

Educating Automotive Designers to Incorporate Sustainability in Their Designs

Beth Walker: Director of Libraries, College for Creative Studies, 201 E. Kirby, Detroit, MI 48202, USA, Bwalker@collegeforcreativestudies.edu

***Abstract:** This Pecha-Kucha will present an overview of the College for Creative Studies' Color & Materials Library and its ongoing efforts to educate transportation design majors in the promotion, understanding, and uses of sustainable materials in automotive vehicle and other forms of transportation designs. Located in Detroit, Michigan, home to the "big three" of the automotive industry, (General Motors, Ford Motor Company and Chrysler Corporation), CCS is a private institution that offers world-class instruction in automotive vehicles, and is one of the few institutions in the world to grant both BFA and MFA degrees in transportation design. The urban proximity lends itself to a shared interest for research and knowledge, resulting in a long history of excellence and innovation that continues to this day.*

Recently, the automotive has re-invented itself in order to respond to consumer demands, and now has a focus on using sustainable materials in design and manufacturing. Thus, CCS is well poised to encourage and promote the use of sustainable materials in its students' designs. This presentation will outline the collaborative work of the College and industry in these efforts, and present CCS librarians' specific strategies for using these resources in the pursuit of responsible design.

Research questions: How can librarians educate students to choose sustainable materials in their designs, and encourage a climate of thinking that lends itself to responsible design? How can librarians promote use of sustainable materials in the execution of design? How can responsible design lead to the increased manufacture of sustainable products?

Keywords: automotive design, sustainability, responsible design

Purpose

The purpose of this Pecha-Kucha is to present the efforts of the College for Creative Studies' libraries in educating its students in responsible design. Specifically, it focuses on its flagship program, transportation design and its emphasis on automotive vehicles. The College for Creative Studies (CCS) offers both undergraduate and graduate degrees in transportation design, and is one of the few institutions in the world to do so. Located in Detroit, Michigan, home to what has traditionally been referred to as the "big three" of the automotive industry, (General Motors, Ford Motor Company, Chrysler Corporation), CCS is a private institution that offers world-class instruction in automotive vehicle and other forms of transportation design. This urban proximity lends itself to a shared interest for research and knowledge that has resulted in a long history of excellence and innovation that continues to this day.

Background

Recently, the automotive industry has been faced with a number of significant challenges. Rising global competition, technological change and the most serious economic downturn in nearly a

century have caused automotive CEOs to view sustainability as an important element to their success; in fact, 93 percent of CEOs see sustainability as crucial to their survival (Maintin and Lacy, 2011). Adopting this strategy, while at the same time trying to increase fuel efficiency and maintain profitability, represents just one of the many challenges facing the automotive industry today.

In preparing students to be successful and responsible designers in this industry, CCS libraries have stayed abreast of, and responded to, these needs. In 2006, the College received funding to extensively research and develop a special color and materials library that aimed, in part but not limited to, the promotion and use of sustainable materials for our art and design students. Today, the library houses more than 3,700 material samples as well as a book and periodical collection focused on sustainability and cutting-edge design. In addition, the libraries continue to work collaboratively with faculty and industry leaders to acquire new and innovative materials that may be considered for future use.

Methodology

The presentation will have a brief introduction of the College and its long-standing history of collaboration and partnership with the automotive industry that will include a number of sponsored projects, and a brief overview of the processes used to develop and execute the prototypes involved. A short history of the development of the Color & Materials Library will be shown, including research visits to Nike in Beaverton, Oregon, and Herman Miller and Haworth in Holland Michigan, companies who have exhibited a strong emphasis on sustainability in their designs and in their manufacturing (Haworth, 2013). CCS librarians interviewed staff, and conducted careful research on these visits that subsequently influenced their design of the work space and material acquisition decisions.

A discussion of sustainability will then be addressed – what is the definition of sustainable materials? What standards are used to determine whether a material can be considered sustainable or not? How are these materials classified, categorized and recommended for use? How are materials acquired, and what is the process to determine their sustainability? To this end, we will refer to the Briefing Paper “What are Sustainable Materials and Sustainable Materials Management?” developed by the Oregon Department of Environmental Quality, which includes the 1994 Oslo Symposium on Sustainable Consumption (Allaway, D. & Spendelow, P., 2011).

A number of sustainable materials and their possible uses in industry will be shown and discussed, as well as ways to determine critical approaches to interaction with the materials, life-cycle concerns and process/properties. Finally, the Color & Materials Library environment will be showcased to describe the number of ways CCS librarians support students to incorporate sustainable materials in their designs.

