



# Gender & Dropout Rates in UK University Computer Science Degrees, 2022

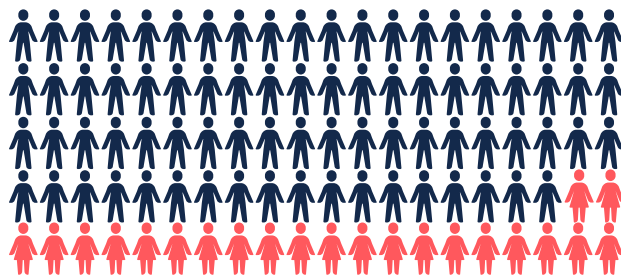
RESEARCH BY  
ZUAIRIA CHOWDHURY

# Introduction

For the second year running, The IN Security movement has sought to investigate computer science in the realm of education in the UK. We wanted to establish trends when it came to computer science students for GCSEs, A Levels, and undergraduate degrees. As before, we were especially interested in performing and underperforming universities, identifying non continuation (which we refer to as dropout) and employability rates.

According to UK Government research, two-thirds of cybersecurity enterprises need help finding

employees for technical cybersecurity skills. Since women make up only 22% of the cybersecurity workforce in the UK but account for approximately 40% of the UK full-time working population, increasing the number of women working in cybersecurity could help reduce the skills gap.



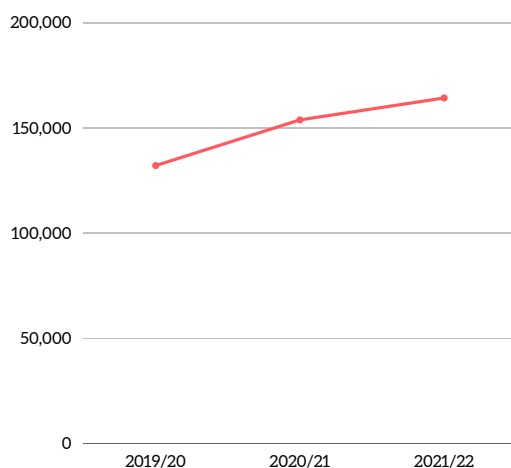
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1072767/Cyber\\_security\\_skills\\_in\\_the\\_UK\\_labour\\_market\\_2022\\_-\\_findings\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1072767/Cyber_security_skills_in_the_UK_labour_market_2022_-_findings_report.pdf)  
<https://researchbriefings.files.parliament.uk/documents/CBP-9366/CBP-9366.pdf>



# Computer science is a popular subject but still has the highest university dropout rates

According to BCS' research from 2022, in England, students taking computer science A Level rose by 17.6%. This was the largest increase of any A Level subject. Applications to study computer science undergraduate degrees also rose by 13%. This was also the largest increase of any subject offered at UK universities that year.

The latest research from HESA (HE student enrolments by subject of study and domicile, academic year's of computer science 2019/20 to 2021/22) illustrated below, also shows a climb:



These statistics show a rise in the number of students selecting computer science for their higher education. This increase bodes well for technology, including cybersecurity.

However, the most current HESA data on dropout rates reveals a high 9.2% for computer science in Higher Education compared to all other subjects. The Uni Guide shows multiple UK universities have a high dropout rate at 28%.

