

ProCivicStat © - Teacher's Manual, 5.301

## Introduction to the usage of Gapminder

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What?	Teaching Material for learning the usage of a visualization tool: <i>Introduction to the usage of Gapminder</i>
Why?	To describe social phenomenon, statistical data and its visualization have a key role. Gapminder offers several possibilities for visualizing data, therefore learning how to use Gapminder is very important to have a better understanding into social phenomenon
Statistics topics	The module develops the student's visualization skills and IT knowledge
Level	Simple
Prerequisites	The required preliminary knowledge is to know different chart types (e.g. line, bar, scatter) and to know different functions (especially linear and log functions)
Digital tools	Gapminder
Resources needed	PCs or notebooks with access to the internet
Lesson time	1 - 2 hours
Further remark	Suitable for group work or home work assignment; some intro to the software needs to be provided

### What is Civic Statistics?

To be fully engaged, citizens need to be aware of and understand statistics regarding past trends, present situations, and possible future changes in diverse areas of importance to society such as demographics, employment, wages, migration, health, crime, poverty, access to services, energy, education, environment, human rights, and other domains. Statistics and data about these and related topics are collectively called here civic statistics. Information about civic statistics is provided by official statistics agencies and other public and private/non-profit statistics providers, and some of it is mediated to the public via print and visual media. Understanding of civic statistics is required for participation in democratic societies, but involves data that often are open, large-scale, official, multivariate in nature, and/or presented dynamically.



Such statistics are usually not at the core of regular statistics instruction. These materials fill an important gap, not addressed in general education at school or university level.

ProCivicStat is a cooperative project of six partners in five countries, funded through the Erasmus+ program of the European Union. ProCivicStat developed new methods for statistics instruction for high schools and universities that will contribute to young people's ability to understand quantitative evidence about key social phenomena that permeate civic life. ProCivicStat offers a platform for continuing cooperation, exchange of ideas, exploration and dissemination of theoretical concepts and concrete teaching materials for promoting civic engagement via exploration of evidence and understanding of statistics about society.

Visit the ProCivicStat website: <http://www.procivicstat.org> for more information.

## Introduction

This document is intended for university teachers who teach a first or second course in statistics.

The document contains a class plan with answers to questions. After reading this plan, you will have a deeper understanding on:

- ✓ The importance of using visualization tools in a class;
- ✓ The topics that can be covered when using this lesson plan;
- ✓ Software programs that can be used;
- ✓ Advantages / Disadvantages of a particular program

### 1. Why should the teacher use visualization tools in class?

To describe social phenomena, statistical data and its visualization have a key role. We can find several possibilities for visualizing data.

### 2. What topics will your students learn if the teacher uses this lesson plan?

- Visualizing
- Handling Gapminder
- Reflecting on context and communicating results

### 3. Student's Pre-requisites

- The required preliminary knowledge is to know different chart types (e.g. line, bar, scatter)
- and to know different functions (especially linear and log functions)

### 4. What program should be used for visualisation and analysis?

We have used Gapminder as the digital tools for this worksheet.

To use Gapminder, go to <http://www.gapminder.org>

## 5. Advantages vs. Disadvantages for using Gapminder:

There are plenty of advantages for using Gapminder for this lesson plan:

- Free, browser-based, open source web application
- Educational web-based visualization tool with very spectacular solutions
- User-friendly interface
- Easy to understanding and easy to use for students with no background in statistical analysis.
- The available indicators are downloadable
- There is an option for importing data in the offline version

There are a number of disadvantages:

- Limited kinds of graphical representations
- Narrower range of indicators (compared to Eurostat or to OECD.Stat)

## 6. Where to start?

Proceed to the following pages to learn more about lesson plan about the usage of Gapminder.

### Appendix 1: How to use Gapminder

Videos and explanations on how to get started with Gapminder and assistance for beginning users of Gapminder is available here:

<http://www.gapminder.org/downloads/>

or

<http://www.gapminder.org/videos/>

## Appendix 2: Worksheet with answers

This part of the document will provide you with worksheet with possible answers and explanations.

### Introduction (10 minutes)

Aim: get a picture about Gapminder. This part is a short lecture but contain interactive part too.

<i>Action/task/questions</i>	<i>Information</i>
1. Open <a href="http://gapminder.org">gapminder.org</a> and show and show existing visualization (e.g. wealth and health of nations)!	Play the visualization, but stop it after a few seconds! It is useful to stop the visualization, because if someone does not understand the meaning of visual elements, he/she will not understand the message of the visualization.
What have you seen?	With the help of some question, you can make the meaning of visual elements more understandable. E.g.: <ul style="list-style-type: none"> <li>- What are the axes?</li> <li>- What do the bubbles indicate?</li> <li>- What do the colours indicate?</li> <li>- What is this dynamic movement?</li> </ul> If everything is clear, you can continue to play the visualization.

*Exploration (25 min)*

Aim: get to know more information and details about the usage of Gapminder by an independent exploration by the students. The process can be controlled by several questions (listed below).

