



Origami as a tool for learning and understanding visuo-spatial and compositional concepts in design and architecture.

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Abstract:

For the past 7 years Origami has been implemented as a core skill and tool in the course of “Fundamentals of Design” that belongs to the undergraduate programs of Industrial Design and Architecture in the Institute of Technology and Superior Studies of Monterrey. This university is first place in the national ranking of higher education institutions in Mexico. The implementation took place after proving the potential Origami had for the understanding and learning of visuo-spatial and compositional concepts that constitute the basis of these undergraduate programs.

The objective of the course is for the student to learn and acquire visual and graphic expression abilities and tools, as well as the semantic background of the lecture of a bi-dimensional object. Throughout experimentation, investigation, and a literature review, the student will learn the relation between the basic concepts and the techniques for the generation and interpretation of bi-dimensional objects. Finally, the student will be introduced to three-dimensional objects. By the end of the course the student will have the knowledge and abilities that are the foundation for the following projects of design, in all its fields.

The course is 50% theory and 50% practical. Traditionally, exercises for the application of concepts were done mainly through sketching and drawing techniques. But when the integration of Origami was implemented, the course had to be redesigned so that Origami constituted more than 60% of the practical exercises. Then it became 50% theory, 35% Origami and 15% drawing and sketching. The course, being an introduction to the compositional process is mainly done in two dimensions, so most of the exercises are monochromatic, except those that belong to the color unit. In this way the student can concentrate on the formal, visual, and compositional aspects as well as in the explorations and proposals related to learned concepts.

Through practice it is intended that the student in each exercise learns to develop and follow a process that will be documented in a blog or sketchbook. All the material generated is analyzed, selected, and synthesized in a final proposal accompanied by a brief written conclusion (approximately half a page). The aim of this process is that the student of Architecture and Industrial Design is able to:

- Understand and apply basic design concepts.
- Discover creative possibilities.
- Create two-dimensional compositions.
- Develop drawing and sketching abilities.

The understanding and application of design concepts as well as the discovery of individual creative possibilities were the two competences that have been impacted more and thus improved by the integration of Origami in the course.

Origami allows students to experiment deeper the whole process as most of the exercises were designed using modular pieces to promote flexibility and broaden the compositional outcomes. In this sense, the students have first to fold the origami modules, and then create the compositions or representations associated with the corresponding concepts. By folding, several cognitive processes are activated enabling students to reflect further on the concepts learned and they start generating compositions simultaneously. Origami also eliminates the common blockage that students have in front of a blank piece of paper or canvas. They don't have to face a blank space to start creating something, they start creating from the unit to a whole and it is in this way exactly how the basic concepts of design are learned.

The following image shows an example of an exercise on the concept of the graphic point which was articulated using Kandinsky's theories and principles of visual perception as theory background.



The implementation of Origami as a fundamental tool in the course was possible due to the alliance of a professional Origamist with a Designer with knowledge in Origami. Is because of this cooperation that the proposal, re-design and evaluation of the impact and benefits of Origami on students is possible. All Origami exercises are designed so that students can reinforce the theory and develop skills to represent what they learned in an innovative way with the highest quality.

Why Origami should be considered as a strategic project and tool in Architecture and Design? Origami is an art but it is also a discipline that has application in practically all disciplines related to creation (design, architecture, engineering, nanotechnology, aeronautics, biology, medicine, etc.) It has proven to be a very useful tool to learn and understand mathematical and geometrical concepts. It is evident that the understanding of spatial notions are clearer with the use and manipulation of foldable models, and this may be applied to many fields of knowledge in modern education. But Origami is not yet a discipline considered fundamental in higher education institutions nor in undergraduate or postgraduate programs, and the benefits of integrating it fully to the education systems are still unknown to most of the academics involved in developing and directing these programs. What is sought is the transfer of knowledge that Origami brings as a mathematical, spatial, parametric and understanding tool of the foldability of any material to solve various problems in different areas and disciplines.