**9.2%**  
*computer science dropout rate*

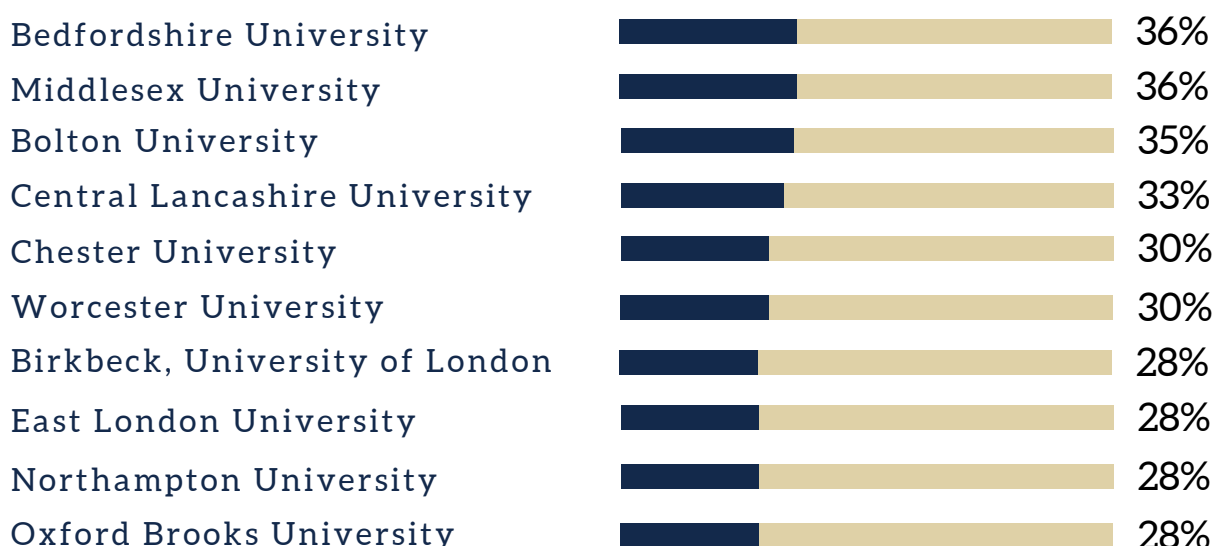
A high drop out rate is a significant worry because there is a shortage of tech professionals available for businesses to hire in the UK.

<https://www.hesa.ac.uk/data-and-analysis/students/what-study>

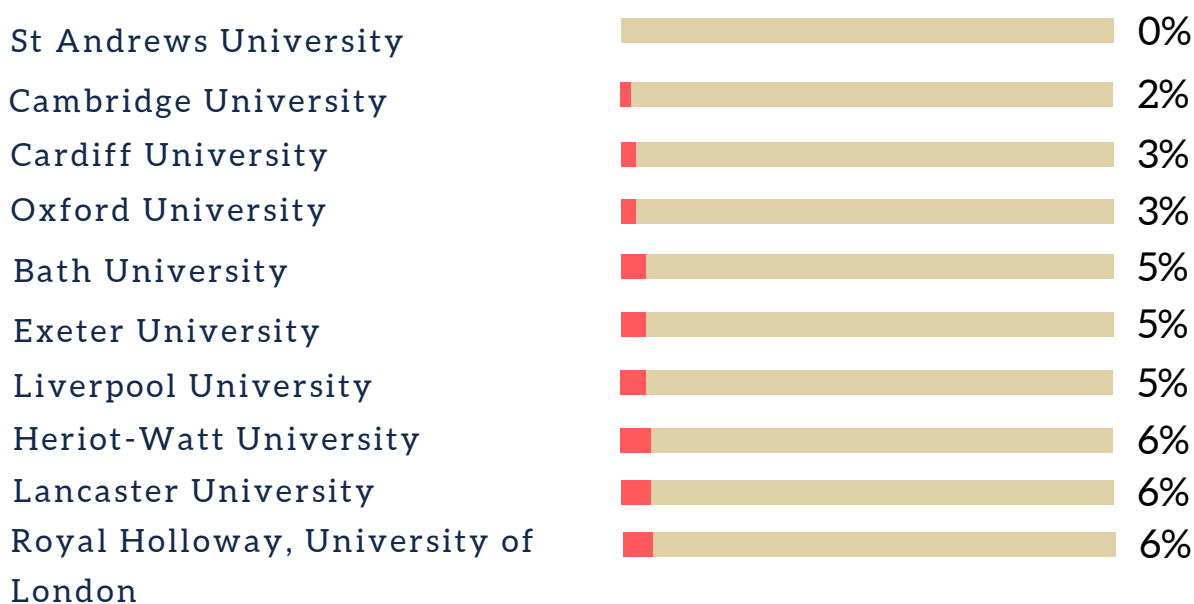
<https://www.bcs.org/articles-opinion-and-research/record-numbers-of-students-choose-computer-science-a-level-in-2022/>

