

# IDU SPAD'20 International Spatial Planning and Design Symposium

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PROCEEDINGS BOOK



IZMİR DEMOCRACY UNIVERSITY  
NOVEMBER, 27-29, 2020 | IZMİR, TURKEY

**Izmir Democracy University**

**SPAD'20**

**International Spatial Planning and Design Symposium  
Proceeding Book**

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**ISBN: 978-605-74811-2-2**

**December 2020, Izmir**

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## PREFACE

As it is known, all living things need "space" in order to survive and they change and shape "space" with their vital activities. Human beings are also a part of the space where they lived within all stages of their existence. However, the intense urbanization process experienced especially in the 1950s and the new production-consumption model and life styles specific to this period, caused the disruption of harmony of people-space relation and the emergence of many environmental problems that we face today. Especially, Particular consequences such as the climate change, biodiversity and habitat loss have also influenced social life substantially, and the ecological and social fragilities have become more visible. Familiar to the history of humanity, but external to our daily routines, the epidemic period that we started experiencing very recently is actually a phase that we can practice very frequently in the near future, especially in the context of climate change, and thus it stands as a phase that we need to learn to live with. All these experiences highlight the necessity of reconsidering and evaluating the planning and design actions at different scales.

Our symposium, which hold with the main theme of "The Future of Planning and Design, Planning and Design of the Future", aims to develop suggestions for the future of society and settlements with a holistic approach by bringing together urban planning, architecture, landscape architecture, product design, geography, ecology, sociologist and other design disciplines who can take part in drawing the future. The purpose of this symposium is to examine the change and transformation caused by the interventions of humanity on the earth throughout history in all kinds of settlement scales and forms, and to have expert discussions on the proposals and examinations of possible habitats that can be a guide for future generations.

I am very pleased to share this publication of the papers presented at the symposium, where many similar subjects such as environment, urbanization, human and society, climate, ecology, sustainability and legal regulations were discussed. I hope it will contribute to both science and practice.

**Prof. Dr. Bedriye TUNÇSİPER**  
Rector of Izmir Democracy University  
Head of Symposium Organizing Committee

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## Pay Forward with Infographics

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### ABSTRACT

Since industrial revolution, design has a catastrophic effect on the ecosystem of the world due to the creation of new materials of permanent garbage which pollute the air and the earth. Today sustainability, energy security, climate change are the challenging issues that concern every business, government and every designer on the earth. Factors such as the loss of the world's ecological balance, uncontrolled population growth, rapid growth of the parallel economy, natural reduction of resources, overconsumption, ecosystem degradation and biodiversity led graphic designers to reconsider not only economic but also social, ecological, and ethical consequences. Graphic design is a sophisticated discipline that creates visual content to communicate messages while serving consumption and effecting the habits of the society.

One of the rapid ways of communication is the data visualization infographics for informative purposes. Infographics uses complex data to transform into understandable visual expressions such as universally interpretable symbols, graphics. This research aims to analyze the role and impact of infographics as a visual representation of information and communication method in terms of an education resource for sustainable actions. Within the scope of this research, it was concluded that environmentally conscious infographics can be used as a very effective educational tool in schools. Canadian educational infographics on environment have been examined on climate change within the framework of literature review. This research reveals that infographics has a powerful impact on our decisions and actions on environment as a rapid visual message interpreter. It can be claimed that infographics is an effective education method which also develops student skills such as visual literacy and critical thinking.

**Keywords:** infographics, data literacy, green graphic design, sustainability, climate change.

## 1. INTRODUCTION

Our world is no longer the same place since the rise of industrialization. The urbanization, new inventions, the construction of railroads that evoked international trade started the demand on goods. The mass production and overconsumption of fossil fuels, coal, oil, gas mines over years caused depletion of the ozone layer and climate warming. Today the world is under threat of an unprecedented global warming, water scarcity and environmental pollution through industrial waste. In the 21st century catastrophes (hurricanes, tornadoes, wildfires, landslip), climate change, species extinction, deforestation have become the abnormal circumstances of our daily life which are frequently encountered.

