

**Course Project**

**BAN140**

**Introduction to Data**  **Visualization**

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# Project Description:

All students must create a data story using **Tableau** that demonstrates their **data visualization and storytelling skills through the course**. While students are given the freedom to select content and execution, *all data stories must contain visualizations using Tableau. All data stories must serve one of two goals: to help the intended audience make data-driven decisions or convey meaningful impact information to an intended audience*. An accompanying project report should briefly contextualize the data story and explain its achieving one of the two intended goals.

To ensure that students are on track with their final project, the following completion deliverables will be enforced:

# Milestone deadlines

|  |  |
| --- | --- |
| **Project Milestone** | **Deadline** |
| **1. Find Your Data and Write your Data Plan** | **Follow as per the Blackboard instruction** |
| **2. Two charts, the main sentence and an "elevator pitch" video** | **Follow as per the Blackboard instruction** |
| **3. Narrated PowerPoint Slide** | **Follow as per the Blackboard instruction** |
| **4. Writing Data Report** | **Follow as per the Blackboard instruction** |
| **5. Interactive Data Story** | **Follow as per the Blackboard instruction** |

# Instructions:

* Four students can work together a one group/team to complete the course project. **Four students per group is recommended.**
* The project should be completed **in a group/team.** (students in the same group will receive the same mark).
* Please submit the submission file(s) through Blackboard. **Only one person must submit for the group/team, and only the last submission will be marked**.

## Milestone1: Find Your Data and Write Your Data Plan (7% of final grade)

Your Data Plan should be submitted through BlackBoard as a Pdf File (recommended, **.pdf**) or Word document (**.docx**).

Find a dataset that will serve as the basis for the other project milestones in this course (Narrated PowerPoint Slide, Writing Data Report and Interactive Data Story). This dataset should be located on an open data portal (i.e., publicly available data). The dataset can be on any topic you choose - ideally, pick one that's about something you're interested in and/or is about where you live. For example, find and download public data from open data portals such a[s data.gov a](https://www.data.gov/)[nd data.un.org.](http://data.un.org/) This will make it a lot more interesting to complete the milestones of this project. While your dataset can be from an international source, the column headings must be in English, and any website describing the data must be in English as well.

If you're having difficulty finding a dataset that fits the course project, here are a few general suggestions:

* **Crime Data**. Many city open data portals have detailed raw crime data, where each row is a single crime, with details on its date, time, location, offence type and location. This type of data provides various opportunities for analysis and visualization. If the place where you live doesn't have this type of data, try a city you used to live in or like to visit. For example, [https://data.torontopolice.on.ca/ ,](https://data.torontopolice.on.ca/)
* **Health Data**. Th[e Public Health Agency of Canada an](https://open.canada.ca/data/en/dataset?portal_type=dataset&organization=phac-aspc)d The U.S. Centers for Disease Control has several datasets measuring health and mortality ([https://data.cdc.gov/ )](https://data.cdc.gov/). There are different datasets covering things like obesity rates, physical activity, disease prevalence and cause of death. For most datasets, information is available both for different states and various years, allowing you to both compare regions and look at how things have changed over time. For Example, [Open Portal,](https://open.canada.ca/data/en/dataset?res_format=CSV&organization=phac-aspc)  [Chronic Diseases](https://www.canada.ca/en/public-health/services/chronic-diseases.html)
* **International Data**. The World Bank has a very detailed open data portal [(https://data.worldbank.org/indicator )](https://data.worldbank.org/indicator) that compares countries on various indicators over time. Much like the CDC data, these datasets allow for interesting regional comparisons as well as looking at how things have changed over time. One nice thing about the World Bank data portal is it even provides some basic visualizations right on the dataset page, so you can get some initial ideas of how you might visualize the data and if the dataset shows any interesting patterns.

### Deliverables, Your Find Your Data and Write Your Data Plan milestone should include:

Write a brief (750-word maximum) report that includes the following questions and your answers to them. **Write each question in your report**, followed by your response:

**Question 1.** What dataset will you use for your course project? (describe your dataset, and either include a link to where I can find it online or submit it as a spreadsheet along with your report).