# First year dropout rates in computer science

## Top 10 universities with the highest dropout rates in computer science



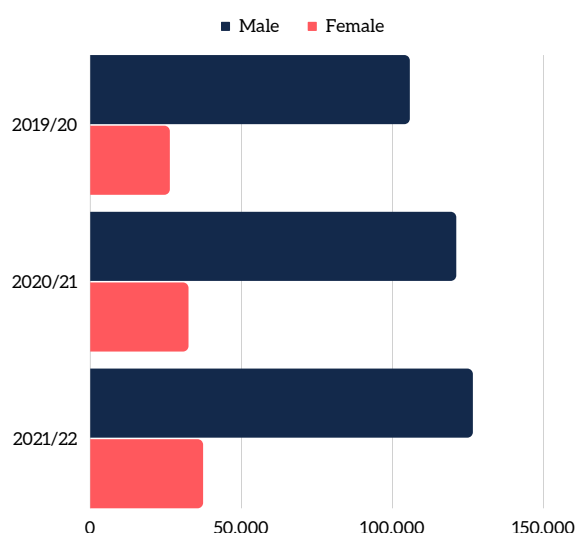
## Top 10 universities with the lowest dropout rates in computer science



<https://www.theuniguide.co.uk/subjects/computer-science>

# Even though more students are enrolling in computer science, is the subject still dominated by men?

Following the most recent HESA study (HE students by CAH level 1 and sex Academic years 2019/20 to 2021/22) here's what the data tells us:

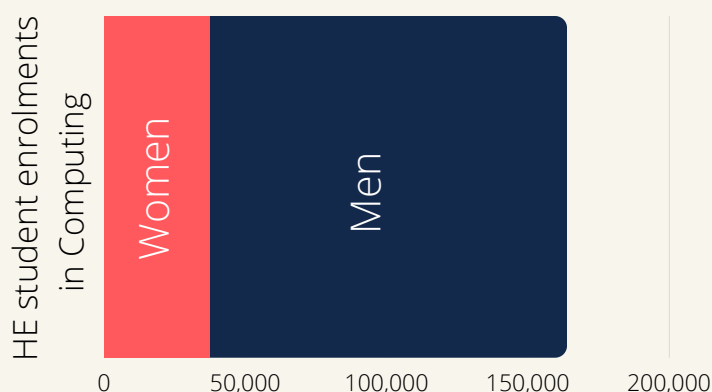


In line with BCS research, the number of women applying for computer degrees has climbed by 23% since 2019 and at a higher rate than any other UCAS subject areas.

In 2021, the ratio of male to female students were 4.7:1 and in 2022, male students still outnumber female students by a ratio of 4.3: 1. The difference has narrowed slightly from 2021.

# 77.2%

OF UNIVERSITY  
COMPUTER  
SCIENCE  
STUDENTS ARE  
MALE



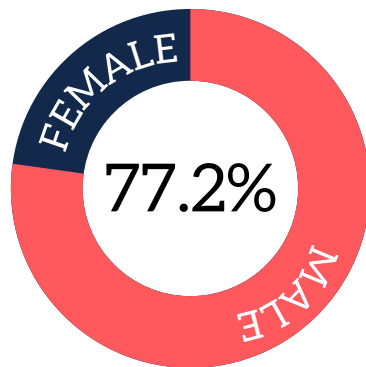
<https://www.hesa.ac.uk/data-and-analysis/students/what-study>

<https://www.bcs.org/articles-opinion-and-research/record-numbers-of-students-choose-computer-science-a-level-in-2022/>