Anderson, Hawkins, Jones (2016) claim that one of the major risks confronting mankind is climate change. As fossil fuels are burned, the concentration of CO<sup>2</sup> in the atmosphere increases year by year building up the natural greenhouse effect thus warming the planet. According to the ensemble-mean results of state-of-the-art Earth System Models, climate warming during the 21<sup>st</sup> century is estimated to be between 1.0-3.7 –C depending on future greenhouse gas emissions. "Greenhouse effect is the result of chemical compounds in the Earth's atmosphere acting as greenhouse gases, trapping outgoing terrestrial radiation and warming Earth's atmosphere" (Lee, Lester et al, 2007). However, the amount of some atmospheric gases like carbon dioxide, methane, nitrous oxide and chlorofluorocarbons have increased since the late 19<sup>th</sup> century as a result of human activity. Global warming indicates an increase in global average temperature and is hypothesized to be the result of an intensified greenhouse effect. The utmost problem is the burning of fossil fuels for energy which artificially enhances the natural greenhouse effect.

This is all shaped with the growth of industrial empire which dominates the economies and politics all around the world. There is no doubt concerning the tremendous growth in industrialization and uncontrolled population which shaped today's world. Mehta points out that there is a correlation between population growth and the urbanization of the planet. "*Population growth and urbanization have contributed to enormous expansion of the energy, manufacturing and transportation sectors of the economy during the twentieth century.*" (Mehta, 2002, p.23). It could be said that growth of population in need of energy caused the overburning of fossil fuels and deforestation leading to green gas effect and global warming. This is the result of the overconsumption of resources which we are facing today.

The tremendous technological advances in industry created demands on consumer culture today. The ambition to make more money exposed the occurrence of commercial advertising to sell more goods. In this context; this article aims to question the effective role of graphic design as part of the problem and infographics as a part of the solution of the environmental catastrophes. According to Roberts (2006, p. 28) the arrival of graphic design as a distinct practice was in large part the result of the Industrial Revolution. By the late nineteenth century advertising had become an industry and governments also used visual communication as promotional materials for their own propaganda and public pronouncements. Especially the Second World War is a good example of usage of visual communication between governments and the governed. Graphic design is a potential tool for good or bad that can be seen in war propaganda or political promotion. By the 1960s, graphic design had become a subject of serious study in art schools and used as a manipulator of ideas into visual communication in economy, politics and social needs. Industries and economies had become more powerful with worldwide recognized logos, symbols and logotypes (Roberts, 2006, p. 29).

Graphic design as a manipulator of messages, owns an enormous power to orient society. The endless passion to sell goods in order to gain income, make profit with glamorous ads created the consumption

madness. As a result, overconsumption of goods drained and reduced the resources and polluted the oceans, seas, rivers, air and the soil. According to Bielenberg (Simmons, 2011, p.1) to maintain the current status is not an option. The tenuous relationship between humans and the natural world has become an unsustainable scenario. It may be too late or impossible to change the course quick enough. The current economic and industrial development needs to be adapted in a sustainable way with the usage of innovations in technology.

Graphic design is related with invention, innovation, human ingenuity and creative problem solving, it can pay forward to shape a better future for the planet and all living beings. Graphic design is a discipline that connects the producer with the consumer utilizing multiple types of media. It helps to convey the message of the product, event or the campaign. Graphic design has been used to sell products by advertising since industrial age. Balcı (2016) stated that graphic design is a discipline that advertises a product or service and conveys a message to the target audience by using various visual elements like typographical items, pictures, illustration according to design principles. The rise in technology in the 20<sup>th</sup> century developed the manufacturing, print and communication techniques. As a result of these improvements and especially in computer technology; the commercial and consumerism culture has emerged all over the world. After the occurrence of digital age and widespread internet network, the world has created a mass consumption of goods and services thus creating trillion tons of industrial waste from plastic bags to packaging boxes.

