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DESIGN EDUCATION AND CLIMATE CHANGE

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ABSTRACT
This paper is a contribution to stop Climate Change through Design Education. We educate for the future and we can use knowledge of Climate Change in different ways. This work is a proposal to educate designers caring about a wonderful Planet that their generation can enjoy. "It is through knowledge that I gain understanding – and understanding let me do by choice what others do by fear "(Aristotle, in [1]). Understanding that climate change is a fact not a theory, will avoid many future choices governed by fear instead of education.
Design Education can contribute to create positive impacts to Climate Change. An approach to this evidence and understanding main causes that affect Climate Change, as Nobel Prizewinner former Vice-President Al Gore describes: demographic growth, technological and industrial revolution, and our way of thinking [2].
Design Science can contribute to reduce negative impacts of demographic growth. Design too was important to Industrial Revolution. New technologies have many positive outcomes as in the past, but new technologies also create effects that alter our planet climate in case we do not change habits. Design Stage provides opportunities for avoidance or mitigation of negative impacts, educating students in the right direction. Education can prepare students for different habits, which could create a positive change of our way of thinking, as Designers and citizens.
Finally this paper recommends how to prepare a programme on Climate Change and Design Education.

Keywords: Design Education, Climate Change

1 INTRODUCTION

Climate Change is man-made; it already has disastrous outcomes [2]. There is a serious conflict between Nature and the Artificial Systems we become used to. The paper supports how important is Design in crafting new social habits, Design Education can help to stop Climate Change. The text includes some relevant misconceptions about Climate Change and clarifies different approaches that may guide our response, emotional and rational. Caring nature for future generations, not simply ecology is the basic Strategic choice as Guidelines for a programme on Climate Change.

2 THE IMPACT OF DESIGN

The products we design influence the actions of individuals and communities, new technologies shape society and individuals; the products we present are arguments for how people should live [3]. Old habits and old technologies deliver predictable results; old habits and new technologies deliver unpredictable outcomes. In many other economic, technical, social, old habits helped to produce part of the Climate Change problem, a man-made problem. Design is also be part of the solution of the problem; we

can also develop new habits in Design, create a different way of thinking; Design Education must change too.
Scientific evidence on Climate Change has given us knowledge that can solidly support a change of our old habits, a different way of thinking. [2]. Climate Change is a fact supported with scientific evidence, we can guide our action by knowledge, quoting Aristotle, in [1]:"It is through knowledge that I gain understanding – and understanding let me do by choice what others do by fear".
Fear, produces risk perception of future catastrophes, individual or collective. Believing in anticipating catastrophes like those associated to Climate Change will change the vision of our society in the XXI Century [4].
"The crisis of sustainability, the fit between humanity and its habitat, is manifest in varying ways and degrees everywhere on earth. It is not only, a permanent feature of the political agenda; for all practical purposes is the agenda. No other issue of politics, economics, and public policy will remain unaffected by the crisis of resources, population, climate change, species extinction, acid rain, deforestation, ozone depletion, and soil loss. Sustainability is about the terms and conditions of human survival…" [5].
Designers contributed to many industrial and market successes like furniture, trains, cars, aeroplanes, and much of memorable goods and equipment…
But if we felt the success history in environment, we see impressive negative impacts especially if we look at the problem globally. Global demographic and economic growth boosts negative impacts in case actions remain unchanged [6].
We learn Eco Design, Sustainable, Green Design, Cradle to Cradle... The previous disciplines follow guidelines or a standard, but "Design for the environment" is sustainable only if every user (?!) returns things for recycling or we use only solar panels as energy source... [4]. Choices like creating disposable products often increase energy consumption, material use, pollution, and waste. Sustainability is of course negatively affected by "free riders"; this special effectiveness and efficiency issue is also under discussion in Climate Change policies.
The Designers' response to the Climate Change crisis is to "imagine products, processes and services that encourage widespread sustainable behaviour" [4] that could help to stop Climate Change. Designers can use the potential of new habits, as a source of creativity. Design Education can make an important contribution to stop Climate Change through Design Education: the main question lays on deciding whether our main goal is ecology (positive but part of present habits) or nature (a new orientation for our habits).

