

Sustainable Design: Aspects of Sustainable Product Development

Rico Ruffino

When NC State University recently hired me to lead a course concentration in sustainable design, I began to hone in on what sustainable product development and design translate to and its actionable applications. Sustainable product development and design of current and future consumer products and services are methods that create a proactive versus a reactive approach. The development of sustainable products and systems must start at the beginning phase of ideation and continue through the entire process to achieve multiple design purposes and duration with a designated end-of-life plan. In contrast, generally, products are developed with end of life and longevity as a secondary thought, and with recycling as a potential option. If the goal is the longevity of a product or service, one needs to look beyond recycling and more at the concept of development. A sustainable product development approach and design thinking are how to accomplish product longevity.

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Contact information: North Carolina State University, Department of Forest Biomaterials, 1022 Biltmore Hall, Raleigh North Carolina 27695-8003 USA; email: rbruffin@ncsu.edu

Introduction

Conventional product development for goods and services precedes with an everyday need in mind. Consequently, the design would focus on getting the product or service to the consumer. However, a more recent design philosophy focuses on the design with the consumer's needs in mind (Human-Centered Design). Focus is placed on the root of the problem and at the design as a whole, constantly testing and redesigning for an optimal solution. Human-Centered Design was a significant achievement in the design process, ensuring that the product or system functions with and for the user's central needs (Norman 2013). It is a process that closely looks at the core needs of an individual or group of people to see what the primary needs are when using or operating a product or system—then designing based on those primary needs. Now, the system requires an additional focus on the environment and its needs. Sustainable product development and design look at multiple aspects of product development in relationship with our environment.

Goals

A key goal is to systematically create a future method of developing products and services that positively affect our planet and to apply sustainability in the design thinking process. Sustainable developed products will be able to do one or more of the following: Biodegradability is achieved by utilizing material that will break down at the end of the product's existence. Longevity is where the product can have a second, third, or fourth life beyond the first. In other words, when the original product's use has expired, the product material can serve another purpose or use. Planned recycling is where the products, if using

material that does not break down, have a direct formulated plan for its active recycling. This recycling plan can be an effort from the company or the consumer, but a designated plan would be in place either way.

Process

Incorporating ethical principles inside the design process is a primary focus of sustainable product development and design. Designers need to examine how things are made and to what end. When advocating for sustainability in designing products and services, one cannot help but think of ethics and the morals, beliefs, and principles of responsible design that assist our environment's longevity. It is a proactive versus reactive approach to designing.

The sustainable product development method breaks down into three principal areas: sustainable inputs, sustainable outputs, and resting implications.

Sustainable inputs examine what goes into the design. The designer begins by asking a question about the material and how sustainable the material is. If it is not, is it recyclable? If recyclable, what is the plan to recycle the material? How is the design put together? What is the number of parts? Does it consume much energy in the manufacturing process? Whom does it serve? Is it for one-time use? Does it have multiple purposes to serve its user many times? A review is conducted to judge whether the intended needs are being met and to determine whether those needs can be streamlined, extended, or multiplied.

Sustainable outputs are what comes out of the product or what does it do beyond its intended use? Now that the product is together, how does it disassemble, and what is that process? Is it something that the consumer does to create a more significant relationship with the product, or is it something that the company does? How long does it last? The goal is to have the product last as long as possible, or if the product is disposable, whether it breaks down in a reasonable amount of time. Does it have a life beyond the first? Can the product be reused in a different capacity, or does it have a second or third life? Remember, longevity is critical.

Resting implications is the end life of the product or service after uses have expired. So now the question is, what happens in the end? Does it biodegrade? Thinking about the ability of our design to break down at its end of life is essential in aiding environmental service. For example, Saltwater Brewery decided to use its by-product waste to create edible six-pack rings. The product is biodegradable, or if it ends up in the ocean, it becomes fish food. Think beyond the scope of just biodegrading and becoming a positive contribution to the soil. For instance, could the product serve another purpose for the ecosystem? Can it be recycled? When we design products, the first thought should be, can it biodegrade? If not, can it be recycled? Then, if so, how and what happens in that process? Having a positive plan for recycling needs to be established. Some suggestions are easily disassembled products that the material is recycled by the consumer or corporation recycling, where the company takes back their old products and ethically disposes or repurposes the material. For example, Nike Grind uses manufacturing scraps, unsellable products, and worn-out sneakers to redevelop them into various new products.

Solution

The result is a process of designing products, systems, and services that focuses on being proactive. Designing with the intention of longevity and a conscious plan of

reintroducing material to the environment would be the primary focus. Thus, creating products that are with the consumer longer with multiple uses and purposes reduces material in our landfills and oceans and diminishes the adverse effects that some of these elements have on our environment. Positive change happens by starting at the beginning with sustainable design.

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