**Question 2.** Describe the dataset. What kind of data does it contain?

**Question 3.** Is there anything about your data that you don't understand? (i.e. what a column heading means)? How will you find this out?

**Question 4.** What are some questions you hope to answer with your data? List at least **three** (you don't need the answers to the questions at this milestone of the course project).

### Some things to keep in mind about this milestone:

* Review the requirements for the other milestones in this project carefully to ensure that the dataset you choose is rich enough to allow you to do a detailed, in-depth analysis on it for the remainder of this project. Generally speaking, "**summary data**" that is only a few dozen rows long is probably not sufficient. **Raw data (hundreds or thousands of rows) is better**.
* That said, you should generally try to avoid data that is ***too*** big. Most newer versions of Excel can't open files that are much bigger than a million rows. Tableau technically can open files that are 10 million rows or larger but, in practice, working with files that big will slow down your machine. **For that reason, a good rule of thumb is that you should pick a dataset that is less than a million rows**.
* The dataset you choose should be **raw data in spreadsheet format (XLS, XLSX, CSV)**. **It should NOT be a website with an online map or chart.** You need to access the raw data for this project to create your interactive chart.
* If the dataset you choose is from a specialized area (i.e. medicine, science, economics), make sure you explain it in a way that someone who doesn't know anything about the topic (including your fellow students and me) can understand what you're talking about.
* If in answering the questions above, you realize that the data you have is too complicated or you don't understand it properly, the best thing to do is to pick another dataset. ***Choosing an overly complex dataset will make the project more difficult and increase the risk of serious errors later.***

### Rubric

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Excellent (90-100)** | **Good (80-89)** | **Unsatisfactory (less than**  **80)** |
| Dataset  (25%) | The dataset selected meets or exceeds all the requirements outlined in this milestone. | The dataset selected meets most of the requirements outlined in this milestone has some flaws. | The dataset selected is not appropriate for this milestone. |
| Description  (25%) | The description of the dataset clearly and thoroughly explains what the dataset contains. | The description of the dataset does a good job of describing the dataset but leaves some important things out. | The description of the dataset does not do a good job of explaining what the dataset contains. |
| Limitations  (10%) | The limitations of the dataset are clearly and thoroughly explained. | The limitations of the dataset are partially explained, with some limitations not identified. | The limitations of the dataset are not well explained. |
| Questions  (30%) | All the questions posed on the dataset are well thought out and answerable from the dataset. | At least two of the questions posed on the dataset are well thought out and answerable from the dataset. | One or fewer of the questions posed of the dataset are well thought out and answerable from the dataset. |
| Writing  (10%) | The milestone report is very well-written,  with proper grammar, punctuation and spelling. | The milestone report is relatively well-written, with  a few grammar, punctuation and spelling errors that do not impede overall understanding. | The milestone report is not well-written, and several grammar, punctuation and spelling errors may disrupt understanding. |

## Milestone2: Two charts, the main sentence and an "elevator pitch" video (7% of final grade)

The charts for this milestone, along with the main sentence, should be submitted through BlackBoard as a Pdf File (recommended, **.pdf**) or Word document (**.docx**).

The charts should be pasted into the Word document rather than submitted separately as image files. And then, convert the Word document to a PDF file. The elevator pitch video should be submitted as a YouTube video. The URL for that video should then be pasted into the Word document before converting the file to a pdf file.

Read the following links about how to create an elevator pitch video. [How to Create an Elevator](https://www.thebalancecareers.com/elevator-speech-examples-and-writing-tips-2061976)

[Pitch With Examples](https://www.thebalancecareers.com/elevator-speech-examples-and-writing-tips-2061976)[, Crafting an Elevator Pitch,](https://www.mindtools.com/pages/article/elevator-pitch.htm#:%7E:text=An%20elevator%20pitch%20is%20a,30%20seconds%2C%20hence%20the%20name.) an[d The 7 Key Components of a Perfect Elevator Pitch](https://articles.bplans.com/the-7-key-components-of-a-perfect-elevator-pitch/)

### Deliverables, Your Two charts, the main sentence and an "elevator pitch" video should include:

In this milestone, you will show the results of your initial analysis of your dataset that you selected in the first milestone.

