

# ENHANCING DESIGN INNOVATION: EMBRACING THE 'OUT OF THE BOX' RESEARCH APPROACH IN PRODUCT DESIGN

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## Abstract

The concept of "out of the box" research in the context of product design refers to a research approach that spans across different fields and sectors unrelated to the specific area of interest. Instead of limiting oneself to conventions and traditional approaches, the designer seeks to incorporate concepts and ideas from different disciplines or fields into their project. Metaphorically, the designer conducts research 'outside the box,' identifying design solutions to unrelated technical problems and 'bringing them inside the box,' adapting them to their own project. The benefits are evident: by exploring and importing ideas from diverse sectors, the possibility of developing innovative solutions that may not have been considered within the specific field of work opens up. It also stimulates the creativity and lateral thinking ability of designers. By encouraging open-mindedness and the exploration of new territories, a space for innovation and the generation of original ideas is created. This can lead to a more dynamic and stimulating design environment. This article presents how this approach was applied in a first-year design studio of a product design bachelor's degree and showcases a selection of the results.

Keywords: product design, design-driven innovation, out of the box research.

## 1 INTRODUCTION

In the field of product design, the quest for innovation is driven by the search for new ideas, inventive solutions, and creative thinking. In this context, the concept of *out of the box* research emerges as an approach where designers are called upon to transcend the limits of their comfort zone, extracting ideas from various domains and integrating them into their work. This approach aligns with the principles put forth by Weisberg [1] but differs from the Design Thinking framework elucidated by the Interaction Design Foundation [2]. In a metaphorical sense, it involves designers exploring solutions to unrelated technical problems "outside the box" and ingeniously adapting them to their projects, thus "bringing them inside the box." The benefits of this approach are evident: by delving into diverse sectors and importing ideas, the potential for developing innovative solutions not previously considered becomes apparent. Moreover, it stimulates the creative thinking and lateral problem-solving abilities of young designers. We believe it is essential to apply this approach from the outset with first-year students in the Bachelor's degree program in product design. This helps them become accustomed to making connections, associations, thinking by analogy, and, furthermore, it aids in honing their lateral thinking and open-mindedness. By promoting open-mindedness and the exploration of new territories, it creates fertile ground for innovation and the generation of original ideas, ultimately fostering a more dynamic and stimulating design environment, as well as the design-driven innovation. This article illustrates how this approach was put into practice within a first-year design studio in a Bachelor's degree program in product design, showcasing a selection of the outcomes.

## 2 METHODOLOGY

*Out of the box* research is a practice implemented in the Master's degree program in product design at the Iuav University of Venice [3]. In this context, it was integrated into a product design studio for first-year students pursuing a Bachelor's degree in Product Design. The studio focused on the theme of smart assistive solutions, requiring students to conceive and develop products designed to address challenges faced by individuals with temporary or permanent disabilities, such as pregnancy, broken limbs, or medical conditions, during specific activities. Essentially, *out of the box* research entails tasking students with seeking technological, functional, and formal insights from diverse sources, including other industries, existing products, research domains, or nature. They gather these insights based on the specific characteristics outlined in their Design Brief, such as "foldable," "expandable," "stable," and so on, and compile them into a moodboard, serving as a repository. Even though it is a research and collection phase, this activity was carried out immediately after the definition of the design brief, at the beginning of the second phase of the Double Diamond, called "Develop-Deliver" [4]. The students

worked in small groups of three and carried out a sequence of weekly tasks (over 6 weeks) as follows: identifying the problem (choosing a temporary or permanent impairment as the project theme) and conducting data research; engaging in an empathy exercise and refining the problem definition; conducting benchmarking and defining the project brief while exploring inspirational sources through *out of the box* research; presenting the design concept; progressing with project development; and concluding with a final presentation that included graphic materials such as presentation posters, technical drawings, and a physical model.

### 3 RESULTS

This section provides three results. For each one, the project theme, the identified problem, the conducted *out of the box* research, and the final result are presented. It highlights which inspirations from the *out of the box* research were effectively translated into the project through formal and/or functional references.