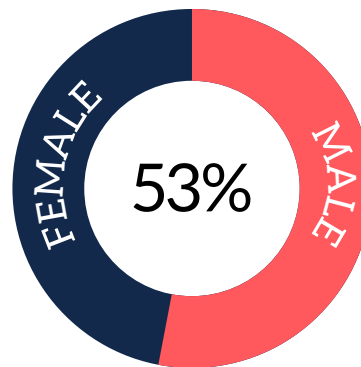


# Gender comparison

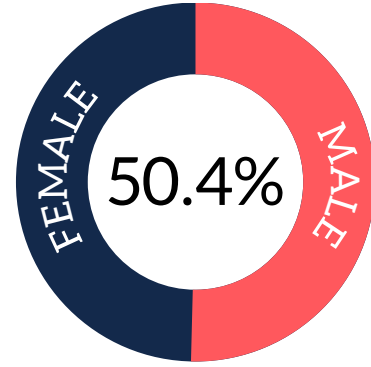
## Computing



## Business & Management



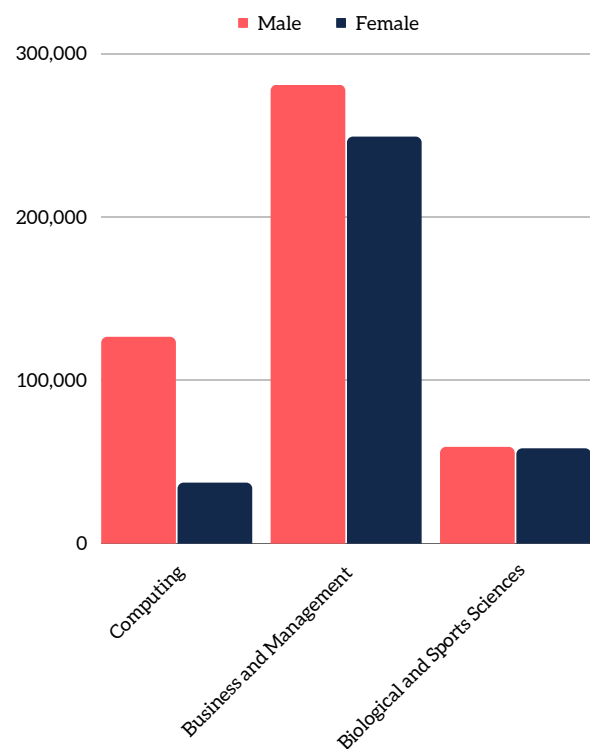
## Biological & Sport Sciences



These pie charts compare the gender distribution of students in business management, biological and sports sciences, and computing in higher education.

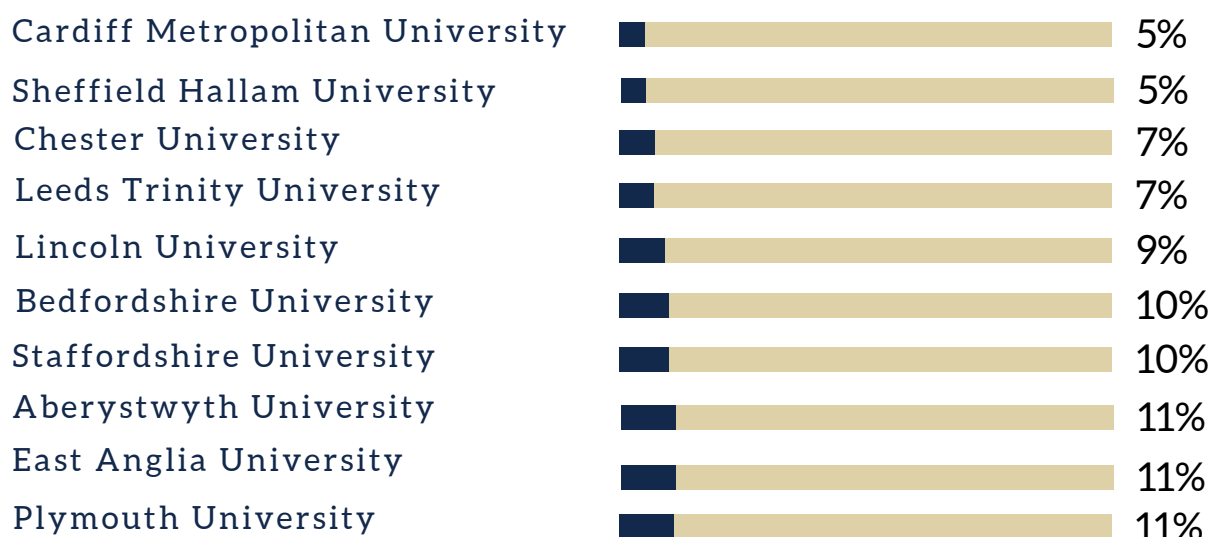
Of all the subjects mentioned on HESA, men study business and management the most, with a 53% male-to-female ratio (see footnote below). Furthermore, biology and sports sciences have a nearly 50% male-to-female ratio showing gender balance can be achieved.