1. The **main sentence** (single sentence) should be identifying the most exciting/interesting thing you have discovered in your dataset. This sentence should intrigue the reader and make them want to learn more.
2. **Two static charts** created using **Tableau** illustrate key/critical insights you have discovered in your data. ***At least one of your two charts should support the statement made in your sentence.***
3. To accompany the charts and sentence, an "elevator pitch" video of **30-45 seconds** in which you are seen on camera explaining why the insights you've discovered are worth paying attention to the data. There should be nothing on camera except yourself (i.e. no slides, no charts). You should wear appropriate clothing as you attend course class in person and be seated in a desk-style setting as in-person course class (i.e. no lounging on the couch).
4. Each member of the group/team should view the two charts and record the three most visual items (or elements) that catch his attention in each chart. For example:
   1. Member-A: title, x-axis label, subtitle.
   2. Member-B: subtitle, data-mark, y-axis label,
   3. Member-C: …, …, …..
   4. Member-D: …, …, …..

Answer the following question

**Question 1. Is there any difference between the team members' visual hierarchies?**

**Answer Yes or No. Then, write a small paragraph explaining your answer.**

### Some things to keep in mind about this milestone:

* Make sure your charts have clear, engaging titles that contain the "**takeaway**" message you want your reader to have rather than a dry, technical description of what the charts are visualizing.
* *Review the Data Visualization Best Practices discussed in class and make sure your charts follow those guidelines.*
* Show your charts to someone unfamiliar with the data (like a friend or family member) and see if they can understand what you're trying to say.
* If you're recording your elevator pitch on your **smartphone**, hold your phone horizontally rather than the usual vertical orientation, so that your video won't have black bars on the sides when you upload it to YouTube.

### Rubric

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Excellent (90-100)** | **Good (80-89)** | **Unsatisfactory**  **(less than 80)** |
| Two Charts  (30%) | The two charts clearly illustrate key insights from the student's dataset and follow the Data  Visualization Best Practices discussed in class. Charts have clear, engaging titles that contain a strong  "takeaway" message. | The two charts illustrate some insights from the student's dataset and follow most of the Data Visualization Best Practices discussed in class. | The two charts do not illustrate key insights from the student's dataset and/or do not follow the Data  Visualization Best Practices discussed in class. |
| Lead/Main  Sentence  (25%) | The main sentence clearly and concisely illustrates the most interesting thing in the student's dataset in a way that makes the reader want to learn more. | The main sentence illustrates something interesting in the dataset but is not written as clearly and concisely as it could be. | The main sentence does not do a good job  of identifying something interesting in the dataset and/or making the reader want to know more. |
| Elevator  Pitch Video  (35%) | The elevator pitch video demonstrates superior oral presentation skills, getting the viewer excited about the dataset and engaged in the topic. | The elevator pitch video demonstrates solid oral presentation  skills, though there is  room for improvement. | The elevator pitch video does not demonstrate good oral presentation skills. The message is unclear and/or hard to follow. |
| Question Visual hierarchies  (10%) | The question-answer is well thought out based on the course topics discussed during the lectures. | The question-answer is good but can be improved and related to the course topics discussed during the lectures. | The question-answer does not contain a solid reflection for the course topics discussed during the lectures. |

## Milestone3: Narrated PowerPoint Slide (7%)

You will produce a short PowerPoint slide deck explaining some key findings of your data and a clear recommendation about what action should be taken as a result of your analysis. You will then narrate those slides to produce a recorded presentation **between 10 and 15 minutes** long. The PowerPoint file (**.pptx**), with your narration attached, should be submitted using the BlackBoard.

