

# Visualization and Empowerment

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## ABSTRACT

Data visualization, commonly used to make large sets of numerical data more legible, also has enormous potential as a storytelling tool to elicit insights on long-standing social problems. It can help to synthesize diverse personal narratives about history, causes and impacts, and thereby give a voice to populations seeking to create change.

In this work, we explore the potential for using data visualization as a vehicle for social change through creative engagement. Our intent is to design and deploy an interactive visualization of development in the Dominican Republic which brings empathy to the society's cultural psychology, helps frame limitations and challenges, and highlights opportunities for progress. Some of the major challenges in designing this work lie in layering both the “big picture” perspective—historical events and statistical trends—with personal narratives—vivid stories that illuminate the current state of the society. We discuss how this work can foster conversations and promote creative thought, motivating actions that can transform the current state of the country.

## Author Keywords

Visualization, design, participatory, social interfaces, perception, reflection, interaction

## ACM Classification Keywords

H.5.1 Multimedia Information Systems; E.m MISCELLANEOUS

## General Terms

Design, Experimentation, Human Factors, Measurement

## INTRODUCTION

Popular awareness and engagement is a critical factor in addressing wide-scale socio-political change. Interactive data visualizations can be used to facilitate that empowerment. By shifting the emphasis of the visualization from the mere presentation of data to the representation of larger historical and cultural trends, and by providing a forum in which individuals can respond to these depictions, we can elicit insights on long-standing social problems and help to synthesize individual responses to the state of affairs.

## PROJECT DESCRIPTION

In this visualization project, entitled The Dominican Republic: Visualizing Empowerment, we address the state of the Dominican Republic. According to the United Nations Human Development Report on the Dominican Republic [1], the challenge to progress in this country is due not to lack of resources, but rather, barriers of power. Thus, the goal of this project is to address one of the critical barriers to advancement by helping citizens comprehend the state of affairs in their country and understand the important role they play as creative minds that have the ability to re-imagine their country.

We started by integrating statistics and findings relevant to the issue of social welfare from the U.N. National Human Development Report on the Dominican Republic, with the visualization depicted in Figure 1. This includes rankings of the economy, education, health, access to information, politics and individual welfare in each province, as well as statistics about the population, jobs, poverty, literacy—basic information which already is able to help viewers identify major issues. A revealing insight achieved through this visualization relates to education. We were able to find patterns that suggest that most Dominican citizens attend

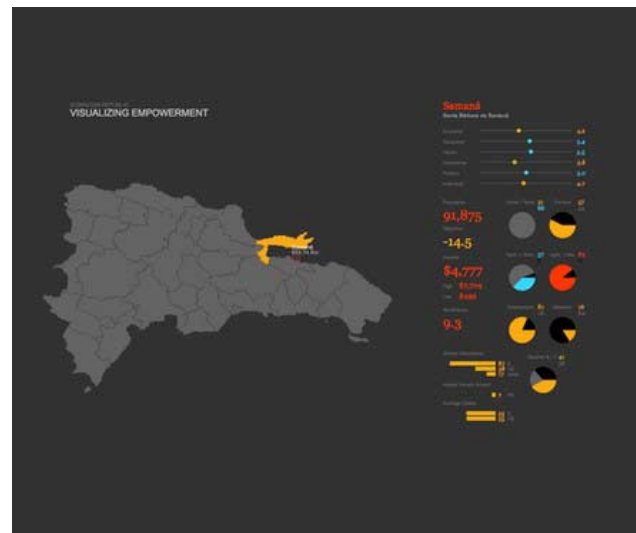


Figure 1. One aspect of the project allows comparison of social welfare characteristics of each of the Dominican Republic’s provinces.

