

3D modeling as a methodological strategy in the design student's learning process

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Summary. The following text presents a study developed in the design career of the University de La Serena, Chile, specifically in the degree project subject corresponding to the fifth year of studies. 3D modeling is a content that students experience from the 5th semester in the career, which allows them to experience and bring the design project closer to reality.

This is where they define a design problem, and then apply a design methodology, reflected in a functional prototype. The design process and approach to virtual reality will be the focus of the study, a space where students can learn from technology and innovation in their projects.

Keywords: Design, 3D Modeling, Project, Virtual Reality

1 Introduction

1.1 Degree Project Course

The course chosen for the study is Degree Project which is a theoretical-practical subject of the specialty, aimed at proposing the development of design projects to students.

From the competences of the profession in conditions of graduation profile, promoting design as a factor of responses to fundamental human needs and the development of the contexts in which its professional work impacts.

The course is developed from project-based learning, where students will observe different case studies, applying social science tools, which allow them to gather relevant information to define the problem addressed and its variables for improvement. The location of the course in the curriculum directly affects the design process, since it is an 8th semester course, where students bring previous experience in project development.

2 Theoretical Framework

In the design of projects there are mental processes that are initial, based on creation and ideation. This is from the detection of a need and/or definition of a design problem to the proposal. There are several project methodologies for the design discipline, as well as in architecture and construction, where phases are identified.

According to Frascara (2000), design is "the production of visual objects intended to communicate specific messages" (p.19). For Jensen (2009), design should be divided into two main approaches: executive and strategic. The former is in charge of executing ideas to transform them into tangible results that fulfill a specific function related to the satisfaction of some specific needs or desire while the latter focuses on solving problems and planning and managing the necessary resources to devise, execute, implement and evaluate all the solutions that are produced.

There are 4 common denominators in all areas of design. First, they all start from the presence of a mental plan. The second is related to the existence in the various branches of an element or purpose that mobilized that plan. The third common denominator is the coexistence of all in the same territory of knowledge in three fields of action: the architectural, the objective and the communicational. The fourth coincidence is the presence in all of them of the same thought, the visual, which merges the sensory with the rational. Finally, the fifth coincidence is the way of teaching and methodological learning.

In the basic stages of the design process, it is observed that all have in common the attempt to externalize the mental mechanism to design. In terms of phases, the design process follows the following stages: problem identification, data collection, synthesis, gestation, enlightenment, elaboration and verification.

For this study, in the elaboration stage, the designer is able to correctly capture the visual idea, in order to approach its construction in terms of graphic representation. This stage is characterized by being the phase of the concretion of the finding and its adjustment, it is the moment of rigor in which intensive, meticulous, constructive and representative work acquires relevance.

3 Method

The aim of this proposal is to apply 3D technology to bring the design proposal closer to reality, for example, from the draft or sketch on paper, to digitization, and then modeling in 3 dimensions. With this technology, students learn by practicing and "testing" spaces from ergonomics and functionality (design aspects).

The approach of the study is of a qualitative and exploratory, where data construction techniques are applied based on observation and interviews to degree students who use this technology in their design proposals.

Although the learning outcome proposes to "evaluate" possible design interventions, the students of the course take the eighth semester, where they plan, project, test and propose improvements to their designs.

This is where the model and the functional prototype are born, where students can test the design with the customer or user segment (user profile) and then redesign or make improvements. (Continuous improvement). Therefore, 3D modeling is an area of design that keeps students and teachers connected and updated in methodologies for learning based on design projects.

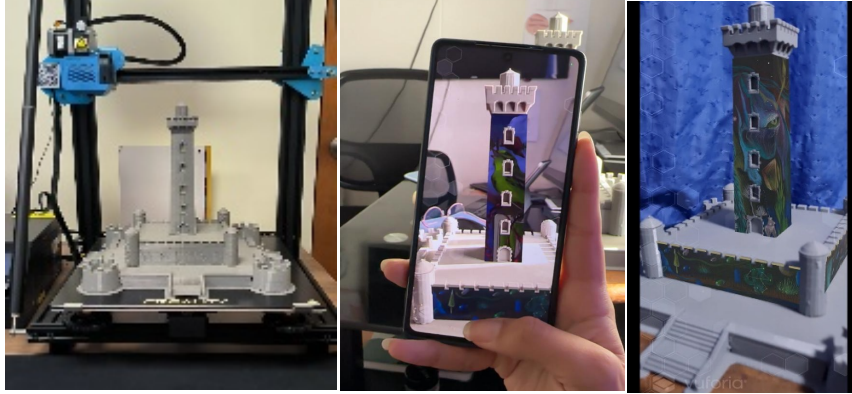
4 Results

The students of the Degree Project were able to apply theoretical content in practice, 3D modeling allowed them to develop a meaningful experience, and to bring the proposal closer to a functional prototype.

For example, the case of 3D modeling and the application of augmented reality in an identifying element of the zone, and the projection of graphic motifs on its surface. The above was proposed by the student as an opportunity to make local artists visible in a tourist attraction.

Design Process

Fig. 1. 3D printing process and augmented reality application.



Source: own elaboration.

5 Discussion

The design student develops specialty competencies over the course of his professional career, which allow the application of practical content in the work of their profession. Digital design is a current need, which allows bringing the client or final consumer closer to the reality of the proposal. Thanks to 3D modeling and augmented and virtual reality, we can experience situations in sketch or draft.

The immediate result is an effect that generates motivation in students, since 3D modeling software allows them to see in situ the effects on the progress of the design. This also allows the teacher to guide the students in the design process, their improvements and adjustments for the final result.

6 Conclusions

The design process is fundamental in the development of projects, its progress allows the continuous improvement of the finished and functional prototype, materials that allow the exemplification of a situation, product or service in the area of design.

Technology complements and adds value to the final result of a product or service in the design, and also allows visualizing the process, improvement and finishing of the final proposal. Degree students design projects that approach the working world, where 3D technology and augmented reality allow them to exemplify situations and actions as professionals in the area. The role of the teacher is fundamental in their process, guiding actions from their objectives as students in the design project.

Finally, it could be concluded that technology allows the design student to experiment in their learning process, from the discipline of design, towards a finished proposal. Its continuous improvement, testing and adjustments for the final solution are aspects of the designer and his insertion into the working world.

7 Limitations and Future Research

Some limitations are visualized from the use and application of technology, where there is a percentage of students who do not handle 3D modeling, programming and augmented reality software. Here, support in the computer area was requested from the University of La Serena, which could be built as a team.

Finally, a look towards studies in the development of video games is proposed, an little explored area in the School of Design at the University of La Serena, a space to work and enhance the virtual and digital area in students and teachers.

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