Intro

We decided to make 5 separate dashboards, one for each of the questions listed in the exam tasks document. And we are going to address each dashboard in separate paragraphs.

Project theme
We set out to have a continuous theme on all our dashboards in order to make them feel connected, as well as to make it easier for the reader when they are kept consistent with one another and adhere to the same style of highlighting.

We decided to use the official color theme for Høyskolen Kristiania as our main color palette. Although red is often used to indicate something negative, we feel that in the given context it should be clear that we have made use of the color to highlight Høyskolen Kristiania and not to highlight a decline or a negative. We have assigned a general shade of grey to all the other universities as we're not that interested in each individual university, but rather where Kristiania ranks in comparison to them.
In the dashboards the background is a dark gray with Høyskolen Kristiania's infamous "HK Hovedrød" as the highlight color to draw attention to the things we wanted to present.
Throughout the solution we tried to remove unnecessary scaffolding and dampen text information that is not essential, but it is still relevant information to the dashboards. We have tested the color theme and it passes the different color-blind tests.

All the dashboard titles, subtitles, labels, and tooltips have their own sub theme where we used a set of font, colors, and sizing for them across all dashboards. This is also to make everything stitch nicely together.

Intro

Dataset 1

This dataset contains data of answers to a survey. Each student answering is logged. The data for each student is a score on multiple questions that was in the survey, what school they are from, what study program they are enrolled in, how satisfied they are with their choice of study program and so on.

There are a lot of different genres and criteria in the survey and as a result there is a lot of data to choose from when creating a dashboard. It was our task to look over the data and pick what we felt was most relevant to showcase to Kristiania's higher management in order for them to get a clear view of how the school is doing compared to the rest of Norway and where the focus should be when looking to improve on certain aspects.

a) Assess how Kristiania is doing as compared to other universities and colleges on the various quality dimensions (Dashboard 1)

When comparing different universities on the survey results, we chose to use a bar chart. Our reasoning behind this is that the results are measured on a scale of 1 - 5, and there are a total of 38 universities. Numerous results were quite close, and we figured a bar chart would be the easiest way to differentiate between certain universities. It is also well suited to the needs of the readers as you can quickly see where a certain university is located on a given subject, especially when sorting by ascending or descending.

The dashboard compares all the universities, colleges and Kristiania on the same sheet. We have sorted each sheet by highest rank, descending. Høyskolen Kristiania is very easy to spot given the red color. In contrast, the other universities are colored in a single shade of grey. We have made use of all the survey questions with 1 - 5 rating and used them to compare Kristiania to the other universities. A problem quickly occurred as there was a great deal of comparisons to be made and it would make it incredibly difficult to read a dashboard that showcases all this information at once. In order to solve this and make the dashboard look as visually pleasing as we could, we added a navigation bar where the user can click on the various quality dimensions. This way the user has more control as to what is being shown on screen and there is not an overload of data to process all at once.

The navigation bar is set to change the parameter value by sending the value of the category selected to the parameter using Parameter Action. The title and the sheet are made by using a calculated field that chooses data based on the selected parameter. When the user changes

parameter the sheet data and title changes accordingly, and as a result we can fit a lot of visualizations on the same dashboard without cluttering it.

We made a calculated field to display the average scoring across all the survey questions we used.

There's also a short, calculated field to get the sorted index number of the universities rank in each category, so we could add it to the tooltip when hovering the bars.

***Meaningful insight* (1):** *On "Average" we calculated the average score from all the survey questions with 1-5 rating. Here we can see Høyskolen Kristiania sitting on 25th place among 38 schools. Thats in the bottom half. So, if you want to score higher you might want to change some things.*

***Meaningful insight* (2):** *On "Feedback" (How students rate feedback on assignments), you can see Høyskolen Kristiania scoring third lowest of all schools in this dataset. Only "Handelshøyskolene" are worse.*

b) Identify their best performing and worst performing study programs (Dashboard 2)

Before we began creating sheets and designing the dashboard, we had a talk about what data we wanted to use to measure what would be considered the "best" and "worst" study programs at Høyskolen Kristiania. We narrowed it down to eight categories:

> *Note: These are the descriptions from the excel sheet.*

- Campus: Physical learning environment and infrastructure.
- Digital tools: Use of programs/tools for teaching and competence of staff to use it.
- Feedback: Degree to which students get feedback on their work.
- Inspiration: Degree to which the program is motivating, challenging and stimulating.
- Organization: How is the study program organization.
- Self-study: Degree of student effort and preparation.
- Teaching: Degree to which teaching is engaging and effective.
- Work relevance: Relevance to work, project with industry, guest lectures, etc.

