and students and to enable the construction of the project Briefing. Throughout the interviews, several needs, and difficulties that users faced in the school routine were exposed, mainly the need to create a more welcoming and adequate school for children uses, because the lack of certain elements limited the work of employees and hindered the process of learning of the students, which generated many expectations with the possibility of the project. Some images selected below show the reality of the school spaces.



Figures 4. Survey of the school situation - shared teachers' room with different uses: library and meeting room. EMEF Presbítero Mabito Shoji, Jacareí-SP, 2019.

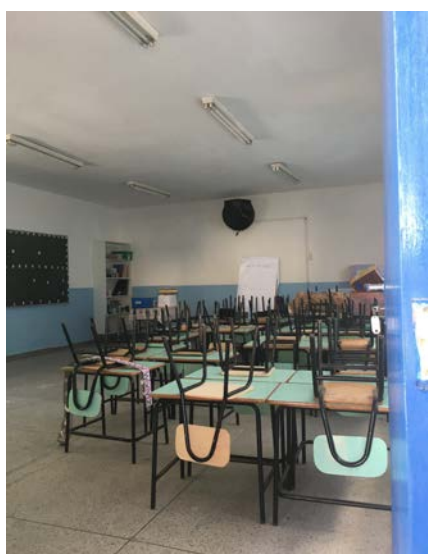
Among the main guidelines, the need to create some environments was raised, such as the teachers' room isolated from the students' circulation, so that they have a private environment for pedagogical



discussions, individualized spaces for the activities of the secretariat and the board, a video room, and a playground, in addition to adapting places to make them accessible and more enjoyable. It was found that the courtyard does not have enough space to accommodate all students in between classes at the same time, with a lack of places to sit, socialize and do meals. The patio has a space for a vegetable garden, but the project for its implementation has not been completed, demonstrating the lack of green areas and the need to think about the school's landscaping project.



*Figure 5. Survey of the school situation – patio and feeding room of students. EMEF Presbítero Mabito Shoji, Jacareí-SP, 2019.*



*Figures 6 and 7. Survey of the school situation – classrooms. EMEF Presbítero Mabito Shoji, Jacareí- 2019.*

Then, surveys and measurements of all existing furniture were carried out, so that the first studies could get off the ground. In the classrooms, the main needs raised were the adequacy of the furniture so that it could attend students of kindergarten and elementary school I simultaneously, and the need for cabinets to organize and store the materials of the classes. These and other issues and problems were raised, and the entire collection of information was analyzed by the participants of the extension project with the disciplines of the DI course, in an attempt to develop project proposals that could meet the wishes of the municipal institution. Here, it was presented only as a cut of this reality for didactic purposes and possibilities of discussions of the pedagogical strategy used.

The project developed by the students for the school was based on the premise of bringing environmental and aesthetic comfort to the spaces, based on a playful concept, with functional, pleasant, colorful, and well-lit environments, which would enable the creation and enjoyment of the children. In

this sense, the design references were based on educational environments with a playful atmosphere, with cheerful colors and creative elements, with storage spaces for school materials and documents. It was made posters of Mood Board to guide the project strategies and define the project's concept. Each of the activities and stages was organized together with the curricular components and guided by the group of teachers of the DI course, and the students actively participated with suggestions and proposals, changes schedule and process feedback.



Figures 8 and 9. Posters with projectual references and Mood Board made by students of the DI – IFSP school EMEF Presbítero Mabito Shoji, Jacareí-SP, 2019.

It is noteworthy that the construction of the didactic strategy took place based a transdisciplinary and dynamic perspective, that is, it was being built collectively by all participants, interrelating the contents of the components around an integrating idea aimed at facing real situations - problem-project, bringing more meaning to the student, that is, making that learning meaningful to him. In this way, this strategy allowed it to distance itself from the teaching practice in the project studio as a unilateral knowledge transfer, making the work in the studio more dynamic, collaborative and applied to real projects.

