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Alex Lobos

Rochester Institute of Technology

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TIMELESSNESS IN SUSTAINABLE PRODUCT DESIGN

Alex Lobos

Department of Industrial Design, Rochester Institute of Technology

Alex.Lobos@rit.edu

Abstract

Shorter product lifespan driven by reduced durability and planned obsolescence is causing severe environmental issues and diminishing user experience. Sustainable Design is addressing this problem with strategies that improve a product's lifecycle and address important areas of impact in manufacturing, use, and end of life. This article explores how the concept of 'timelessness' can be used as an effective strategy for creating products that are cherished and enjoyed by their users, last longer, are easier to repair and have better options for end-of-life. A series of case studies found in commercial products as well as in student projects illustrate how timelessness can be achieved at four levels: appearance, product efficiency, materials selection, and user experience. Timelessness integrates sustainability and user experience in a natural way that is needed for elevating the quality of design and its impact on society.

Keywords: *sustainability, design, timeless, emotion, education.*

Introduction

Industry growth allows for products to be developed and distributed at a fast pace. While this allows for easier accessibility to the latest technology and opens doors for multiple product selection, it also reduces the lifespan of products and diminishes their relevance in consumer's minds (Lobos & Babbitt, 2013). By knowing that there is a wide selection of newer—and in many cases cheaper—products out there, consumers replace them without thought or guilt. With this short lifespan comes a series of environmental and social consequences that cannot be ignored (Papanek, 2009; Tang & Bhamra, 2009). Products need to be developed with attention to their whole lifecycle in order to improve their manufacturing, distribution, useful life and end of life.

Timelessness, a quality of not being affected by time, can be a successful way of extending product lifespan by protecting them from style trends and ever-changing consumer tastes. While discussions over timelessness cover in great detail aesthetic considerations of artifacts and their cultural relevance, this paper intends to drive the concept of timelessness beyond theoretical realms of appearance and culture and apply it in design practice as a tool for obtaining a sustainable advantage in product design. This advantage relies on creating products that have a universal language that remains current for a long time, paired with durability and dependability. The benefits of timelessness go beyond aesthetic considerations; they focus on creating something useful and letting form enhance utility and usability with as few elements as needed (Morrison, 2002). The result is a product that is meaningful for longer and allows for reparability and graceful aging. These factors help in

offsetting any environmental effort put into producing the product and extending the product lifespan in a manner that elevates user experience and satisfaction.

Product lifespan in today's society

Today's society looks at product lifespan as part of a short-lived cycle where artifacts are underused and quickly replaced by newer versions that promise higher performance at lower costs. Products that follow this model are the result of planned obsolescence: a strategy that makes useful goods be perceived as useless and outdated regardless of their functionality (London, 1932). Planned obsolescence has become a pillar for most economical models to the point where many countries' economical growth is measured on how much their population spends on goods and services (Packard, 2011). This model encourages society to produce and discard products as quickly as possible and is more common in western societies, whether as in eastern cultures the idea of purchasing something only once is more prevalent (Chapman, 2005). The economical incentive of planned obsolescence is complemented with a human instinct of turning possessions into symbols of who their users are and who they want to become (Schultz, Kleine & Kerman, 1989). As people go through an endless cycle of outgrowing themselves and wanting to become something different than what they are, they keep changing their material possessions, leading to a consumerism pattern with negative environmental consequences (Chapman, 2009). Manufacturing processes consume large amounts of energy, water and other natural resources in order to extract and process materials as well as to run infrastructure. The speed at which these resources are being used is far larger than their renewal rate, leading to an unsustainable pattern (Leonard, 2010). Also, the push for cheaper products compromises quality and makes products fail early. Since these products are manufactured as cheaply as possible, they are often impossible to repair or upgrade. The result is an unmanageable volume of trash that affects the environment and takes up precious space in the form of landfills or informal waste grounds. This cycle also diminishes the experience that users have with their products, leading to unsatisfied consumers that don't find products meaningful or relevant, and replace them without much thought or care (Hamilton, 2004).

