

The impact of the sustainability development on graphic design

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Abstract

Recent years have shown the evolution of the concept of sustainability to be a remarkable development in several fields. There is a growing movement in design, a movement toward products that are smarter in how they are conceived, manufactured, distributed, and discarded. This movement of green design and sustainable design is in every discipline, from environmental architecture to packaging, fashion, graphic design, and new media. The goal of this paper was to examine how the sustainability movement has affected graphic design. The main objectives of our discussion are to highlight the expanding trends in sustainability in the field of graphic design, explain how designers can and should be more responsible, and progress toward a more sustainable design culture.

This research addresses the environmental sustainability concept and defines methodologies for development sustainability in the field of graphic design by applying the thinking of the life cycle systems. It also includes the study of the principles of sustainability and transformation of graphic design to serve this concept to achieve successful sustainable design with a focus on social, environmental, and economic responsibility of graphic designers, which are facing the world today.

Keywords

Sustainability, 3 Rs, graphic design, green design, ecology, Cradle to Cradle, environment, paper, smart.

ملخص البحث

أظهرت السنوات الأخيرة تطور مفهوم الاستدامة ليكون تطوراً ملحوظاً في عدة مجالات. فهناك حركة متنامية في التصميم، وحركة نحو المنتجات الأكثر ذكاءً في كيفية تصورها وتصنيعها وتوزيعها والتخلص منها. هذه الحركة للتصميم الأخضر والتصميم المستدام موجودة في كل التخصصات، من الهندسة المعمارية البيئية إلى التعبئة والتغليف والأزياء والتصميم الجرافيكي والوسائط الجديدة. كان الهدف من هذا البحث هو دراسة تأثير حركة الاستدامة على التصميم الجرافيكي، من خلال تسليط الضوء على الاتجاهات المتزايدة في الاستدامة في مجال التصميم الجرافيكي، وشرح كيف يمكن للمصممين ان يكونوا أكثر مسؤولية، والتقدم نحو ثقافة تصميم أكثر استدامة. فيتناول البحث مفهوم الاستدامة البيئية ويحدد منهجيات تطور الاستدامة في المجال من خلال تطبيق أنظمة دورة الحياة في التفكير كما يشمل دراسة مبادئ الاستدامة، وكيفية تحويل التصميم الجرافيكي لخدمة هذا المفهوم من أجل تحقيق تصميم مستدام ناجح مع التركيز على المسؤولية الاجتماعية والبيئية والاقتصادية لمصمم الجرافيك الذي يواجه العالم اليوم.

الكلمات المفتاحية:

الاستدامة؛ ال 3 آر ؛ التصميم الجرافيكي؛ التصميم الأخضر؛ الايكولوجي

Introduction

Sustainability is the process of striving to meet the needs of people, culture, and business in the present while restoring the environment and preserving our ability to meet the needs of future generations.

The term ‘sustainability’ has taken on a variety of meanings over the 25 years since being incorporated into the lexicon. It was first used in 1987 when “The World Commission on Environment and Development”, headed by the Norwegian Prime Minister Brundtland, defined it as, development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).

Sustainability is not a novel, or even recent, guest to the table in the field of design. In fact, the ideas behind environmental sustainability have been around since humans began documenting their presence (Adrienne, 2011).

As early as 1860, a movement known as the suffragette movement (design-led activism), which involved graphic artists talking about social issues, was at the forefront of the drive for change, according to Fouad-Luke (2009).

Graphic design has only recently, within the last fifteen years, begun making its mark in environmental sustainability. However, it’s rapid expansion in the late twentieth and early twenty-first century have been so transformational, it can be classified as a primary player in social activism.

For the first Earth Day in 1970, Robert Rauschenberg and “The Washingtonian Magazine” created posters. Their central roles in design-led activism through graphic design outlets were focused most directly on issues like AIDS, equality, race, war, democracy, and poverty, all of which have obvious connections to sustainability as a system's theory approach but were not connected as such at the time.

