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# DESIGNING WITH A SOCIAL CONSCIENCE: AN EMERGING AREA IN INDUSTRIAL DESIGN EDUCATION AND PRACTICE

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## ABSTRACT

In recent decades, a growing number of those in the industrial design profession have shown concern for socio-ethical issues and pondering the impacts of their work on the planet and its peoples. While mainstream industrial design education and practice still clearly focuses on product-centric innovation, the increasing involvement of designers in activities that advance the betterment of humanity is undeniable. Some university design programs immerse students in developing countries and disadvantaged neighborhoods to learn to co-design appropriate solutions with communities. The professional design industry has also been supportive in engaging and contributing to this new area of social innovation. In line with this emergence of design for society, this paper reports on some of the studio projects at the Industrial Design Program at the University of New South Wales, which highlight design's agency as a catalyst for social change. The studio briefs are discussed as case studies and the learning experiences gained and the reflections of students are analyzed and used as arguments for the continued and growing inclusion of social responsibility within the industrial design curriculum.

*Keywords: socially responsible design, industrial design, design education*

## 1 INTRODUCTION

Apart from aesthetic form-giving, social ethics is considered as one of the other tasks of the industrial design profession: "giving benefits and freedom to the entire human community" [1]. Indeed the impact of designed solutions in our contemporary consumerist world is tremendous and designers have an unprecedented opportunity to use their skills to make meaningful, sustainable innovation in the world [2]. Socially responsive design "takes as its primary driver social issues, its main consideration social impact and its main objective social change" [3].

Article II of the ICSID Code of Professional Ethics states that: "Designers recognize their contributions to the social, individual and material well-being of the general public, particularly as regards health and safety, and will not consciously act in a manner harmful or contradictory to this well-being. Industrial designers shall advocate and thoughtfully consider the needs of all potential users, including those with different abilities such as the elderly and the physically challenged" [4].

The Cumulus International Association of Universities and Colleges of Art, Design and Media acknowledged that "global development and an awareness of the growth of related ecological and social problems are posing new demands and offering new opportunities for design, design education and design research. Design is challenged to redefine itself and designers must assume new roles and commit themselves to developing solutions leading to a sustainable future." [5]. Moreover, since 2005 we have entered the United Nations Decade of Education for Sustainable Development [6]. This challenges educators into rethinking and reforming education to become a vehicle of knowledge, thought patterns and values for building an ecologically and socially sustainable world, integrating such concerns as the fight against poverty, gender equality, human rights, education for all, health, human security and intercultural dialogue.

## 2 GROWTH OF SOCIALLY RESPONSIBLE DESIGN

### 2.2 Sixties to Seventies

Perhaps the earliest call for industrial designers to be conscious of the impacts of their work was made by the activist professor Victor Papanek in his classic 1971 book, "Design for the Real World" [7].

Here he argued that “much recent design has satisfied only evanescent wants and desires, while the genuine needs of man have often been neglected by the designer”. He advocated that industrial designers can go beyond “appearance design”, styling, or “design cosmetics”, and use their talents to solve the pressing needs of the disadvantaged minorities in society: the disabled, the elderly, the communities in the developing world, people surviving under marginal conditions, and others often ignored by the design profession. To lead by example, he worked with the United Nations and Volvo to, among others, design a taxi for the disabled, develop an educational TV set for Africa, and prototype a 9¢ battery-less transistor radio from tin cans that can be produced and used in developing countries. Papanek believed that “the only important thing about design is how it relates to people” [7]. He advocated that market-oriented designers should contribute 1/10 of their time or income on socially conscious projects.

Papanek’s voice echoes those of economic thinker Ernst Friedrich Schumacher, who critiqued the lack of human scale and decentralization in mainstream Western economies in his influential book, “Small is Beautiful” [8]. Released at the time of the 1973 energy crisis, Schumacher’s book called for “intermediate” technology, which is one that lies between the capital-intensive advanced technologies of the West and the traditional subsistence technologies of developing countries. It particularly considers aspects of the community it is intended for, and is thus democratic and “appropriate”. Schumacher was very strongly influenced by Mahatma Gandhi, who advocated village-based production to help India’s small local communities become self reliant.