Sustainability in product design

Reacting to this negative trend in today's economy, sustainable product design has evolved as an important approach to product development, addressing issues created by outdated processes and behaviors. Sustainability strives for the implementation of systems that can meet today's needs without preventing future generations from meeting theirs (Hofstetter & Madjar, 2003) and in order to achieve this, designers and engineers must develop products that optimize processes throughout their entire lifecycle. Frequent solutions include enabling material extraction and manufacturing with reduced energy requirements, simplifying transportation and packaging, prolonging product use, and improving end of life by reuse and recycling (Petrina, 2000). Nonetheless true sustainability goes beyond ecological considerations and looks at broader issues that also address society and commerce, achieving solutions that are better for the environment while also providing improved and equitable quality of life (Fuad-Luke, 2007). In making a product's life cycle more sustainable, it is

key to reduce the use of resources while assuring their future availability, all without compromising other stages or the quality of output. Many products use such high amounts of energy in their creation that the chance of this energy being offset during their useful life is unlikely. Another stage in the life cycle where there is significant room for improvement is end of life. From the consumer's side, end of life has high importance as it is up to most consumers to make sure that reduction of waste, reuse and recycling take place.

A typical approach for addressing energy-intensive manufacturing is to identify processes that are more efficient. This can be obtained by looking at materials, processes or both (McDonough & Braungart, 2002). While this strategy makes sense in terms of reducing environmental impact of products it is only as partial solution. A deeper issue related to manufacturing has to do with the ever-growing scale of products being produced and the fast speed at which they are disposed of and replaced. Reasons for this trend can be low-cost (due to high volume of production), reduced durability (due to poor quality issues) or desire to acquire the latest product (due to marketing pressure). This tendency, commonly referred to as planned obsolescence, is imposing enormous pressure on our natural resources and making our way of life unsustainable.

Timelessness and design

A product whose quality has been optimized has the potential to last the equivalent to multiple lifespans of comparable products. Reducing frequent product replacement can be achieved as long as a product is able to maintain its relevance to the user, both in terms of functionality and appearance (Lobos, 2011). Functionality in this case implies not only that the product will work for a long period of time but also that the product is easy to repair or upgrade. Appearance relates to an aesthetic that does not go out style quickly. Achieving a long-lasting appearance can be result of having a unique style or in the contrary having as little ornament as possible. In either scenario, products are able to disconnect themselves from popular aesthetic queues that will act as time and cultural stamps on them (Loos, 1908) and eventually make them be perceived as obsolete. The ultimate goal is then to achieve a superb performance and enhanced user experience that remains valuable to users time after time (Eisenstein, 2011; Mugge, Schoormans & Schifferstein, 2009; Van Hinte, 2004).

Timelessness is an important design strategy that can lead to a successful extension of a product's life span. This is true in products that have been around for a number of years and that have become part of everyday life, sometimes throughout different cultures around the world. American manufacturer KitchenAid, for example, is best known for their iconic stand mixer (Figure 1). First introduced in 1919, the company released their classic Model K in the early 1930's, which has been trademarked and remains virtually unchanged since (Lidwell & Manacsa, 2009). The mixer's design has changed so little throughout the years and design historian Victoria Matranga (1997) describes how "every attachment in the stand mixer, for example—from the rotor slicer/shredder to the sausage stuffer—will work with every KitchenAid stand mixer ever manufactured, including the 1919 original Model H" (p. 150). KitchenAid's stand mixer offers a perfect integration of form, function and aesthetics and it is a staple in many kitchens around the globe. In 1997, the San Francisco

Museum of Modern Art included KitchenAid's mixer as one of only three items in its exhibition "Icons: Magnets of Meaning" (Evans & Cullen, 2003), making evident that this product is a true icon of American design.



Figure 1. KitchenAid Stand Mixer Model K

By Amy (Flickr: Behold!) [CC-BY-SA-2.0 (<http://creativecommons.org/licenses/by-sa/2.0>)], via Wikimedia Commons.
http://upload.wikimedia.org/wikipedia/commons/1/1a/Green_Apple_KitchenAid.jpg

Another example of timelessness in the industry comes from the German company Braun. During the 1960's Braun developed multiple products that applied a simple, clean and understated design language. These products, designed by Dieter Rams and his team, are an excellent integration of functionality, logic, elegance and convenience. Rams' Ten Commandments of Good Design emphasize how design needs to be useful, durable, honest, and environmentally friendly, among other things (Rams, 2009). These guidelines are evident in products such as the SK-4 radio and record player (circa 1956) and its follow up models SK-5 and SK-6 (Figure 2).