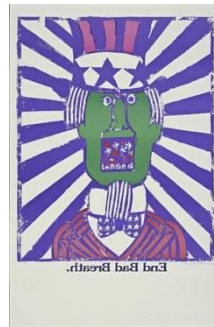
Bierut and Friedman considered that most graphic designers were associated with their activism during World War II and the 1970s' first environmental movement. (Bierut and Friedman, et al 2006). Figure (1).



Robert Rauschenberg, Earth Day 1970



Walt Kelly, Earth Day 1970



Seymour Chwast. End Bad

Breath Seymour Chwast, War is Madness

Figure (1)

Problem Statement

The problem of this research is formulated as follows:

- How has the sustainability movement affected graphic design?
- What are the major trends that graphic designers can use to develop sustainable design?

Statement of Purpose

- Understand the challenges that the mainstream graphic design field faces are in adopting the concept of sustainability.
- Help the graphic design field moves toward a consensus about what sustainability.
- The paper may bring to light underlying issues that could be improved to stimulate a more sustainable graphic design profession.
- Shed light on a wide range of issues related to graphic design through the concept of Sustainability, including the toxicity of the traditional printed materials.

Definitions

Environmental design: It is important to distinguish between environmental design and ecologically friendly design. Development of physical, spatial environments (interiors and/or exteriors) to meet a particular purpose or produce a certain experience is known as environmental design. Architecture, urban planning, landscape design, interior design, exhibit design, and occasionally event design is all included in the category of environmental design. (Sustainable Design Dictionary, 2017).

Sustainable development: The Brundtland Report, also known as Our Common Future, first used the term "sustainable development" in 1987. According to this definition, the phrase refers to "The ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs". (UN World Commission, 1987).

Graphic design: The graphic design profession is referred to as a group by the United States Department of Labor's (2018) definition of the term. Graphic design professionals are those who "create visual concepts, using computer software or by hand, to communicate ideas that inspire, inform, and captivate consumers."

They create the overall layout and production design for a range of applications, including ads, brochures, periodicals, and corporate reports.

Sustainable design: Sustainable design as the NASAD handbook stated is "The consequences of design in interdependent systems, lifespan of designed objects, and use and disposal of resources. (NASAD Handbook 2017).

Sustainable graphic design: "The process of developing products, services, and organizations that comply with the principles of economic, social, and ecological sustainability. There are many principles of sustainable design, including a customer-centric approach, dematerialization, transmaterialization, and biomimicry." ("Sustainable Design Dictionary," 2017).

Sustainable design

Sustainable design is more often confused with "Green" or "eco" design. There is a distinction between the two. The "Green/eco" design is the practice of reducing or eliminating environmental impacts of design, whereas sustainable design is concerned with the environment, and also with social and economic issues. Therefore, sustainable design

encompasses whatever concept Green/eco design has and goes beyond encompassing ecology, economy and cultural contexts. The intention of sustainable design is to eliminate negative environmental impact completely through skillful, sensitive design. Manifestations of sustainable design require non-renewable resources, impact the environment minimally, and relate people with the natural environment.

Sustainable Design includes the theories and principles for design that cultivate ecological, economic, and cultural conditions that will support human well-being infinitely (Thorpe, A.,2007).

In the free online encyclopedia Wikipedia, sustainable design is the philosophy of designing physical objects, the built environment, and services to comply with the principles of economic, social, and ecological sustainability (McLennan, J. F.,2004).

This philosophy can be applied to all forms of design such as product design, graphic design, architecture, and interior design. For the last few decades, sustainable design has started growing as a reaction to the growth of the concept of sustainability. The rising demand of products and technology, as well as a growing world population, has created a need for sustainable design solutions to counteract the increasing environmental impact of products, services, and buildings.

Since our economy is based on consumption, designers need to find more sustainable materials and ways of manufacturing and supply chains in order to fulfill demand but keep the impact on the environment low. Besides that, design can also help to send messages and convince consumers to make sustainable choices in their daily lives. Finally, design can influence behaviors and lead to behavior change when executed thoughtfully. Design not only serves to produce products that use resources and materials, it can also help to create a shift in the society towards a more sustainable lifestyle (Melanie, 2011).