3 CLIMATE CHANGE

3.1 Understandings the Crisis

The crisis is real, but are the public, Industry, Designers, Professors and Students ready to change habits? What are the positions of the Public?
Firstly people beliefs play an important role: studies like [7] characterize public or people understanding of Climate Change. People consider global warming "as bad and highly likely", or that it already occurred. Stratospheric ozone depletion was confused with greenhouse effect, and weather with climate. "Greenhouse effect" is interpreted as the "cause of a hot and steamy climate". Effects include skin cancer and changes in agriculture, and few people linked climate change to energy use and carbon dioxide. There is a general misconception about Climate Change: "Science is an illusion deliberately created by those who oppose government action". Their cynical objective,

as stated in a secret memo leaked to the press, is to: “Reposition Global Warming as “Theory rather than Fact.” The confusion process is similar to that used by Brown and Williamson Tobacco Company memo of the 1960s. Their statement was “Doubt is our product, since it is the best means of competing with the ‘body of fact’ that exists in the mind of the public. It is also the means of setting up a controversy.” Informative articles of a sample of 636, the majority, 53% present doubts about the causes that impact Climate Change. **Of course: people are confused.**
On the other side, there are few consensuses in science so unanimous. Climate Change is a fact. The last ten years, 928 peer reviewed scientific articles on Climate Change and 0 (zero) is the number of articles against Greenhouse Gases (GHG) caused last 50 years Global Warming [2]. Climate Change is man-made as public confusion on Climate Change causes and facts is man-made. **Design Education must include “understanding the crisis” and the arguments of “confusion”.** Understanding of the two sides is important to change habits in the right direction.

3.2 The challenge

Climate Change is the most important challenge that humanity faces for the next century. Climate Change as Global Warming linked to the increase of GHG emissions [2]:

- Alters weather: Hurricanes, Typhoons, change in intensity, frequencies... Produces extreme or severe drought periods and flooding too.
- Affects water, causes a rise of sea level, increases melting of permafrost...
- Impacts agriculture production, and create food crisis,
- Health problems can mean a surge in life expectancy growth; more than 30 new diseases have emerged, spread or resurged.

Climate Change pushes migratory movements of people. In the future, cities like London, Shanghai, entire regions of Florida and the Netherlands, islands...Will be under the water. “The maps of the world will have to be redrawn” as Sir David King, U.K. Science Adviser, on what is happening in Greenland. **The course must include a vision of these evidences.**

3.3 Education as a solution

Design Education moves emotion and reason towards action. Economy and technology give too good arguments. First we must unlock our feelings about Nature as the author personally learned from Al Gore. In silence, we recommend the students to think of a place of nature that has a special connection with every person (the student, the professor, the reader...) Where your own source of energy comes from. The own professor experience can boost this. The message is: Feel and enjoy the sensations of Nature, please! Then think about the beauty of our wonderful planet. We may use images like Figure 1, and then insist on how fragile the equilibrium is:
Economy and Technology will also support action in Design Education and never seen as constrain:

- As Jeffrey R. Immelt, Chairman and CEO, of General Electric said: “We think green means green. This is a time period where environmental improvement is going to lead toward profitability. This is not a hobby to make people feel-good.”

- "Humanity already haves the fundamental scientific, technical, and industrial know-how to solve the carbon and climate problems for the next half-century", citing Stephen Pacala and Robert Socolow.

Habits and our way of thinking are the essential to solve the problem; Design Education can exert an enormous degree of influence to change habits and ways of thinking [2].