The first example concerns the design of an assistive kit for makeup intended for those suffering from hand osteoarthritis. Hand osteoarthritis is a common age-related disorder worldwide (typically occurring after the age of 50) and predominantly affecting females. It is characterized by various clinical indicators of the condition, which encompass reduced functionality, diminished grip strength, as well as occasional stiffness and pain [5]. Taking care of one's appearance is a daily and important activity, even in mature age. However, it can be compromised if one is unable to perform it due to hand mobility impairment. Therefore, the project aimed to develop a system of elements that allows the user to use makeup without having to grip the products, without bending their finger joints, and consequently without experiencing pain. Once the objective was defined, the students looked for visual inspirations that conveyed the concepts of "anatomical", "organic", "wearable", "jointable", "steady", "easy to handle" from different categories of products, as shown in Figure 1.



Figure 1. Moodboard based on: anatomical, organic, wearable, jointable, steady, easy to handle.

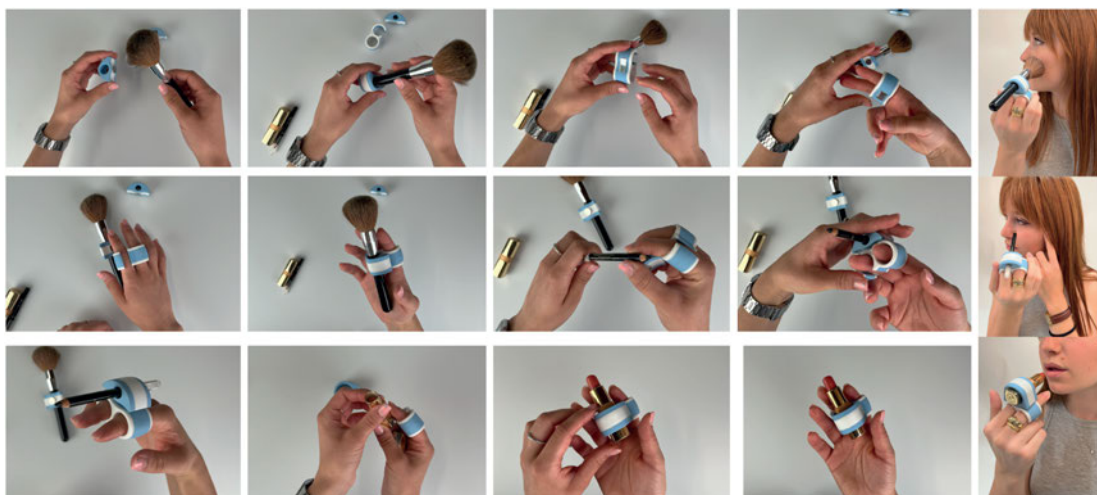


Figure 2. Glam your hand, design by Giorgia Pesavento, Irene Sgreva, Francesca Tempesta.

As visible in Figure 2, some of the formal and functional aspects identified and collected in the moodboard in Figure 1 are reflected in the solution proposed by the students. *Glam Your Hand* is an accessory composed of a wearable element like a ring, which integrates a magnetic attachment, and a

set of elements to be attached to makeup products (mascara, brushes, pencils, lipsticks, etc.) designed to remain attached until the product is consumed. During the makeup process, the user wears the ring and, with a single gesture, attaches/detaches the makeup product. The system allows for a stable grip of the makeup and its precise use while simultaneously reducing hand fatigue: the user does not need to grip the makeup or bend their joints.

The second example concerns the design of an assistive solution intended for individuals with limited upper limb mobility, such as the elderly, who find it challenging to raise their arms and wash their hair in the shower. Existing research already provides solutions for motor assistance in the upper limbs of the elderly [6], but these devices are often not suitable for use with water. Therefore, the project objective was to develop a product suitable for water contact and enabling the user to wash their hair without raising their arms. The *out of the box* research was conducted by seeking sources of inspiration guided by the following concepts: "automatic", "wrap", "wash", "brush", "massage", "soft", "fluid-actuated" (Fig. 3).



Figure 3. Moodboard based on: automatic, wrap, wash, brush, massage, soft, fluid-actuated.