The “3 Rs”

Reduce, reuse, and recycle - the 3 Rs- have become a rallying cry for ecological responsibility (along with a concomitant life cycle analysis which is gaining a strong foothold in design and production processes). Of the three, recycling seems to have struck a chord with most people, perhaps because it actually allows individuals to do something about the environment without really changing their habits. Recycling is seen as good because it seems to replicate the natural principles of the biosphere. There is no waste in nature, only the creation of new raw materials. The new raw materials derived from recycled waste are reinserted into the linear system at the materials processing stage. Similarly, reuse of end- or interim products can be accommodated into the linear model without undue difficulty. In fact, reuse has always been a part of money-saving strategies, prime examples are returnable bottles and other forms of packaging. Reductions in the use of materials have also figured prominently in the economics of the linear model. Savings are possible in all sorts of ways, or conversely, profit is increased (Rüdiger, 2003).

Designer's Roadmap:

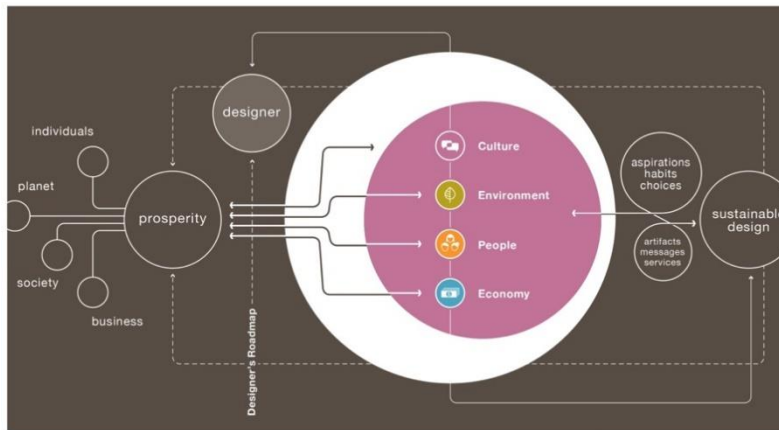


Figure 2: The streams of integrated sustainability

There are four streams of integrated sustainability:

Environment

Design can invent new systems, products, and services that use less and deliver more. It can translate complex concepts into the relevant messages that help people adopt behavioral change.

People

Design can visualize acute needs, raise awareness, prompt public response, and affect policy. It can promote messages of inclusion, equality and empathy, helping to establish harmonious and healthy conditions in which all members of society can flourish.

Economy

Design thinking's approach to investigation, analysis, and visualization can create value and opportunities for companies and people across all streams of sustainability.

Culture

Design can cross cultural barriers to promote universal understanding. It can deliver a compelling view of sustainability that ensures its assimilation by a broad array of people. And at its best, it can shift consumption and lifestyle aspirations, literally changing the definition of prosperity (www.livingprinciples.org)

Design approaches to Sustainability

While there were many approaches to design for environment before the 1990s, the birth of industrial ecology symbolizes the approaches in place today.

The fields of study in industrial ecology are:

- Systems analysis
- Industrial metabolism: flow of materials and energy, and their transformation
- Using perspectives from other fields
- Study of natural systems
- Closed loop systems

Today we might term these fields as:

- Systems thinking
- Life cycle assessment
- Cradle to Cradle (C2C) inspired design

Life cycle analysis

In order to quantify environmental impacts a life cycle analysis is conducted. It is most useful to think of LCA as a comparative tool: Does one approach have less impact than another? There is no single perfect design, just a constantly evolving landscape of designs moving toward our design goals. The advantage of an LCA is that it gives independent confirmation of material impacts, and designers are forced to consider each step in the process. Users of LCA find that their design thinking may not have extended to the end of life or may not have considered transport costs. An LCA is a somewhat complex tool that requires the material characteristics of a piece to be known before analysis can be proceeded.

This creates difficulties for designers in several ways:

- Components of a piece may not be known when the design process is started.
- Composition and chemistry of a piece's components may not be known.
- There may not be support (staff and software) for the LCA process.

Cradle to Cradle

Cradle-to-cradle approach that is to apply design intelligence and ecological intelligence to the design process. It indicates, sustainable designs should be generated and created with a close relationship to economy, ecology, technology, equity, social values and human activities. (McDonough et al., 2002).