Another genius has been working in socially responsible design decades earlier: Richard Buckminster Fuller, who in 1969 published “Operating Manual for Spaceship Earth” [9], in which he reminds us that the planet has a finite amount of resources, cannot be resupplied and requires maintenance to keep it functioning. In 1949 he famously developed the geodesic dome, aimed at cost-effectively addressing the postwar housing crisis. He dedicated himself to discovering “what the little, penniless, unknown individual might be able to do effectively on behalf of all humanity”. His lifelong goal was to find out what it would take to provide food, shelter and energy for all using the least resources.

## **2.2 Eighties to Nineties**

In the 1980s and 1990s responsibility in the design industry was embodied in the new terms “ecodesign” and “green design”. Environmentally conscious design was used to communicate to consumers that designers and manufacturers are showing some concern about the lifecycle impacts of designed objects on the planet. Most ecodesign approaches were of a technical nature, such as reducing materials or energy, light weighting, avoiding toxics during production or usage, and recyclability [10, 11]. Particularly in the European Union, directives and regulations to protect the environment helped ensure that designers conformed with technical requirements on manufacturing, materials, distribution, energy consumption, and end-of-life. Consumer demand for green and greener products went up, marking a distinctive societal change.

Socially sustainable design goes beyond the ecological by exploring solutions that can positively change the lives of people everywhere. Nigel Whiteley reiterated Papanek’s message about responding to “needs” and not merely “wants” in his 1993 book, “Design for Society” [12]. Confronting the unsoundness of consumerist design, Whiteley encouraged designers to ensure that all design benefits the community at large and that they look into social, environmental, economic and political issues.

Universal design, inclusive design, design-for-all, barrier-free design, accessible design – which all meant designing products that are inherently usable by as many people as possible, whether able-bodied or physically challenged, without need for adaptation – emerged as another design philosophy of this period, especially as a result of the passing of national laws aimed at reducing discrimination against people with disabilities. In 1998 the Cooper-Hewitt National Design Museum of the Smithsonian Institution launched a travelling exhibition on “Unlimited by Design”, showcasing products and residential interiors created based on the principles of universal design [[www.cooperhewitt.org](http://www.cooperhewitt.org)].

## **2.3 Noughties**

Davey et al proposed a model for socially responsible design [13] based on the business management approach of corporate social responsibility. It encourages designers to use their unique skills to address issues of crime, education, government, health, fair trade, ecology, social inclusion and economic policy [[www.sociallyresponsibledesign.org](http://www.sociallyresponsibledesign.org)]. In the UK nationally funded research

initiatives such as Design Against Crime [[www.designagainstcrime.org](http://www.designagainstcrime.org)] successfully demonstrated the agency of design in solving problems plaguing contemporary society. The UK Design Council also issued several publications on using design-led innovation to tackle some of Britain's most complex challenges in healthcare, environment and communities [[www.designcouncil.info](http://www.designcouncil.info)].

Margolin and Margolin [14] described a "social model" for product design practice, as contrasted with the traditional "market model" or "design for the market". They liken the product development process to the problem solving procedure practiced by social workers. They felt that many "helping professionals" – particularly in the areas of health, education, social work, aging, and crime prevention – share the goals of designers who want to do socially responsible work, and therefore they should work together. They suggest a research agenda to find out the role a designer can play in the collaborative process of social intervention, and to seek ways for changing the public's perception of designers into one reflecting the image of a socially responsible designer.

In the new millennium the phrase "bottom of the pyramid" or "BoP" [15] became popular in academic and business circles to refer to the 2.6 billion people living on less than \$2 a day, and who represent the largest but poorest group at the base of the economic pyramid. At least 8 international conferences have been held to discuss the topic, resulting in many research publications, including several on "design for the BoP".

Paul Polak, founder of the not-for-profit International Development Enterprises that creates income opportunities for poor rural households, contends that "the majority of the world's designers focus all their efforts on developing products and services exclusively for the richest 10% of the world's customers... nothing less than a revolution in design is needed to reach the other 90%" [16]. Inspired by this assertion, the Smithsonian Institution Cooper-Hewitt National Design Museum in New York launched in 2007 "Design for the other 90%", a travelling exhibition and book which explored the growing movement among socially responsible designers who develop low-cost solutions for the survival needs of the world's marginalized people [17]. Indeed this exhibition demonstrated how design can be a dynamic force in saving and transforming lives around the world. In 2009 Project H Design, a team of humanitarian designers engaging locally to improve the quality of life for all, released "Design Revolution", a book and road show compiling 100 products that are changing the lives of people in the developing world [18].