## **2. DESIGNER AS AN INTERPRETER OF MESSAGES**

Graphic designers as mediators of consumption culture carry a big responsibility in creating innovative solutions for a sustainable future. Simmons (2011, p.3) describe designers as “problem solvers” and they work according to their own interests and values. Dougherty (2008, p. 8) points out that there are three distinct ways of thinking about a graphic designer’s role: designer as a manipulator of stuff; designer as message maker; and designer as agent of change. The messages and the brands that a graphic designer creates have a big impact on consumption. Graphic design has the power to influence people for change. Designers try to help clients change the way people think or the way they act. Robert (2006, p. 29) claims that awareness of “ethics” in the way life was conducted had become a topic for discussion with a general feeling that public bodies were less suspect than large private companies. During the last thirty years graphic design has become part of the social landscape, projecting ideas about popular culture, industry and much more. The rising technology with personal computers and internet network also accelerated the process of communication. The electronic communication through internet network connected people to each other and eliminated distance and time.

O’Grady (2008, p.9) points out the advances in technology and communication are driving phenomenal change. Today in the age of communication designers globally seek to find better ways to share information. Geographical, cultural and language barriers combined with conflicting messages and customer choices created an overwhelming clarity for design. It is the information design that transfers complex data into a clear and effective presentation of information. Frank Thissen argues that information “design involves a multi and interdisciplinary approach to communication, combining skills from graphic design, technical and non technical authoring, psychology, communication theory and cultural studies”. Information design is the defining, planning and shaping contents of a message and the environments it is presented in with the intention of achieving particular objectives in relation to the needs of users.<sup>1</sup> Information design transmits information efficiently into signs, graphs, and charts. At information design, graphic designer uses symbols, type, colors and images and makes

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<sup>1</sup>(iiid)

deliberate aesthetic and cognitive choices to create effective communications. Information design is ubiquitous. Information design is used on a roadway signature, on a map design, on a website, on a brochure, ballots, voter information guides, new product assembly and usage guides for furniture or an electronic product, signage for travel hubs such as airports, train terminals, exhibits at museums, on books and for sustainable environmental information guidelines (Baer, 2009, p.14). Infographic types vary according to the category of the content; such as statistical infographics, informative infographics, timeline infographics comparison infographics, geographic infographics, process infographics and comparison infographics. Almost every industry uses infographics to explain their complicated data to the audience as an effective visual communication method.

Society for Technical Communication's (STC) describes information design as the translating of complex, unorganized or unstructured data into valuable, meaning full information. Today's unprecedented deteriorating world by human activity is in need of clear compact information to create communication system for the sake of a better future. In this context this article aims to analyze and show the impact of information design as a rapid visual message interpreter for change for the better. So the information data needs to be effective and be rapidly understood by the viewer. Designers use numerous tactics and methods to make information meaningful. Writing, editing, graphics, symbols and illustration are used in the practice of information design. All these elements and tactics working together can help ensure the effective communication of information. Effective communication is the very essence of information design (Baer, 2009, p. 13). According to Micki Breitenstein;

*"Traditional information delivery is very linear and includes tables of contents, indexes and such. People respond to visually engaging design, but they can get easily lost if the design isn't well organised. There are benefits to the dictatorial linear structure. People need both: the comfort of someone telling them where to go next, but the attraction of multilevel visuals"* (Baer, 2009, p. 17).

At information design the data needs to be presented in the most efficient and effective way in order to accomplish an accurate communication with the society. The argument of this article is to question infographics as an effective communication in guiding people to change for better with sustainable actions. The world is running out of time; it is getting hotter, the icebergs are melting, the oceans, sea, the soil and the air has been polluted, the resources are disappearing each day, forests are being destroyed and living species are dying and there are millions of suffering sick and homeless people all around the world. So what change can graphic design make within people's mind? Is it possible to change human behavior by environmental infographics? I think graphic design can create a consciousness through environmental infographics. Chapman and Gant (2007, p.7) claim that design is a needed, necessary and valuable process of invention and innovation, with the potential of taking us closer to a sustainable society – a society in which we design for sustainable consumption. In this sense consumption must not be longer polarized in terms of consuming or not consuming – the model of nonconsumption means designing nothing at all. Although this may seem to be contradictory, the consequence of our streamlined and automated life styles imply to determine the role of the designer. The aim of design must be to design in a way that promotes consumption models of long term sustainability.