Figure 2. Braun SK-6 radio and record player.

By xavax (Own work) [Public domain], via Wikimedia Commons.
<http://upload.wikimedia.org/wikipedia/commons/0/04/Braun-Sk61.jpg>

The SK-4's unique approach to product design lies in its “honesty” and focus on function, clean of any ornament and a clear order in the operating elements (Franksen, Rams, Skeruttsch, & Vitsoe, 1980). Another great example of Braun's simplistic approach to design is the series of radios T3, TP1, TP2 (circa 1958) and T4 (circa 1969). These pocket receivers show little use of color and touch-points and highlight the speakers with holes creating geometrical patterns with no desire of hiding their function (Ueki-Polet & Klemp, 2009). These radios are considered design icons and it has been argued that they served as inspiration for the Apple's popular iPod, introduced to the market in 2001, more than thirty years later (Linzmayr, 2004). Ram's philosophy on design shows a high degree of humility as he describes products such as household appliances as “humble servants, to be seen and heard as little as possible.” (Lovell, Kemp & Ive, 2011) His principles are also used every day by designers that want to create products that are not described simply as “stuff” but rather as important components of a person's material landscape. Rams approach of creating not only simple designs but also better products might look simple in practice but it is extremely challenging to achieve, with an evident connection between form and function.

Good, responsible design shows a clear connection between products and their function, user and environment. Sometimes designers create forms for aesthetic pleasure only but great designs always have in mind the situation in which they will exist. Masato Sasaki (2007) talks about how ‘good’ shapes cannot exist in isolation of function and design is about developing answers to specific situations, not about creating forms. Sasaki's commentary on good design is part of a reflection on Japanese designer Naoto Fukasawa, an important figure of modern design and responsible for a wide array of products, including a CD player For Japanese manufacturer MUJI (Figure 3). This design was first developed as a concept for the company's ‘Without Thought’ exhibition in 1998, and it consists of a minimal wall-mounted CD player operated by simply pulling off a cord (Fukasawa, 2007). The concept was so well received in the exhibition that it was released to the market in 1999 and it's still in production today.



Figure 3. MUJI wall-mounte compact disc player.

By Myself (Myself) [Public domain], via Wikimedia Commons.

http://upload.wikimedia.org/wikipedia/commons/3/37/Muji_NYC_inside_CD_players.jpg

MUJI is a Japanese manufacturer of household goods, founded in 1980. The company was conceived as a critique to the overload of low-priced products with poor quality out in the market, offering high-quality artifacts at very low prices. MUJI, which stands for 'no brand' in Japanese, has the purpose of "restoring a vision of products that are actually useful for the customer and maintain an ideal of the proper balance between living and the objects that make it possible." (Kanai, 2010 p. 14). Following on this minimalist and timeless type of design, Naoto Fukasawa along with British designer Jasper Morrison organized an exhibit in 2006 titled Super Normal. The exhibit gathers a wide variety of products, ranging from anonymous everyday objects to design classics by Enzo Mari, Marc Newson, Isamu Noguchi and Achille Castiglioni, among others. All the products included in the exhibit share the same quality that Fukasawa & Morrisson (2007) describe as "something that's good to have around, that you use in a completely satisfactory way without having to think about its shape or decipher any hidden message or trickiness (p. 100)." Some products included in the exhibit include Alfred Neweczersai's REX peeler for Zena (Figure 4), Bialetti's Moka Express stovetop coffeemaker (Figure 5), and Isamu Noguchi's "Akari" ceiling lamp (Figure 6). There is a peculiar balance in the Super Normal philosophy, in which old and anonymous objects are just as—or perhaps more—recognizable than recent designs from some of today's most famous designers, all sharing a common use of minimalism and simplicity.

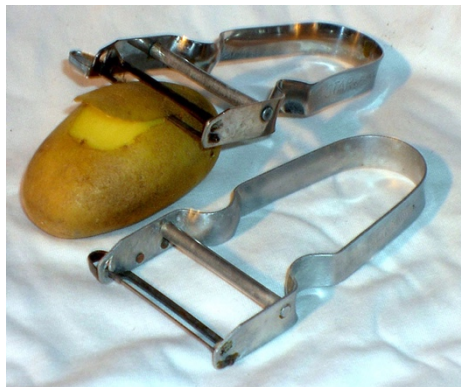


Figure 4: REX peeler by Alfred Neweczersai for Zena, Switzerland.

