

# A Creative Strategy for Sustainable Design Education - A Tribute to Charles and Ray Eames

Dr. Martin Racine<sup>\*</sup>

*Concordia University, 1455 De Maisonneuve Blvd. West, Montréal, H3G 1M8, Québec, Canada*

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## Abstract

This paper describes a project that was assigned to senior level Design students in the Department of Design and Computation Arts at Concordia University, Montreal. The objectives were to transmit advanced conceptual and creative skills while bringing students to integrate fundamental sustainable design principles. The challenge suggested was to create a base for the structure of recuperated chairs designed by Charles and Ray Eames in the 1950's. This project stimulated students to deeply engage in the development of high quality designs and creative concepts while encouraging them to understand the importance of preserving the environment and the cultural heritage related to objects that are much too often discarded after the end of their useful life. This project was inspired by Metacycle, a design research that aims to prolong the lifespan of everyday objects ([metacycle.ca](http://metacycle.ca)).

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Key Words: Design Education; Sustainable Design; Design History; Material Culture, Charles and Ray Eames.

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## 1. Introduction

According to the International Council of Societies of Industrial Design (Icsid.org), design is a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life cycles. Therefore, design is the central factor of innovative humanization of technologies and the crucial factor of cultural and economic exchange. In general, designers concentrate their expertise on the creation of furniture and products related to a broad range of domains, including transport; electrical and electronic appliances; lighting; medical devices; sports equipment; etc. Design education is therefore concerned with transmitting both the theoretical and practical knowledge involved in this complex activity.

With the current environmental crisis, the field of design is more than ever challenged by finding solutions and developing products that will have less negative impacts on the ecosystem, which means using less resources, less energy and finding ways to re-use and recycle the materials and the various parts of all the furniture and objects we use after their end of life. For many design schools, the environment issue has become a central preoccupation, as students need to understand that it will be their responsibility to integrate the fundamental principles of sustainability through an ecological perspective, but also from a socio-cultural and economical standpoint.

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<sup>\*</sup> E-mail address: [martin.racine@concordia.ca](mailto:martin.racine@concordia.ca)

Since many years, as a design researcher and educator, I have focused my interests towards issues related to sustainable development and I attempt to develop strategies aiming at inducing a fundamental paradigm shift in our society of consumption. Essentially, this means putting less emphasis on the production of new things and paying more attention to notions of maintenance, re-use, repair and durability. While design activities usually concentrate on developing innovative products, this may seem paradoxical and incongruous to focus on the re-use of existing materials and recuperated elements, especially for students who are eager to create novelty. My challenge as an educator is therefore to transmit values of sustainability and making my students realize how creative it can be to re-use and refurbish elements that otherwise would end up in the garbage dumps or landfills. In this paper I describe a project that I have assigned my students, which had the specific objectives of developing advanced design skills, while integrating notions of ecology, and both socio-cultural and economical sustainability.

## 2. Background Context

Since the late sixties, ecologists have been raising their voices in opposition to the western world's profligate lifestyle. A few designers were among adamant agitators for a reassessment of our wasteful habits and the values that support them. At all scales, the message was the same: progress as measured by unending growth is an untenable paradigm, leading to both depletion of non-renewable resources and the poisoning of the planet through the increased production of toxic pollution. Jane Jacobs argued that architects were destroying the ecology of the built environment through the promotion of urban sprawl [1]. Victor Papanek criticized designers for participating in the suicidal race towards ecological disaster through their contribution to the relentless rise of consumerism [2]. At an even earlier date, Buckminster Fuller demonstrated how wasteful building methods were standing in the way of providing adequate shelter for all[3].

Half a century later, in line with notions of sustainable development established at the Rio World Summit in 1992, a group of ethically responsible designers are proposing changes in our ways of doing things in order to reduce the negative effects of our society's excessive consumption (McDonough and Braungart, 2002, Lewis and Gertsakis, 2001, Charter and Tischner, 2001) . It is along this axis that my group's research efforts have been directed, linking various digital technologies with modern social phenomena in an effort to prolong the life span of manufactured products and thus reduce the deleterious effects of over consumption.