### Deliverables, Your presentation should include:

* Between 10 and 15 slides.
* The charts in your slide can include those from the previous milestone. If so, make sure you incorporate any feedback you received from the instructor about making those charts better, if any.
* Your first slide, which will appear on the screen before your narration begins, should identify who the **audience** for your presentation is. In most cases, you should envision your audience as the head of an organization that you work for (i.e. a business, a government agency, a charity) that needs to make a decision based on your analysis.
* Your presentation should include **at least four static charts** that you've created in Tableau based on your data, though you can include more charts if you wish. I recommend pulling your charts into a Dashboard before exporting them from Tableau as static charts. This will allow you to size them in the best way possible for your slides rather than just using the default layout on a Tableau Sheet (which, for some charts, may look squished on a PowerPoint slide).
* Your slides should include **some visual elements other than static charts** that help illustrate your points and maintain viewer interest (i.e. photographs, clip art, etc.)

### Somethings to keep in mind about this milestone:

* Your narration only needs to be oral. The only thing that needs to be on screen is your slides. You do not need to appear on video in the corner.
* Please avoid transitions or reveals on your slides (i.e. bullet points appearing one after the other, one image being superimposed on top of another, things sliding in from the side). Each slide should appear on its own, in its entirety, while you're talking.
* Remember that people may be viewing your presentation from the back of a room. Make sure everything is **big enough** for people to see.
* Your presentation should be more than just **reading your slides**. Instead, your slides should be relatively minimalist, showing key images, key ideas or key charts that you then enrich with your oral presentation.
* You can find instructions for how to turn your PowerPoint slides into a narrated presentation from this [link ,](https://support.microsoft.com/en-us/office/record-a-slide-show-with-narration-and-slide-timings-0b9502c6-5f6c-40ae-b1e7-e47d8741161c?ui=en-us&rs=en-us&ad=us) [link,](https://support.microsoft.com/en-us/office/video-record-a-presentation-2570dff5-f81c-40bc-b404-e04e95ffab33) and [link.](https://www.online-tech-tips.com/ms-office-tips/how-to-add-audio-narration-to-a-powerpoint-presentation/)

### Rubric

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Excellent (90-100)** | **Good (80-89)** | **Unsatisfactory**  **(less than 80)** |
| Slide Number and Length  (20%) | The presentation has between 10 and 15 slides, is between 10 and 15 minutes long and has at least four charts. | The presentation is too short or too long but only by a couple of slides or minutes. | The presentation is significantly longer or shorter than it should be and/or does not have the required number of charts. |
| Charts (25%) | The charts used in the presentation clearly illustrate key insights from the student's dataset and follow the Data Visualization Best Practices discussed in class. The charts are appropriately sized to be easily read on the slides. | The charts illustrate some insights from the student's dataset and follow most of the Data Visualization Best  Practices discussed in class. | The charts do not illustrate key insights from the student's dataset and/or do not follow the Data  Visualization Best  Practices discussed in class. |
| Other Visuals  (10%) | The other visuals used in the presentation (clip art, photographs) are well chosen and help communicate the presentation's key points. | The other visuals used in the presentation (clip art, photographs) are OK, but there is room for improvement. | The other visuals used in the presentation (clip art, photographs) are not well chosen or are missing altogether. |
| Ideas and  Insight (25%) | The presentation makes clear, compelling points derived from the student's data analysis and makes a clear recommendation appropriate for the intended audience. | The presentation is reasonably straightforward and compelling but could be made more so. | The insights and ideas of the presentation are not clear and/or are poorly presented. |
| Oral presentation  (20%) | The oral presentation of the material is clear and engaging. The presenter speaks at a good pace, and key points are made effectively. | The oral presentation of the material is reasonably straightforward and engaging, but there is room for improvement. | The oral presentation of the material is ineffective. |

## Milestone4: Writing a Data Report (7%)

Your data report will be submitted through BlackBoard as a Pdf File (recommended, **.pdf**) or Word document (**.docx**). You will write a data report outlining the **key findings of your data analysis as well as suggestions for how your intended audience should respond to your findings**. This milestone will build on the findings in your Narrated PowerPoint Slide (the previous milestone), exploring them in greater depth.