By Peter Wiegel (Own work) [GFDL (<http://www.gnu.org/copyleft/fdl.html>), CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>) or CC-BY-SA-2.5-2.0-1.0 (<http://creativecommons.org/licenses/by-sa/2.5-2.0-1.0>)], via Wikimedia Commons
http://upload.wikimedia.org/wikipedia/commons/3/3e/Sparschaeler_Rex_Star.jpg



Figure 5: Moka Express coffeemaker by Bialetti, Italy.

By photograph by Hans Chr. R., derivative work by Saibo (Own work) [CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons

http://upload.wikimedia.org/wikipedia/commons/c/cd/Moka_Express_sideview.png



Figure 6: A set of "Akari" lamps by Isamu Noguchi.

By User Fluffy nns on [ja.wikipedia](http://ja.wikipedia.org) [Public domain], via Wikimedia Commons

<http://upload.wikimedia.org/wikipedia/commons/9/90/Ja-isamunoguchi-akari1.jpg>

Designing a product with enough opportunities to extend its life is not enough; there also needs to be a conscious effort to transform user behavior and to encourage the desire to keep the product for longer. Designers are able to steer consumers in specific directions in terms of purchasing, using and disposing of products (Jelsma & Knot, 2002). The degree in which behavior can be affected ranges from subtle approaches that enlighten and spur desired attitudes to features that actively steer and even force specific behaviors (Lidman & Rendstrom, 2011). The effect of using physical characteristics of a design to influence function is commonly referred to as 'affordance' and it creates a very important bond between the signals that an object projects and how users perceive them (Gibson, 1977). Affordances are quite effective in making a product more intuitive and enjoyable, while avoiding unintended use or abuse (Lidwell, Holden & Butler, 2010) and in the case of sustainability they can make a dramatic difference in assuring that a product will have a good, long lifespan that offsets the resources used for its creation.

Applying timelessness in product design education

In order for designers to effectively integrate timelessness into their design process, it is critical to expose them to this approach as early in their careers as possible. The goal of this exposure is for them to develop a set of tools that leads to meaningful products and also addresses sustainability issues. A perfect environment for introducing sustainability in design is in higher education, since it is during this time when designers develop their processes and skillset and unfortunately sustainability has not received the attention it needs in design curriculum (Spangenberg, Fuad-Luke & Blincoe, 2002). A series of courses on sustainable design at Rochester Institute of Technology's Industrial Design department are exploring topics such as emotional attachment, materials selection, and timeless design, in order to improve product sustainability and encourage a longer, more meaningful lifespan. While the influence of time in design has been explored as a general philosophy and framework (Khoury, 2013), this educational effort is moving from a theoretical analysis and applying timelessness as a practical set of strategies for product design practice. The focus of these student projects is influenced heavily by Fukasawa and Morrison's concept of Super Normal, encouraging students to maximize simplicity and to create products so ordinary that they become extraordinary. Along with the notion of Super Normal, students explore emotional attachment as a catalyst for user experience. Products that bond deeply with their users often turn from plain artifacts into bridges that connect users with other people, enjoyable experiences, and their overall environment. The implications of emotional attachment are important for sustainability since products with these attributes have longer lifespans.

The product categories covered by these assignments are apparently simple: everyday products that exist in most home and office environments, such as tape dispensers, staplers, salt and pepper shakers, measuring cups, bottle openers and mortar and pestle sets. These products depend on simple technologies and mechanisms, allowing students to keep their attention on the subtleties of the products themselves rather than the technology that makes them work. But there are a couple of additional aspects that come with working on these types of products. One is of familiarity: most people use these products on a daily basis and because of this, students need to find a design approach that feels natural and intuitive. The second aspect is how to understand complexity within simple products. A good example of this discovery is in tape dispenser. Most students begin working on how to hold the tape in place and to develop an interesting shape around it. Very soon they realize challenging details such as the dispenser's cutting blade: its complexity doesn't come from tearing the tape itself but rather from the force used to pull the roll and assuring that the roll will remain extended and accessible when it's time for cutting the next piece. Other similar examples are finding the right shape and angle for the mouth of a bottle opener that will hold and open a cap effortlessly every single time, or the right angle and thickness of a measuring cup's spout so that liquids come out right, preventing liquids from dragging and leaking.