The premise at the root of this research concerns the organic nature of manufactured objects; like living things, objects can change over time. Jonathan Chapman considers that a product's life span is determined in large part by the attachment linking it to its user and that this could be enhanced by the product's ability to evolve and change over time [4]. While this ability is often seen in the area of software design [5] where updates, patches and versioning enable programmes to evolve not only to correct errors but also to meet new needs, some researchers have made attempts at transferring this aptitude to physical objects[6, 7].

As an educator concerned by environmental issues, the important question to address is "How can I raise the students' awareness regarding sustainable design approaches? In order to reach this objective, I introduce them to my research activities, and put the emphasis on a project entitled Metacycle, a concept aimed at establishing a network of designers applying their creativity to proposing how existing objects could be enhanced and modified in order to take on a second life (Figure 1). Previous work called PRéco [8] established the feasibility of using digital manufacturing technologies and in particular Rapid Prototyping (RP) for repairing products. My research group took this to a second level in

META[morphose] by experimenting the application of RP to the up and side grading of products thus enabling them to evolve [9]. Metacycle configures this technique into an operational framework by creating a virtual community of designers linked by their common interest in the creation of new products from old.

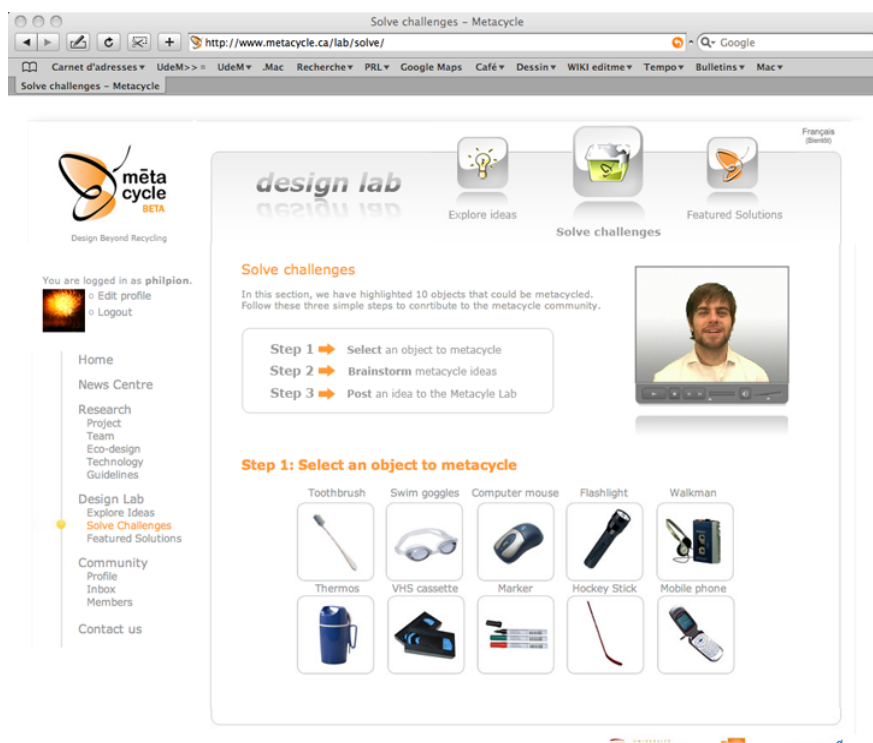


Figure 1: Metacycle.ca, a web site where designers are asked to find a second useful life to old objects: swimming goggles, cell phones, computer mice, etc.

More specifically, Metacycle.ca is a web site that aims to optimize the creative potential of designers by reuniting them within a virtual community serving the common objective of prolonging the life span of consumer products. The goal of this project is to develop an interactive framework through which consumers can benefit from unique and innovative updates to products whose usefulness is being put into question. The pooling of a large number of creative minds allows the generation of a new category of unique products that favour increased attachment through personalization. Essentially, the metacycle web site challenges creative minds to find solutions for giving a second life to objects that cannot be recycled, for example toothbrushes, VHS cassettes, hockey sticks, computer mice, swimming goggles, computer screens, markers, Walkmans, cell phone, etc. After having chosen a challenge, additional information pertaining to the size, materials and other characteristics of the object is presented with a reminder of the Metacycle guidelines: “Revitalize Functionality, Maximize Reuse, and Reduce Waste and Energy”. After having accepted the Creative Commons terms for the non commercial use of their ideas, users can submit their images, models and/or instruction manuals. This content is automatically uploaded into the Explore Ideas section for others to browse and vote upon. If ever an idea gathers a large amount of positive

feedback, the Metacycle team will promote it into the third and final section of the Design Lab labelled Featured Solutions.