Research Problem

Research Questions:

How can librarians educate students to choose sustainable materials in their design? How can we encourage a climate of thinking that lends itself to responsible design? How can librarians promote use of sustainable materials in the execution of design? How can responsible design lead to the increased manufacture of sustainable products?

The following research strategies CCS librarians are currently using to foster this movement will be discussed:

- Holding bibliographic sessions in the Library that showcase an emphasis on sustainable design, what the definition entails and the availability of these materials in manufacturing today. Librarians collaborate with faculty to encourage all design majors to attend at least one research and information session. Advanced searching techniques that allow for filtering sustainable materials in Material Connexion and other relevant databases are taught, as well as a number of other research strategies. In 2012/13, 43 sessions were held for a total of 843 students, representing 64.8% of the total student population (bibliographic sessions, 2013). Transportation design is the College's flagship program, with 204 students enrolled in the undergraduate program, and 27 students enrolled in the MFA program.
- Similarly, in an attempt to reach additional students, librarians have physically gone into individual classrooms to present research on sustainable materials and their practices in design. Projects with a focus on sustainability have been assigned by both faculty and industry, and library staff has assisted students with their research in terms of the relevant literature as well as the current state of manufactured materials. Individual appointments with librarians may be scheduled for specific, tailored instruction.
- As a result of these visits and bibliographic sessions, traffic to the color and materials library has increased by 20 percent (Circulation statistics, Reference log, 2012).
- Librarians have also worked with faculty when industry leaders and their design staff are invited to the classroom to validate the importance of using sustainable materials that reduce the use of natural resources while fulfilling industry's quality standards and remaining within a prescribed cost structure. Faculty at CCS have industry experience, and have also participated in numerous international educational exchanges, the most recent being a ten-day intensive workshop on boat design at Hangzhou Dianzi University in Hangzhou, China. (Tom Roney, personal communication, 2013).

- The participation and presentation by library professionals at conferences, such as the recently-attended Materials Education and Research in Art and Design – a New Role for Libraries, held at the Rhode Island School of Design in Providence, Rhode Island, is important for librarians to keep abreast of innovation and changes affecting the increasingly large array of sustainable materials that are made available to designers. This conference, an IMLS-grant funded symposium, brought together design leaders in industry as well as faculty. Presenters included Chris Lefteri of Lefteri Design, Professor Martin Bechthold of the Graduate School of Design at Harvard University, Mike Taylor, Principal Researcher at Steelcase, and Nader Tehrani, Professor and Head of the Department of Architecture at MIT, Principal of NADAAA, to name a few. By attending, CCS librarians were able to increase their knowledge and glean a host of information and opportunities, such as the project to collaborate digitally on a shared sustainable material database.
- Finally, as a result of librarians' continued research and visits, students are shown successful products, such as the lifecycle design chairs of Herman Miller that are helping to lessen the carbon footprint, and are encouraged to incorporate similar materials in designs. According to Herman Miller designer Bill Lausch, the company will not embark on a design project for manufacture unless all components are recyclable (personal communication, 2007).

Findings, Conclusion

By employing these methods, and continuing to conduct research and collaborate with faculty and industry leaders, CCS librarians encourage their students to think sustainably. As a result, the Color & Materials Library has grown and expanded in its services, materials, and importance. Due to demand, hours of operation for the library grew from 40 hours per week to 52, and an additional staff member was hired. In 2014, a proposal will be brought for additional staffing and hours of service so the Library may operate during the weekend. Collection development for periodicals, monographs and materials has increased steadily by ten percent each year since its inception, and professional development funds have been restored for 2014.

This support and assistance has resulted in positive, transferrable skills to industry. In 2012, graduates of the MFA transportation design program enjoyed a 100 percent employment rate; graduates of the BFA program, an 89 percent employment rate (Survey, 2013). Considering that the national average employment rate for transportation/industrial designers is 59 percent, CCS has deservedly earned its reputation as the premier institution for transportation design, and its recent emphasis on sustainable materials assures it will remain on the cutting-edge of education now and well into the twenty-first century.

Finally, in light of the Color & Materials Library's importance and support, and in response to industry demand, CCS has developed an additional graduate program. The MFA in color and materials will have an even greater significance on sustainable design and the use of sustainable

materials. This program has been approved by U.S. accrediting bodies and is scheduled to begin in the fall of 2014.

It is clear that with the librarians' continued support and assistance for sustainable resources, CCS students will succeed in lessening the carbon footprint of materials, lead the charge to reduce the use of natural resources, and set themselves firmly on the path of responsible design.

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