# Women and Skills Report

**2021**

Addressing gender gaps through online learning

**coursera**

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# We envision a world where anyone, anywhere has the power to transform their life through learning.

# Letter from CEO

**Welcome to Coursera's first-ever Women and Skills Report, which examines the pandemic's impact on skills trends among women and how online learning is helping them prepare for the future.**

The dual impact of the pandemic and automation have disproportionately impacted women — largely due to school closures and the growing burden of unpaid childcare. It has exacerbated income inequality and worsened social inequities worldwide, chief among them: women's labor force participation. According to the International Labor Organization[1], the number of employed women in 2021 is projected to be **13 million fewer** than in 2019, while the number of employed men is projected to be about the same. And even after some recovery in recent months, only **43.2%** of the world's working-age women will be employed in 2021, compared to **68.6%** of working-age men.

Despite the exodus of women from the labor market during the pandemic, a few promising trends are emerging. The data from the recently published Coursera Global Skills Report 2021 found that women are pursuing online education, including in STEM courses, at a higher rate than pre-pandemic. The share of overall course enrollments from women on Coursera globally increased from **38%** in 2018-2019 to **45%** in 2020. For STEM courses, which teach many high-demand digital skills, enrollments among women grew from **31%** in 2018-2019 to **38%** in 2020.

These insights inspired us to dig deeper into global and regional trends to understand how the pandemic has shifted the gender balance and potentially created more opportunities for women to acquire skills online that can accelerate their return to work and promote economic mobility.

The Women and Skills Report shows that the increased participation rates among women observed in 2020 have sustained in 2021 — with **45%** of overall course enrollments and **37%** of STEM enrollments coming from women globally. **Fifty percent** of new registered learners on Coursera in 2021 are women, up from **45%** in 2019. Women are narrowing the gender gap in training for digital jobs, with enrollments from women in entry-level Professional Certificates increasing from **25%** in 2019 to **37%** in 2021.

**While education is not a panacea, the Women and Skills Report 2021 indicates that the gender gap in online learning narrowed during the pandemic, even as the gender employment gap widened.** As the world faces new skills imperatives, this research offers a glimpse of what an inclusive future could look like in the digital economy. I hope the data and insights offered in this report act as a catalyst for new ideas that institutions can embrace to achieve greater gender parity and build a more just world.

**Jeff Maggioncalda**
CEO, Coursera

1. Building Forward Fairer: Women's rights to work and at work at the core of the COVID-19 recovery. International Labor Organization (ILO). July 2021.
Findings throughout the report based on self-reported and inferred gender data on Coursera. For more information, refer to Data Methodology.

## On Coursera...

**50%**
new learners are women in 2021 compared to **45%** in 2019

**45%**
overall enrollments are from women in 2021 compared to **38%** in 2019

**37%**
STEM enrollments are from women in 2021 compared to **31%** in 2019

**37%**
entry-level Professional Certificate enrollments are from women in 2021 compared to **25%** in 2019

**48%**
women are using mobile learning in 2021

# Global overview

# Share of new women registered learners over time

Women are turning to online learning at higher rates than pre-pandemic. In 2020, women accounted for a peak **54%** of new registered learners on Coursera globally. While this normalized to **50%** in 2021, it still represents a significant increase from **45%** in 2019.
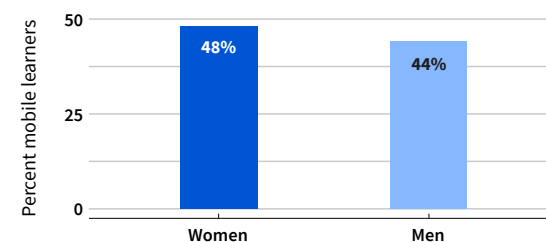