### Deliverables, Your Data Report should include:

* **Be between 1,500 and 2,000 words long**.
* Given its (relatively) short length, your report does not need to include a table of contents, executive summary or bibliography. You can use headings for different sections to make the organization of your report clear (i.e. write "Recommendations" above the section where you provide your recommendations). But think of this milestone as a (relatively) brief analytical report rather than a long, detailed report with multiple parts.
* Include at least six (and no more than 10) static charts. The charts in your report can include those from previous milestones. If so, make sure you incorporate any feedback you received from the instructor about making those charts better, if any. Your charts should be sprinkled throughout your report, as close as possible to the text they relate to. This makes it easier for the reader to digest than having all the charts at the back, in a "Figures" section. Also, I recommend pulling your charts into a Dashboard before exporting them from Tableau as static charts. This will allow you to size them in the best way possible for your report rather than just using the default layout on a Tableau Sheet (which, for some charts, may look squished in a written report). Also, pay attention to the size of your titles and labels: You may want to make them bigger to make them easier to read.
* At the top of your first page, include a brief description of who the **intended audience** for your Data report is.
* Reference **at least three outside sources** (studies, news articles, reports) that put your data into **context**. For all external sources used, you should briefly summarize what the outside source says, explain how it's relevant to your data, and include a hyperlink to where the source can be found online.
* Your report should include a **clear recommendation** for your audience of what steps they should take in response to your analysis. Base this suggestion on who your intended audience is and what they are in a position to do in response to your analysis. For example, a CEO could hire more staff. An advocacy group could create a new awareness campaign.

### Rubric

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| --- | --- | --- | --- |
|  | **Excellent (90-100)** | **Good (80-89)** | **Unsatisfactory**  **(less than 80)** |
| Length  Requirements  (20%) | The report is between 1,500 and 2,000 words and has at least six charts. | The report is too short or too long but only by a few hundred words and/or four or five charts. | The report is significantly longer or shorter than it should be and/or it falls well short of the number of required charts. |
| Writing (20%) | The report is very wellwritten, with proper grammar, punctuation and spelling. | The report is relatively well-written, with a few grammar, punctuation and spelling errors that do not impede overall understanding. | The report is not wellwritten, and several grammar, punctuation and spelling errors may disrupt understanding. |
| Ideas and  Insight (20%) | The report makes clear, compelling points derived from the student's data analysis and makes a clear recommendation appropriate for the intended audience. | The report is reasonably straightforward and compelling but could be made more so. | The insights and ideas of the report are not clear and/or are poorly presented. |
| Charts (20%) | The charts used in the report clearly illustrate key insights from the student's dataset and follow the Data Visualization Best Practices discussed in class. The charts are appropriately sized to be easily read within the report | The charts illustrate some insights from the student's dataset and follow most of the Data Visualization Best  Practices discussed in class. | The charts do not illustrate key insights from the student's dataset and/or do not follow the Data  Visualization Best  Practices discussed in class. |
| Outside  Sources (20%) | The Memo refers to at least three outside sources that are  well summarized and effectively put the data into additional context. | The outside sources referenced in the report are adequately summarized and put the data in some context but the sources could have been chosen with more care. | The outside sources referenced in the report do a poor job of putting the data into additional context and/or there are not enough outside sources cited. |

## Milestone5: Interactive Data Story (7%)

Using **Tableau**, you will create a "**Data Story**" that uses maps and charts — some interactive, some not — to explain the results of your data analysis and **anticipates** the user's questions about your data. Your Data Story should be submitted through Blackboard as a *Tableau Packaged Workbook (.twbx) file,* ***NOT*** *a Tableau Workbook (.twb) file*.