It can be also said that today's graphic designer's role has been reshaped through ecological changes and challenges we are facing in the current world. Design needs to be sustainable. According to Manzini, design must play a role and become instead "part of the solution" by its nature in relation with human beings. Design holds a special power; a power that is at the same time both very weak and very strong (Chapman 2007, p.77).

In this context, graphic design as a tool for making a demand on consumption is the weakest part and graphic design as a tool in shaping the habits and orienting the society for a sustainable future is the strongest part. I believe graphic design has an ethical mission as a challenge in reshaping the consumer culture's demands to create a sustainable future. Information design aims to communicate the message in a clear way to understand. Prior to design, the intention of the infographic and the target audience should be envisioned. This research aims to examine the role and effects of infographics as a visual representation of information and communication method on sustainable actions. Within this scope environmental infographics have been examined only on climate change according to the subject matter and design principles.

#### **4. STRUCTURE OF THE INFOGRAPHIC**

One of the biggest problems facing today's world is the climate change and global warming. World Wide Fund for Nature: According to the claims of WWF, carbon dioxide and other heat-trapping gases are released into the atmosphere as a result of fossil fuels, cutting down trees and specific livestock types. Scientists indicate that there will be catastrophic effects if warming is more than 1.5°C. These effects can already be felt by droughts, fires, flooding and heatwaves which are caused by extreme weather as the coral reefs are destructed due to changes in ocean temperature. As climate scientists point out, global temperatures must be kept to 1.5°C in order to avoid the worst climate changes.<sup>2</sup> The infographic titled 'Climate risks: 1.5°C versus 2.5°C Global Warming' of WWF reveals the effects of global warming to the planet. The infographic (Figure 1) is made up of descriptive texts, headers and 2D illustrations representing the topics of arctic sea ice, sea level rise, forest, sun, human and marine life. This infographic gives information about the climate risks: 1.5°C versus 2.5°C global warming effects including the following headings 'extreme weather, water availability, arctic sea ice, sea level rise, coral bleaching, oceans, species, costs and food'.

This kind of complex information needs to be clarified for an effective communication to the audience. Environmentally conscious projects usually contain too much information to be communicated to the audience. Particular environmental design problems such as these need a creative brief and good planning as well as objective solutions. According to Nathan Shedroff, information needs to be designed in an objective way; organizing data and creating of information may have a profound impact on its meaning. The written information which is the key component of information design should be clear and concise, at a level the audience can understand (Baer 2009, 49).

For a well designed effective infographic there should be consistency and visual harmony with usage of graphics, signs, symbols, colours, illustrations with the typography. The main title, section title, headers, descriptors and body text should be set with a right typeface according to the content. At WWF's infographic on climate crisis, a majuscule condensed sans serif typeface is used for headings and a smaller punto size - minuscule sans serif typeface used for descriptive texts. In overall design the usage of texts are in harmony with the illustrations. The complex and dense information about climate crisis has been designed in a clear and effective visual structure.

