STOP MOTION AS A TOOL TO PRESENT, PROMOTE AND COMMUNICATE PRODUCT DESIGN

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Abstract: *Stop motion is an animation technique, where objects are physically manipulated in small increments between individually photographed frames, creating the illusion of movement, when the series of frames is played in sequence. Both stop motion animation and digital animation can attract and engage a user. Stop motion is known for its handcraft character and offers the feeling that what you watch really exists. It brings prototypes to life and highlights their characteristics, while at the same time, allows the storytelling transfer and offers dynamic visualization. Digital animation provides a versatile and dynamic platform capable of intricate detail and seamless integration with other digital media, making it suitable for a wide range of applications i.e. technical presentations, marketing campaigns. In the present paper, four rooms inspired by the four seasons of the year were created. All rooms include a set of furniture and several products, which are presented both physically and digitally. The main idea is to use the stop motion visual technique as an innovative tool for presenting, promoting and communicating the use of the products within the designed 3D space. In this way, an alternative advertising method is offered and can attract the user's attention. The implementation consists of using both physical and digital prototyping for presenting the use of the designed products.*

Key words: stop motion, digital animation, prototyping, product

1. INTRODUCTION

The product design process is getting a great deal of attention because all the decisions approved during this phase, lead to customer satisfaction and cost related outcomes. A number of methodologies (i.e. conceptual development) and technological tools (i.e. Computer Aided Design - CAD, render technologies, graphics, computer generated animation) affect both the performance and successful presentation of the products to the end user (Kyratsis et al., 2020). Examples of this approach are based on the computational product design that is a way to create extensive families of products with different geometries under a commonly defined brand principle, and unruly design that increases the creativity via including art within the conceptual design process (Kyratsis et al., 2022; Manavis et al., 2017).

Over the years, a number of physical techniques have been substituted by digital tools thus making the result more appealing to the customer for branding purposes mainly via the social media channels. Nevertheless, taking photographs with digital cameras and paying attention to the correct adjustments for fast moving items, or light performance, becomes more fashionable to a great deal of youngsters (Manavis & Kyratsis, 2021).

2. STATE OF THE ART

Prototyping is a design method that involves the use of physical or digital prototypes to explore and examine how a new product will be used before its final production. This approach allows for experimentation and research in the early stages of development, helping designers identify solutions to problems. Prototypes serve specific purposes and applications, as it is often not feasible to test all possible design ideas. Originally, prototyping emerged from the field of architecture and has since been adopted in product design.

Today, with the aid of digital tools, physical models have gained even more significance. Technologies such as 3D printing play a critical role, while C.A.D. (Computer-Aided Design) software is crucial for creating physical models. Examples of such methods include laser cutting and engraving, 3D printing, and CNC machine production. Furthermore, advancements in software have significantly contributed to the design process, enabling the creation of complex forms and shapes that enhance the prototyping methodology. The role of computers has also become increasingly important in this process (Efkolidis et al., 2020; Manavis et al., 2020;).

Stop motion animation has emerged as a versatile and powerful tool for presenting, promoting, and communicating product design. Its unique characteristics, such as engaging storytelling, visual appeal, and the ability to demonstrate product functionality, make it an effective medium for capturing the attention of potential customers and fostering emotional connections with brands (Bonanni & Ishii, 2007; Davis, 2019). By creating compelling narratives around their products through playful and imaginative animations, designers can effectively communicate product features and benefit, leaving a lasting impression to the audience.

The handcrafted quality of stop motion, with its distinct aesthetic, stands out in a crowded digital landscape, making it an attractive choice for brands seeking to differentiate themselves. This tactile aspect resonates with consumers, who value authenticity in an increasingly digital world, allowing brands to showcase their values and craftsmanship (Heller, 2021). The imperfections inherent in stop motion can make brands appear more relatable and genuine, fostering trust and loyalty among consumers (Bennett, 2020).