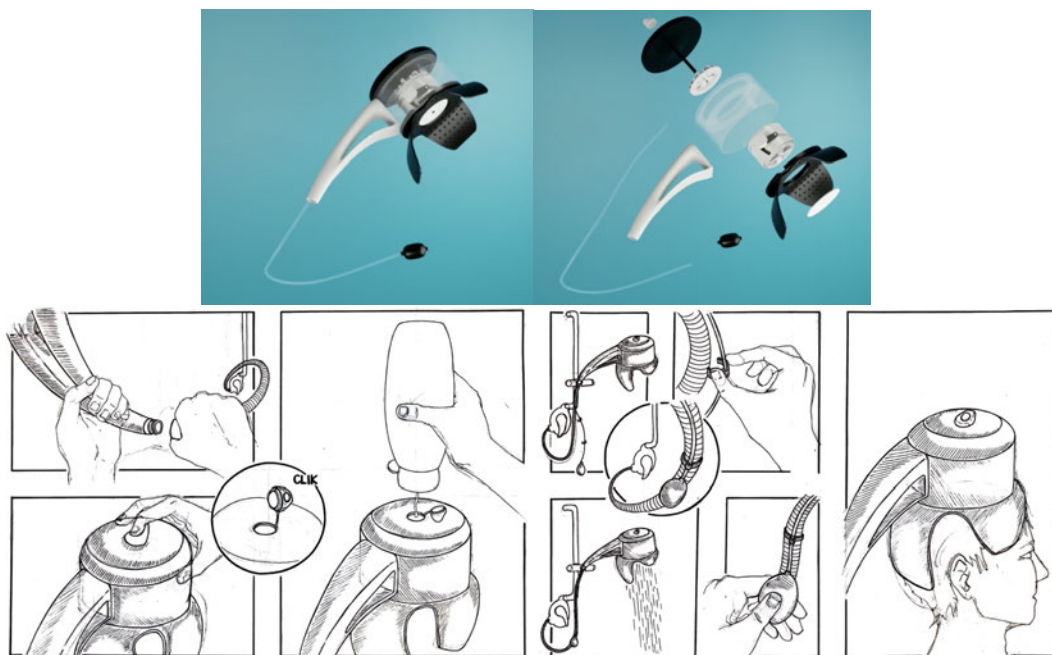


Figure 4. Aqua Liliun, design by Filippo Nardelli, Jenny Brunisso, Tommaso Trevisol.

The result is the design of a handheld showerhead with an integrated rotating brush that is mechanically activated by water pressure, and a shampoo reservoir connected to a hand pump. Thanks to this new showerhead, the user does not need to raise their limbs during washing. The shampoo, stored in a reservoir and refilled only when needed, is dispensed by the hand pump when the user chooses to do so. Furthermore, with this solution, the user may even enjoy a pleasant head massage.

The last project, on the other hand, concerns the playful aspect in the elderly population. It is proven that playing chess has positive effects on cognitive abilities and, more generally, on the quality of life of the elderly [7,8]. That being said, and hoping that this game becomes increasingly widespread among



the elderly and in senior living communities, a redesign of its form is seen as necessary. The elderly often experience reduced motor skills and, in some cases, as in those with Parkinson's disease, stiffness, and tremors. Thus, the size of traditional chess pieces and the board can be inconvenient. The project objective, as anticipated, is to design a chessboard and its pieces suitable for the elderly, with the aim of facilitating the grip and movement of the chess pieces. In this case, the *out of the box* research was conducted with the following concepts in mind: "stability", "maneuverability", "center of gravity", "weight", "grip" and "signage" (Fig.5).

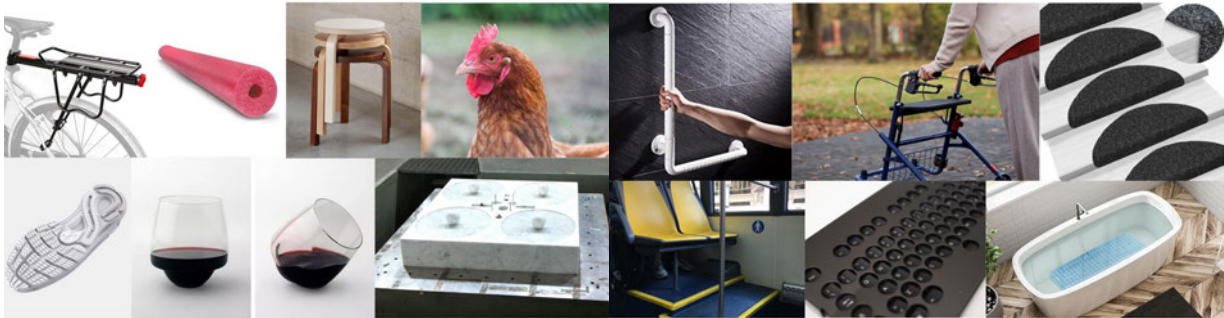


Figure 5. Moodboard based on: maneuverability, center of gravity, weight, grip, signage.

