Assignment 3: What Data Shows and What It Hides - Two Visual Approaches to Student Mental Health

For this assignment two visual analyses are constructed from the Mental Health of Students dataset from Kaggle. The first is constructed from an analytical statistical view, examining patterns within the data, while the second takes a feminist perspective, focusing on excluded factors within the dataset in order to provoke emotional and critical reflection. Together the analyses bridge the gap between what data can show and what's invisible.

The dataset explores the relationship between academic life and student mental well-being. It consists of independent variables in the form of demographic traits such as age, gender, course of study, current year of study, CPGA, marital status and sought treatment (see Figure 1). These are used to predict binary dependent variables, indicating anxiety, panic attacks and depression.

Choose your gender	Age	What is your course?	Your current year of Study	What is your CGPA?	Marital status	Do you have Depression?	Do you have Anxiety?	Do you have Panic attack?	Did you seek any specialist for a treatment?
Female	18	Engineering	year 1	3.00 - 3.49	No	Yes	No	Yes	No
Male	21	Islamic education	year 2	3.00 - 3.49	No	No	Yes	No	No
Male	19	BIT	Year 1	3.00 - 3.49	No	Yes	Yes	Yes	No
Female	22	Laws	year 3	3.00 - 3.49	Yes	Yes	No	No	No
Male	23	Mathemathics	year 4	3.00 - 3.49	No	No	No	No	No
Male	19	Engineering	Year 2	3.50 - 4.00	No	No	No	Yes	No
Female	23	Pendidikan islam	year 2	3.50 - 4.00	Yes	Yes	No	Yes	No
Female	18	BCS	year 1	3.50 - 4.00	No	No	Yes	No	No
Female	19	Human Resources	Year 2	2.50 - 2.99	No	No	No	No	No
Male	18	Irkhs	year 1	3.50 - 4.00	No	No	Yes	Yes	No
Female	20	Psychology	year 1	3.50 - 4.00	No	No	No	No	No
Female	24	Engineering	Year 3	3.50 - 4.00	Yes	Yes	No	No	No
Female	18	BCS	year 1	3.00 - 3.49	No	Yes	No	No	No
Male	19	Engineering	year 1	3.00 - 3.49	No	No	No	No	No
Female	18	KENMS	Year 2	3.50 - 4.00	No	No	Yes	No	No

Figure 1. *Mental Health of Students dataset*

The first visual analysis approaches the data set from a conventional statistical view to identify patterns between students' academic demographics and their self-reported mental-health conditions (see Figure 2). The relationship between year of study and reported cases of depression, anxiety and panic attacks is visualised with a simple line plot showing the proportion of students reporting each condition across study years one to four. The visual plot was constructed in Python.
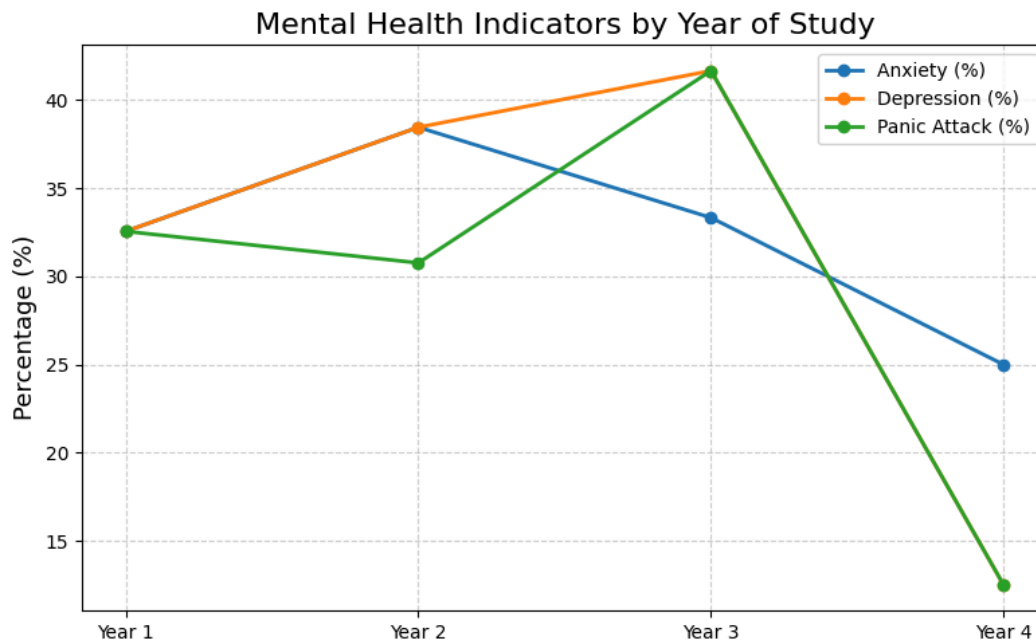
Figure 2. *The plot shows the percentage of students reporting cases of anxiety, depression and panic attacks by year of study.*

Through visual inspection it can for example be seen that no cases of depression are reported in the fourth year of study and the highest cases of panic attacks were reported by students from the third year of study.