<i>Action/task/questions</i>	<i>Information</i>
2. What can you set in Gapminder? 3. What is the function of several tabs/menus?	Leave 5-10 minutes for students to explore Gapminder basic settings independently (or they can work in pairs, small groups).
	<p><i>Discussion version A: 5-10 minutes.</i></p> <p>In this version students tell what they have found independently. Discussion should cover the following settings/functions:</p> <ul style="list-style-type: none"> <li>- indicators</li> <li>- bubble charts, maps</li> <li>- log/lin button</li> <li>- speed of visualization</li> <li>- sharing graph</li> <li>- country choice</li> <li>- bubble size</li> </ul>
<ul style="list-style-type: none"> <li>- How can I find existing visualizations? Can you create different visualizations?</li> <li>- How can I change indicators?</li> <li>- What are the differences between chart and map tabs?</li> <li>- What can be role of the log/lin button?</li> <li>- How can I change the speed of visualization? Why is it useful?</li> <li>- What is 'Share graph' button for?</li> <li>- How can I change the examined countries? Can I select more countries?</li> <li>- How can I change the size of bubbles?</li> </ul>	<p><i>Discussion version B: 5-10 minutes.</i></p> <p>If students do not mention none or any of the answers listed above, use these questions.</p> <p>You can wait for the answers from the students, or you can show the solution/answer if students do not know.</p>
<ul style="list-style-type: none"> <li>- What is the meaning of the indicators? Where can I find the definitions of indicators?</li> <li>- How can I download data?</li> <li>- Are there any other visualization tools in Gapminder?               <ul style="list-style-type: none"> <li>o How can I use them?</li> <li>o What kind of settings do they have?</li> </ul> </li> <li>- What is 'Dollar Street' about?</li> </ul>	<p>Exploration of other options (10 minutes)</p> <p>Beyond the exploration of basic settings of visualization (listed above) it is worth to know other options in Gapminder. You can work together with students.</p>

Group work (20 minutes + presenting the results of group work)

- Aim: use Gapminder for answering a research question
- Structure:

<i>Action/task/questions</i>	<i>Information</i>
Form groups!	Forming groups: 5 minutes Organize students into groups (Number of groups and members of groups is depending on the timeframe. More time → smaller, but more groups, less time → larger, but fewer groups.)
<p>4. Formulate a question concerning your topic! (You can split it into sub questions.) (E.g. How did poverty change in the last 100 years?)</p> <p>5. Find answer(s) to your question(s) with the help of Gapminder! Give reasons for your answer (e.g. why did you choose the given indicators).</p>	<p>Task solution: 15 minutes</p> <ul style="list-style-type: none"> <li>- Give topics to the students (or they can choose) (e.g. poverty, education, population).</li> <li>- Groups has to solve task in their topics. They have to show the answer with the help of a visualization, or they can create a PowerPoint presentation too.</li> </ul>
6. Show your results!	<p>Task presentation</p> <ul style="list-style-type: none"> <li>- Groups have to present the results of their tasks.</li> <li>- They can show the solution with Gapminder or with the help of other software (e.g. ppt) as well.</li> </ul> <p>Evaluation aspects:</p> <ul style="list-style-type: none"> <li>- In this level, the aim is only to learn the technical usage of Gapminder.</li> <li>- The task solved successfully if students <ul style="list-style-type: none"> <li>○ are able to create a not built in visualization</li> <li>○ are able to draw up 1-2 sentence about the visualization (e.g. What are the indicators, are there any decrease or increase or are there any regional differences?)</li> </ul> </li> </ul>

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### What is Gapminder?

Gapminder is a visualization tool which can support a better understanding of social and economic phenomena and of the usage and background of various statistical methods.

### Why does it matter?

To describe social phenomena, statistical data and its visualization have a key role. Gapminder offers several possibilities for visualizing data.

### More Background

For more information, visit the following website

<http://www.gapminder.org/>

### Data Source

Considering the datasets, there are 519 indicators organized into 10 main categories in Gapminder. Gapminder Documentation describes the methods, sources and data used to produce the various datasets of Gapminder. The data itself is available through excel files.

Consider the technology and the software, we can use either the online or the offline version of Gapminder in this level. The offline version and data used by Gapminder are downloadable. In the online interface, Gapminder has spectacular-, dynamic visualization tools. Gapminder World has a bubble chart which can show the change of two indicators in time; and there is also possibility to colour the visualization by other grouping variables or indicators, and use the bubble size to show the population size. Besides the 'original' bubble chart, Gapminder has the possibility to create mountain charts, bar ranking and line charts as well; and the 'Dollar Street' tab can visualize some topics by photos.



## Promoting Civic Engagement via Exploration of Evidence: Challenges for Statistics Education

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**To start, click here**

[https://www.gapminder.org/tools/#\\_chart-type=bubbles&locale\\_id=en](https://www.gapminder.org/tools/#_chart-type=bubbles&locale_id=en)

### Tasks:

#### Introduction

1. Open gapminder.org and show and show existing visualization (e.g. wealth and health of nations)! What have you seen?

#### Exploration

2. What can you set in Gapminder?
3. What is the function of several tabs/menus?

#### Group work

4. Formulate a question concerning your topic!
5. Find answer(s) to your question(s) with the help of Gapminder! Give reasons for your answer (e.g. why did you choose the given indicators).
6. Show your results!