The data can be analyzed and utilized to improve the worse performing study programs by looking at the best performing programs and deciphering what they do differently on the measured criteria.

Originally, we intended to create a pie chart as our means to compare between the best and worst performing study programs. The reason behind using a pie chart is that they are very easy to read

when there are few measures and since the dashboard is made for "higher management" we thought it perfect to use something simple that does not show too much information at once.

When we set off to create the first pie chart, we ran into the first problem almost immediately. Our idea was to simply filter the average of the given category, example "Campus", by "Institution name", choose "Høyskolen Kristiania", filter by top 1 Campus average and then add "Study Program" and filter this by top 1 Campus average as well. When we applied both filters, no data appeared on the screen anymore and we realized that this is not going to work as we intended. Our solution to this problem was to apply our programming knowledge and create several calculated fields to assist us.

Once we had finished the first sheet and pie chart, we realized that in this state the pie chart was underwhelming, and we needed to do something to make it appear more enticing. We had a quick discussion and played around with different graphs and ideas. We then got the idea for a donut chart, instead of a pie chart. It was a rather simple transition as all we had to do was to add the same "Dataset-1" measure to "rows" and activate "Dual axis". We then activated ''Synchronize axis" and played around with the size and colors until it looked right.

With the target audience in mind, we feel like the dashboard is very visually pleasing and we have attempted to fit the necessary information while simultaneously keeping it very simplistic and readable, without undesirable clutter.

Meaningful insight *(3): We added the description from each category as a subtext to each category-title to easily identify what criteria the student survey was based on; without the extra detail it can be difficult to work out what the categories represent.*

Meaningful insight *(4): At face value the donut chart will show the key statistics as requested by the task. However, if you want some more information that could be relevant in a comparison, you can simply hover over the center of each donut chart and the tooltip will give a couple more interesting points to look at.*

Meaningful insight *(5): You can clearly see "Bachelor of 3D Graphics" representing over half of the top scorings. While "Bachelor in Information Technology – E-Business" represents half of the worst scorings.*

Dataset 2

In Dataset 2 there are a few things we noticed that we felt we had to go through.

We noticed there was absolutely no data for E-Business in Bergen, which was strange as E-Business in Bergen is also enrolled in Visual Analytics.

> We decided to leave it as is but felt the need to mention it.

The session names are not consistent, and they have different names. There is no release timestamp for the videos, so there is no way to know the order of them without manually checking canvas.

> We wanted to show the data in order in some of the dashboards, so we decided to make our own attribute where we added it manually for each lesson in the order they were released.

There is no video length data, so there is no way to normalize view time for video length, without manually going to each video and putting them in the dataset ourselves.

> We really wanted to be able to use percent of videos watched, especially since there is such a big difference between the study programs in number of students. Our solution was to add another attribute that gives every lesson a length in minutes (manually checked on canvas).

There are 150 entries in the dataset with unique students (*Student-573* to *Student-725*) viewing the same lesson (*Lecture01_Practicalities*) for exactly 0 min. With no other entries for that same student.