There appears to be an emerging stream of "design activism" among people who passionately "use the power of design for the greater good of humankind and nature" [19]. Many design-inspired organizations are now fundamentally challenging how design can catalyze positive impacts to address sustainability. For instance, the global design and innovation consultancy IDEO produced freely downloadable how-to guides and workbooks on designing for social impact [20] and human centered design [21]. These publications aim to help design firms to get engaged in social responsibility projects. IDEO calls for a shift to participatory, transformative and human-centered "design thinking", which they define as a "collaborative process by which the designer's sensibilities and methods are employed to match people's needs with what is technically feasible and a viable business strategy... converting need into demand" [22]. IDEO's CEO Tim Brown observes that the design profession seems to be preoccupied with creating nifty objects even though it could have a bigger role in solving more pressing global problems, and suggests that design thinking can make a big difference here [23]. In 2006 the Industrial Designers Society of America (IDSA) started a "Design for the Majority" professional interest section whose mission is "to bring attention to the large group of humans that most of us do not currently design for" [24].

There is also evidence that many design education institutions are starting to seriously consider their broader responsibilities to society. The Massachusetts Institute of Technology D-Lab (<http://d-lab.mit.edu>) runs a series of courses and field trips to host communities in developing countries where students work on improving the quality of life of low-income households through the creation and implementation of low-cost technologies; this educational vehicle allows university students to gain an optimistic and practical understanding of their roles in alleviating poverty. MIT also hosts the pro bono service DesignThatMatters ([www.designthatmatters.org](http://www.designthatmatters.org)), where academia and industry professionals can donate their design expertise to create breakthrough products for underserved communities in need. At the DesignMatters department of the Art Center College of Design ([www.designmatters.artcenter.edu](http://www.designmatters.artcenter.edu)) students from all disciplines can participate in courses, internships and special projects, in collaboration with international development agencies and nonprofit organizations, to explore the many ways design can address humanitarian needs in the larger world. A

graduate course on Entrepreneurial Design for Extreme Affordability (<http://extreme.stanford.edu>) is ran at the Stanford Institute of Design, aka d.school, where students are immersed in the fundamentals of design thinking and then travel to international project sites to experientially develop comprehensive solutions to challenges faced by the world's poor. At the Delft University of Technology a large body of master's thesis works has been done by industrial design engineering students who have spent months of internship periods in developing countries to co-design with locals some solutions to their needs in education, healthcare, food and nutrition, water, energy, housing, materials, connectivity, and entrepreneurship [25].

Furthermore, a web search for product-oriented (as opposed to architecture-oriented) design degrees on socially responsible design found at least 12 universities with undergraduate and postgraduate degree programs: Chalmers University of Technology, Sweden: M.A. Design for Sustainable Development; Cranfield University, UK: M.Sc./Pg.Dip./Pg.Cert. Design & Innovation for Sustainability; Institut polytechnique de Grenoble, France: B.Eng./M.Sc. Responsible Design; Kingston University, UK: M.A. Design for Development; L'École de Design Nantes Atlantique, France: M.Des. Responsible Innovation; L'École de Design Nantes Atlantique, France + University of Shanghai, China + Srishti School of Art, Design and Technology, India: M.Des. Transcultural Design; Loughborough University, UK: M.A./M.Sc./M.Des. Sustainable Product Design; Maryland Institute College of Art, USA: M.A. Social Design; University of Brighton, UK: B.Sc. (Hons) Sustainable Product Design with Professional Experience; University of Derby, UK: M.Sc. Sustainable Design and Innovation; and University of Worcester, UK: B.A. (Hons) Art and Design and Social Welfare. Lastly, Archeworks, an alternative design school in Chicago, offers a non-degree project-based curriculum, "dedicated to envisioning and advancing a better quality of life for communities through socially responsible and environmentally conscious design solutions that address the greatest urban challenges of the 21st century" [[www.archeworks.org](http://www.archeworks.org)].

In 2003 Worldchanging, the American non-profit online magazine and blog about social innovation and sustainability [[www.worldchanging.com](http://www.worldchanging.com)] was launched and resulted in a bestseller book that surveyed the best practice solutions in responsible design [26]. In 2007 the Designers Accord s[[www.designersaccord.org](http://www.designersaccord.org)] was formed as a global coalition of designers, educators and business leaders, working together to create positive environmental and social impact. It was also during the same decade that the Design21 Social Design Network [[www.design21sdn.com](http://www.design21sdn.com)] was formed to inspire social consciousness through design and to connect people who want to explore thoughtful, informed, creative and responsible ways for using the power of design for the greater good.