While the production of stop motion can be time-consuming and requires significant expertise, advancements in technology and software have made it more accessible. Modern tools enable creators to streamline the process, making stop motion a viable option for businesses looking to differentiate their product presentations (Wang & Lee, 2022; Thompson, 2023). The integration of digital techniques with traditional stop motion practices allows for innovative storytelling that can significantly enhance the viewer engagement (Johnson & Smith, 2021).

Stop motion animation not only serves marketing and communication purposes but also proves valuable in the design process itself. By allowing designers to visualize concepts and prototypes in a tangible way, stop motion facilitates exploration and iteration of ideas before the final production, streamlining the design process and leading to more innovative and effective product solutions (Bonanni & Ishii, 2007; Davis, 2019). This iterative approach can lead to more refined designs that resonate better with the target audiences (Peters & Green, 2022).

Additionally, research has shown that stop motion can evoke emotional responses that enhance brand recall and consumer loyalty (Martinez, 2023). By leveraging the unique qualities of stop motion, brands can create memorable experiences that not only highlight product features but also foster deeper connections with their audiences.

This present study aims to explore an alternative way of communicating and advertising a series of designed products. The project utilized design tools, digital techniques, and prototyping methods with an aim to create both digital and physical stop motion animations. The philosophy and techniques of stop motion, as well as of digital animation, were examined.

3. METHODOLOGY

In the initial experimental phase, various design tools were used, such as concept mapping, sketches, 3D visualization, photorealism, and prototyping. This phase concluded with the production of four digital animations and four stop motion animations, with the goal of investigating techniques and practices for the main project. The thematic focus required selecting one or more products, whose use needed to be highlighted for advertising purposes.

Furniture was chosen as the design focus, with the four seasons serving as inspiration due to their rich colors, forms, and shapes. Four rooms were designed, one for each season, containing various pieces of furniture. The design process involved using tools like mind maps, mood boards, sketches, 3D visualization, and prototyping. Based on the digitally created rooms, four digital animations were produced. Additionally, the rooms and furniture were physically constructed, and with the use of a manikin, four stop motion videos were filmed.

During the project, both physical prototyping techniques and digital animation techniques were utilized. Everything that was created digitally was later replicated physically as well. The implementation of the project began with the use of methodology-based design tools, such as mind maps, mood boards, and sketches. Figure 1 depicts the framework and the tools used for increasing the creativity aspect of the project.
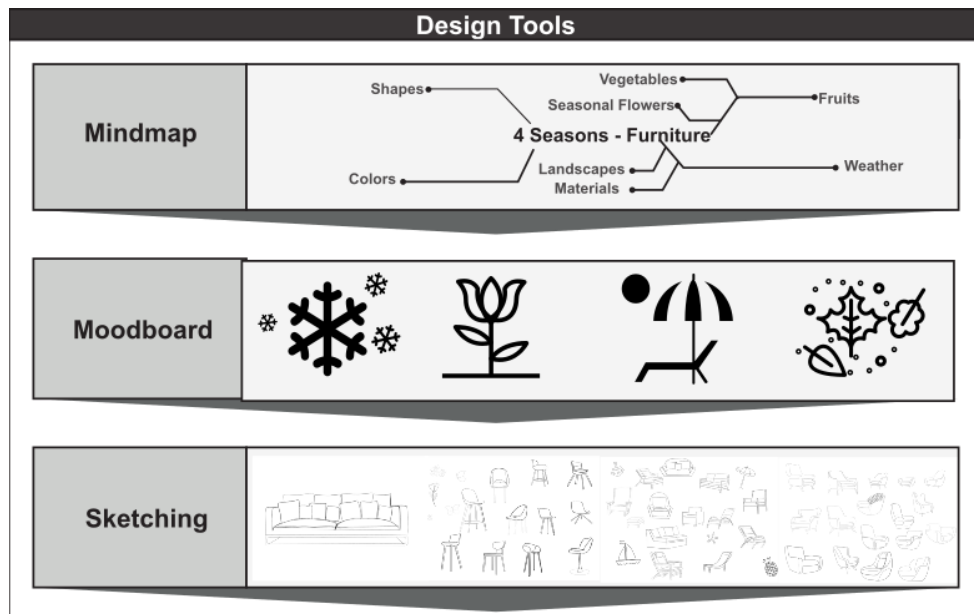
igure 1: Framework used during the project

For the digital animations, the Blender™ design software was exclusively used. Further to its high performance, Blender™ is an open-source suite and free to use. Initially, the spaces were designed based on the four seasons of the year concept, and then the furniture that decorated the spaces were designed with an aim to support creativity and high appearance. In addition, the main character of the simulation was defined. The character was placed in each 3D space, and by using inverse kinematics, the movements performed within the space were created. Each movement was recorded using the inserted keyframes, and eventually, all these frames formed the animation (Figure 2).