These statistics demonstrate gender diversity in business and management, biology and sports science, no matter how many men study them. The same cannot be said for computing, however.

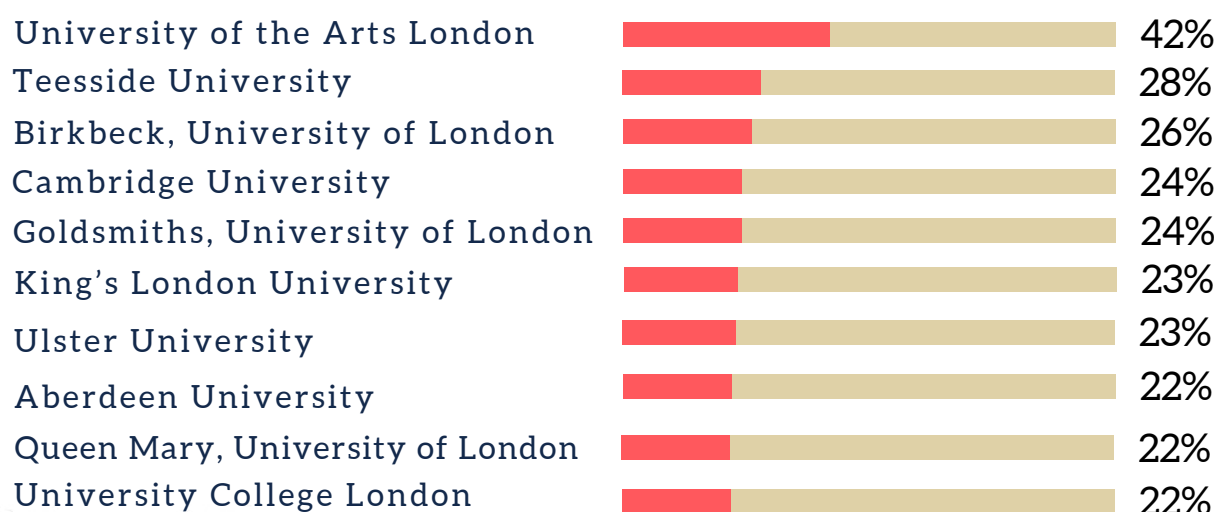


# Gender percentages in computer science

## Top 10 universities with the least women in computer science



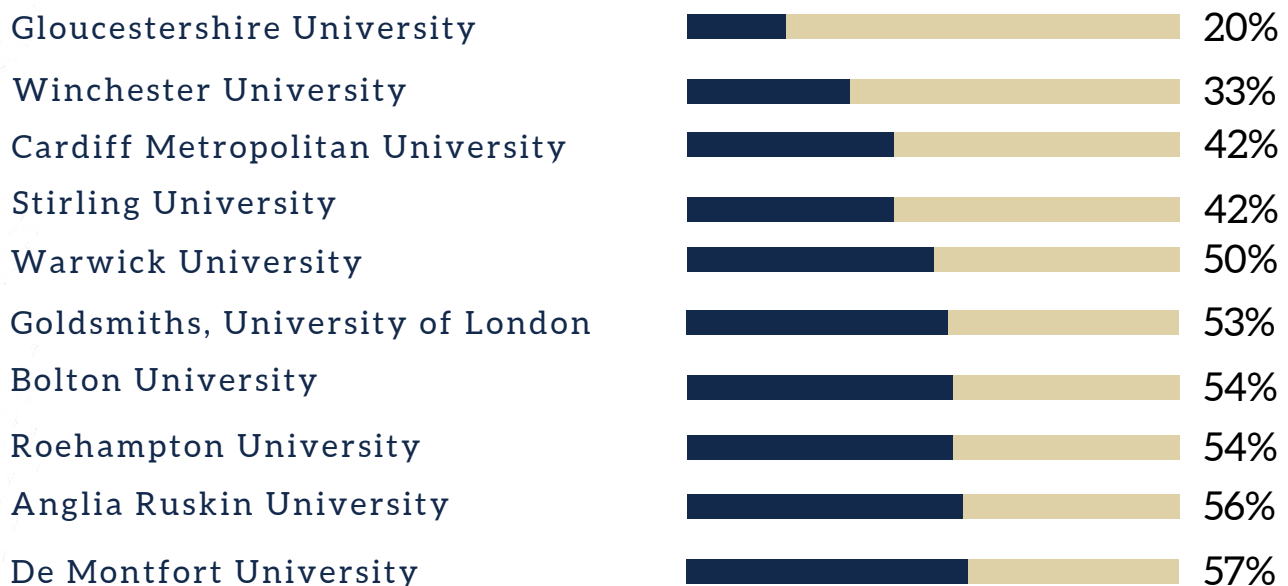
## Top 10 Universities with the most women in computer science



<https://www.theuniguide.co.uk/subjects/computer-science>

# Student satisfaction rates in computer science

Top 10 universities with the lowest student satisfaction rates in computer science



<https://www.theuniguide.co.uk/subjects/computer-science>





# What is it like for women to study computer science at UK universities?

The underrepresentation of women in computer science is a pervasive issue in academia and industry. In this section, we will present the findings from *'Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK.'* Research authors were Julia Yates and Anke C. Plagnol from City, University of London.

The methodology involved 23 participants who were selected

through purposive sampling, representing diverse backgrounds and experiences. In-depth qualitative interviews were conducted, transcribed, and analysed using thematic analysis (Yates and Plagnol, 2021).

Three themes emerged through interviews with female students:

- Feeling stupid.
- Identity fit is not problematic.
- Enablers.

Yates, J., Plagnol, A.C. Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK. *Educ Inf Technol* 27, 3079–3105 (2022).  