The C2C approach is being used on design projects ranging from packaging to buildings but can be applied to any effort. A building using C2C ideas, for example, focuses on the effective use of energy and resources along with the creation of safe and uplifting environments for human occupation.

This end of life does not close a loop. Rather, it locks up materials and energy in forms that are not usable in the cycles of nature or technology and often pollute. The alternative strategy is for object end of life to be considered as a new beginning, looping back either into the production process or into the biological system. This is the idea of C2C: Model industrial cycles on natural processes and ensure that these cycles are tied safely back to the Earth.

Using this systems approach means that market growth is good, as objects created actually could improve eco systems instead of just doing less damage to them. C2C ideas suggest that designers examine all processes to increase efficiency or lower energy usage. Move operations progressively toward a balance with current solar income. Enough sunlight hits the Earth every day to fuel society for a year. (Andrew C and Matthew L.,2007).

Today the impacts of material production, processing, and disposal are known. Using ideas such as C2C, it becomes possible to design objects with positive impact on Earth systems. Another perspective on C2C is to view the product life cycle and look for areas where particular tools can be employed. For example:

- Consider material impacts (toxicity, source reduction), manufacturing, and end of life.
- Design for reuse, recycling, and composting in material selection, acquisition, processing,

and end of life.

- Consider energy use in material processing, material acquisition, and transport.
- Use recycled materials in materials acquisition, processing, and end of life.
- Consider biological diversity in material acquisition.
- Work toward weight reduction and design for transport in manufacturing and end of life.
- Choose best practices when selecting materials and suppliers.
- Know the chemistry of your package. Ask about green chemistry and engineering when checking supplier performance (Wendy ,2010).

Graphic Design and Sustainability

Graphic designers apply their skills to a gamut of design needs from the printed page and packaging to product graphics and user interface design; to way- finding, signage, and event support to promotional items, Web pages, advertising and branding, just to name a few. All of these applications have to deal with some sort of base medium (physical materials or Web page screen) and how the image gets on to it. Sustainability approaches certainly must address concerns about materials: Can the object created decay gracefully or be returned to the production process? But on another level, it looks deeper at the message being sent communicating values between the piece's producer and the viewer; or in the case of packaging and advertising, helping consumers make better choices. Great design encompasses all of these into an integrated unit, including:

- Collaboration between designer and supplier/ service vendor.
- Fitting the end piece to the market.
- Encouraging positive behaviors.
- Giving a visual language to sustainability.
- Encoding positive actions (cycling, efficient use).
- Communicating at several levels: design situation, values, style, and market.
- Awareness of what and how the design situation is represented.
- Identifying sustainability with lifetimes, minimal impacts, and restoration.

Graphic design strategies are useful for expanding our vision but also sometimes helpful to think of what we can do to reinforce those strategies in our day-to-day practice. From the very start creating a sustainable design is about asking questions. From these basic questions we can begin to conceptualize our final design.

- Is this the best method to communicate my message?
- What is the impact of making this design?
- How can we lessen the impact if we print the design?

The role of the graphic designer

The primary question for the design professions was not what new products they could make, but rather how to reinvent a design culture so that worthwhile projects could more clearly be identified and realized. The power of design is in conception and planning, first generating an idea and then embodying that idea in a product, whether an object, system, or environment (Margolin ,1998).

The idea that designers should take into consideration the environment impact of their work is not new. Designer was in a powerful position, able to help create a better world by considering environmental issues and creating environmental process and products.

The role of designers as the link between the manufacturing process and the customer, between technical and marketing requirements, has given them a central position in many companies in area such as new product development.

Promoting behavioral change is one of graphic design's common objectives.

Designers have the profound capacity to inspire change while igniting a sustainable design revolution since they are both makers and consumers (Benson, 2007).

Designers may help reroute the current global economic, social, and environmental course by utilizing their creative thinking and design expertise.

Each designer has unique abilities; therefore, they should apply their particular skill sets and passions to a situation where they can have the biggest impact (Santiago, M. T. (2016).