Figure 2 (part 1): Character animations based on the four seasons (spring, summer, fall, winder)

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Upon completion of the digital animations, the physical prototyping process was implemented. For prototyping the 3D spaces (rooms), foam board was used as the base, while the walls and floors were printed on vinyl with textures (i.e. colored plaster, wooden, marble floors, acoustic panels), which were then attached to the foam board. The furniture and various decorations in the available 3D space were crafted from materials like balsa wood, extruded polystyrene, fabrics, plexiglass, straw etc. Once completed, a pre-made stop-motion character was used for filming the animations. For the filming process, a smartphone (with high resolution camera), a tripod and the Stop Motion Studio™ mobile app were used. The models were stabilized in a fixed position, along with the smartphone and tripod. The character was attached to a soft wire that extended beyond the height of the "walls" and was secured to another piece of foam board, where pathways were carved for the wire and character to follow. The character was moved from place to place, with its limbs posed in each frame. Each pose was captured, and by maintaining consistency between the movements, the remaining poses were created. In the end, the piece of software compiled all the photos and generated the final videos (Figure 3).
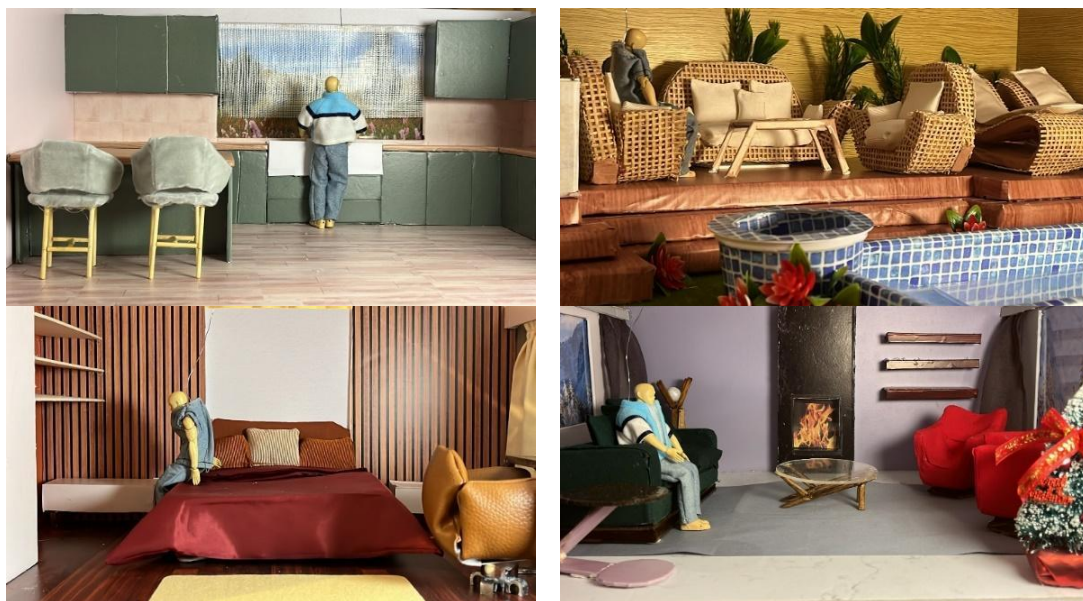

Figure 3: Stop Motion character posed based on the four seasons concept

4. DISCUSSION

The project was presented, for an early evaluation, to a diverse audience comprising industry professionals, designers, and potential consumers. The feedback received was highly encouraging, with the audience expressing significant interest in the use of stop motion and digital animation as effective tools for product promotion and presentation. Attendees agreed that both stop motion and digital animation offer compelling methods for advertising, each bringing unique strengths to the table. The interactive and visual appeal of these techniques successfully conveyed the designer's intended message, demonstrating that the project's objectives were effectively communicated. The audience's positive response and acknowledgment of the project's ability to highlight product features and enhance brand messaging validated the approach and confirmed its relevance and effectiveness in the field of product design.