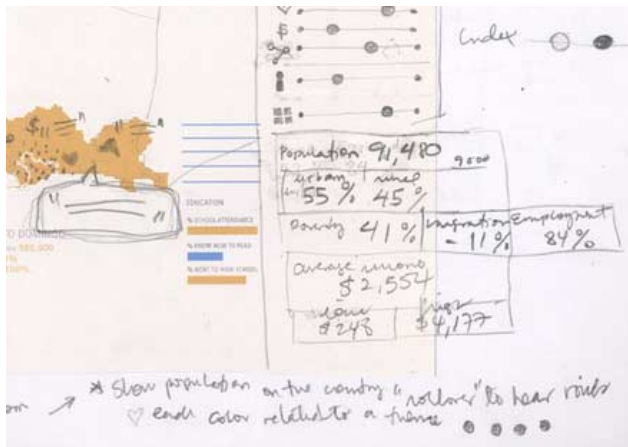
elementary school, yet the high school attendance drops more than forty percent (40%) in every province. What

happens at the end of elementary school that obstructs the further education of these students? How might we help bridge this gap? This is just one example of many insights that can help us learn where individuals and organizations can intervene to address social change. We are progressing next to a visual representation of major historical and cultural events that have influenced the current condition in the country, and intend to round out this project with a collaborative and interactive depiction of responses and narratives that will provide a human voice to the issues facing this country.

Like recent data visualization projects such as Josh On's TheyRule.net, which examines the interlocking networks of executives of top companies in the U.S. to create awareness about how power is held in this country [2], and Eyebeam R&D's ForwardTrack, which tracks and maps the diffusion of email forwards, political calls-to-action, and online petitions to promote online activism [3], Visualizing Empowerment goes beyond scientific representations of data, and even the artistic expressions of the designer [4], to engage viewers on a social and political level to react and act.

### IMPLEMENTATION

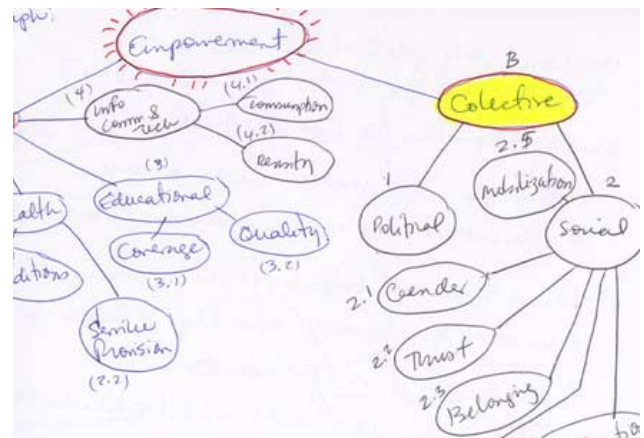
Visualizing Empowerment is programmed in Java using Processing [5] using data from the 2008 United Nations Human Development Report [1]. In the first visualization of the project, users are shown an outlined map of the Dominican Republic. Mousing over individual provinces causes the data in the panel on the right to shift to reflect the relevant information about that particular province.



**Figure 2. A sketch of the interface design for the first stage of Visualizing Empowerment.**

In the second visualization of the project, which is a design in progress, users are shown a timeline of major events in the history of the Dominican Republic, superimposed with historical trend data related to power and social welfare. By interactively traversing through the timeline, viewers are permitted to discover patterns of history and to draw their own conclusions about the influence that different events

have on the modern-day republic. People are also permitted to embed their own stories and reactions in the timeline, thereby creating another layer to what is being depicted.



**Figure 3. A sketch of a possible thematic organization of the narrative portion of the visualization project.**

The stories elicited by the timeline will form the basis for the third visualization of the project—a thematic representation of ideas, stories, quotes and reactions from individuals who have engaged with the Dominican Republic: Visualizing Empowerment project. In this final visualization, which will function as an interactive storytelling tool, viewers will once again be able to contribute content to the visualization and through this action continue to highlight patterns and connections. The program will enable the cluster of stories to constantly rearrange themselves based on what people are selecting to view and to comment on. By encouraging active navigation and reflection through the narratives of this final stage, we hope to instill viewers with empathy about the state of affairs in the Dominican Republic. Through the stories found in this last visualization, we want to motivate action through creative engagement, encouraging individuals to become agents of change and take charge of the future of the country.

### REFERENCES

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