**Percent of new registered learners**
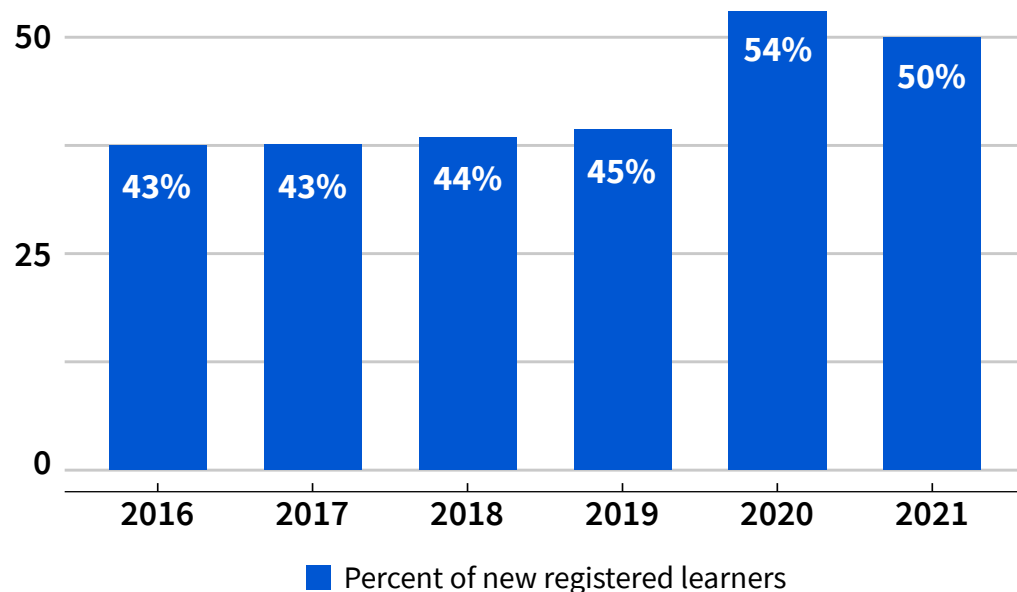
### Age distribution of learners by gender
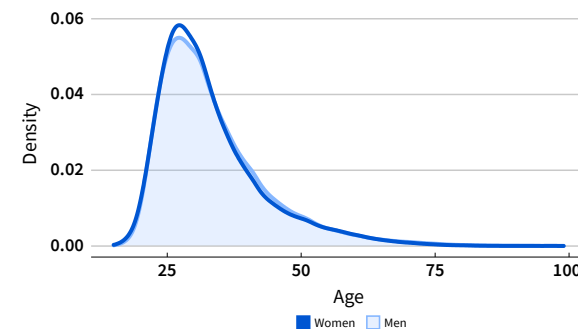


The median age among women on Coursera is **31 years old in 2021**.

### Learners using mobile by gender



**Forty-eight percent** of women learners use mobile in 2021.

New registered learner data covers the period January 1, 2016 - June 30, 2021; Age density and mobile learning data as of June 30, 2021; Learners using mobile includes learners registering or learning on mobile

# Top 10 countries with highest number of registered women learners

Women are seeking online learning at higher rates globally since the onset of the pandemic.

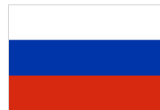**1.** United States
**8.6M**

**2.** India
**4.8M**

**3.** Mexico
**2.4M**

**4.** Brazil
**1.7M**

**5.** China
**1.6M**

**6.** Canada
**1.3M**

**7.** United Kingdom
**1.2M**

**8.** Russia
**1.1M**

**9.** Colombia
**1.1M**

**10.** Spain
**790,000**

Inferred based on gender share determined by self-reported and inferred data, and total registered learners as of June 30, 2021; For more information, refer to Data Methodology.

# Top countries by year-over-year increase in enrollments from women

Many countries, particularly emerging economies, have seen a dramatic increase in online learning participation among women year-over-year.
Despite many odds, women have shown remarkable determination and resilience in learning new skills.

**1.** Philippines
**774%**

**2.** Lebanon
**729%**

**3.** Uruguay
**565%**

**4.** Lithuania
**355%**

**5.** Greece
**294%**

**6.** Ghana
**233%**

**7.** Kenya
**228%**

**8.** Sri Lanka
**179%**

**9.** Turkey
**174%**

**10.** Guatemala
**159%**

Covers the period of July 1, 2020 - June 30, 2021 compared to the period of July 1, 2019 - June 30, 2020

# Global learning trends

# Top courses among women globally

Top courses among women globally indicate a balanced investment in job-relevant human skills such as writing and language learning and technical skills like machine learning and Python programming.