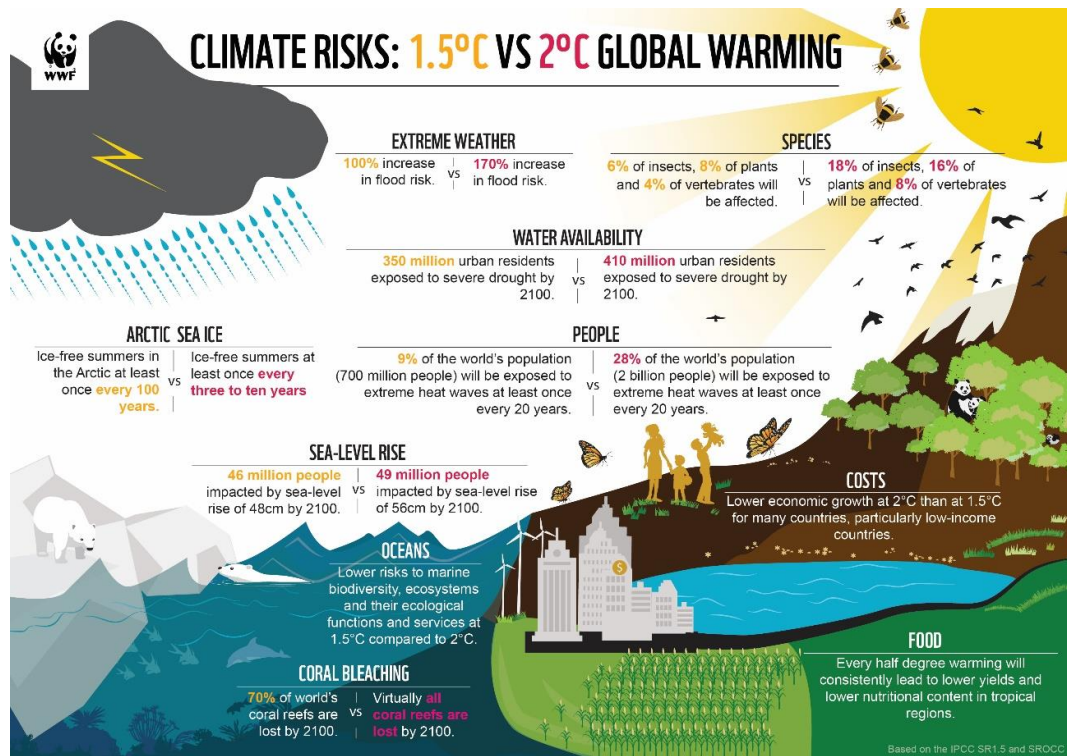


Figure 1. WWF, Climate risks: 1.5°C vs 2.5°C Global Warming.

[https://wwf.panda.org/our\\_work/our\\_focus/climate\\_and\\_energy\\_practice/?1070641/WWF-net-zero](https://wwf.panda.org/our_work/our_focus/climate_and_energy_practice/?1070641/WWF-net-zero)

The following infographics (Figure 2 and 3) based on two reports from Natural Resources Canada offer a way to unravel the complex issue of climate change. Canadian Geographic Magazine in partnership with the Canadian Museum of Science and Technology has created six infographics for educators to teach to students about climate change and its effects on environment. "Melting permafrost, ocean acidification, biodiversity, habitat destruction, the impacts on Canadian economy and the health of Canadians" topics have been designed into infographics to be taught to students. Adaptation and mitigation infographics discuss ways to reduce carbon footprint and adopt new habits and strategies to adjust to a changing climate.<sup>2</sup> Figure 2 and 3 are the Canadian climate infographics which are designed to be taught to grade 9 and 10 Canadian Students in geography and science classes. Climate change infographics have been designed in 5 different categories; on environment, Canada's biodiversity, adaptation and mitigation, economy, health and urban living. It is said that one of the aims of this course is to develop a variety of 21st-century skills such as critical thinking, creativity, collaboration and communication. Infographics can aid critical thinking and can develop communication skills of students. In this context visual literacy is an important factor in developing reading skills. According to O'Grady Visocky, (2008, s. 91) visual literacy focuses on ability to interpret, appreciate, gather and create images. Information literacy describes an individual's ability to recognize when information is needed and then have the skills to find, evaluate, analyse and effectively use that information. Infographics can aid thinking, clarify decision making, enhance learning and strengthen communication.

The infographics examined on figure 2 and 3 have a dense pack of information about climate change and environment. This complicated information needs to be organised by visual hierarchy principle that arranges elements to show their order of importance. The visual hierarchy can be done by using

<sup>2</sup> (Canadian geographic)

spacing, positioning elements to create focal points on the layout of the infographic. Designers structure visual characteristics in a logic that users can understand information easily. By laying out of visual elements logically and strategically, designers can influence users' perceptions and guide them to desired actions<sup>3</sup>. So it can be claimed that visual literacy and visual hierarchy are very important factors in directing people to desired behaviours.