### 3. The Design Challenge

Describing my research activities brings students to understand the importance of recuperation for its environmental benefits. They also realize the creative challenge associated with the objective of extending the life span of old objects. While examining closer all the objects around them that end up being rapidly discarded, they recognize the design efforts that are behind and discover the cultural value of those objects, like as archaeologists examining and preserving precious artefacts. Yet beyond the benefits of recuperation from a strictly environmental point of view, there can also be cultural benefits behind such a strategy. With this in mind, I initiated a project for my senior design studio course aiming to address the global notion of sustainability, from an environmental, socio-cultural and economical perspective. I entitled the assignment "A Tribute to Charles and Ray Eames" as the challenge consisted of creating a base for seats salvaged during the renovation of our university's amphitheatres, which were recuperated just before their disposal. Those seats were actually chairs without legs and only supported by a steel post, as they were previously bolted on metal structures and fixed to the floor (Figure 2). Inspired by the DSR (*Dining Height Side Chair Rod Base*), a famous chair designed in the early 1950's by two of the most innovative American designers of the 20th century, Ray and Charles Eames, those seats are made in fibreglass, an extremely durable material that otherwise cannot be recycled.



Figure 2. The challenge was to design a base for salvaged seats, recuperated during the renovation of university amphitheatres. The model is inspired by a famous chair designed by Charles and Ray Eames in the 1950's.

Each team of two students was given a fibreglass shell and had to develop a support system (legs, structural system or central post) with the material of their choice (wood, metal, plastic). The base had to be built to scale and attached to the seat without any modification of the original shell. Therefore, students were not allowed to drill holes or to glue any elements on the fibreglass chair in order to preserve the integrity of the original design. They could however use the existing metal structure to which the seats were fixed or attach their base by using the four threaded rods protruding through the shell under the seat. The structure needed to be solid enough to support at least 100kg and be perfectly functional. The project also had to be developed according to sustainability principles, as indicated in my course outline:

*"All the projects generated in class must integrate the fundamental notions of sustainability: favouring local materials and production, reducing parts and costs, designing for disassembly, designing for repair and longevity, avoiding the use of toxic materials, glues, paints and finishes. These principles must be integrated in all the aspects of the design process: limiting the printing, using eco-friendly materials for the construction of preliminary maquettes and leaving the studio clean after class".*

The first step for this project was to bring students to better discover the original Eames concept and the richness of the designers' vision while giving them the occasion to bring a new life to an icon of modern design (Figure 3). Charles Eames (1907–1978) and Ray Kaiser Eames (1912–1988) are known to having given shape to America's twentieth century. Their lives and work represented the nation's defining movements: the West Coast's coming-of-age, the economy's shift from making goods to producing information, and the global expansion of American culture. The Eameses embraced the era's visionary concept of modern design as an agent of social change, elevating it to a national agenda. Their evolution from furniture designers to cultural ambassadors demonstrated their boundless talents and the overlap of their interests with those of their country. In a rare era of shared objectives, the Eameses partnered with the federal government and the country's top businesses to lead the charge to modernize post-war America.



Figure 3. Here is a sample of the furniture designed by Charles and Ray Eames. Many elements of their work have become icons of 20<sup>th</sup> century American modern design.

The students were asked to do a complete research about the creative couple, and to study their work in the areas of furniture, architecture, film, art and exhibition design. Following the research phase (Figure 4), students explored conceptual and creative avenues through sketches and preliminary cardboard maquettes, which were presented in class and discussed during the critiques (Figure 5).

