# Politecnico di Torino

Database systems

# Laboratory 1

# Google Data Studio - Introduction

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## 1 Summary and objectives

Google Data Studio is an interesting free tool for data visualization, allowing users to design dashboards and graphical reports. Several options are available, ensuring high customization to represent data, including in particular tables and graphs. They can easily support financial analytics and summary visualization.

During this laboratory activity, you will explore the basic functionalities and possibilities behind this platform. The main focus is devoted to understand the environment and to become familiar with the crucial concepts. Among the others, they are necessary to properly deal with real databases and produce a first comprehensive data report.

## 2 Getting started

First of all, connect to https://datastudio.google.com/ by using your personal Google account. Clearly, it is similar to other popular Google services, like Drive and Docs. The homepage intuitively provides your recent projects and data sources, as shown in Figure 1. You can access your own projects and the ones shared with you as well, since you can decide to allow other participants to contribute.

### 2.1 Pre-built templates

Before creating a new report from scratch, it is suggested to explore the templates gallery in order to observe the potentiality of the platform and different examples which can be useful for future projects design.

### 2.2 Data sources and connectors

The first crucial element for a new report is the employed database. Similarly to reports, you can browse your previously configured data sources which are included through the use of specific *connectors*. They represent the bridge to import your data into your reports. Data Studio provides two main categories: the official Google Connectors (e.g. Google Analytics, Google Sheets) and the Partner Connectors proposed by third-party entities (e.g. Twitter, Facebook), according to the database origin.



Figure 1: Data Studio main page

## 3 Creating your new report

Once provided the general overview of the platform, it is time to create your first report and directly investigate the most important functionalities.

Click on **Create report** to begin and you will be asked to select the desired connector for the data source (Figure 2) in order to link your personal resources with Data Studio. For example, using the Google Sheets Connector, you can authorize the system to browse your personal files. In this case instead, we are interested to access the free samples provided for testing purpose. Use the **My data sources** button and then select "*[Sample] YouTube Data*". This database consists of collected information about a YouTube video sample to analyze useful insights, including views, comments, dislikes and so on (with constant updates).



Figure 2: Connector selection for data source

After confirming the intention to add the selected data to the report, a table will appear. From the right panel you can investigate the database structure and associated fields. A first important distinction should be made:

- Dimensions, representing specific categories of data.
- Metrics, being the actual measurements to quantify some information.

### 3.1 Exploring your data

This preliminary step should be never underestimated. In fact, in order to detect interesting patterns and produce appealing analysis, you should always have perfect awareness of your data. In particular, Google Data Studio provides you an intuitive interface to explore both the available dimensions (green) and metrics (blue).

Using the generated table, you can easily observe the database, by including more columns and sorting them as you prefer. Therefore, spend some time to play with these functionalities to better understand the available information. As shown in Figure 3, the top menu allows to visualize data in a more extended manner by clicking on **Resource**.

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Figure 3: Analyze the resources associated to data source

**Question 1.** Edit the table using the right panel. Set *Country Code* as dimension and report the following metrics: *Watch Time*, *Video Shares*, *Video Likes Added*, *Views*. Finally, sort your results according to *Views* descending order.

**TIP.** Although it was automatically generated with the connector selection, the table is not mandatory to keep. If it is unnecessary for your final report, you can safely delete it. On the contrary, if it is useful, you can customise the table according to your preferences, like re-sizing the columns (i.e. right click on the table) or editing the style.

#### 3.2 Set the title and the header

Moving on to new fundamental elements, the basic one is certainly related to the possibility of including texts and additional components. An effective report requires to be clear and - most importantly - to be self-explanatory.

The highlighted toolbox in Figure 4 offers interesting elements to make the report more readable and complete. Of course, the simplest way to gain confidence is to create a suitable header for your dashboard, since you have started with a blank paper.



Figure 4: Report with header

**Question 2.** Details are important. After re-naming the project, include a customised header which matches your personal taste. Exploit the different components (e.g. images, shapes).

**TIP.** You should notice that each selected element from the report presents two distinct columns within the right panel: "Data" and "Style". For instance, from the latter one, you could highlight specific pattern for each column of the table with heat maps and bars.

#### 3.3 Add controls and View mode

When performing data analysis, it is often preferred to observe the results under some conditions only. For example, from **Add a control** you can insert a box devoted to date range selection. This is extremely useful for making the report more **interactive** by offering the possibility to observe charts referring to different periods of time. In fact, if you click on the top right button **View** shown in Figure 5, you will exit the editor mode. In this way, you simulate what other viewers are expected to watch once your report has been completed. You should notice that the date selection is still interactive.

However, our report is basically empty and we now need to include some graphs for our analysis before changing the considered period. Therefore, keep in mind this function and return to the editor mode.

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**Question 3.** Controls are in general useful to let viewers filter your data. Add to the report a drop-down list to select the desired *Country code*.

**TIP.** Remember that the data range selection will affect the entire report and all the displayed charts. In order to keep the period fixed for a specific component, you should individually set the reference time by using the corresponding right panel (*Default data range*, see Section 3.4.1).

#### 3.4 Include charts

Since everything has been set, it is time to proceed with the actual data visualization. If you click on the **Add a chart** menu, different graphs typologies can be observed. They are all interesting and suitable for different tasks. However, we will only cover the most useful ones since they share common functionalities.