### The Science of Well-Being
Yale University
★★★★★ 4.9
**360,000** enrollments

### COVID-19 Contact Tracing
Johns Hopkins Bloomberg School of Public Health
★★★★★ 4.9
**280,000** enrollments

### First Step Korean
Yonsei University
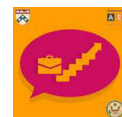★★★★★ 4.9
**200,000** enrollments

### Learning How to Learn
Deep Teaching Solutions
★★★★★ 4.8
**140,000** enrollments

### English for Career Development
University of Pennsylvania
★★★★★ 4.8
**130,000** enrollments

### Introduction to Psychology
Yale University
★★★★★ 4.8
**130,000** enrollments

### Programming for Everybody (Getting Started with Python)
University of Michigan
★★★★★ 4.8
**120,000** enrollments

### Machine Learning
Stanford University
★★★★★ 4.9
**120,000** enrollments

### Financial Markets
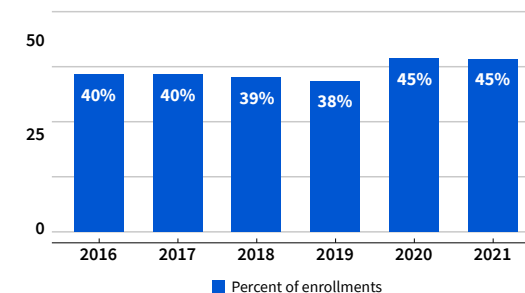Yale University
★★★★★ 4.8
**90,000** enrollments

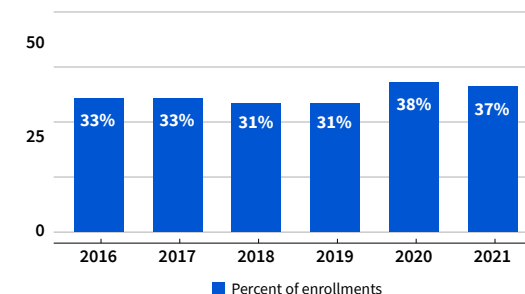### Google IT Support Professional Certificate
Google
★★★★★ 4.8
**80,000** enrollments

Top courses cover the period of July 1, 2020 - June 30, 2021; Overall and STEM course enrollments cover the period of January 1, 2016 - June 30, 2021

## Share of overall course enrollments from women over time

| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|------|------|------|------|
| 40% | 40% | 39% | 38% | 45% | 45% |

■ Percent of enrollments

Globally, overall course enrollments by women remain at **45%** in 2021 compared to **38%** in 2019.

## Share of STEM course enrollments from women over time

| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|------|------|------|------|
| 33% | 33% | 31% | 31% | 38% | 37% |

■ Percent of enrollments

The share of STEM course enrollments from women increased from **31%** in 2019 to **37%** in 2021.

# Entry-level Professional Certificate enrollments from women over time

Entry-level Professional Certificates are designed to prepare learners without a college degree or technology experience for high-demand entry-level digital jobs in just a few months. The increase is due in large part to a growing number of entry-level Professional Certificates on Coursera from industry leaders like Google, IBM, Facebook, and Salesforce.

| | 2019 | 2020 | 2021 |
|---|---|---|---|
| Percent of enrollments | 25% | 30% | 37% |
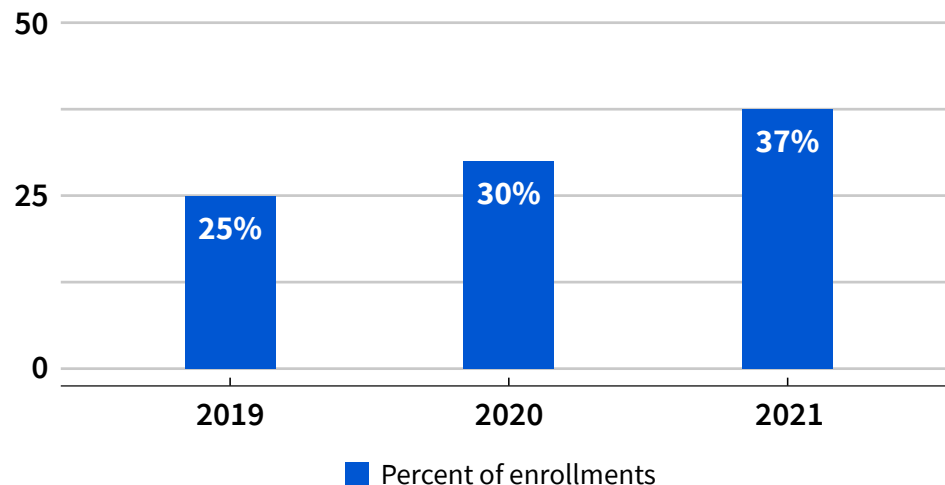
Covers the period of January 1, 2019 - June 30, 2021

### Google IT Support Certificate

The Google IT Support Professional Certificate has seen interest from women on Coursera*

**30%** learners are women

**85%** women registered learners took the certificate to achieve a career goal

**76%** women learning for professional development** reported any outcome, such as improved work performance, promotion, career change, or starting a new business

Today, learners who complete the certificate program can earn credit toward four-year degrees with leading institutions including the University of London and the University of North Texas, and pursue stronger job opportunities through a hiring consortium of over **130** employers including Deloitte, Intel, and Home Depot.

