

HISP Data Project

Building a STEM data dashboard for UHI FE Colleges

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Introduction

A project to produce a data visualization of data relevant to STEM student enrolments across the Highlands and Islands, Moray and Perthshire has been commissioned by the University of Highlands & Islands. The Scottish Government's STEM Education and Training Strategy aims to boost education and training in Scotland. Its objectives are to enhance the relationship between STEM education and the labor market, close equity gaps in participation and accomplishment, inspire young people and adults to pursue STEM jobs, and increase capacity to deliver great STEM learning. The University of the Highlands and Islands (UHI) has 11 active FE colleges and centrally coordinates STEM involvement throughout UHI. The HISP region is distinctive in Scotland because of its vastness and rural setting.

Data visualization tools are crucial for analyzing massive volumes of data and making data-driven decisions in the age of big data. Dashboards enable businesses to harvest crucial data from many sources and present it in a user-friendly way (Tableau 2022).

Project Aim

To create a dashboard to help STEM providers in the Highlands and Islands STEM Partnership (HISP) to plan activities, understand pupil intentions, school enrolments, and demographic trends in STEM subject entrants at school, college, and university, and forecast future trends

Methods

The development of the dashboard followed a professional agile approach to the CRISP-DM process (Manasson, 2019) as can be seen in Figure 1. The agile methodology's adaptability made it possible to communicate progress and obtain feedback. The MoSCoW prioritisation technique was used to manage the requirements

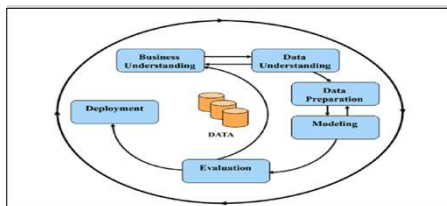


Figure 1 CRISP-DM Process Flow Diagram (Manasson, 2019)

Figures and Results

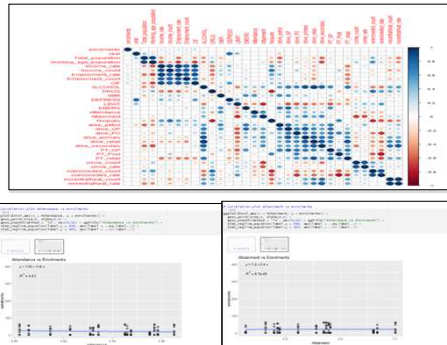
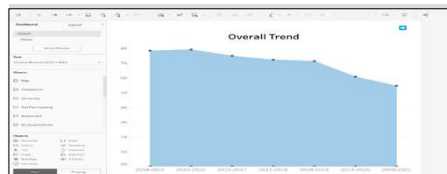


Figure 2 Correlation Matrix and pair plots

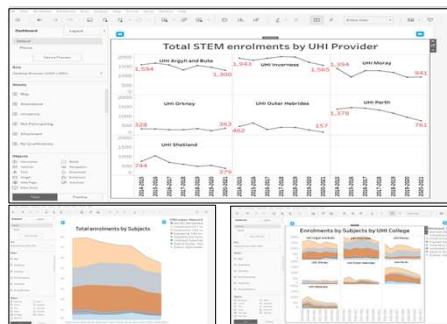
The SFC proprietary data was selected for the dashboards during the first stage of design, which examined viable open datasets. Along with the SFC data, SIMD 2016 and SIMD2020 were investigated to see if there were any correlations, and some intriguing insights were generated, as shown in Figures 2.



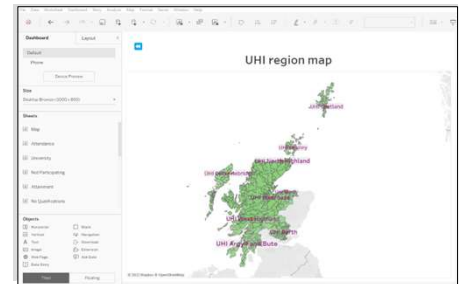
R shiny, Microsoft Power BI and Tableau were investigated to find the best tool for this project.

All the different forms of visualization charts were explored to find the best fit.

It was concluded that Tableau was most suitable for this project. Line charts, area charts and geographic maps were chosen as the forms of visualizations. Accessibility of the dashboards was also considered.



Conclusion



To summarise we can say that this is an exploratory Data Science project, and the outcome of this project can be used to determine future directions in data collection and sharing, access, and improved planning for the promotion of STEM professions.

Every such project ends, perhaps, with nostalgic views about the process and the lessons learned from it. At the end of the experience, the following lessons were learned: A good preparation is essential, Regular supervision meetings and adaptability to overcome hurdles.

Acknowledgments

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References

- Tableau, 2022. What is data visualization. [online]. Seattle: Tableau. Available from: <https://www.tableau.com/engb/learn/articles/data-visualization> [Accessed 26/05/2022].
- Manasson, A., 2019. CRISP-DM: Manage your Data Science Projects. [online] Towards Data Science. Available from: <https://towardsdatascience.com/why-using-crisp-dm-will-make-you-a-better-data-scientist-66efe5b72686> [Accessed 27 July 2022].