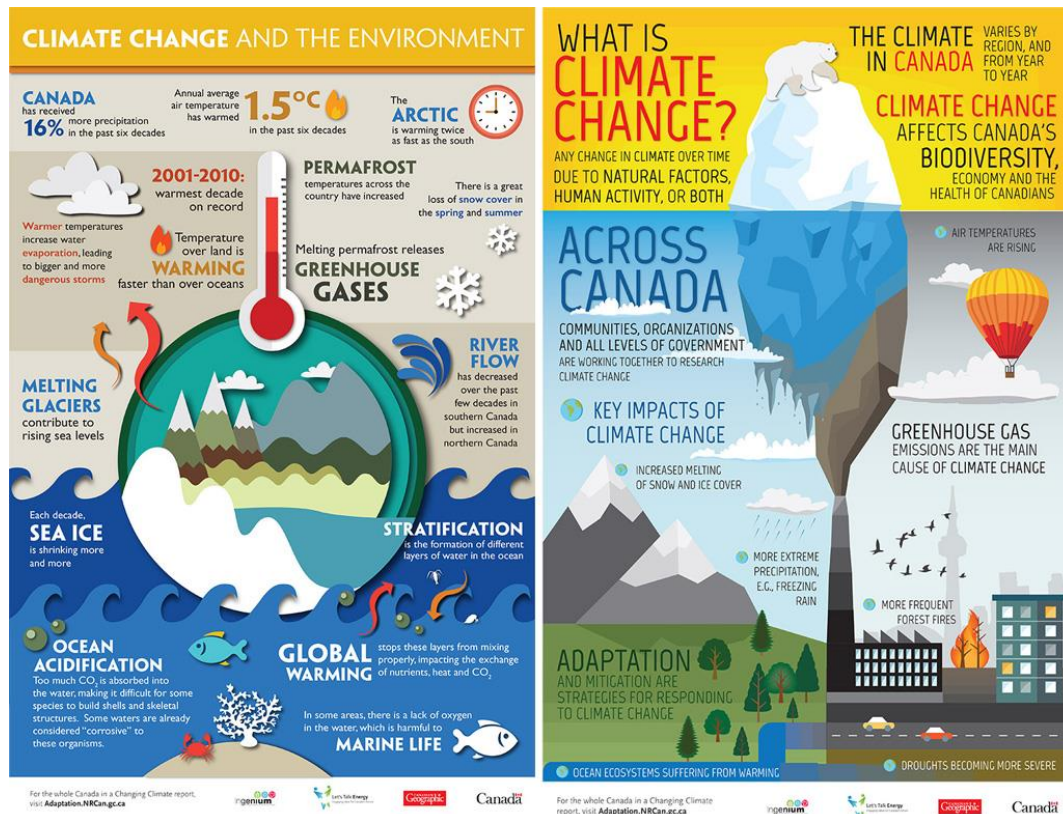


Figure 2. Canadian Climate Infographics

[http://www.canadiangeographic.com/educational\\_products/products\\_climate\\_change.asp](http://www.canadiangeographic.com/educational_products/products_climate_change.asp)

The Canadian awareness infographics consists of a vector based illustration and clean usage of typography. In the infographic design entitled 'Climate Change and Environment' Figure 2 shows a natural cross section with a cutout effect. There are some blurred shadows under some of the vector images and this turned out to be paper cut out effect in design. The paper cut out effect seems to give a dimension in design which creates attention to the subject.

Another important factor is the selection of right typeface in the design. The designer needs to select the font according to the theme of the infographic. Typography is a complementary element of the theme of the design. Sans serif styles tend to work best for the headers, captions, lists and titles in infographics. Sans serifs do not have small lines or embellishments attached to the ends of letters.

3 (Visual Hierarchy)

