

Abstract

Data Science is a multidisciplinary field that combines technical skills, domain knowledge, and analytical thinking to extract insights from data and solve complex problems. Data Science has applications in various domains, such as business, health, engineering etc.

In recent years there is a growing use of Data Science also in the areas of education, social sciences, and humanities. However, despite the growing demand for data scientists, there is a lack of diversity and inclusion in this field, especially among female students.

In this report, we intend to present the overall work that led to the creation of a Framework of competences in Data Science, which aims to provide a comprehensive and coherent set of learning outcomes and assessment criteria for data science education at the undergraduate level. The Framework is based on a literature review of existing data science curricula and competencies frameworks, as well as on the input of experts and stakeholders from academia and industry. The Framework covers different dimensions such as: data management, data analysis, data communication, and data ethics.

The following Report also includes the analysis of a questionnaire that measures the degree of skills, knowledge and Interest of students in Data Science of the Universities of Salento (Italy), Sannio (Italy), Oviedo (Spain), and Academia de Studii di Economice of Bucharest (Romania). The questionnaire was designed to assess the students' self-perception of their data science competencies according to the Framework, as well as their motivation, interest, and confidence in pursuing a career in data science. The questionnaire was administered online to a sample of 440 students from different disciplines and backgrounds.

The report has been divided into Four (4) parts: - The first part is dedicated to the analysis of the literature on the state of the art of the world of education to bring female students closer to Data Science.

We review the main challenges and barriers that women face in entering and advancing in data science careers, as well as the best practices and initiatives that aim to foster gender diversity and inclusion in this field. We also discuss the potential benefits and opportunities that data science can offer to female students from different disciplines and backgrounds. – The second part explores various case studies that apply methods and tools of data analysis to the humanities and social sciences. We showcase some examples of how data science can enhance the understanding and interpretation of cultural, historical, cultural, social, and economic phenomena. We also highlight the importance of interdisciplinary collaboration and communication between data scientists and domain experts.

The third part is dedicated to the presentation of the Questionnaire and the scale used – The fourth and last part is dedicated to the measurement of students' skills, Interest, Attitude in Data science. We present the results of the questionnaire analysis, focusing on the descriptive statistics, the reliability and validity of the instrument, and the differences among groups based on gender, discipline, country, and level of education. We also discuss the implications and limitations of our findings, as well as some suggestions for future research and practice.

Keywords: Graduates, Labour Market, Data Science, STEAM, Gender Gap, Structural Equation Models, Human & Social Sciences, Women in STEM, Gender diversity in data science, Data-driven solutions for gender equality, Gender bias in machine learning, Women in data science