### 3 RESULTS

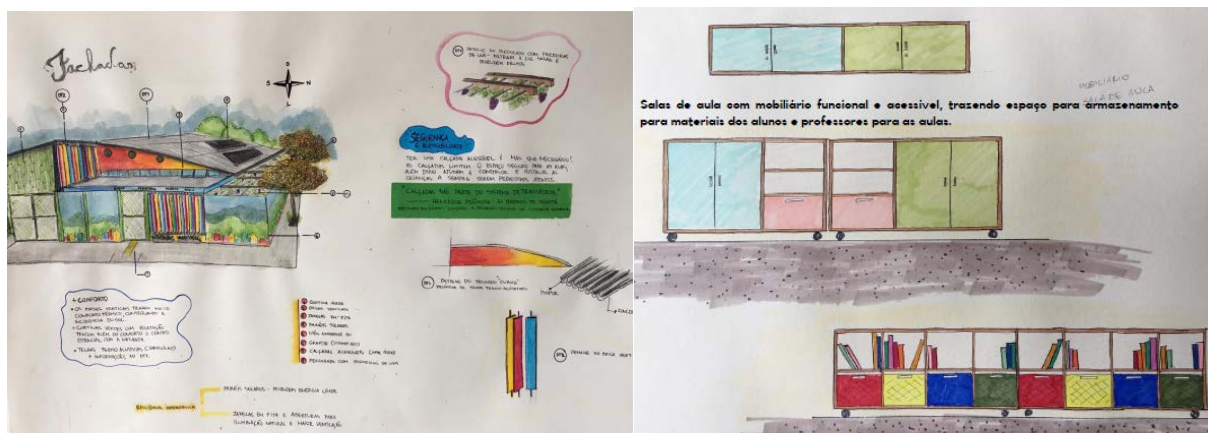
The projects are in progress, so the results are partial, and the processes are being built as this article is presented. As already consolidated results, it can be considered that the implementation of extension projects in conjunction with the PBL methodology from a transdisciplinary approach has brought enormous benefits for students, for the DI course and for the community. By incorporating real projects as extension actions to didactic strategies in the classroom, it was possible to contribute effectively so that the student could experience the design and constructive processes, and have the understanding from real contexts, allowing a greater understanding of reality. Therefore, students, under the guidance of teachers, had the possibility to approach this creative process in a direct relationship with the practice of execution, with all the challenges and problems arising from this reality. The students even had to deal with anguish and frustration in the face of a lack of funds, problems related to the social reality in question, a school in the periphery that lacks infrastructure and staff, and so many other reflections put into that school reality and into that specific context, which are inherent in any real-life project.

The student learned by participating, experiencing, formulating problems, taking actions in the face of facts, experiencing real challenges and problems, building new concepts, defining procedures according to the needs and issues that emerged. And in this transdisciplinary approach, the curricular components contributed by enriching the contents with the classes and activities corresponding to the different types of knowledge. The theoretical approaches of the classroom could be confronted and discussed when put into practice in a real environment, generating a process of empirical knowledge of the project's praxis.



Figure 10. Preliminary proposal to adapt the uses to the environments made by students of the DI course – IFSP to the school EMEF Presbítero Mabito Shoj, Jacareí-SP, 2019.

It was also possible to reflect on the social role of the designer and the draftsman, since the realization of the projects and renovation works of the municipal public school in the periphery is a real demand from the external community, lacking the means and conditions which can to feasible its actions. The extension actions with the PBL in the course promoted the improvement of the conditions of use of the school environments, providing greater quality and comfort to students and users, contributing to the process of socio-spatial transformation. It can show how Interior Design can transform spaces and enable creative solutions at low cost, providing the experience of concrete design.



Figures 11 and 12. Project studies on the adequacy of school environments and furniture. Made by students of the DI course– IFSP to school EMEF Presbítero Mabito Shoji, Jacareí-SP, 2019.

In this process of consolidating the pilot project, many other students, faculty, and staff at the IFSP Campus became aware of the proposal, and voluntary initiatives were received for the next steps. The idea is to strengthen relations with some companies that can contribute with construction materials and voluntary labor, to capture each more projects for the context of the University, articulating teaching-research and extension actions with active and innovative methodologies. It is believed that these projects were positive incentives for IFSP students and the external community, as it provided the experience of the real project, of building, of the challenges existing in a work from its conception and fundraising to its execution, contributing significantly to the process teaching and learning of project in the field of Design.



## 4 CONCLUSIONS

The use of active and innovative methodologies based on a consistent transdisciplinary approach and the understanding of the student as the protagonist of their learning process can expand conditions that favor student learning and that may involve the design of more creative classroom spaces, use of innovative and ludic, didactic resources, digital resources, and social media, which today transit all the time in the students' daily lives, and which support research. In this way, the active participation of students translates into effort, mobilization, commitment, a sense of team and willingness to learn, as this means something important to him.

It is essential to discuss the innumerable possibilities of articulating extension actions with scientific projects and teaching activities, understanding it as an educational, cultural, and scientific process, bridging the gap between the university and society; being able to bring effectively and by indissociable way this integration linked to undergraduate courses and the classroom. It is important that there is commitment from all parties and dialogue between them and the external community, which allow for a transformative, reflective, and socially committed performance, allowing for the integral training of students.

Proximity to professional practice and experience in real project contexts are fundamental in the training of the professional designer [8]. This notion is very important to train professionals who are critical and aware of their role in society. Learning and experience which go against that emancipatory education, which causes ruptures and forms for citizenship, which brings together in the curriculum the full education of the student. Having this articulation between all the elements present in the educational universe, it is possible that the extension projects and actions, combined with teaching and learning strategies using active methodologies, can contribute to effective human education and that form critical, autonomous, conscious and citizens, that meets the demands of the contemporary world, and which can provoke the disruptions necessary of today.

The reflections placed here make it possible to feed the debate about teaching of project in Interior Design and to contribute to other areas related to the creative-projectual field, such as in Architecture courses, based on teaching practices with an emphasis on collaborative and participatory processes for the development of projects with real problems resolution, that promote the articulation between teaching, research, and extension.

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