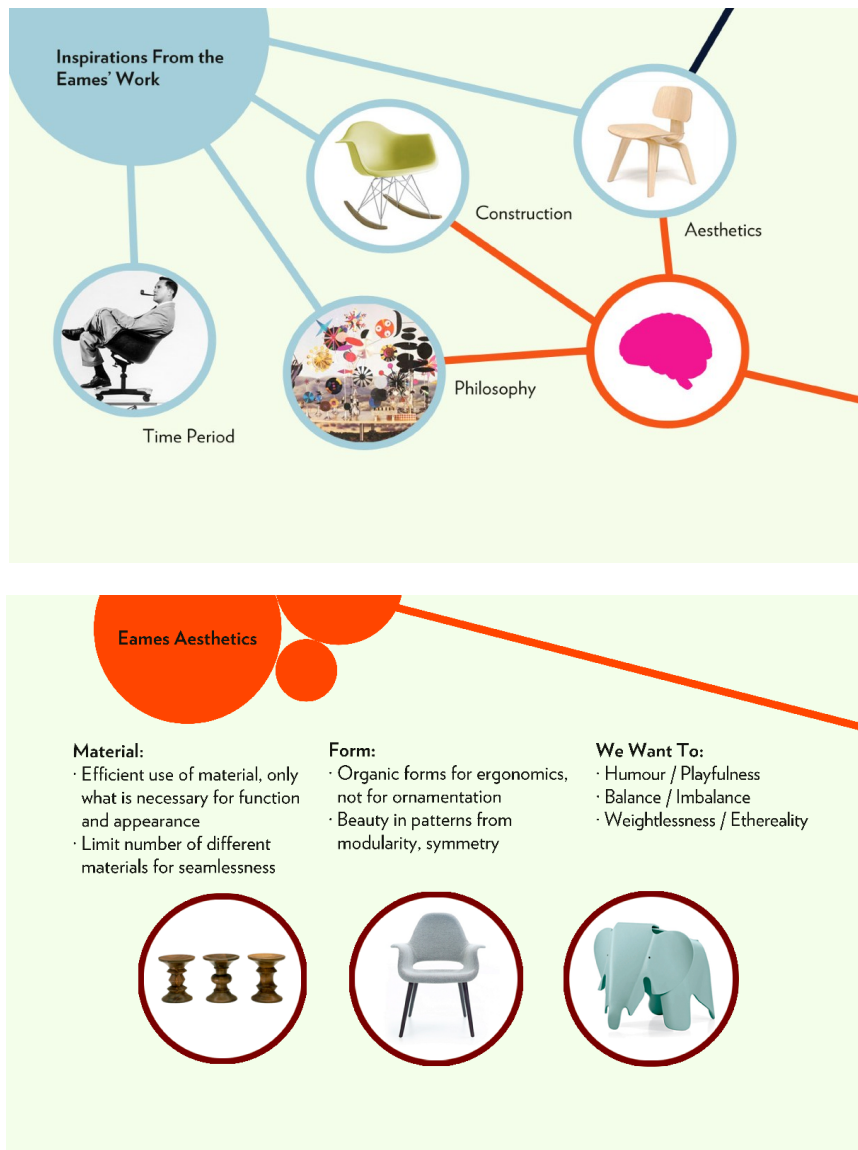


Figure 4: In their presentation, students had to address the historical context, the design philosophy of the famous designers and describe the conceptual framework for their creative intervention. Students: Gabrielle Turcotte and Zachary Kain.



Figure 5: Students prepared sketches to present their brainstorming sessions in the studio. Students: Vivien Leung and Levi Bruce.