<https://doi.org/10.1007/s10639-021-10743-5>



# Feeling stupid

This theme captured the participants' experiences of low confidence and self-doubt. Pre-existing conditions, perceptions of women as inferior, and a lack of support caused these feelings.

**Pre-existing Factors:** Participants believed coding was complicated and required high intelligence, leading to feelings of inadequacy. Additionally, male peers were perceived to have greater experience and confidence in coding, creating a sense of intimidation among female students (Yates and Plagnol, 2021).

## **Assumptions of Female**

**Inferiority:** Explicit and implicit assumptions of female technical inferiority were pervasive in the participants' experiences.

Lecturers, male peers, and even sixth-form teachers reinforced these stereotypes, leading to undervaluing women's achievements and limited support.

**Lack of Support:** The self-directed learning approach in computer science courses left many female participants feeling unsupported and reluctant to ask questions. The lack of female contributions in class further reinforced their reluctance to participate, affecting their motivation and confidence (Yates and Plagnol, 2021).

Yates, J., Plagnol, A.C. Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK. *Educ Inf Technol* 27, 3079–3105 (2022). <https://doi.org/10.1007/s10639-021-10743-5>

# Identity fit is not problematic

This theme explores the participants' perceptions of fitting in on their computer science courses, with some participants finding it easier to identify with their peers than others.