### 3 TEACHING SOCIALLY RESPONSIBLE DESIGN @UNSW

The University of New South Wales (UNSW) is one of Australia's leading teaching and research institutions. In its strategic intent, it mentions that "focusing on contemporary and social issues" is a critical item in its aspiration to be "a peer in good standing with the best globally" [27]. Aligning with this strategy, the third year course IDES3221 Industrial Design Studio 3A at the Faculty of Built Environment covers the learning of socially responsible design. Historically this course has had a focus on technical resolution, documentation to a professional standard, and working on projects with "real-world" constraints, but in 2003 the course has had an added emphasis on design that is both environmentally conscious and responsive to society's needs. During the last 9 years of IDES3221 social-cultural aspects of design for sustainability has been a mainstay in the studio project briefs. Details of the studio projects presented below are reported in other papers by the author [28-30].

#### 3.1 School Loos, 2003

This project built on investigations on toilet facilities in schools by other students at UNSW, which confirmed that school toilets are perceived as being unclean, unsafe and unhygienic. The list of problems was long: inadequate lighting and ventilation, wet floors, no toilet seats, no cubicle locks, and notorious for bullying assaults, graffiti, vandalism and cigarette puffing sessions. A sanitary ware design expert briefed the students with guidelines on the design of toilets, washbasins, and urinals. Students then went off to various primary schools, shopping centers, transport terminals, food courts, health facilities, and recreational areas, in order to document use and misuse of public toilets, as well as to determine examples of best and worst practice in toilet facility design. Some of the creative ideas received were: brightly colored urinal trough with flush mechanisms on the step platform (Figure 1a); stamped stainless steel washbasins with vandal-proof mirror-finished surfaces; oversized flush buttons



on cisterns to encourage flushing after use; and cascading hand wash troughs to make the wash-up process fun for kids.



*Figure 1a. School Loos project by Anders Alexander, 2003.  
Figure 1b. Design vs Crime project by Morgan Green, 2004.*

### **3.2 Design vs Crime, 2004**

This project offered students an opportunity to help pre-empt criminal behavior using industrial design as an anti-crime tool. After inspirational presentations from crime experts students were asked to come up with practical design solutions in five crime areas: assault, robbery, unlawful entry with intent, vehicle theft, and vandalism. They were required to interview victims to understand how certain crimes occur; gather news clippings of relevant crime cases; and collect brochures on crime-prevention products. Ingenious ideas which came out of the project include: an illuminated park bench with seat boundaries to prevent vagrancy (Figure 1b); textured walling sheet to discourage illegal street posting; reconfiguring ATMs so customers face the public while withdrawing cash; photo chromic tag on pub patrons to detect how many times they have gone to the bar for a drink; and protective patches for females in the defense force to identify and deter gender harassment.

### **3.3 Designing for Disasters, 2005 & 2010**

Whether manmade or natural, disasters cause widespread destruction, lasting distress and severe affliction to the community and to the environment. Year in and year out, the world experiences several deadly and damaging tsunamis, earthquakes, floods, storms, hurricanes, heat waves, volcanic eruptions and similar catastrophes. It was well-timed to wake up design students and make them aware of their potential in contributing solutions to disaster problems. In the aftermath of the 2004 Indian Ocean tsunami and the 2010 earthquakes in Haiti and Chile, IDES3221 students were challenged to minimize losses to life and property during disasters. Lectures were provided by relief organizations and disaster researchers, and then students sought creative solutions to the four phases of emergency management: prevention or mitigation, preparedness, response or rescue, and relief or reconstruction. They had to choose a country where a large-scale natural disaster occurred, gather survivors' personal accounts scientific analysis of the destruction, and interview disaster combat agents to understand efforts in responding and restoring normalcy to people's lives. Many exciting proposals came out of these projects, including: kits for assembling net structures where helicopters could aerially drop relief supplies in remote areas (Figure 2); tripods for holding firefighters' hoses, allowing them to perform other tasks such as entering a burning house; waterproof "vault" bag for keeping valuables safe and dry during an emergency; "wheel n tow" barrow for moving injured people to safer grounds; disaster victim identification kits that were simple to use; and water sipping hoses for people trapped under rubble.

