AN EVALUATION AND INNOVATION FRAMEWORK FOR RESPONSIBLE DESIGN BASED ON PRUDENCE

Carmela CUCUZZELLA[1]
[1]Ph. D. Candidate, Université de Montréal

ABSTRACT
The current dominant mode of design for addressing the environmental and social crisis rests on an approach of prevention, which is predominantly based on the logic of efficiency for the conceptualization of products and services. This mode of innovation aspires to technical improvements of products and services so that the impacts are minimized throughout their entire life cycle; from the extraction of raw materials to their disposal. However, evidence suggests that environmental gains from technical improvements in product efficiency have historically been outweighed by an overall increase in consumption. So a sustainable future requires a broader perspective of evaluation and innovation, one founded not only on an approach of efficiency, but also one of sufficiency. Efficiency largely depends on technical innovations; get the same goods and services out of less. Sufficiency relies on individual behavioural changes as well as on social innovation; improved well being out of fewer goods and services. An approach to design that entails the logic of sufficiency, elicits the values of precaution in the solutions proposed. According to Ewald (1996), prudence encapsulates the dimensions of prevention and precaution. Therefore a prudent approach towards the evaluation and innovation of solutions to existing unsatisfactory situations can constitute a promising framework for responsible design. This method for seeking to transform unsustainable modes of living towards sustainable modes will not be coercive, but cooperative. They will help stakeholders assume their responsibilities.

Keywords: sustainable design, eco-design, prevention, precaution, responsibility, foresight, efficiency, sufficiency, effectiveness

1 INTRODUCTION

Design has become an increasingly significant vehicle for achieving environmental, economic, and social policy goals at a regional, national, and international level (Fletcher and Goggin, 2001). In fact, the role of design has expanded and increased in complexity because the scale of environmental impacts does not depend on population size alone, but also on consumption choices, production choices, and in general, actions taken. Therefore to move towards sustainability, design has had to deal with the growing concerns that humanity faces. However, in order to deal with such global concerns, design requires methods or tools to enable designers make decisions that will have a real positive impact for the long-term, and not only for the short-term economic gain. The predominant methods available to designers to help evaluate design solutions are statistical, based on a problem solving approach. In other words, based on the definition of the problem at hand, the designer will seek to improve those areas that may present negative impacts, and possibly optimize those areas that present positive effects. In fact, these methods encourage a linear method of innovation, meaning that based on the results of such evaluation tools, designers will seek o optimize the products. This will not be more sustainable, especially if the impacts are reduced by10% yet 100% more products will be sold. Where is the sustainable gain?

2 CURRENT DESIGN APPROACHES

When addressing the current environmental and social crisis in this manner, the designer does not challenge the status quo or the current product or service in question. Within this framework, the designer is limited to incremental improvements in the product system. Transformational changes necessary to change the way in which humans conduct their daily lives are difficult when adopting such an approach.

When designers adopt a linear approach to design based on a problem solving approach, design

procedures and scientific laws will guide them on how to proceed (Dorst and Dijkhuis, 1995) in an objective manner. In this perspective, the position of the expert is solidified relative to the general public since they are perceived to have the knowledge required to solve the problem. In addition, even if deep values are involved in many of the decisions, they are portrayed as strictly 'objective' if they are to appear credible (Howard, 2004).

As experts are those with the knowledge, then they have the power to make decisions that in many cases have far-reaching effects. Citizens (or other stakeholders) do not often participate in the deliberation or the decision process of projects that may have significant impacts on them, in particular when the consequences of solutions may present potential risks. There is a belief among the experts that lay-people do not have the capacity necessary to contribute to possible solutions. In fact, lay people knowledge in this context is neither necessary nor desirable since design is approached within the realm of experts where the approach of optimization is the dominant operational model (Sclove, 1995, Bonsiepe, 2006, Howard, 2004). They are considered as a source of external pressure (Howard, 2004).

However, in a context of sustainable design, where the designer is expected to challenge the status quo, where transformational changes are sought regarding the ways in which humans relate to their world, optimization on its own does not go far enough when seeking radically different solutions. The problems that designers face in this context are essentially unique problems that comprise not only technical but also social considerations and therefore need to be addressed in a reflective manner (Papanek, 2000, Margolin and Margolin, 2002, Dorst and Dijkhuis, 1995).

If the designer does not have the responsibility of making decisions that cannot be justified without any statistical or hard data, then the broader concerns become very difficult to assess and address. Decisions made by designers in this context then reflect the neutrality and narrow (disciplinary) perspective of the evaluation methods used. And therefore, decisions are often made without addressing the more global problems, such as the prevailing levels of consumption and their impacts on the various levels of society (Howard, 2004, Schrader, 1997, Schaefer and Crane, 2005, Reisch and Scherhorn, 1999, Hertwich, 2005, Cooper, 2005).