❝

**I had always wanted to have a career in IT but I thought the only way I could achieve that goal was by getting a degree. I was unhappy with my job at the time, so I began looking for local and online programs that offered some kind of intro IT [...] The Google IT program gave me the foot in the door of IT I was looking for.**

**Monique Harley**
Learner from Maryland, USA
PC Provisioning Coordinator, World Bank

* Includes results from program completers in the U.S. surveyed between July 2020 and July 2021.

** Outcomes conditional on learners having a stated career goal for taking content on Coursera.

# Highest share of enrollments from women by domain

### 1. Health
**66%** of enrollments from women in 2021 compared to **62%** in 2019

### 2. Humanities & Social Sciences
**56%** of enrollments from women in 2021 compared to **49%** in 2019

### 3. Business
**45%** of enrollments from women in 2021 compared to **41%** in 2019

### 4. Data Science
**29%** of enrollments from women in 2021 compared to **25%** in 2019

### 5. Technology
**29%** of enrollments from women in 2021 compared to **23%** in 2019

Covers the period of January 1, 2019 - June 30, 2021

"

I got a scholarship from Palencia Women in Technology […] and I could see women who were already programmers doing amazing things in the world. That feeling of unity. Of yes, this is it. I feel welcomed – this field of computer science, this field of AI and Machine Learning is for me. I don't have to question myself. I'm in the right space.
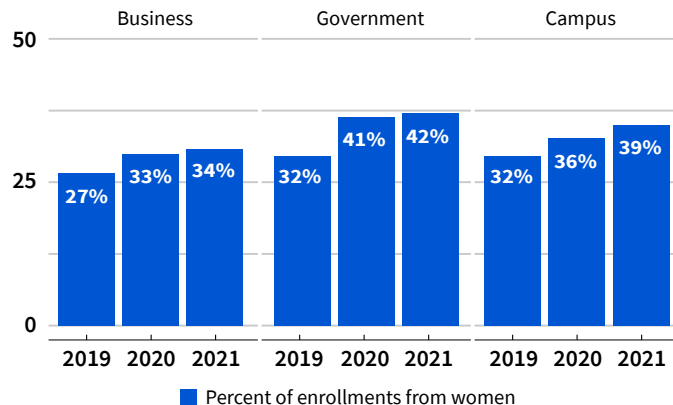
**Mary-Brenda Akoda**
Learner from Johannesburg, South Africa
University of London BS in Computer Science

# Reducing gender skills gaps among institutions

Businesses, governments, and university campuses will play a critical role in addressing the gender gap in education and work during and after the pandemic. Today, more than half (**51%**) of learners accessing online learning through government initiatives are women.

**36%**
business learners are women

**51%**
government learners are women

**42%**
campus learners are women
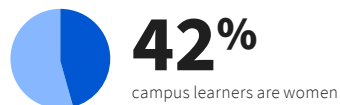
**Share of overall course enrollments among enterprise learners over time**

| | Business | | | Government | | | Campus | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 | 2019 | 2020 | 2021 |
| Percent | 27% | 33% | 34% | 32% | 41% | 42% | 32% | 36% | 39% |

■ Percent of enrollments from women

## Case studies

**ABU DHABI SCHOOL OF GOVERNMENT**  أكاديمية أبوظبي الحكومية

In the Middle East, **Abu Dhabi School of Government** in the United Arab Emirates partnered with Coursera to upskill their entire government workforce in critical digital skills.

**43%** overall course enrollments in 2020 were from women compared to **39%** in 2019

**36%** STEM course enrollments were from women compared to **31%** in 2019

**REPUBLIC OF ESTONIA MINISTRY OF SOCIAL AFFAIRS**

In Europe, the **Republic of Estonia Ministry of Social Affairs** launched a workforce development program for unemployed citizens through the Coursera Workforce Recovery Initiative. In 2020:

**61%** overall course enrollments were from women

**52%** STEM course enrollments were from women

Share of enterprise learners based on registered learners across Coursera for Business, Coursera for Government, and Coursera for Campus as of June 30, 2021
Enrollments cover the period of January 1, 2019 - June 30, 2021; Case studies cover the period of January 1, 2019 - December 31, 2020 (ADSG) and July 10, 2020 - December 31, 2020 (Republic of Estonia)

# Global skills trends

# Top skills among women globally

Women are developing a wide range of high-demand skills including human, digital, data science, and business skills.