## **Many Participants Fit In:**

Several participants reported fitting in with their peers due to shared interests, diverse backgrounds, and

a sense of acceptance within the computer science community.

**Not Fitting In is Not a Concern:** For other participants, not fitting in did not significantly impact their experiences. Some focused-on academics and found social connections outside the course, while others saw standing out as advantageous (Yates and Plagnol, 2021).

Yates, J., Plagnol, A.C. Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK. *Educ Inf Technol* 27, 3079–3105 (2022). <https://doi.org/10.1007/s10639-021-10743-5>



# Enablers

The final theme highlights the enablers that motivated and supported participants to pursue computer science and contributed to their positive experiences.

## **Early Exposure to Computers:**

Participants with early exposure to computers, either through video games or family access, felt more confident in their choice to study computer science.

Conversely, limited exposure was seen as a disadvantage.

## **People Who Made It Seem**

**Possible:** Important individuals involved in introducing participants to computer science and fostering their interest in the field included family members, teachers, and male role models (Yates and Plagnol, 2021).

This study clarifies the experiences of female computer science students at UK universities. The results highlight the significance of dealing with self-confidence issues, dispelling stereotypes of female inferiority, and offering sufficient support in the educational setting. A woman's ability to pursue a profession in computer science can also be significantly aided by early exposure to computers and supportive mentors. Universities can try to close the gender gap in computer science by implementing focused interventions and promoting inclusive learning environments.

Yates, J., Plagnol, A.C. Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK. *Educ Inf Technol* 27, 3079–3105 (2022). <https://doi.org/10.1007/s10639-021-10743-5>



# Further reading on women at UK universities

**The top three subjects studied by females are:**

- Veterinary Sciences (82.9%),
- Psychology (81.4%)
- Subjects allied to medicine (79.7%)

**The top three subjects studied by males are:**

- Engineering (79.5%)
- Computing (77.2%)
- Maths (62.9%)

Direct quotes from participants in the study *'Female Computer Science students: A qualitative exploration of women's experiences studying Computer Science at university in the UK'* are detailed here.

## **Feeling Stupid:**

Carolyn: *'the mentality is that women are just not made for technology.'*

Caitlin's example was from an occasion where she offered to help some male colleagues who were struggling with a problem; one thanked her for the offer but said *'we couldn't solve it so you probably wouldn't be able to.'*

Leila felt that her male colleagues *'weren't interested in helping.'*

## **Identity Fit is not Problematic:**

Alys felt *'we all have the same interests, so I would say I do fit in.'*

Svetlana talked about having many interests outside her course explaining that she was *'busy doing other things'* which meant that it mattered less that she did not identify with her colleagues, explaining *'I don't feel I need to fit in here'.*

Yates, J., Plagnol, A.C. Female computer science students: A qualitative exploration of women's experiences studying computer science at university in the UK. *Educ Inf Technol* 27, 3079–3105 (2022). <https://doi.org/10.1007/s10639-021-10743-5>

<https://unifresher.co.uk/cities/national/degrees-with-the-highest-percentage-of-male-students-revealed/>

<https://unifresher.co.uk/cities/national/degrees-with-highest-percentage-of-female-students-revealed/>



# Employed or in further education after six months of graduation

Top 10 universities with the lowest employment / further education (after six months) rates in computer science



<https://www.theuniguide.co.uk/subjects/computer-science>



# Our analysis

Based on this year's analysis of computer science drop-out rates and gender imbalances at UK universities, dropout rates in computer science programs still vary across universities. Sadly, computer science still has one of the highest dropout rates among all degree courses. Some universities have reported dropout rates as high as 36% in the students first year, indicating a significant challenge in retaining students in computer science programs. Our recommendations for improvement are consistent with last year's report.

**#1 Gender Imbalances:** UK universities should focus on implementing initiatives such as mentorship programs, scholarships, and outreach campaigns to encourage more girls and women to pursue computer science education.