Designers must demonstrate an ability to take on the complex and challenging issues which surround designing for minimum environment impact. This will require a willingness to undertake thorough research before starting the design process, and an understanding of environment issues and the ability to know where to look for guidance. In addition to that, some technical understanding of the production process and of the properties of materials will also be essential for the environment-conscious designer. (Deniz ,2002).

Sustainable production methods, energy efficiency, material choice, and waste minimization should all be incorporated into new projects and additions thereto. Since the printing and production industries are continually changing, it is essential that graphic designers stay up to date with them. Designers should use this information to consult with clients about specific project objectives.

Graphic designers' education

Although sustainability is a serious issue, graphic designers are not given the necessary training in design programmer. Sustainability needs to be viewed as important for the future and a common concern in order for it to play a significant role in education.

Sustainable methods of manufacturing, energy use, material choice, and waste minimization should be incorporated into any new projects or additions to existing ones.

Since the printing and production industries are continually changing, it is essential that graphic designers stay up to date with them (Metropolitan Group, 2008).

Designers should use this knowledge to discuss specific project goals with their clients to determine the best sustainable solution.

Connecting to the customer

Clients frequently believe that sustainable design will be more expensive and of lower quality. In fact, the opposite is true, the greatest way to use materials to cut down on energy use, pollution, and waste is through sustainable design. This can be achieved by utilizing less paper, ink, and chemical processes, which lowers costs and protects the environment (csdesign, 2008).

Rethinking design (Smart thinking)

Sustainable design workflows, eco-products, best (or better) practices, and much more. This includes environmentally preferred purchasing programs; efficient, paperless, digital processes; and virtual tools. Tips are included on how to choose greener electronics and carbon offsets, how to conserve energy in the studio, and how to dispose of e-waste?

Working smarter entails thinking green. Environmentally preferable purchasing polices can guide industry growth to a more sustainable place. Smart, virtual workflows save time and energy and conserve natural resources. Energy conservation strategies prolong the useful life of equipment and save money. Environmental footprint tools, energy waste audits, and office carbon footprint tools help measure an effort's impact and help to provide feedback and guidance to make adjustments. Design firms and personal workspaces can be healthier, more productive, and more sustainable. Becoming more eco-minded not only leads to ways to conserve energy, resources, and money, it provides creditability and gives design firms or studios an edge. Designers will be able to translate and share new information with colleagues and become abler to guide clients toward more environmentally aware choices. Designers can grow their businesses in new ways and affect social change at the same time.

The design studio for "The Metropolitan Group" offers the following advice: To minimize waste, the entire package should be considered while considering design concepts. White space is a waste of space unless it is used for functional design goals. To generate a more consistent response, the right audience should be targeted rather than simply printing and mailing out mass mailings. (Metropolitan Group, 2008).

Thinking green requires a flexible mind open to challenges and creative problem solving. Keep up with the latest news and information regarding eco-products, green gadgets, sustainable developments, design and marketing (Wendy ,2010).

Designers need to rethink sustainable solutions for the design issues posed by their clients. By starting with the correct inquiries, it is possible to achieve the intended results of cutting down on paper and ink use or developing a digital solution (Benson, 2008). Consider going above and beyond what the client is asking for; you might be able to use the project for something more worthwhile. The designer should be open to experimenting with different ways to produce printed materials. The goal of good design is to communicate using materials that have the least negative environmental impact feasible.

The media for project

For the actual execution of a project, designers have a wide range of possibilities.

They must choose the project's best format, whether it be tactile, digital, or some other type of system, (Benson, 2007). Not every design needs to get printed. it can be just as effective in an email, a website, or a portable document format (PDF).

The designer should give thorough quantity planning top priority if they decide to have the product printed. Printing too few copies necessitates additional print runs, which are expensive both financially and environmentally, and printing too many copies is wasteful.

Understanding Materials

Adding to the traditional concerns of the designer, we can relate to the use of materials, and this is a good start. One of the challenges of becoming greener in design is in understanding new materials choices and how they affect the look, feel and overall sustainability of a project. There is a lot of misunderstanding and misconception in regard to green materials.