**1.** Communication

**14.4M** enrollments

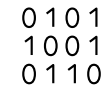**2.** Leadership and Management

**11.7M** enrollments

**3.** Probability and Statistics

**10.1M** enrollments

**4.** Entrepreneurship

**9.9M** enrollments

**5.** Computer programming

**8.5M** enrollments

**6.** Business psychology

**8.3M** enrollments

**7.** Business analysis

**7.8M** enrollments
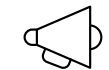
**8.** Data analysis

**7.4M** enrollments

**9.** Machine Learning

**7.4M** enrollments

**10.** Marketing

**7.3M** enrollments

Covers the period of July 1, 2020 - June 30, 2021

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# Job-relevant skills women and men are more likely to learn

Skills that are disproportionately popular among either women or men are measured by the number of enrollments from each gender in courses associated with specific skills. For example, women are 1.7 times more likely than men to enroll in a course teaching resilience.

## Business

**Women**

| | |
|---|---|
| **1.** Resilience | **1.7x** |
| **2.** Culture | **1.6x** |
| **3.** Storytelling | **1.5x** |
| **4.** People development | **1.4x** |
| **5.** Emotional intelligence | **1.4x** |

**Men**

| | |
|---|---|
| **1.** Blockchain | **1.4x** |
| **2.** Financial technology | **1.3x** |
| **3.** Operations management | **1.2x** |
| **4.** Data visualization software | **1.2x** |
| **5.** Project management | **1.2x** |

## Technology

**Women**

| | |
|---|---|
| **1.** Graphic design | **1.7x** |
| **2.** Design and product | **1.5x** |
| **3.** User experience | **1.4x** |
| **4.** Human computer interaction | **1.3x** |
| **5.** Web Development | **1.2x** |

**Men**

| | |
|---|---|
| **1.** Operating systems | **1.1x** |
| **2.** Network architecture | **1.1x** |
| **3.** Computer architecture | **1.1x** |
| **4.** Graph theory | **1.1x** |
| **5.** Software architecture | **1.1x** |

## Data Science

**Women**

| | |
|---|---|
| **1.** Epidemiology | **2.1x** |
| **2.** Data analysis software | **1.6x** |
| **3.** Bioinformatics | **1.6x** |
| **4.** Geovisualization | **1.4x** |
| **5.** Experimentation | **1.4x** |

**Men**

| | |
|---|---|
| **1.** Graph theory | **1.1x** |
| **2.** Applied machine learning | **1.1x** |
| **3.** Deep learning | **1.1x** |
| **4.** Bayesian statistics | **1.1x** |
| **5.** Big data | **1.1x** |

Covers the period of July 1, 2020 - June 30, 2021

# Instructor representation and product innovation

# Top women instructors globally

Women instructors from the world's top universities have taught millions around the world critical skills that can improve their personal and professional lives.