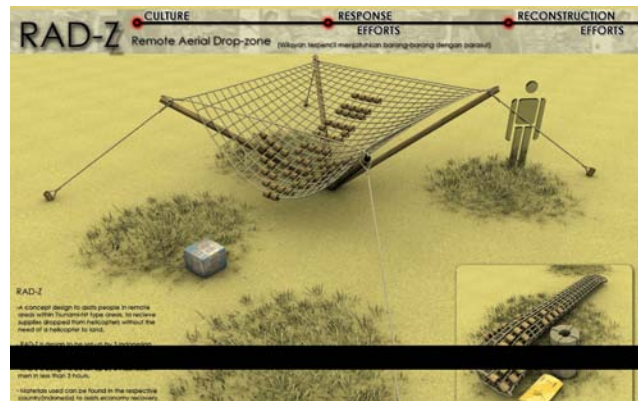


Figure 2. Designing for Disasters by Beng Seng Liew, 2005.

### 3.4 A Sense of Place, 2006

IDES3221 collaborated with Street Furniture Australia to offer a student prize for creating an innovative street furniture element that helps give a public space its “sense of place”, thus making it more meaningful and more pleasurable for its users. Students were briefed on trends in furnishing the urban environment, and on the emotional and universal design aspects of public space objects. Students walked about, looked at, listened to, and inquired with the users of the spaces they’ve chosen to transform, in order to discover their needs and aspirations and to determine how they would behave and interact with the street furniture within the space. The winning design was a set of community poles to be decorated by local artists (Figure 3a). A sense of ownership is fostered by the installation, possibly deterring graffiti while showcasing neighborhood talent and culture. Each pole has a solar powered light that releases a soft atmospheric illumination at night, improving safety in the park. Park visitors can either passively enjoy the artwork, or interact with the poles by configuring and rotating them. Other notable outcomes of the project were a thermo-chromatic seating for public squares, which enables users to leave fleeting impressions of themselves; and light-up bollards for responsible disposal of hypodermic needles in parks.



Figure 3a. A Sense of Place project by Angeline Meloche, 2006.  
Figure 3b. Packaging & Society project by Matthew Spruell, 2006.

### 3.5 Packaging & Society, 2006

The class entered an Australia-wide tertiary competition, the Southern Cross Package Design Awards, organized by the Packaging Council of Australia. We focused on the brief “Society, Design & Now”, which calls for intelligent responses to the evolution of our society’s constantly changing culture and values, and anticipating how the changes will impact on the needs, wants, desires and expectations of consumers. A silver award was received for the design of a bubble pack containing antibiotic capsules

in disaster stricken areas, which comes with its own purified water to minimize user exposure to unclean water (Figure 3b). Other notable outcomes were: a bring-your-own toilet seat cover and toilet paper pack for public toilet users; all-in-one “quit smoking” aid kit; drink-spiking detector label for premixed beverage bottles; and a self-measuring medicine cup for the vision impaired.

### 3.6 Designing for the Millennium Development Goals, 2008-2009

The Millennium Development Goals (MDG) were adopted by the United Nations as a blueprint for building a better world, with the main strategy being “making poverty history” by 2015. Towards this end, IDES3221 students were challenged to investigate issues and explore creative solutions to address hunger, achieve universal primary education, empower women, reduce child mortality, improve maternal health, combat killer diseases including malaria, tuberculosis and HIV, and ensure environmental sustainability. Students chose to remotely design for peoples in Africa, India and Southeast Asia. As part of understanding the situation, students were required to construct a fictional but fact-based photo-essay about the “a day in the life of an MDG-affected person” in the country they’ve chosen, as well as to interview by email relief workers or international aid volunteers working in their target MDG issue. It was obvious from the group research presentations that the students were very much engaged into their topics and that they tried to empathize with the affected individuals. They enthusiastically presented their collections of web videos of their MDG topic and other interesting stories, myths and belief systems that they discovered from the other cultures. The student projects that emerged ranged from products for drinking water safety, portable teaching shelters, simplified educational equipment, medical test strips, water or milk pasteurizers, devices for minimizing childbirth risks, reducing incidence of malaria and HIV, and others. Among those were a village kit for making organic insecticide spray from crushed chrysanthemums (Figure 4a) and an in-home hypertension indicator kit for pregnant rural women to detect eclampsia (Figure 4b).



Figure 4a. Millennium Development Goals project by Dani Thai, 2008.  
Figure 4b. Millennium Development Goals project by Wai Yin Cheng, 2009.

## 4. DISCUSSION

Reflections on the learning journals and blogs of participating students generally show that they appreciated the challenges of contributing to design solutions that would promote a better society and a more sustainable environment. Through these projects they were able to comprehend the interplay between ecology, consumerism, society’s needs and sustainable development. Several commented that their interests were heightened by the “real-world” nature of the briefs, and this attitude kept them motivated in searching for practical solutions.