Paper

The main material that graphic designers use is paper. By ignoring the environmental effects of paper distribution and consumption, designers are generating income for the paper mills, the third most polluting business in the world. Over 50% of the world's forests have been destroyed as a result of these paper mills. (Benson, 2007).

Paper is probably the first thing that comes to mind when recycling is discussed. Paper is certainly the most obvious when discussing green design as it is the designer's primary method of producing work (Brian H. and Paula D., 2010).

Producing one ton of paper with virgin fiber uses the wood from two to 4.4 tons of trees. If recycled fiber is used, it takes 1.4 tons of paper products out of landfills to produce the same amount of pulp. (Neenah Paper, 2006).

Designers can take opportunities to learn more about paper manufacturing and sourcing. It is imperative to understand the value of recycled paper, sustainably harvested wood and certified paper products, and alternatives to wood-based papers. Designers can use their knowledge and purchasing power to help prevent deforestation and protect endangered habitats and to share this knowledge with customers (Wendy ,2010).

There are many choices on the market for designers interested in using alternate types of paper. The thing that is important to note is that while many sounds like untapped or unutilized "gold mines" of raw materials the key to a successful alternative is its level of renewability. Considering the massive quantity of paper products used globally every year, waste left over from grain production. This sounds like a great option, but it also requires a lot more energy to remove silicates present in wheat and the straw needed for compost would be gone. Other alternatives are hemp, banana, bamboo—the reality is we can make paper out of almost any fibrous material. Manufacturers are also looking to synthetically produced paper products. These are papers that are manufactured from non-wood materials, oftentimes plastics. The book *Cradle to Cradle* by William McDonough and Michael Braungart utilizes a recycled plastic material for its pages that can be washed clean and recycled over and over again.

Whatever the future holds for paper products, one thing is clear, while there are many realistic alternatives on the market, the real problem is consumption, we simply consume too much printed material. The best way to attack this problem is by managing the amounts of materials we use.

Plastics

Plastics are becoming more of a problem as time goes on. The high levels of usage generate a massive problem for the public health as toxic chemicals, landfills, and our environment have become clogged with an excess of discarded plastic materials.

Therefore, designers need to better educate themselves to make more informed responsible

decisions in their material specifications. It is quite easy for a designer to specify a non-toxic, highly recyclable number two HDPE plastic rather than a toxic unrecyclable PVC. Educated consumers can begin a change from damaging plastics simply by avoiding those products produced in harmful ways (Brian H. and Paula D., 2010).

Alternatives to Plastics

Because of the problem being faced with petroleum-based plastics, many researchers and manufacturers are searching for new means of producing plastic-like products without the same ecological damage. This has given rise to a whole new classification of plastics called “bioplastics” which are manufactured from organic sources. There are three main engineering efforts in the search for new bioplastics, converting plant starches and sugars, producing plastics inside microorganisms via fermentation and genetically modifying crops such as corn and rapeseed so they actually grow plastic. All of these are interesting ideas that show some promises but they also have drawbacks and dangers associated with them (Imhoff, 2005). It has to come back to the designers’ ability to build awareness and reduce consumption. Designers must rethink the vast quantities of packaging and products that are filling up the landfills and find better, more efficient ways of communicating and producing.

Green printing

Sustainable print graphic designers solely consider the resources utilized for the project, such as paper, inks, plastics, and computers. The choice of ink is crucial; for example, printing a metallic navy-blue logo in two spot colors would be preferable than four colors (CMYK) and metallic ink. When the item is no longer required, vegetable and soy-based inks are far simpler to be cleaned, deinked, and recycled than petroleum-based inks, they also have just as high-quality.

It is essential that the designer determine whether the substrate is recyclable and constructed of recycled materials. In order to avoid unnecessary waste, such as excessive trimming, the designer should collaborate with vendors. Finding the right equipment and supplies is crucial for the graphic designer to finish the project responsibly.

Instead than focusing on permanence, graphic designers should think about impermanence.

The designer supports the planet's natural cycle by deciding on materials that disintegrate, compost, can be recycled, and are constructed of recycled resources. (Benson, 2007).