**Laurie Santos**
Professor of Psychology

**The Science of Well-Being**
Yale University
**820,000** enrollments

**Emily Gurley**
Professor of the Practice
Department of Epidemiology

**COVID-19 Contact Tracing**
Johns Hopkins Bloomberg
School of Public Health
**770,000** enrollments

**Barbara Oakley**
Professor of Engineering
Oakland University

**Learning How to Learn**
Deep Teaching Solutions
**540,000** enrollments

**Robyn Turner**
Senior Language Specialist
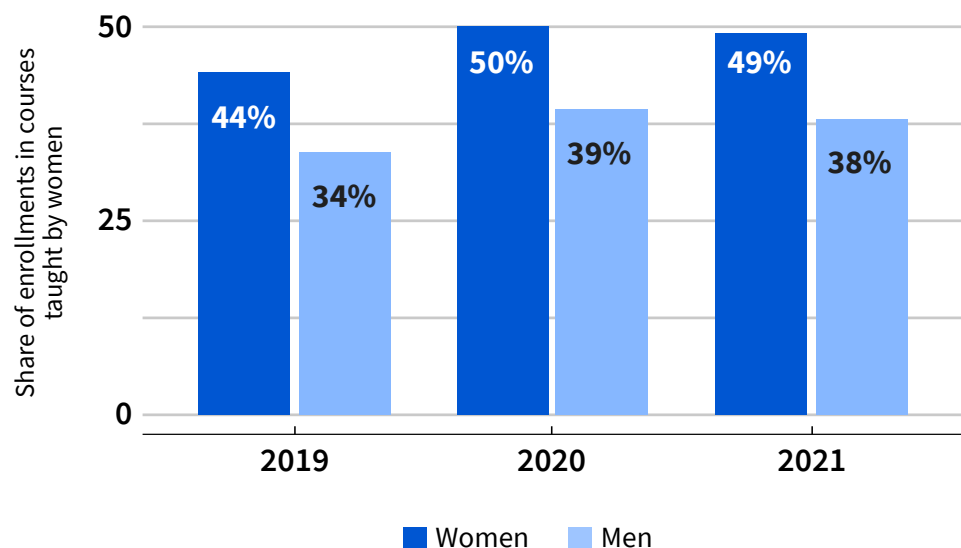English Language Programs

**English for Career Development**
University of Pennsylvania
**510,000** enrollments

**Seung Hae Kang**
Professor
Graduate School of Education

**First Step Korean**
Yonsei University
**490,000** enrollments

**Yvonne Breyer**
Associate Professor and Deputy Dean,
Education and Employability

**Excel Skills for Business: Essentials**
Macquarie University
**320,000** enrollments

**Nicky Bull**
Lecturer and Lead Content Designer

**Maya Adam**
Clinical Assistant Professor and
Director of Health Media Innovation
Stanford School of Medicine

**Introduction to Food and Health**
Stanford University
**180,000** enrollments

**Colleen van Lent**
Lecturer
School of Information

**Introduction to HTML5**
University of Michigan
**150,000** enrollments

**Susan Rodger**
Professor of the Practice
Computer Science Department

**Programming Foundations with
JavaScript, HTML and CSS**
Duke University
**150,000** enrollments

**Rosa Arriaga**
Associate Professor and Associate
Chair of Graduate Affairs, School of
Interactive Computing

**Introduction to User Experience Design**
Georgia Institute of Technology
**100,000** enrollments

Top women instructors determined by number of enrollments in a single course; Covers the period of July 1, 2020 - June 30, 2021

# Women learners enroll more than men in courses taught by women instructors

There are a number of factors that can contribute to an increase in enrollments from women on the Coursera platform. Representation of women instructors is among the most important. Our research finds that women registered learners are enrolling in more courses where at least one instructor is a woman – compared to men registered learners, whose enrollments favor courses taught by all men instructors.

**Share of enrollments in courses taught by women**

| Year | Women | Men |
|------|-------|-----|
| 2019 | 44%   | 34% |
| 2020 | 50%   | 39% |
| 2021 | 49%   | 38% |

■ Women ■ Men

Covers the period of January 1, 2019 - June 30, 2021

> " We want to hear from and see others from our same identity groups especially when they are sharing expertise or are in leadership positions. Women, in particular, feel empowered and inspired when they see other women in instructional and leadership roles, in part because this is relatively rare even today in many parts of the world and in part because women instructors and leaders intentionally and unintentionally open up pathways and possibilities that others may never even have considered for themselves.

**Diana Bilimoria, PhD**
KeyBank Professor and Chair of Organization Behavior
"Women in Leadership: Inspiring Positive Change!"
Course Instructor
Case Western Reserve University

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# Product innovations helping to grow women enrollments

Factors that can improve gender participation include increasing women instructors, inclusive course design, and broader selection of entry-level Professional Certificates. Using machine learning interventions, enabling university experimentation, and launching features to support a diversity of learning strategies are also factors contributing to **increases in share of lifetime enrollments from women.**

**+17%**
Personalizing content recommendations for individual needs

**+12%**
Adding practice quizzes before challenging assessments

**+16%**
Listing common mistakes for peer-reviewed assignments

**+8%**
Distributing assessments throughout a course

Covers the period of March 28, 2016 - June 30, 2021

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"

I loved the course because it is well structured, insightful, and nicely explained with practice quizzes. Couldn't think of a better way to learn Excel [...] I feel a lot more confident and can't wait to learn more.

**Vandana J.**
Learner from India
Excel Skills for Business: Essentials,
Macquarie University

"

I took this course to help during this pandemic and learn more about COVID-19. I did like the easy-to-follow format, videos, practice quizzes, and sample contact tracing scenarios. Very helpful. I'm looking forward to being an active part of the contact tracing environment.