> We chose to interpret this as just adding all the students, who has not viewed any video, to the end of the dataset. And just using the first lesson as the *Session Name* to not leave any attribute record empty.
>
> This will give 150 extra students, with no view time, for only that lesson.
>
> We think the reason for so many students with no view time can be that they have dropped out of the study program, or simply did not watch any videos.
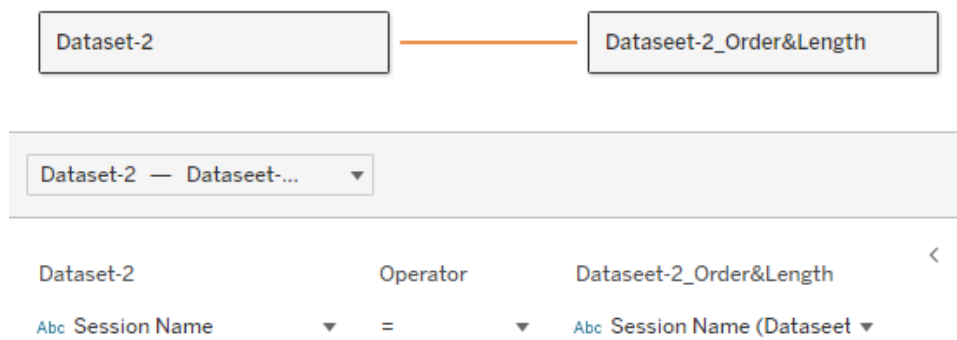
Sometimes students have watched videos for more than the actual length of the video. This will show up as "viewed video over 100%".

> This probably just means that the student has watched the video again or reminded a little bit. This might give some strange results sometimes.

To make way for better and more precise data visualization, we made another page in the excel file. This one is called "Dataset-2_Order&Length". The page includes all the different video sessions, length of each video, and number for the order they were released to students.

	A	B	C
1	**Session Name**	**Session Order**	**Video Length in Minutes**
2	Lecture01_Practicalities	1	35,88
3	Lecture01_Live_Recording	2	69,95
4	Session 1 - intro	3	29,42
5	Session 1 - exercises	4	16,27
6	Introduction to Data Visualization - Part 1	5	13,50
7	Introduction to Data Visualization - Part 2	6	17,78
8	Introduction to Data Visualization - Part 3	7	9,58
9	Session 2 - intro #1	8	20,25
10	Session 2 - exercise #1	9	8,00
11	Session 2 - intro #2	10	14,60

In tableau we added a relationship between '*Dataset-2*' and the new table '*Dataset-2_Order&Length*'. And to make tableau able to use data across tables, we joined the two tables on '*Session Name*'.

Dataset-2 ——— Dataseet-2_Order&Length

Dataset-2 — Dataseet-...   ▼

Dataset-2	Operator	Dataseet-2_Order&Length
Abc Session Name ▼	= ▼	Abc Session Name (Dataseet ▼

a) Assess performance of lectures and exercise sessions (Dashboard 3)

To help course managers and teachers see how the video lectures has performed for the given time period, we decided to make a dashboard showing all the videos from the lecture. We used bar chart to display the length of the videos in comparison to each other. Then we put average time spent watching each video as red bars on top of their corresponding video. This way makes it simple to see where the long videos are, where the short videos are, and the general consumption of each video.

We added a Compact List in the top right corner to filter the bar chart. The filter shifts through parameter values which in turn is used in calculated fields to color the bars. This is a complicated workaround (which should have been built in the program), but we achieved the result we wanted. Now we have the ability to highlight only the bars/videos with either an average video watch percent of 50 % and under, or 50 % and over.

Meaningful insight (6): When applying the filter, you can see there is a high tendency for longer videos to get watched less percent of their length, compared to the shorter videos.

In addition to the bar chart, we added a couple donut charts and two text boxes to add some, more specified, information and to make the dashboard feel more complete. These additions pretty much speak for themselves in the title as to what they represent. But to clarify any confusion, they are a collection of displays showing top and bottom values in different categories. First, top left is the video with the highest average percent of the video watched, with the percent displayed in the donut chart, and its name and length described beneath. The rest follow the same setup except with the lowest view percent, longest video, shortest video, highest total minutes of single video views, and lowest total minutes of a single video viewed.