Overall students found the socially responsible design projects successful in helping them realize the broader responsibilities of a designer to the majority of the world’s population, beyond that of “creating new stuff” for the relative minority. It was a rigorous exercise that shook their views of a seemingly undemanding future career as a designer. For some there was also the realization that design solutions should always be appropriate to the context and living conditions of people. From their reflections they mostly said that if they were to do these sorts of projects again, they would dig a little bit deeper in research in order to have a better understanding of who they’re designing for and to use their discoveries to inform their designs.



Students showed a remarkable degree of enthusiasm as they started their social responsibility projects. It was apparent that they were eager to use their design talents to help people in need. The first evidence of this was during the presentation of their fact-finding discoveries. They were keen to report on their findings on the social taboos, superstitions, cultural beliefs and stereotyped racial behaviors (such as contracting a sexually transmitted disease being considered a "rite of passage" in Africa; violence against women being culturally acceptable) as well as the current political-economic climates (graft and corruption in government, civil war, international aid not welcome, etc). They also gained an understanding of the psychological effects and the stigma of being victimized by crime or surviving a major disaster. Most were able to confidently answer questions about daily life in the country they were designing for, or about ways to promote personal safety or to prevent the incidence of crime. The social projects in IDES3221 have been helpful in introducing design students to their responsibilities to society and sensitizing them to different cultures and the lives of disadvantaged individuals. They confront the typical designers' approach of targeting primarily the more affluent consumers in advanced markets. Designing for people who don't have money to purchase designed objects was certainly a serious challenge and culture-shock for the students.

## 5. CONCLUSIONS

The socially responsible design projects were able to introduce all participants in this process to several student-centered approaches to teaching and learning for a more sustainable future: experiential learning, enquiry-based learning, community based problem solving, and learning outside the classroom [31]. Students were able to engage in conscious critical thinking, active investigation, generalization, decision making, reflection, and peer assessment. The experiences, knowledge, skills and attitudes they gained can be readily applied to new situations and to future project briefs.

Particularly for the "Design for Disasters" and "Design for the Millennium Development Goals" projects, a better comprehension of the cross-cultural aspects of design was important, and a paradigm shift was necessary to appreciate that the market they were designing for was totally different to the technologically advanced countries they were used to, and that approaches for solving the problem needed alteration. It is promising to see that some students have successfully used their learning in these projects to pursue social responsibility in their final year graduation projects, which is the culminating work of their student career and which somehow discloses the kind of designer they are interested in becoming.

In the future I hope that our educational experiences at UNSW in working on socially responsible design projects could become part of a bigger, perhaps funded, research undertaking where students could actually engage with communities in developing countries or at least in less developed rural areas of Australia, similar to what other universities have successfully done. As Polak [16] suggested, we have to "go where the action is, talk to the people who have the problem, and learn everything about the specific context". Dieter Rams warns that "indifference towards people and the reality in which they live is actually the one and only cardinal sin in design" [32]. Co-designing with the beneficiaries of design seems to be more effective: two of the tenets of Project H are "Design with, NOT for" and "Design systems, NOT stuff" [18].

The experiences gained from these sorts of projects show that students appreciate the challenging nature of briefs which benefit society at large, and their reflections point toward a growing desire to be more responsible future practitioners in the industrial design community.

The third-year studio has been an opportune spot within the four-year industrial design curriculum to actively engage and influence young minds about their future responsibilities to the planet and to its peoples when they practice as design professionals. The work that these new industrial designers will generate will have an enormous impact on the future, and it is our duty as their mentors to empower them with authentic learning and ensure that they conscientiously grow with the belief that they should actively be part of the sustainability solution, not the problem [2].

As educators of the designers of tomorrow, we should actively see to it that this future holds great promise for the generations to come. It is our job to inculcate in the next generation of designers an understanding of their strategic roles in forthcoming years: that of thinking and creating solutions which not only advance a better quality of life for human society but also uphold a more habitable world as well. By addressing aspects of social concern in disasters, industrial design students were able to get acquainted with their responsibilities to society as well as show their ability to empathize and to respect the diverse needs of disaster and crime victims from different cultures, religions, life

situations and social standing. Designing for the betterment of human society can represent an emerging paradigm for design education, one that we could conscientiously embrace.

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