### Deliverables, Your Data Story should include:

* Include **at least five "Story Points"** (and no more than 10) that tell a data story in sequence using Tableau's built-in navigation bar.
* Each Story Point should include **at least one chart or map** but can also include other elements such as **images** and **text**. Multiple Story Points can use the same Dashboard if you want to use Filters or Highlighters to focus on different elements of your data (i.e. different highlight locations on a map, show a breakdown for different categories). However, your Data Story should include **at least three** unique Dashboards (i.e. the whole Data Story shouldn't just be one Dashboard with different filters applied).
* The charts in your Data Story can include those from previous milestones. If so, make sure you incorporate any feedback you received from the instructor about making those charts better, if any. You should make sure any charts you use in your Data Story are pulled into a Dashboard first, so you have more control over how it's laid out. Any "static charts" in your Data Story should also include **tooltips** so that users can learn more about a given data point.
* At least one-Story Point should include a map or chart that can be **altered by the user using a Filter or Highlighter.** In situations where the user can choose from many different options, consider using **preset** filters to draw the user's attention to the most interesting patterns in your data.
* The dimensions of the Data Stories should be **no larger than 1000 x 800 pixels** (the default for "Desktop Browser") but can be smaller if you wish. NOTE: The default "Story" dimensions (1016 x 964) are larger than this but too big for viewing properly on most laptop screens. **Ensure all Dashboards are appropriately sized for your Data Story (using "Fit to Story"). Hence, there should be no scrollbars on your Data Story.**

### Some things to keep in mind about this milestone:

* Don't overdo it with interactivity. Only one-Story Point needs to include an interactive element (i.e. a Filter or Highlighter). And you can use preset filters to show different views of that same interactive Dashboard over multiple Story Points.
* Re-using the best charts from your Data Report and PowerPoint presentation can be a useful way to help explain the key findings in your data. Making a chart interactive doesn't necessarily make it better.
* The main message of your Interactive Data Story can be the same as the message in your PowerPoint Presentation and Data Report. You don't need to come up with a brand-new topic. You're just communicating that same message in a different medium and adding some interactivity to allow your audience to "drill down" into your data to answer additional questions about the data.
* Some datasets lend themselves to more than one interactive Dashboard and some students are more comfortable with Tableau's interactive features than others. If you want to have more than one interactive feature in your Data Story, that's great. But you don't need to. Better to have one well-designed interactive Dashboard in your Data Story than three or four that don't work properly or don't reveal anything interesting about your data.

### Rubric

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| --- | --- | --- | --- |
|  | **Excellent (90-100)** | **Good (80-89)** | **Unsatisfactory (less than**  **80)** |
| Basic  Requirements  (15%) | The Data Story has at least five Story Points, and there is a chart or map on each one. At least three unique charts/maps are used in the Data Story. The Data Story is no larger than 1000 x 800 pixels and all Dashboards fit properly without scrollbars. | The Data Story is too short or too long but not by much and/or a chart/map is missing from a single-Story Point. | The Data Story is significantly longer or shorter than it should be and/or it fails to include charts on several Story Points. |
| Ideas and  Insight (25%) | The Data Story makes clear, compelling points derived from the student's data analysis. | The Data Story is reasonably clear and compelling but could be made more so. | The insights and ideas of the Data Story are not clear and/or are poorly presented. |
| Charts (35%) | The charts used in the Data Story clearly illustrate key insights from the student's dataset and follow the Data  Visualization Best Practices discussed in class. | The charts illustrate some insights from the student's dataset and follow most of the Data Visualization Best Practices discussed in class. | The charts do not illustrate key insights from the student's dataset and/or do not follow the Data  Visualization Best Practices discussed in class. |
| Anticipating  Questions  (25%) | The Data Story, in particular any charts that permit Filtering or Highlighting, does an excellent job of  anticipating the questions a viewer may have about the data and makes answering those questions possible. The most interesting findings are | The Data Story has some interactivity that permits the user to answer their  own questions, but  it is not  implemented as effectively as it could be. | The Data Story does not permit the user to answer their own questions through Filtering or Highlighting, or it is done so poorly as to make it impossible for the user to answer their own questions about the data. |
|  | highlighted through the use of **preset** filters. |  |  |