Meaningful insight *(7): Here you can also see that the video with most combined minutes viewed from all students is far from the longest video. So, a takeaway for any teacher might be to spend less time in single lectures and rather spread it out over more, but shorter videos. That is, if the goal is to make the students watch more of the videos.*

b) Compare different study programs (Dashboard 4)

To start with this dashboard, we were a little stuck with how to build it. On one side we thought that to compare different study programs the best way would be to make it similar to "Dashboard 1". But we wanted to try alternatives, to challenge ourselves and show off other ways of doing the job. We eventually landed on the idea of comparing just two and two study programs at the time.
We tried doing it one on the left and the other on the right. But it didn't look the best. Instead, we split them in the middle and moved one to be at the top and one to the bottom. This way there was more horizontal space to work with which we thought looked better.

To make it possible to compare every study program against every study program we had to make two of every chart. That way, we can use separate filters to update all the charts with information for the selected study program.

For each side we have a waffle chart visualizing all the students in the study program as a circle for each student. This was purely made for trying to make a visual way of interpreting how big the different classes are. And there should be a number in the title displaying the number of students, but we couldn't for the life of us figure out how to make it work while keeping the dots as they are. Eventually we managed to make the tooltip display the number of students on the last dot. Not optimal but this is not professional so why not.

Continuing the charts, we have a donut chart showing how many of the students in each study program attended school. By attending school, we mean watched any of videos. We added tooltip

describing each half of the chart as either the percent that watched at least one video, and the other percent which didn't watch any video at all.

Meaningful insight (8): From the "Percent attending school" doughnut chart we can see there were a relatively high percentage of students that didn't watch a single video at all through the entire course.

Furthermore, there is a text box displaying the total amount of time the students have watched videos throughout the course. This mostly varies based on the number of students in the classes, but there are some who stands out of the norm.

At the far right in the dashboard there is a simple line graph showing the Moving Average of the Average Minutes Viewed each week. The moving average is solely to smoothen out the graph so the end user can get a better overview of the viewing pattern over the entire course.

Meaningful insight (9): We can see from this graph that there are some studies that tend to watch more towards the end while other do the opposite.

This comparison might not be the best as you are unable to compare more than two study programs at the same time. However, we made this with the intention of comparing two and two against each other as the main goal.
There are also a lot of different visualizations on this dashboard that may make it look a little cluttered, but we wanted to try multiple types to make it interesting.

c) Analyze the viewing patters across the weeks, days, and time of day (Dashboard 5)
To analyze the viewing patterns, we decided to use line graphs, as they are very efficient at comparing and analyzing data. The data we are analyzing are hours viewed per week and time of day, total amount of hours viewed per week and average minutes viewed per week.

This dashboard has the most basic design out of all our dashboards. We did not see the need to overcomplicate it or try to add extra charts as it does exactly what is requested in the task. There is not a lot of data to process, which makes the dashboard very understandable and easy to read. We added three graphs that display the data we set out to analyze. One graph is used to show days of the week and time of day, another graph shows total hours viewed per week and the last graph shows average minutes viewed per week.

We found it somewhat challenging because we felt the dataset lacked options and offered few measures that could be used to analyze the viewing patterns. We do feel like we did a good job with

the data we had at our disposal, and it is possible to see trends and viewing patterns with the graphs we have created.

The dates on the weekly chart range from January 31st to April 11th. We are aware that the data was supposed to be from February 3rd to April 13th, however, if we manually change the dates to start at February 3rd, the final date on the week chart will be April 7th and the daily chart will start with Thursdays rather than Mondays. We changed it for a little while, but the data feels less comprehensible and tidy, so we changed the dates to the automatic setting.

Meaningful insight (10): You can instantly see the viewing pattern. Thursday is day most people tune in to watch the lecture, followed by Friday. Not that surprising considering Thursdays and Fridays are the scheduled days for lectures and exercises. Students spend the least amount of time during the weekends. Monday, Tuesday and Wednesday are all close to one another when it comes to watch time per week. To see the exact time of day and hours watched, hover over the line graph and look at the tooltip.

References:

Note: This is the only reference we have, everything else was made by ourselves.

Bernard. "Tableau Tips: Top/Bottom N Members (Index(),Size(),Integer)." *Rigor Data Solutions*, Rigor Data Solutions, 17 May 2021, https://www.rigordatasolutions.com/post/2018/02/03/tableau-tips-topbottom-n-members-indexsizeinteger.