Figure 1 Earth from Apollo 17, NASA/NSSDC

4 TOWARDS FUTURE

We selected a series of words and associated ideas; the objective is to form a vision and promoting basis for discussion of normal contradictions between Industry and Environmental problems as Climate Change. From a futures management group, approaches to define change patterns in strategy that can be useful in changing our Design Education and Climate Change. They recommended the use of simple Words like: Act, Feel, Verify or check, Analyse, Categorize, Respond, etc. and combining only three of these words. Chaotic or enactment tools, known or best practice; complex or pattern management, analytical approaches, enactment tools are the ideas describing different ways that we may use, to drive our future strategies and in Design Education.

4.1 Chaotic: act/feel/respond

We may now reorient actions: Industrial Revolution and Environmental damage caused is in the Chaotic or of "Enactment" category. Industry and designers' first approach meant action; feelings where important; many positive and negative results are visible. Industry and Designer success contributed to the early environmental and public health crisis (negative impacts in water and atmosphere); but the present crisis is Climate Change and chaotic pattern is acceptable only if it means a change of direction.

4.2 Known: feel/categorize/respond

We may use what we know to use our strategy. Feel, categorize and respond suits to the **best practice approach**, we will finally do what we think is the best; the categories well-Known will serve us. Industrial Revolution use of knowledge was effective and efficient; now we have knowledge of Climate Change, that Designers can learn and use. The feeling is about caring the Planet for the future of Humanity.

4.3 Cognoscible: feel/analyse/respond

We can name this category as the cognitive approach, to the problem, analytical ending in reductionism: **Cognoscible.** Developing of feelings towards the Planet, and a good "praxis" of analysis methods make change possible.

4.4 Complex or pattern management: verify/feel/respond

Pattern or **complex management** can bring us to say the problem is too complex or has no possible solution. The problem is complex and Humanity has proposals that could solve complex situations. Design too has solved for decades everyday complex problems.

4.5 The future of Design and Climate Change

Design and Design Education uses the previous categories of strategies and the proposed Education scheme includes them too. In the previous categories of strategies that drive our response, feelings and actions are important if for different situations, we base our praxis with common methodological tools in the different scenario we face; the interacting categories, analysis, checklists... We can produce a creativity impulse to reduce GHG emissions and stop "burning our future" [8] as we see as an example in figure 2 below:

Figure 2: "We are burning our future", picture from [2]

5 CONCLUSIONS: DESIGN EDUCATION AND CLIMATE CHANGE

Design will continue to provide functional, aesthetically pleasing, ergonomic, safe, environmentally benign… A "good design", but design at its core is art of thought and communication. Design can induce in other a wide range of beliefs about practical life, and of course affects GHG emissions and its decrease. [3] [6]. The previous text drafts arguments and recommendations. The following points are a succinct outline or a basic scheme for Design Education and Climate Change:

- A core course to create the basis of the "known": Introduction to Global Warming and GHG, Systems and Human, Population, Biodiversity, International Agreements, Lessons Learned or existing Solutions…
- Core, special courses and training, addressing "best practices", "cognoscible" and "complex" issues: Industry and especially Energy use or saving, Household, Transport, Deforestation, including Life Cycle Analysis cases. It is especially important the stimuli or evoking the students bonds to caring for the Planet.
- Cross-linking with other: Sustainability Education is a premise to Climate Change education, Cognitive and Behavioural aspects must adopt the vision suggested in the paper: changing attitudes, beliefs and unblocking or developing feelings.

- Agenda of implementation should include grade, master and doctorate
- Pilot Project implementation and testing, can start as add-on or optional seminars with teaching material from "The Climate Project" initiative or United Nations experts' documents from www.unfcc.org .
- Updating must continue after final approval and implementation as part of the plan Checking.

We have the opportunity to change direction of our "chaotic" model of burning our future. Design Education for knowing, caring and creating practical and practicable products with a new spiritual connection with Planet Earth [6] can promote a radical GHG emissions decline.

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