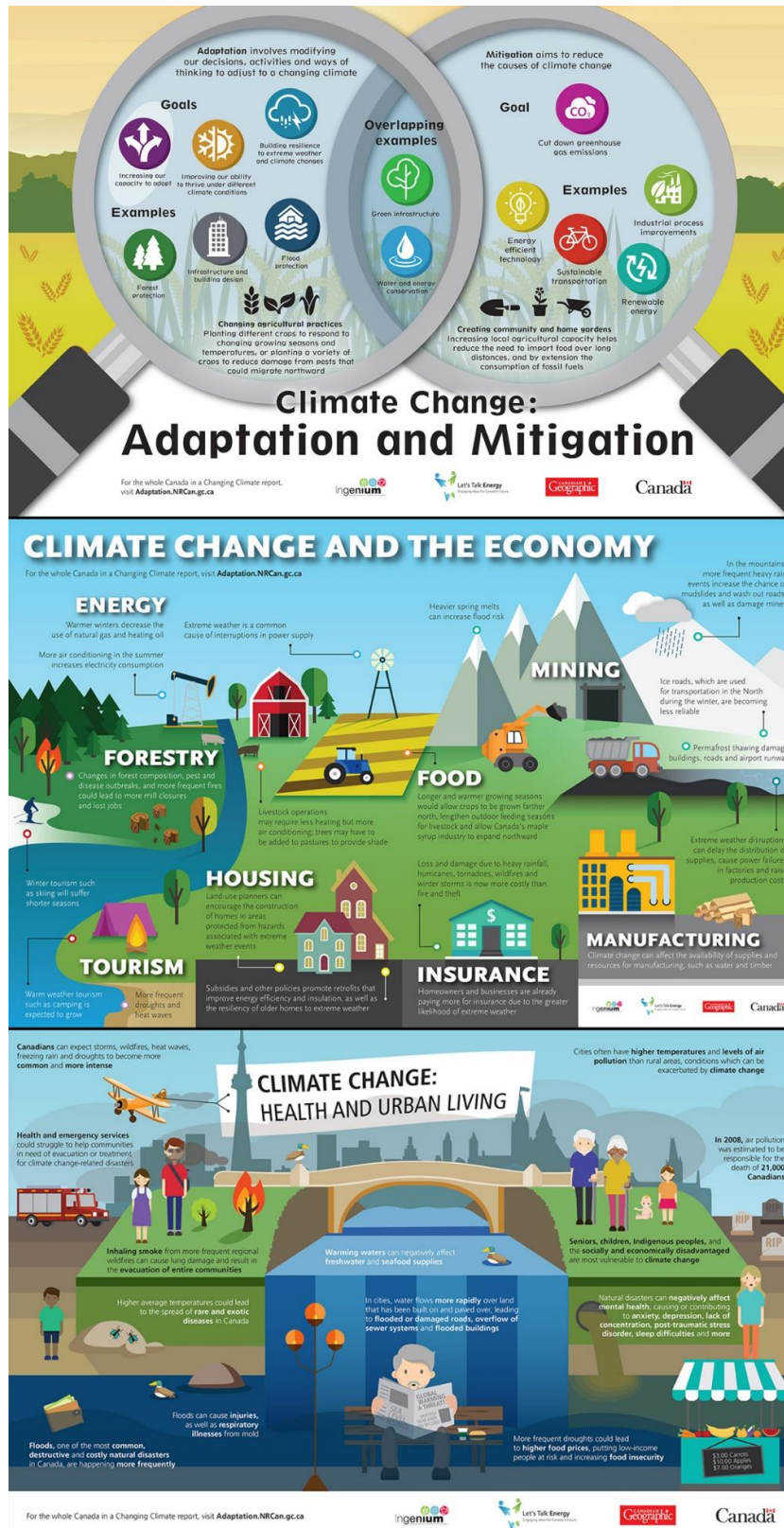


Figure 3. Canadian Climate Infographics  
[http://www.canadiangeographic.com/educational\\_products/products\\_climate\\_change.asp](http://www.canadiangeographic.com/educational_products/products_climate_change.asp)

For a well-designed infographic it's important to establish the size, weight of the font throughout different sections.<sup>4</sup> In Canadian environmental infographics sans serif typeface has been used to match with the content. The descriptive texts are aligned to right or left according to the position of the main titles. The viewer captures the message through the emphasized content. These infographics consist of excessive visual data on climate change and environment all over the design. When there are too much visual elements there will be less white space in the layout which makes it difficult to read and understand the content. White space doesn't need to be white, it can be any colour or texture in design, it is the space area between design elements. The white space balances design elements and organize content to improve the visual communication experience. White space has a direct impact on content legibility. When there is more information in the layout, there will be less amounts of white space.<sup>5</sup>