The motivation behind this visual analysis was to explore if certain years of study corresponds to a higher degree of mental-health conditions. For example, can transitional years of study be challenging for many students. Being the first year where everything is new while starting up a new study while figuring out your identity in a new place and the last year where finals and figuring out the future after study can be challenging. The visual analysis highlights contrasts of mental-health conditions by presenting each mental-health condition with easily separative lines where positive and negative peaks are clearly identifiable.

The view constructed within this visual analysis is the view of an institutional or analytical observer, viewing students collectively through aggregated measures. The line graphs represent a reasoning for quantifying complex mental-health factors and simplifying individual experiences as comparable units. Aligning with what Drucker (2011) describes as the constructed nature of graphical displays, where visualizations do not simply represent data but actively shape how phenomena are understood. The indication of mental well-being with binary categorical variables within the data set in the form of yes/no responses loses the richness and variability of real mental-health experiences. The design choice supports analytical reasoning but is highly dismissive of nuance and contextual factors that cannot be explained with simple quantifiable variables.

The second visual analysis approaches the data set with a feminist and critical data studies approach. Instead of representing the simple and quantifiable variables within the dataset, this

approach focuses on the highly important factors which are not captured within the dataset. The figure shows a student outline with surface level variables that are included in the model. Underneath the student outline unmeasured, critical variables that explain mental well-being are shown as features that have not been included within the dataset. A bar with multiple page indicators is presented to show that numerous factors play a crucial role in explaining student mental health (see Figure 3).
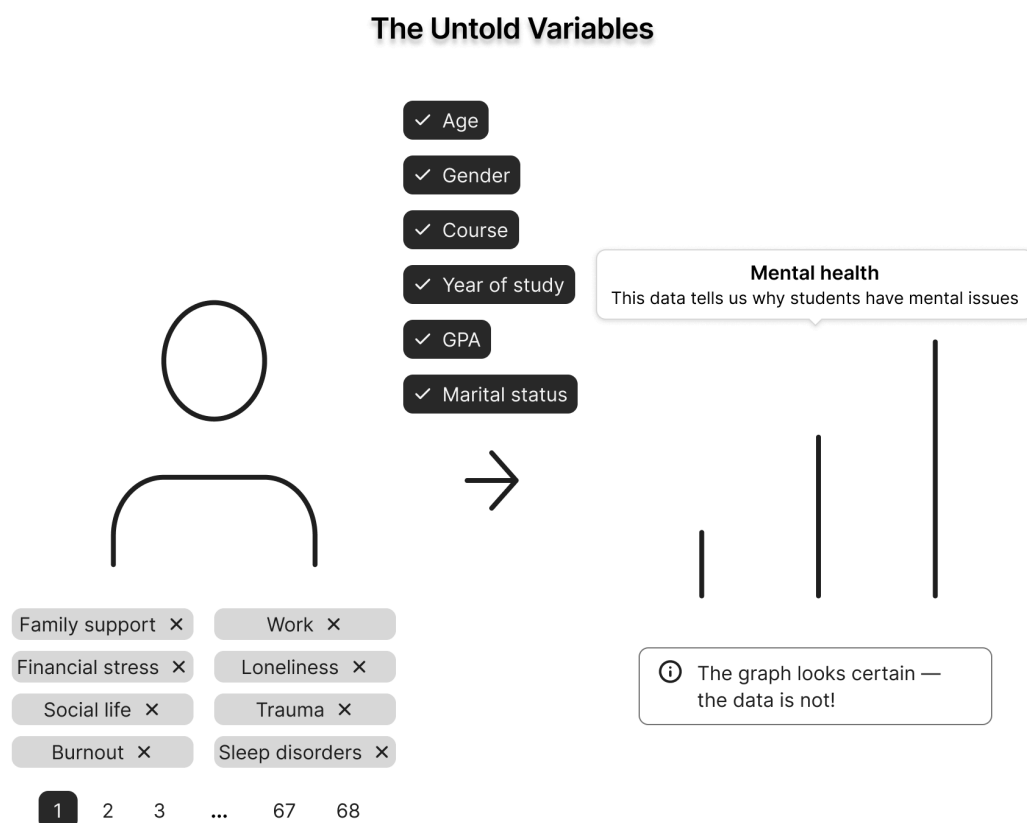

Figure 3. *Visual analysis showing the many crucial variables that are not captured or are untold within the dataset.*

The motivation behind this visual analysis is to show how complex mental health is and that so many factors or variables play a crucial role in understanding why a person suffers from a mental health condition. It cannot just be accessed from simplified demographic variables. Therefore this analysis is constructed to make these absences visible, drawing from feminist perspectives, which challenge claims of objectivity in data representation (D'Ignazio & Klein, 2020).

This visualization speaks from the students themselves, indicating that mental well-being cannot derive and be accessed from simplified quantifiable predictors. Furthermore, a perspective that indicates that a graph doesn't conclude a full picture, what's most important is the visible and invisible data that lies within and beyond the data.

Bibliography

Kaggle. Mental Health of Students Dataset. Retrieved from https://www.kaggle.com

Drucker, Johanna. 2011. "Humanities Approaches to Graphical Display" 5 (1). http://www.digitalhumanities.org/dhq/vol/5/1/000091/000091.html.

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