Today’s digital pre-press and direct computer-to-plate processes conserve resources and are free of the chemical baths of former years while also dramatically enhancing workflow and productivity. Managing impacts in the studio, designers can choose from computers and desktop printers that have been designed to meet Energy Star certification or can purchase hardware by companies that offer recycling services.

It’s important to remember that the materials and products of the current commercial ink and printing industry are comprised of chemicals and use industrial processes. As such, they are not considered inherently healthy or environmentally friendly. Cleanup and disposal are a part of printing that those on the design side don’t often think about. Just as ink formulations are important when considering environmental impact, so too is working with a printer that understands the impacts of the chemicals and solvents used in other pressroom materials.

Lifecycle of design

The key to sustainable design is knowing the complete life cycle of the materials used in design projects—as well as how the products themselves evolve over time. (Twemlow, 2005). Can the design fill more than the initial purpose—a pocket folder and a brochure, a brochure and a poster, a brochure and an envelope? Can the design fulfill more than one purpose? These are important questions that the graphic designer must consider (Metropolitan Group, 2008).

A project called "Design Ignites Change" was created by World studio and AIGA. After a project in New York was finished, the program understood that they had to prevent the materials—banners in this case—from ending up in a landfill if they were to be really sustainable.

Andy and Kate Spade were asked by the program to turn the banners into tote bags. The bags were then put up for auction, and the money raised was donated to mentorship and scholarship initiatives that support young people in developing their creative and sustainable abilities, giving back to the neighborhood and assisting future generations (McCarron Sienicki, 2007).

Analytical study

In this section, the paper examines some selected samples of graphic design sustainability.



Figure (3) Stafidenios Raisins

<http://www.re-nourish.com>

▪ Stafidenios Raisins:

Design Studio: Matadog Design

Stafidenios is a packaging for seedless raisins especially designed for kids. There were no limitations when this project began. After thorough investigation, the designer Andreas Kioroglou came up with a novel concept for extending the packaging life cycle. Instead of throwing away the package, the intention was to use it as a toy. The packaging was made to make it simple for kids to turn the boxes into paper toys without the need for tools like scissors, blades, glue, or other adhesives.

The project was a huge success, clients' sales data and market research indicated that children favored it, they found that increasing the life cycle of the packaging, is funny, educational, and most importantly, sustainable.



Figure (4) Patagonia
<http://www.re-nourish.com>

▪ Patagonia

▪ Design Studio: Cast Iron Design

Tasked by Patagonia to design a guide to the city of Boulder, Colorado. The pocket-sized booklet uses multiple zoom settings to accommodate the many sites of interest that range from "across the street" to "an hour away," delivering maximum utility and improving the cartophily's experience.

The phrase "World's First Algae Offset Ink" sounds great, but the technology has a lot of promise. Because it substitutes the petroleum-based pigments included in traditional offset ink and has a lower carbon footprint, algae-based ink is noteworthy, having knowledge that Patagonia was willing to travel to new territory.

A business called Living Ink has been creating algae-based pigments since 2013. 8,000 booklets were produced on one of our favorite 100% PCW recycled papers after a successful test run. Despite being a relatively insignificant victory of itself, yet this one helps the industry move toward a more sustainable future.



Figure (5) Salvaged
<http://www.re-nourish.com>

▪ Salvaged

Design Studio: Kalico Design

In Frederick, Maryland's downtown, there was a unique retail establishment called Salvaged that sold both contemporary home furnishings and refinished, up-cycled vintage pieces. Salvaged and Kalico Design collaborated to update their brand identity, which included stationery, hang tags, window graphics, and a redesign logo. Kalico Design produced a set of multiple-sized tags for Salvaged since they needed in-store hand tags in various sizes to fit on both huge furniture and smaller home accessories.

The hang tags were intended to be written on by hand because the aim was to make them reusable. Kalico created a 2-tag set for the repaired furniture that featured a general salvaged tag as well as a "My Story" tag. Each "My Story" tag includes a handwritten explanation of the product's age, where it was discovered, and how it was restored. A smaller tag was also made

for the smaller home goods. Customers frequently decided to preserve the personalized "My Story" that came with their furniture since they really enjoyed it.