3 CHALLENGES FACED BY CURRENT DESIGN APPROACHES

According to Princen (2005, p.360) "*in North America and increasingly elsewhere, the goals of the economy are to maximize return on investment and consumer choice, all at low, low prices*." All else is secondary; ecological integrity is an afterthought (Princen, 2005). In fact, as early as 1970, Baudrillard (1970) recognized that humans were at a point where consumption has grasped all aspects of their lives. Princen (2005) claims that the transition from an over-consuming society to a sustainable society; from an economy founded on efficiency gains to an economy premised on social equity and ecological integrity is necessarily based on a serious consideration of a sense of 'enoughness' (or sufficiency). In this perspective a few social organizing principles make good common sense; principles such as precaution, reverse onus, polluter pays and restraint and respite (Princen, 2005). This is one reason why Van Der Ryn & Cowan (2007) question the benefit of technological sustainability. They challenge the idea that this approach for sustainability may actually be "*simply a kinder, gentler form of reductionism in which we do a more efficient job of using up, accounting for and managing nature*" (p.21).

Many technical innovations are fundamental for the long-term well-being of humanity. But it is important to consider the consequences of technical innovations in light of the thesis of counter-productivity by Illich (1978). This implies that in some cases, technological innovations present consequences contrary to what was intended. For example, the introduction of cars, initially a form of leisure but later adopted as a form of wide-spread mobility, has resulted in immobility because of its over-production and over-use by society. This is contrary to the intention of the invention of the car.

This perspective is a broader perspective of the impacts of technological innovations. By considering the

counter-productivity thesis by Illich (1978) when assessing innovations, a precautionary perspective is adopted because the long-term and possible global consequences are considered. Here, the threshold of use is a serious consideration. Therefore, the value of the usage of such technical innovations then also becomes a fundamental concern for the future of humanity (Jonas, 1985, Gollier et al., 2000, Dupuy, 2002, Arendt, 1958).

An example of where the thesis of counter-productivity by Illich (1978) becomes relevant is with the idea of eco-efficiency. Eco-efficiency largely depends on technical innovation and on reducing the impacts of products and services (Reisch and Scherhorn, 1999). When using eco-efficiency as a strategy for reducing impacts, it is a convincing and easily operational approach for design. However, the eco-efficiency of a product or service is only a small picture of the bigger whole (Van Der Ryn and Cowan, 2007, McDonough and Braungart, 2002, Droz and Lavigne, 2006, Princen, 2005). Eco-efficiency may be an appropriate strategy for increasing economic growth and wealth; however, it is not clear how useful it is with regards to environmental improvements (Mongeau, 2007).

In fact eco-efficiency may lead to an ever increasing resource use rather than less because of the ever-increasing potential for rebound effects based on the resulting cost savings that are eventually transferred to the consumer (Latouche, 2006). In the end, a strategy of eco-efficiency may impede long term economic growth because resource shortage will pervade technical change - a counter-productive effect of eco-efficiency. When assessing the impacts, it is important to consider the wider perspective of consumption, and not just the assessment of the use phase of one product. In this broader perspective, other impacts are revealed (i.e. social acceptability which includes an assessment of the social necessity of the product or service), since the patterns on a macro scale can be observed, instead of the details on a micro scale.

4 ADDRESSING THE CHALLENGES

So, the strategy of efficiency (based on the notion of the prevention of risks) only provides part of the operative opportunities necessary for sustainability. An approach of efficiency may solve problems at one level, but cannot consider problems at other levels, and therefore may contribute to the emergence of other problems by inhibiting a global vision of the situation (Hertwich, 2005). The idea of eco-efficiency is powerful in communicating the reduction of environmental impacts for a product or service, yet if it encourages mass consumption through direct or indirect effects, then eco-efficiency on its own as a design strategy is flawed. The system of changes possible to a society or a community through the introduction of a product or service (no matter how eco-efficient it may be) can have multiple ripple effects on a local, regional, national or international scale. Design cannot ignore this fundamental uncertainty.

According to van der Sluijs (2007), both sustainability and precaution exist in a realm of high uncertainty and multi-disciplinary issues; referred to as post-normal science. Sustainable design, one dimension of sustainability, must consider the consequences of innovations on society, environment, culture, economics, etc. Therefore, it is not enough to ensure that the innovation has been produced and provisioned in an environmentally sound manner, but that the various other concerns are also considered.

Chapman and Gant (2007, p.7) state that *"The aim therefore must be to design in a way that promotes consumption models of long-term sustainability."* Changes in consumption models refer to social changes since they require humans to change the way in which they live their everyday lives. According to Wahl and Baxter (2008), the designer has become more of a trans-disciplinary facilitator, *"At the nexus of values, attitudes, needs, and actions, designers have the potential to act as transdisciplinary integrators and facilitators."* (p.72). Transformational social innovations are therefore needed to address the current crisis where such innovations will challenge existing cultural and social norms and models and therefore the implication of the community becomes an integral and essential part of the design process. The question that remains is how can the community contribute to the design process so that the limitations of current modes of design are addressed in a context of sustainability?

