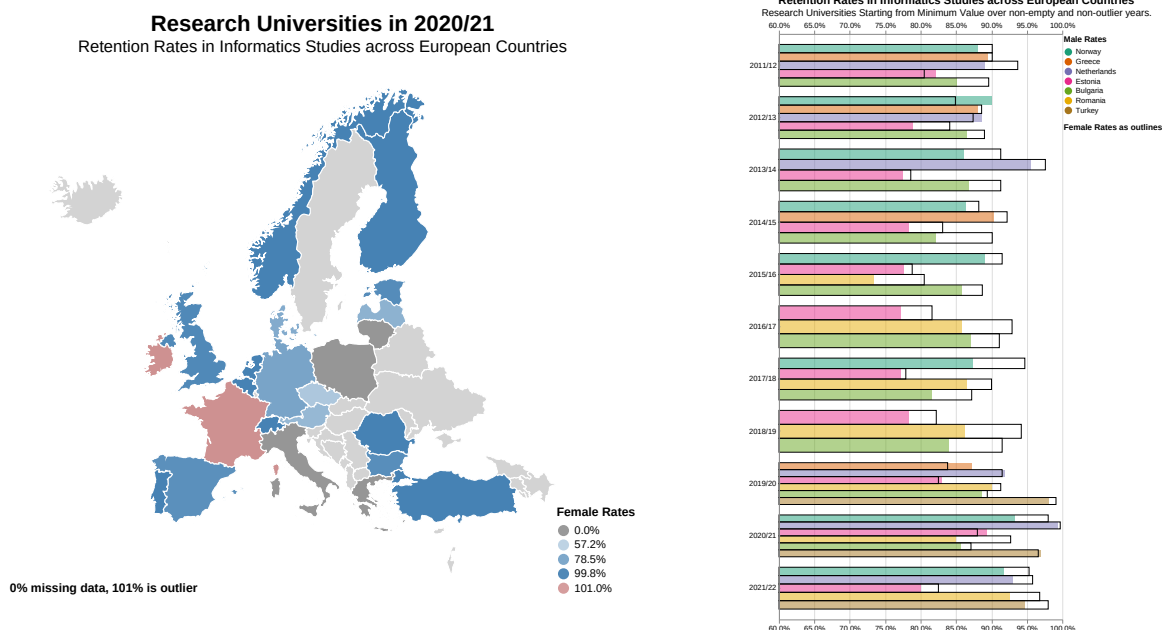


# Mapping Retention Rates in Informatics Studies across European Countries

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## 1 Introduction

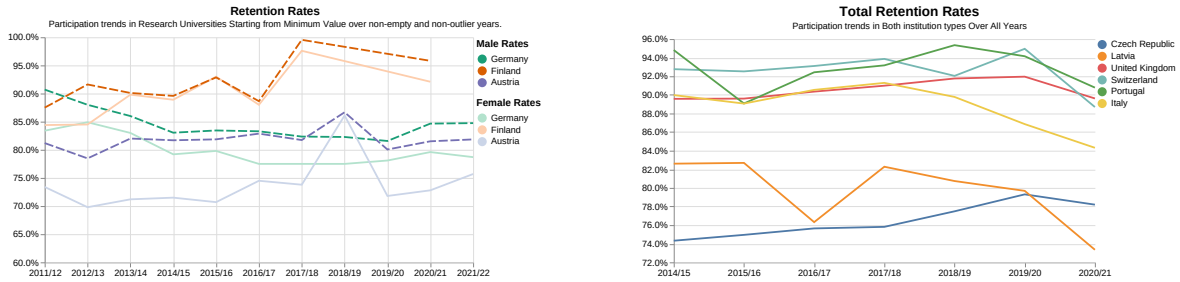
This study investigates the factors influencing student retention rates within European informatics programs. This study develops interactive dashboard to analyze retention data across diverse European countries. By using national educational statistics, surveys, and institutional reports, from Nitto et al. (2023) we aim to create a comprehensive picture of informatics education retention. These interactive visualizations, built upon Vega framework and JavaScript, provide a dynamic platform for users to explore complex datasets. This facilitates deeper understanding of retention trends within the European informatics education landscape.



**Figure 1:** View on the interactive visualization parts

The study also examines how retention rates differ between men and women. It examines the impact of the COVID-19 pandemic on retention rates and hypothesizes different impacts due to the disruption of the pandemic. In addition, it examines whether clusters of countries share trends in student retention and seeks to uncover systemic influences. These findings serve as a basis for strategies to improve student retention in European computer science programs.

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**Figure 2:** View on the interactive visualization parts

## 2 Methods

The dashboard incorporates filtering options to enable focused exploration across various dimensions: Year Slider, drop-downs for genders and institution types. These filter options dynamically update all visualizations within the dashboard. In the interactive map users can zoom & scroll and shift + clicking on a country adds or removes it from a group displayed in the dynamic charts. The provided data models are computed by following given formulas:

- first model - Retention Rate:  $R = \frac{S[X + 1]}{S[X] - D[x] + F[x + 1]}$
- second model - Year-on-year Retention Rate:  $R = \frac{S[X + 1] - F[x + 1]}{S[X] - D[x]}$

where  $R$  is retention rate,  $S$  is amount of students in certain year  $X$ ,  $D$  is amount of graduated students for certain year  $X$  and  $F$  are first year students.

## 3 Results & Conclusion

The dashboard revealed key trends in the retention of computer science students in Europe. Based on the analysis from the first retention model, we've observed a small decrease in retention rates across several European countries in academic year 2020/2021 when the COVID-19 pandemic has begun. Although the overall analysis did not reveal any significant differences in retention rates between genders in Europe, examining specific countries and program types could yield more nuanced results. (Figure 2 on the left for male higher retention, and Figure 1 on the right for female higher retention) The provided data did not show significant clusters. However, the lower rates for Czech Republic are seen in all available data. The source code can be found at GitHub<sup>1</sup> repository.

In conclusion, this study and interactive visualization development provided valuable insights into the complex landscape of student retention in European informatics programs. Including additional year filters would allow users to explore historical trends and identify long-term patterns in student retention.

## References

Di Nitto, Elisabetta and García-Varea, Ismael and Jazayeri, Mehdi and Tamburri, Damian A. and Tikhonenko, Svetlana *Informatics Higher Education in Europe: A Data Portal and Case Study* 2023 doi: 10.1145/3591107

<sup>1</sup><https://github.com/danschnurp/kiv-vi>