**Linda Anne S.**
Learner from USA
COVID-19 Contact Tracing Course,
Johns Hopkins Bloomberg School of Public Health

# Country spotlights

# Country spotlights

NORTH AMERICA
# United States

**Total women registered learners: 8.6M**

**Median age**
Women: **34**
Men: **34**

**Share of learners using mobile learning**
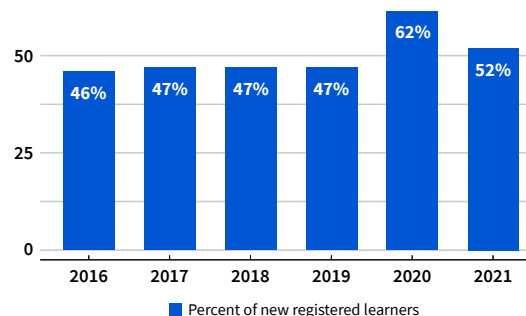Women: **40%**
Men: **36%**

**Top skills among women by enrollments**

1. Communication — 1.9M
2. Leadership and Management — 1.8M
3. Probability and Statistics — 1.6M
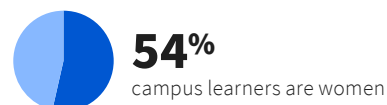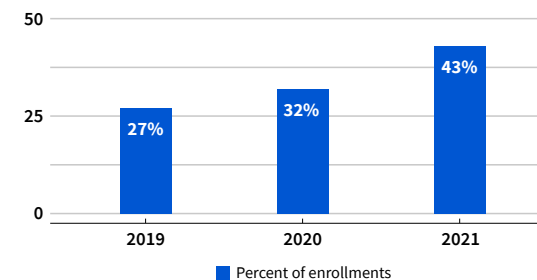4. Entrepreneurship — 1.4M
5. Strategy and Operations — 1.2M

**Top courses among women**

1. COVID-19 Contact Tracing, Johns Hopkins Bloomberg School of Public Health
2. The Science of Wellbeing, Yale University
3. Google IT Support Professional Certificate, Google
4. Learning How to Learn, Deep Teaching Solutions
5. First Step Korean, Yonsei University

Country insights cover the same time periods noted in corresponding global insights

## Share of new women registered learners over time



- 2016: 46%
- 2017: 47%
- 2018: 47%
- 2019: 47%
- 2020: 62%
- 2021: 52%

■ Percent of new registered learners

## Share of entry-level Professional Certificate enrollments from women over time



- 2019: 27%
- 2020: 32%
- 2021: 43%

■ Percent of enrollments

**32%** business learners are women

**57%** government learners are women

**54%** campus learners are women

## Relative skills proficiency* of women learners compared to others on Coursera

| | |
|---|---|
| Communication | **+12%** |
| Accounting | **+9%** |
| Databases | **Equal** |
| Machine learning | **-30%** |
| Mathematics | **-34%** |

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**LATIN AMERICA**

# Brazil

**Total women registered learners: 1.7M**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **32** | Women: **49%** |
| Men: **33** | Men: **39%** |

**Top skills among women by enrollments**

**1.** Communication — **520,000**
**2.** Entrepreneurship — **400,000**
**3.** Probability and statistics — **350,000**
**4.** Leadership and management — **350,000**
**5.** Marketing — **330,000**

**Top courses among women**

**1.** Digital Marketing, Universidade de São Paulo

**2.** The Science of Well-Being, Yale University

**3.** English for Career Development, University of Pennsylvania

**4.** Learning How to Learn, Deep Teaching Solutions

**5.** Introdução à Ciência da Computação com Python (Introduction to Computer Science with Python), Universidade de São Paulo

**Share of new women registered learners over time**
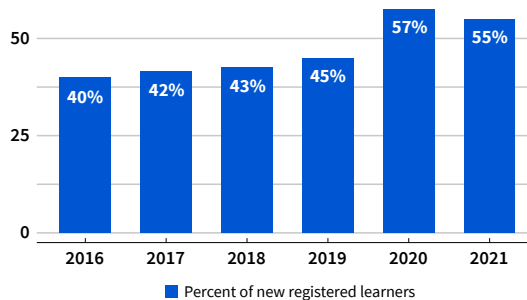
| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 40% | 42% | 43% | 45% | 57% | 55% |

■ Percent of new registered learners

**22%** business learners are women

**21%** government learners are women

**43%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**

| 2019 | 2020 | 2021 |
|---|---|---|
| 15% | 23% | 32% |

■ Percent of enrollments
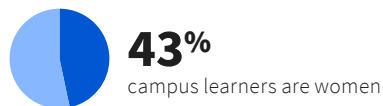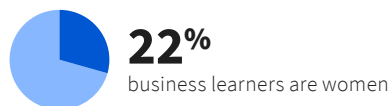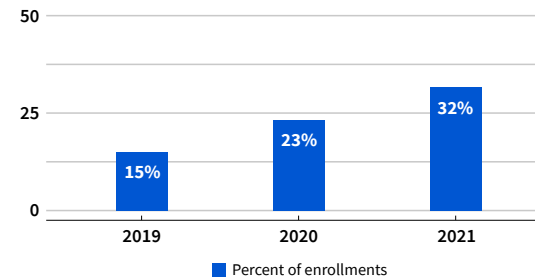
**Relative skills proficiency\* of women learners compared to others on Coursera**

| Databases | **-9%** |
|---|---|
| Communication | **-9%** |
| Data visualization | **-10%** |
| Mathematics | **-47%** |
| Machine learning | **-59%** |