Figure (6) Earth Greetings Christmas Cards
<http://www.re-nourish.com>

▪ Earth Greetings Christmas Cards:

Design Studio: Earth Greetings

The goal was to design a line of Christmas cards that people adore giving because they celebrate the birds and blooms of an Australian Summertime Christmas while having a little negative impact on the environment. We have been able to achieve this because of Earth Greetings' support of the Australian nonprofit group Trees for Life. Every time a pack of Christmas cards is purchased, we donate money to them, allowing them to plant a tree in their own country.

It minimised our impact on the environment by using 100% post-consumer recycled paper for the Christmas cards and packaging and 100% post-consumer recycled, natural, and unbleached envelopes. Instead of using plastic to hold the goods in place, the packaging is made so that the front designs can be seen through a window.

Locally, a carbon-neutral printer uses vegetable-based ink to print the cards. As part of Earth Greetings' yearly carbon audit, the remaining life cycle of the paper, printing, packing, and freight is measured and offset. Since all of this product's greenhouse gas emissions have been compensated, it is now carbon neutral.

As a result of donations from pack sales, Earth Greetings has helped Trees for Life plant more than 40,000 trees since 2008. On the packs and POS displays, the slogan "Every pack plant a tree" is prominently featured, and many customers claim they are inspired to purchase these cards in order to support the environment.



Figure (7) This Too Shall Pass, 2012. Rice package

This project “This Too Shall Pass “addresses the increasing issue of environmental pollution and recycling. There is example from a Swedish design studio called Tomorrow Machine. They experiment with unusual materials to create revolutionary food packaging concepts. Pursuing the modernist principle of form follows function, Tomorrow Machine unites visual appeal with highly innovative and operational technologies to create both aesthetic and pragmatic design.

Using biodegradable materials, studio has created food packaging that shares the symbiotic life span with the food housed inside. Vividly colored and minimalist in shape, these concept containers for oils, dry foods and liquids disintegrate when the content they store are used. Rice Package made of biodegradable beeswax. To open it you peel it like a fruit.

According to Tomorrow Machine, “this is the new generation of sustainable package design, using materials that are both smart and environmentally friendly”.

Conclusion

Today, the concept of sustainability has become more important, the challenge of sustainable design is to alter conventional design and manufacturing procedures to incorporate environmental considerations systematically and effectively. Design for Environment (DfE), Cradle to Cradle (C2C), and other sustainability systems thinking processes can help designers think cyclically.

Design is the key intervention point for making radical improvements in the environmental performance of graphic design. The relationship between graphic design and ecology is a very close one, Graphic design should enhance the ecologic awareness, and take up the task to bring people high-quality healthy living by introducing eco-design technology, environmental protection to future. Graphic design was in a powerful position, able to help create a better world by considering environmental issues and creating environmental process and products. Designers have a direct influence on the amount of damage which will occur at each stage in the process. For example; what materials will be used, how will the product be manufactured, how will the product be used and disposed? Is it designed to be easy to repair? Is it reused or recycled?

The idea that designers should aim to minimize the environmental impact of their work which has been accepted in many cases. For all designers, one of the first rules should be to minimize the quantity of any material chosen wherever possible.

Designers and manufacturers should be increasingly aware of the possibility of using recycled materials. In general, materials that have come from a recycled source are more environment-friendly than those from virgin sources. It’s time to become more aware of the impacts of the graphic design industry and to take advantage of the marvelous tools and resources that are available to green creative processes, workflows, and workspaces.

The graphic designer should collaborate with the customer and suppliers as the project advances to build a solution that adheres to these four sustainable principles:

- Respect and preserve the community.
- Enhance the standard of living while preserving the life and diversity of the planet.
- Reduce the use of nonrenewable resources as much as possible.
- Modify behaviors and attitudes to remain in line with the carrying capacity of the earth.

Graphic designer keen on adopting sustainable practices as a part of his work ethics needs to be educated on the environmental repercussions of the paper industry to be able to identify the issues and make informed sustainable choices.

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