Achieving timelessness from four angles

As students develop their products, they break down timelessness into four strategies that integrate functional and aesthetic elements: appearance, product efficiency, materials selection, and user experience. As students explore these strategies they understand that each product has a different set of needs and opportunities, and the best result will come from knowing how and when to combine different degrees of sustainable strategies. This multi-level approach is crucial in successfully addressing planned obsolescence given that product replacement is not necessarily result of a single product deficiency but rather the combination of several factors that accumulate over time (Van Ness & Cramer, 2003).

Appearance

This strategy is based on the notion that good design never goes out of style. Famous conceptual artist Syd Mead (2013), best known for the designs in iconic films such as Blade Runner, Tron and Mission: Impossible 3, talks about how good design needs to be “future-proof,” meaning that it should avoid becoming outdated. For students, their goal is to develop products with an appearance so simple and classic that it is hard for anyone to know if the products have been designed recently or if they have been around for a long time. If this strategy is successful, these products will have a better chance of being used for a long time and maybe even handed down to future generations.

Joshua Rivers’ mortar and pestle sets use shapes that are simple, elegant, and engaging (Figure 7). Human factors play a big role in making sure that the products feel “just right” in hands of the user, from proportions to shape to even weight. Models were created using rapid prototyping as well as aluminum sand casting, combining state-of-the-art technology with traditional manufacturing processes.



Figure 7. Mortar & pestle set by Joshua Rivers. Photo by M. Komeijani.

Product efficiency

Design is nowadays an additive process. In order to offer competitive advantages, products are filled with features and customized options. In most cases, these additions do not add significant value to products but compromise performance and dependability. Products developed for timelessness use an opposite approach that removes anything superfluous. As concepts are refined, there is a conscious effort of having each iteration being simpler, which means stripping away unnecessary components, shapes, parts, processes and interaction. The goal is to bring products down to their most basic form and function. The result not only offers smarter products but also reduces complexity during manufacturing in terms of number of parts, assembly, etc. The simplicity of components also makes it easier for products to be repaired and optimizes lifespan (Khoury, 2013).

A tape dispenser by Robert Fish is created out of a single piece of sheet metal, using basic processes like bending, pressing and cutting in order to create functional details without compromising usability and appearance (Figure 8). Interesting details are the bumps on the sides that help to hold the tape in place while also providing more structure to the metal, and the pattern in the front edge of the piece that serves as a cutter to tear off and hold the tape. The overall style of the dispenser consciously leaves a rough finish and slight blemishes in the metal to add personality and the perception of longevity to the product, borrowing from “Wabi-sabi,” a Japanese concept that celebrates aesthetic imperfections as symbols of natural beauty that enhance simplicity, modesty and intimacy (Koren, 1994).



Figure 8: tape dispenser by Robert Fish. Photo by M. Komeijani.

Materials selection

Materials are a key factor in product design. Their choice will drive many decisions not only in terms of manufacturing but also in terms of weight, durability, finish and appearance, recyclability, etc. In terms of sustainability, materials selection needs to balance energy used for extraction and manufacturing with durability during use and potential for recyclability. It is also preferred to minimize additional processes such as painting and texturing. For their projects, students focused on wood, metal, glass and ceramics, as these materials are durable, easy to manufacture, and can age gracefully. The final designs celebrate the materials chosen by

turning them into a focal point of the design. For some of the designs, students analyzed how material choice impacts the product's environmental performance. After creating CAD models of their design, students used Autodesk's Inventor Eco-Materials Adviser (EMA) plug-in to assign two different materials and compare them side-by-side in aspects such as cost, transportation, embedded energy, durability potential, etc. EMA was extremely useful to students in determining which material offered the best environmental advantage, and then connecting that information with notions of perceived value and physical appearance.

Chen Guo's set of salt & pepper shakers uses a simple shape with an inner compartment for holding condiments (Figure 9). The design is versatile enough that it can be produced out of wood, plastic or ceramic. After analyzing the environmental impact of each material, Guo proposed plastic is a good option for high-volume productions, and wood for shorter runs. EMA also made evident that for the wooden version, eliminating chemically-based finish coatings improved environmental performance while enhancing wood's natural beauty.