Successful examples from other countries, include the Middle East, where 40% of university students who specialise in computer science or IT are women. The percentage is even higher in Saudi Arabia and the United Arab Emirates, where

women represent 70-80% of computer science and IT students. In India recent enrolment data also shows that women constitute over 40% of students at undergraduate level, 65% at master level and 50% at doctorate level.

**#2. Drop-out Rates:** When comparing universities, it is crucial to analyse the institutions with both the highest and lowest drop-out rates to identify potential areas for improvement.

**a) Universities with the Highest Drop-out Rates:** For institutions experiencing high drop-out rates, exploring the underlying factors is vital. These may include inadequate academic support, lack of engaging teaching methodologies, or limited access to resources and extracurricular activities.

Addressing these challenges requires the implementation of comprehensive student support programs, fostering a sense of belonging, and providing personalised academic assistance to struggling students.

<https://peer.asee.org/indian-perspective-on-women-in-computing.pdf>

<https://agsiw.org/arab-women-technology/>

<https://www.catalyst.org/research/women-in-science-technology-engineering-and-mathematics-stem/>

**b) Universities with the Lowest Drop-out Rates:** Analysing the characteristics of universities with low drop-out rates can provide valuable insights. These institutions likely prioritise student support, offer well-structured academic programs, and create a nurturing learning environment. Best practices from these universities should be shared widely to inspire other institutions to adopt effective strategies for reducing drop-out rates.

**#3 Recommendations for Policymakers:** To improve computer science education in the UK and address gender imbalances, policymakers should consider the following recommendations:

- Develop comprehensive strategies to promote gender diversity in computer science education, including mentorship programs and awareness campaigns.

- Invest in resources and support systems to assist struggling students, such as tutoring services and academic counselling.
- Foster collaboration between academia and industry to ensure curriculum relevance and enhance students' employability skills.
- Encourage partnerships with organisations that promote diversity and inclusion in STEM fields.
- Continuously monitor and evaluate the impact of interventions to identify successful practices and areas for improvement.

By implementing these evidence-based recommendations, policymakers can make significant strides towards enhancing computer science education in the UK, promoting gender equality, and reducing drop-out rates.

# Our methodology

We sought information from Ipsos on the UK cybersecurity labour market which was published in 2022, and carried out on behalf of the Department for Digital, Culture, Media and Sport (DCMS).

We used secondary resources such as the Higher Education Statistics Agency (HESA) and, the British Computer Society (BCS) – the Chartered Institute for IT Research. Using the The Uni Guide website, we displayed dropout rates and student satisfaction rates for computer science in UK universities.

We also looked at the percentage of students employed, or in Further Education, after six months of graduation. We did this because we

wanted to see which students pursued computing in their professional careers, and to ascertain how long it took students to be placed in cybersecurity careers, given the shortage of skills.

Since we lacked information in the reports on specific gender expression, we defined gender in this report in terms of the sex of the students. From HESA, BCS, and The Uni Guide, we obtained information on the highest and lowest percentages of female students studying computer science from 2019 to 2023.

We used UK labour market statistics from the House of Commons library.





We believe the world will only be safer, happier and more prosperous when there are more women in male dominated industries. That's why our goal is to strengthen cyber space by empowering and mobilising a gender diverse cyber workforce.

# About the IN Security movement

The IN Security movement has been going since 2017. It follows on from Jane Frankland's bestselling book, IN Security, and is an initiative whereby global change agents in cybersecurity come together to take action on gender diversity and inclusion.

This requires an innovative, inclusive approach that mobilises all people. Additionally, it acknowledges that men, women and anyone in between genders in cybersecurity can achieve more together by being the sum of the parts.

The IN Security movement believes that the only way we can make cyber space more secure is by growing and enabling diverse talents in cybersecurity.

This requires solidarity, pulling together, and using each other's energy and ideas. It means empowerment and changing the narrative, too.

## Join the IN Security movement

To join the IN Security movement and tribe, go to:

<https://bit.ly/INSecurityTriber>

## Partner with us

To work with us as an active partner, email our founder, Jane Frankland, at: [hello@jane-frankland.com](mailto:hello@jane-frankland.com).