In fact, when a new chart is added, Data Studio will automatically select one metric among the available ones. As always, use the right panel for proper customisation. Next to the metric name you have the aggregation function acronym (e.g. SUM, AVG) which can be generally modified for other kinds of database. By clicking on the acronym box, the associated editing menu will appear. It also allows you to modify the displayed metric name, as it can be appreciated in Figure 6.

You should pay special attention to **Default date range** command. If you want a fixed reference period, select **Custom**, otherwise it will be automatically adapted to the general date range selection. You can either manually select the range or using the common proposed ones.

#### 3.4.1 The Scorecard

This simple element is extremely direct and useful to briefly summarize significant metrics. From the menu, select one **Scorecard** and choose where to place it. Besides the stylistic adjustments, this block is compact and intuitive. However, you have a fascinating **Comparison date range** option (*Default data range* section) to highlight trends of given time periods.



Figure 6: Edit the chart metric

Usually, it is interesting to select **Previous period** which will automatically provide the comparison with respect to the currently selected date range, using different colours depending on whether it is a positive or negative trend. **Remember**: help your viewers to correctly interpret the reported information. You should always rename objects and include texts to make your dashboard clear.

**Question 4.** Insert 4 Scorecards to summarize the video performance with the layout you prefer. Include *Watch time* and *User Comments Added*, both being independent from the report date range (i.e. providing cumulative results). Concerning *Views* and *User Subscription Added*, set the automatic date range and the comparison time with the previous period. By changing the period range from the report date control, check that they properly work as expected.

**TIP.** When setting the chart default date range to *Custom*, you can select the automatic range among the proposed ones to refer to the whole available database.

#### 3.4.2 Time series

In order to investigate the evolution over time of some metrics, **Time series** graphs are usually employed. They are useful to identify specific patterns and trends. In particular, you can visualize more metrics on the same graph. Then, similarly to Scorecards, it is possible to compare the metric evolution with previous periods. You can play with the different possibilities from the right panel, as usual.

**Question 5.** Include two time series to your report. The first one showing the evolution of views number by overlapping the selected date range with the corresponding previous period. For the second graph instead, represent the *Video Shares* trend with custom date range to show the whole database period, independently from the general date selector. In this case, from the style section, include also a reference line to compare the evolution with the mean value.

**TIP.** An effective chart should take into account all the details. Always check that the main elements are present and correct, including grids, legends, axis labels, etc... For better analysis, you can also decide to replace lines with bars from the style section.

#### 3.4.3 Pie chart

Probably one of the most popular graphs, the **Pie chart** is ideal for instantly clarify the data distribution according to specific characteristics. The implementation is simple, but you have several style options to play with. They are essential to better match the considered information and be consistent with the report purpose.

**Question 6.** When analyzing online traffic, it is important to understand the geographical origin. Use the pie chart to gain insights about the main countries in terms of total views. Finally, spend some time to tune the stylistic appearance. In particular, set the proper number of slices, shape and colours to make the graph clear and readable.

#### 3.4.4 Geographic chart and Google Maps

The most suitable strategy to successfully represent geographical data is certainly the use of maps. From the chart menu, you have different possibilities. By clicking on **Google Maps**, you will obtain a map you are probably more familiar with. In fact, also the street view option is available to make the chart extremely interactive.

Observe that Data Studio will automatically select the proper geographical dimension if present. However, it is interesting to notice how you can easily highlight different aspects by setting *Country Code* and *US State Code*. In fact, the database allows you to have a more specific overview of US within the map. Finally, you can evaluate the geographical distribution of all the available metrics.

**Question 7.** Support the previous pie chart with the standard *Geo chart* to include a world map about the number of views.

#### 3.4.5 Bar chart

The final important element is the **Bar chart**, which is useful for several analysis. The basic idea is clearly similar to the previous ones. In our case, we would like to test the horizontal bar chart for inspecting the US traffic.

Question 8. Place the chart into your report and select the US State Code dimension. Concerning this analysis, we are interested in the following metrics to have a complete overview: Video Likes, Video Dislikes, Video Shares and Likes Removed. Sort them according to Views. You should obtained a coloured multi-bar graph. However, the first entry has no label. Can you figure out why?

**TIP.** Never simply report the data! You should always check for consistency. In fact, information frequently requires to be filtered. Use the **Filter** section of the right panel to define a new filter, as in the example of Figure 7. Try to identify the proper rule for our case.

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Figure 7: Filtering menu

After the filtering process, you can customize the chart style and observe the final result. It is useful to infer interesting considerations about users response in different regions. This proves the importance of generating consistent reports. Companies and authors can deeply understand the performance by comparing different factors and feedback.

#### 3.5 Style and layout

At this point, we have explored the main elements of Google Data Studio. Organize the report layout to provide clear information by including the mentioned charts. If needed, from the **Page** menu, you can manage and add new pages to your report. Feel free to explore the other available functionalities to highlight any additional insights you consider relevant. Individually customise each single component to achieve a final project that is both pleasant and valuable. **Important**: test your final report in **View mode** by varying your selectors to check that everything has been correctly set. Eventually, you can download the PDF from the **File** menu. Figure 8 shows a possible solution.



Figure 8: Complete report example