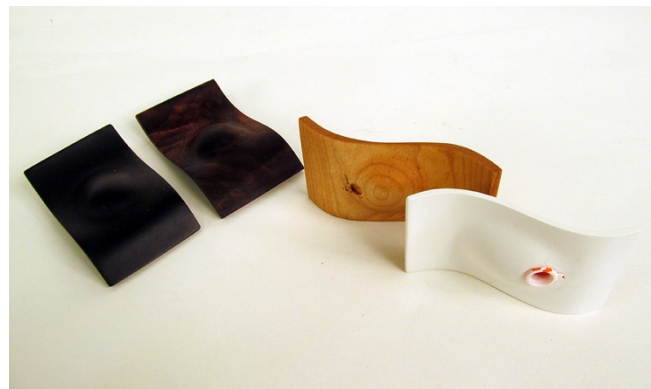


Figure 9: Salt & pepper shakers by Chen Guo. Photo by M.Komeijani.

User experience

Emotional Design is an approach that goes beyond form and function and addresses the experiential elements that happen whenever using design solutions. The benefits of emotional design offer important benefits to the user, as products designed under this philosophy are more engaging, authentic and easier to use (Desmet & Hekkertt, 2009). Patrick Jordan (2000) talks about how in order to reach an emotional level products need to achieve three levels of experience. First, they need to be functional, or in other words, to solve a need. Second, they need to be usable so that users know how to interact with them and accomplish their tasks. Third, products need to provide joy and pleasure when used. It is important to understand that Jordan's theory assumes that product pleasure can only happen after functionality and usability have been met. Good design then involves having strong attention to detail without losing sight of how a product comes together and provides a meaningful interaction beyond the sum of its parts.

Bridget Sheehan's bottle opener shows an understated form factor that is intuitive to hold and to use (Figure 10). Sheehan choice for an apparently simple object allowed her to spend plenty of time considering design

details such as the right length, width, thickness and finish. The opening that grips the bottle top was tweaked several times to make sure it would open different types of caps. There is a satisfying aspect about holding and using this bottle opener given its proportions and sturdiness, and the stainless steel should age gracefully as marks of wear begin to appear.



Figure 10: Bottle opener by Bridget Sheehan. Photo by A.Lobos

Conclusions

One of sustainability's largest challenges is the continued urge to replace products that are still functional. This challenge, blamed on big part to planned obsolescence, is leading to an unnecessary accumulation of products with lower quality and with appearance that goes out of style quickly and in a predetermined pattern. This issue is of particular interest to product designers, given that they are the ones that determine the appearance and experience of objects. Creating timeless products is an effective strategy for prolonged the lifecycle of any product. When users acquire artifacts with strong functional, aesthetic and experiential attributes, they connect at a stronger level with them and use them for longer. Products designed under this approach can also be designed for reparability, upgradability and recyclability, increasing their sustainability benefits even further.

In the development of timeless products it is important to understand trade offs as a key element of sustainable design. A common example is the use of better materials, which can lead to higher cost. In this case, manufacturers need to make evident to consumers that a higher initial cost is an investment and will most likely pay itself off with a longer useful life and higher product satisfaction. In other cases, however, higher product quality does not imply a more expensive product. Companies such as MUJI have defined business models that allow them to offer products with superior design and quality at same price points as competitors. In this case, timelessness not only provides a competitive advantage at the time of purchase but it also allows for production lines to require minimal changes over time, increasing manufacturing efficiency and offsetting investment costs dramatically.

An excellent way to measure the success of a product is by observing how it withstands the passing of time as good designs maintain popularity regardless of trends and consumers' ever-changing tastes. Timelessness provides strategies that make products less likely to become outdated or easily replaced. The case studies

illustrated earlier highlight how timelessness can be used effectively to elevate the perceived value of a product and to extend its lifespan beyond plain functionality. Timelessness creates a strong connection with users and it can be described as something that gets better with age. This approach is essential for any designer's tool kit and that's why it's important to integrate it not only in design practice but also in education. The student projects described in this article demonstrate various approaches for students to integrate timelessness attributes into their designs in an effective and elegant way. Designers are interested in developing design solutions that are long lasting and engaging, and timelessness is a perfect vehicle for achieving this connection and to offer solutions that defy traditional expectations for product lifespan and for user satisfaction.

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