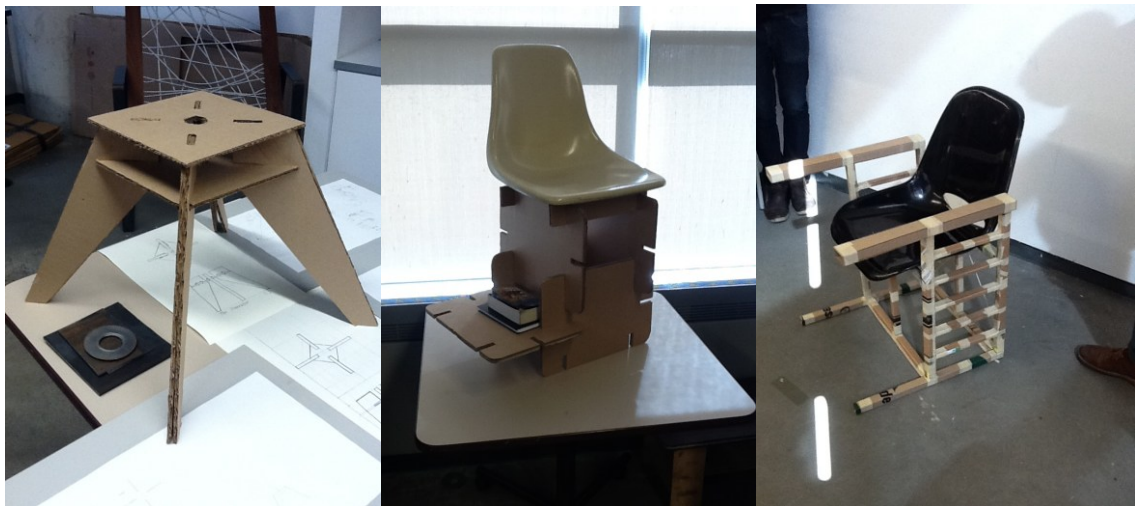


Figure 6: Exploration of different concepts through cardboard mock-ups. Different iterations were developed to test the solidity of the structure and evaluate the aesthetic proportions.



#### 4. The results

It has been quite impressive to see the level of commitment and energy the students have spent on this project. What made the experience even more satisfying was to see the level of innovation and creativity that has been expressed through the various solutions. In fact, each of the twelve different concepts developed in class was distinct from the others and every concept focused on a unique structural solution and fabrication method, which led to an extremely rich array of aesthetic and functional approaches (Figure 7).



Figure 7: Images show a sample of the different creative concepts have been developed by the students. (a) Project 1: Rodolfo Martinez and Alexandre Th  roux; (b) Project 2: Jeffrey Bush and Alexis Pautasso; (c) Project 3: Vivien Leung and Levi Bruce; (d)Project 4: Kyle Goforth and Dacia Pantelis.



In the four examples presented in Figure 7, we note that the version (a) is based on a braced wooden structure fixed directly to the chair as the version (b) uses the central post to support it, allowing the chair to rotate. The version (c) is also unique, as it is inspired by the Japanese culture, where people sit lower to the ground. The metal structure gives the option of sitting straight or leaning back for additional comfort. The other version presented (d) is a rocking chair, which can turn into a normal chair when the legs are inverted. While developing their concepts, students have learnt to develop essential design skills, while studying the furniture designed by the Eameses, they had the opportunity to understand chair structures and the physical principles applied in furniture and architecture. Because the chairs had to be functional, the students were challenged to use a rigorous process in order to precisely determine the height of the seating position, evaluate the amount of material needed, choose the fabrication method and develop their design according to the technologies that were accessible to them. Throughout this assignment, students were encouraged to exploit the potential of computer assisted design (CAD) and the precision of the computer numerical control (CNC) milling machine. By doing so, they successfully integrated and assimilated abstract theoretical notions and technical knowledge through practical experimentation.

To showcase the projects and to celebrate the unique quality of the projects, I organized an exhibition of the work in the Faculty of Fine Arts' Gallery. This brought a great deal of exposure to the students and contributed to their sense of pride as the expo received many positive comments by the university community.

## 5. Conclusion

This project proved to be remarkably successful, the challenging assignment stimulated students to understand the Eameses unique vision and to deeply engage in the development of high quality designs, creative concepts and innovative breakthroughs. It also encouraged the students and the community at large who has been exposed to the projects, to be more concerned about the value of the many objects that are discarded without any respect for the environment and consideration for the cultural richness that disappears when things in our surroundings are thrown out. Design, as a creative activity has the potential to add value to what is too often considered useless. In the Department of Design and Computation Arts at Concordia University, we strongly believe that design educators should play a leading role in moving forward towards sustainability, which requires the reconciliation of environmental, but also social equity, cultural heritage and economic demands. Too often this view expresses the idea that the pillars of sustainability are mutually exclusive, they should to the contrary be mutually reinforcing.

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