In these infographics there is less white space in the layout of the design. As shown in Figure 2 and 3 the dense information could be shared in two different infographic layout designs for an effective communication. The aim of the environmentally conscious infographics is to change people's daily actions and decisions. Everyday people make quick decisions on food, transportation, heating, clothing etc. and these choices determine and effect the future of the world. In this context infographics is a very powerful and a rapid way of visual communication method to clarify decisions. The designer of the infographic should master the subject context in order to create an impact on audience for change. Information designer is like an interpreter who helps to communicate and grab the reader's attention. Due to the fact that it is a well organised visual representation of complex information data, infographics are used to teach at schools as an effective communication tool. The use of infographics as a communication tool in education is significant in terms of teaching students the precautions to be taken in environmental matters. Students also learn visual literacy and critical thinking with infographics. Baker the SAT (College Board) and Common Core acknowledge the importance of having today's students be proficient in understanding graphic representations (Baker 2017). In their research entitled 'Putting Environmental Infographics Center Stage: The Role of Visuals at the Elaboration Likelihood Model's Critical Point of Persuasion', Lazard and Atkinson (2015, p. 12) claim that infographics are strongly communicative in the field of environmental issues and this idea is supported by experiments conducted with infographics. These experiments showed that when compared in terms of elaboration individuals experiencing infographics ranked higher than individuals experiencing text-based messages. Infographics also influence individual's eagerness about critical thinking concerning pro-environmental messages. Preference for visual or verbal information is very important for educational information. In this way individuals can be informed about pro-environmental behaviour and build up an attitude.

## 5. CONCLUSION

*"I don't want your hope. I don't want you to be hopeful,  
I want you to panic...and act if the house was on fire"*  
Greta Thunberg

Our world is running out of time. In the 21st century climate change and mass extinction of living beings are the greatest challenges facing humanity. Global environmental problems already have profound effects on health, livelihoods, food security, water supply and extinction of living beings. Animal agriculture and fossil fuels and overconsumption is devastating our world. The tremendous

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<sup>4</sup>(Mighty)

<sup>5</sup>(interaction design)

technological advances at industry created demands on consumer culture and exposed the occurrence of commercial advertising to sell more goods.

Graphic design is a needed necessary and valuable process of invention and innovation. Graphic design is related with human ingenuity and creative problem solving. Graphic design has the power to influence people for change. Designers try to help clients change the way people think or the way they act. The aim of graphic design must be to design in a way that promotes consumption models of long term sustainability. This article aims to question the effective role of infographics as a part of the solution of the environmental catastrophes. Information design can be entitled as a translator of complex, unorganized or unstructured data into valuable, meaning full information.

Today's deteriorating world is in need of clear compact information to create communication system for a sustainable future. In this context this article aims to analyze and show the impact of information design as a rapid visual message interpreter as a change for the better. Infographic designers as mediators of consumption culture carry a big responsibility to create innovative solutions for a sustainable future. Designers are becoming more critical participants in problem solving process due to global environmental problems. I believe infographics has an ethical mission as a challenge for reshaping the consumer culture's demands to create a sustainable future.

This research revealed that infographics as a visual representation of information is a strong and rapid way of communication method on sustainable actions. In order to create an effective communication with the audience the design problems need a creative brief and good planning and objective solutions. Information design should be clear and concise at a level which the audience can comprehend. The infographic should have consistency and visual harmony with usage of graphics, signs, symbols, colours, illustrations with the typography. Visual literacy and visual hierarchy are important factors to create a clear and effective communication in order to guide people to desired behaviours.

In this research Canadian Geographic's six different infographics on climate change has been examined as an educational material and as an effective visual communication method. Infographics as a visual representation can provide a visual method of engaging audiences with scientific information. This study has revealed that environmentally conscious infographics not only guide students to learn about environmental issues but also develops their critical thinking and visual literacy skills. Infographics can aid thinking, clarify decision making, evaluation, analysing, enhance learning and strengthen communication. We can claim that infographics is an essential factor in visual communication for educators, guiding people's expected actions. I believe infographics can create an environmental consciousness and can change people's old habits into sustainable actions. This is how infographics can pay forward of what commercial design has done so far with consumer culture. Infographics has the power to influence people for change. I think infographics can help to educate people to shape a sustainable future for our planet and all living beings.

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