5 PRUDENCE: AN EVALUATION AND INNOVATION FRAMEWORK FOR RESPONSIBLE DESIGN

According to Ewald (1996), prudence refers to how humans deal with situations when they are faced with uncertainty. This author claims that historically there have been three concepts based in uncertainty: *foresight*, *prevention*, and *precaution*. Kourilsky and Viney (2000) also group prevention and precaution within a category of prudence. Their definition of prudence is farther from that of Aristotle (2002), and closer to the definition by Weber (1959), which is based on an ethic of contemporary responsibility. According to Ewald (1996), foresight encourages the integration of the future with the present on an individual level. Prevention is developed from a certainty of risk through dominant scientific analysis. Precaution represents the uncertainty of science itself, and therefore refers to conditions not covered by either foresight or prevention.

The precautionary principle in a general context can be defined as a principle that tries to guide development (and decision-making) in the absence of certitude and in the presence of potential risks, and therefore allows the establishment of a responsible, anticipative action (Tickner and Raffensperger, 2002, Kourilsky and Viney, 2000, Harremoës et al., 2001, Godard, 2005). Tickner & Geiser (2004) claim that to achieve more sustainability, we need to focus on a solution-based policy (searching for and assessing alternatives). Most of the work done in environmental policy focuses on the investigations of the problems and their optimization at the expense of investigations of new or alternate solutions; this requires a shift from a problem-based to a solution-based approach.

There are several authors who advocated a precautionary approach as a means for exploration of alternative solutions (Tickner and Geiser, 2004, Kriebel et al., 2001, Harremoës et al., 2001). In addition, such exploration is strongly encouraged within a participative environment as this has varying benefits. Participation can greatly nourish this process because the views and concerns of the stakeholders based on unacceptable conditions of existing situations emerge. The benefits of participation, where stakeholders are involved in the deliberation process, include: considerations of well-being, their creative insights; the cross-fertilization of ideas among participants; the recursive learning process; and a greater sense of responsibility among the participants (Whiteside, 2006, Tickner and Geiser, 2004, Sclove, 1995, Droz and Lavigne, 2006). In this process, the reflection moves out of the hands of the experts alone and therefore can include the values and visions of the community in the search for solutions. By including the non-expert perspectives, a sense of empowerment is required so that individuals feel the competence, autonomy and need to participate with the intent of improving the quality of life for individuals and their communities on a local, regional and international level.

This implies that several elements are necessary for such a process to be successful: (1) the awareness and willingness from the community that a current unacceptable situation must be addressed; (2) some system of governance is in place so that such deliberation can occur; (3) methods within such a system that can help elicit the values of all the representative stakeholders; and (4) methods of arriving at a consensus. This research seeks to develop a framework where the visions and views of the community become integrated within the final design solution. This will not only raise the level of responsibility among participants, but also help renew their belief in self-governing (democratic) systems. The notion of prudence for sustainable design extends the existing preventive approach based on eco-efficiency. In particular, for contentious situations, this approach is promising since it seeks to consider the diverging views in the search for alternatives and therefore becomes a driver for sustainable innovation. Prudence can therefore provide a promising framework for responsible design.

6 CONCLUSION

Current methods (such as eco-design) for assessing and establishing solutions do not impel designers to go far enough into their reflection. Sustainable design, based on the precautionary principle, assumes a different way of thinking than eco-design (based on prevention), and adopts diverse methods for identifying problems and arriving at solutions.

A precautionary approach within a framework of prudence, responds to the vision of sustainable development more adequately because of several reasons: (1) it seeks very long-term and global solutions; (2) it provides an additional perspective, based on lifestyles and human needs; (3) it is based on an approach of sufficiency which encourages social cohesion and ecological integrity more adequately than an approach of efficiency; (4) it is based on a complex framework and therefore can contribute to integrated, inter-disciplinary solutions; and (5) the reflection occurs very early during conceptualization, and can therefore complement the methods used in eco-design (which are more downstream in comparison). The reflection based on the exploration of this principle revealed that it is a promising approach for evaluation and innovation in a context of sustainable design, and can therefore guide the designer towards a mode of design that is more responsible.

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Corresponding Author Contact Information
[1]Ms. Carmela CUCUZZELLA
Université de Montréal,
Faculté de l'Aménagement,
2940 chemin de la Cote-Sainte-Catherine
Montreal, Quebec,
Canada, H3C 3J7
carmela.cucuzzella@umontreal.ca
(514) 886-7100