During this project, a total of four 3D digital animations and four stop-motion videos were created. In the videos produced, the manikin moves through each room and interacts with both the designed furniture and the 3D proposals of the interior. These efforts take place before sending the designed products for manufacturing and aims in presenting the work prior to production.

The digital animations highlight the design appearance and capacity of the designed products, while the stop-motion videos emphasize the physical prototype in real time. Although on a smaller scale, they provide an initial realistic sense of what geometry and appearance, of the designed products and scenes will achieve. Additionally, they help reveal design flaws that were not identified during the design stage.

The final videos serve as effective advertisements and a means of communication with potential customers, offering a preview of what will be produced. However, the creation of digital and stop-motion animations can be challenging. These processes are time-consuming and require meticulous attention to detail.

The elements that make up the scene, both digitally and physically, also demand careful consideration. For instance, lighting plays a crucial role, as it can either enhance the scene and convey the intended message, or, if used incorrectly, ruin both the animation and the message. Camera placement is equally important; the wrong angle can completely distort the product's image, undermining its strengths rather than promoting its potential. Beyond requiring significant time and attention to detail, prototyping also demands careful selection and management of materials. The right choice and use of materials contribute to effective communication with the audience, building excitement and anticipation for the product. Additionally, it allows the designer to understand how the design will look in production and to identify potential flaws.

The completion of four digital animations and four stop-motion videos provided valuable insights into using animation for product design, promotion, and communication. Each animation presented a unique interaction between the manikin and the furniture, highlighting both form and function. The combination of digital and stop-motion methods offered distinct perspectives on the products, allowing designers and consumers to engage more interactively.

Digital animations excelled in showcasing polished, versatile designs with control over light, camera angles, and textures, delivering an idealized version of the product for early-stage marketing. In contrast, stop-motion animations offered a more tactile, authentic representation, with physical models revealing textures and behaviors that digital renderings could not capture. The handmade quality of stop-motion enhanced the sense of craftsmanship, resonating with consumers seeking authenticity.

A key discovery was that stop-motion exposed design flaws overlooked in digital prototypes, offering a more holistic approach to product testing. However, both methods presented challenges, particularly in terms of time and precision. Lighting and camera placement were critical, as errors could distort the product's appearance or diminish its visual impact.

Material selection also played a crucial role. For stop-motion, materials needed to closely resemble the final product in order to provide an accurate portrayal. This helped improve communication between designers and end-users, offering a clearer understanding of the product's final form. Overall, combining digital and stop-motion animation provided a comprehensive framework for testing, promoting, and communicating product designs, ensuring both aesthetic appeal and functionality.

5. CONCLUSIONS

This project demonstrated the effectiveness of using both digital animation and stop-motion as innovative tools for product presentation and communication. By showcasing furniture designs within seasonally themed rooms, the combination of these techniques allowed for a compelling and engaging presentation, providing potential customers with an early glimpse of the product in use. The digital animations offered a high level of detail and flexibility, while stop-motion provided a tangible, handcrafted feel, reinforcing the authenticity of the designs. Both methods enable designers to visualize and experiment with product functionality before their final production, helping to identify potential design flaws that might not have been apparent during the initial stages of development.
However, the process of creating both digital and stop-motion animations was time-intensive and required careful attention to detail in terms of lighting, camera placement, and material selection. These factors played a critical role in enhancing the visual impact and ensuring that the final presentation conveyed the intended message. Ultimately, combining these animation techniques provided a powerful and versatile approach for product promotion, allowing for a richer storytelling experience and fostering stronger connections between the product, the designer, and the audience.

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