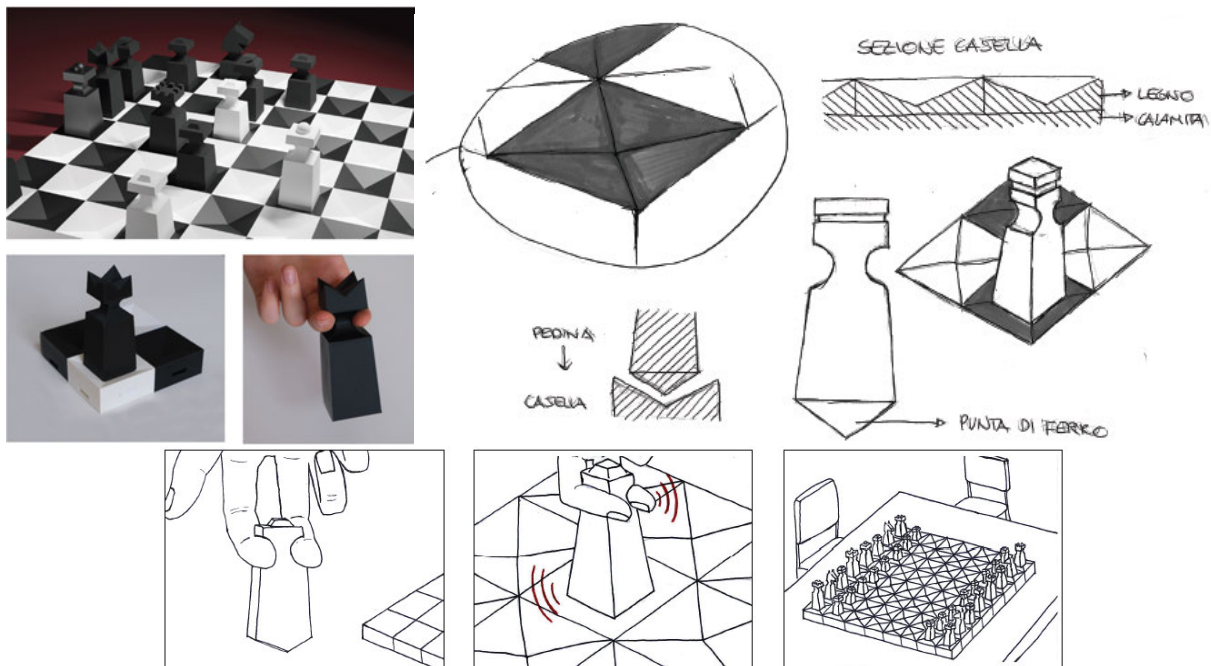


Figure 6. *In Presa*, concept by Lia Robusti, Nicolò Raffaello, Sasha Gilodi.

It is possible to notice how the visual references identified by the students (fig. 5) do indeed translate into what the project outcome is. *In Presa* (fig. 6) consists of a chessboard larger than traditional ones. Each square features a magnetic pyramidal cavity to encourage and attract the pieces to position themselves on the square with greater precision and ease (the base of the pieces is covered with a thin metal layer). Each piece is designed to be lifted effortlessly, without the need for finger pressure. If, due to tremors or joint stiffness, the piece were to slip from the user's hand, it will still be positioned on the chosen square thanks to its shape and materials.

## 4 CONCLUSIONS

*Out of the box* research is a highly valuable practice in design because it helps designers make connections and think by analogy. Applying this method from the first year of the Bachelor's degree program in product design proves to be particularly fruitful and beneficial for young designers themselves. It brings several benefits, including: i) *broadened perspectives*: students learn to consider

a wide range of sources of inspiration and think more broadly; ii) *stimulated creativity*: the *out of the box* approach encourages creativity as students are pushed to find unconventional solutions to design problems; iii) *development of problem-solving skills*: students acquire more advanced problem-solving skills as they have to adapt ideas from different fields to their project; iv) *open-mindedness*: they become more open to new ideas and approaches, which is crucial in the rapidly evolving field of design; v) *innovation*: incorporating concepts from different sectors can lead to innovative solutions that may not have emerged otherwise; vi) *greater flexibility*: young designers become more flexible and capable of adapting to various design challenges; vii) *future preparedness*: the design sector is constantly evolving, and openness to new ideas is essential to remain relevant in the industry; viii) *improved research skills*: they learn to conduct in-depth research and identify relevant sources of inspiration from diverse disciplines. To conclude, the application of *out of the box* research within first year design education provides young designers with a more comprehensive training and prepares them to tackle the challenges and opportunities in the field more effectively.

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