Country insights cover the same time periods noted in corresponding global insights

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**LATIN AMERICA**

# Colombia

**Total women registered learners: 1.1M**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **30** | Women: **43%** |
| Men: **31** | Men: **39%** |

**Top skills among women by enrollments**

**1.** Communication      **520,000**
**2.** Business analysis      **430,000**
**3.** Entrepreneurship      **410,000**
**4.** Data analysis      **380,000**
**5.** Leadership and management      **310,000**

**Top courses among women**

**1.** First Step Korean, Yonsei University

**2.** Primeros Auxilios Psicológicos (Psychological First Aid), Universitat Autònoma de Barcelona

**3.** Sexualidad…mucho más que sexo (Sexuality… much more than sex), Universidad de los Andes

**4.** Competencias digitales. Herramientas de ofimática (Digital skills. Office automation tools), Universitat Autònoma de Barcelona

**5.** Fundamentos de Finanzas Empresariales (Fundamentals of Business Finance), Universidad de los Andes
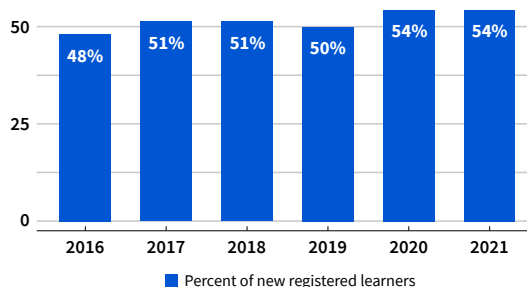
Country insights cover the same time periods noted in corresponding global insights

**Share of new women registered learners over time**



| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 48% | 51% | 51% | 50% | 54% | 54% |

■ Percent of new registered learners



**42%**
business learners are women

**52%**
government learners are women

**45%**
campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



| 2019 | 2020 | 2021 |
|---|---|---|
| 15% | 21% | 28% |

■ Percent of enrollments
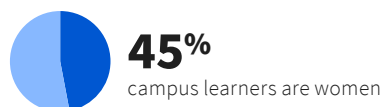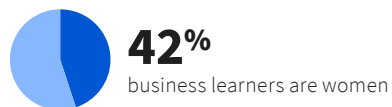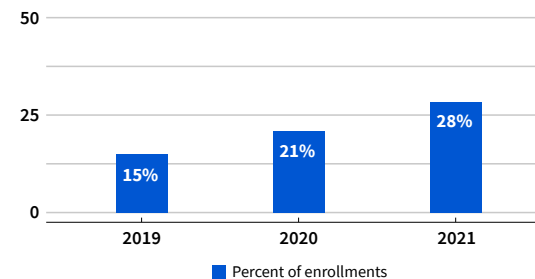
**Relative skills proficiency\* of women learners compared to others on Coursera**

| | |
|---|---|
| Mobile development | **Equal** |
| Data analysis | **Equal** |
| Databases | **Equal** |
| Mathematics | **-64%** |
| Theoretical computer science | **-75%** |

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**LATIN AMERICA**

# Mexico

**Total women registered learners: 2.4M**

| Median age | Share of learners using mobile learning |
|---|---|
| Women: **30** | Women: **52%** |
| Men: **31** | Men: **45%** |

**Top skills among women by enrollments**

1. Communication — **810,000**
2. Entrepreneurship — **650,000**
3. Business psychology — **520,000**
4. Business analysis — **470,000**
5. Leadership and management — **430,000**

**Top courses among women**

1. Contabilidad para no contadores (Accounting for non-accountants), Universidad Nacional Autónoma de México

2. First Step Korean, Yonsei University

3. Finanzas personales (Personal finance), Universidad Nacional

4. Nutrición y obesidad: control de sobrepeso (Nutrition and obesity), Universidad Nacional Autónoma de México

5. Fundamentos de la escritura (Writing Fundamentals), Universidad de los Andes, Tecnológico de Monterrey
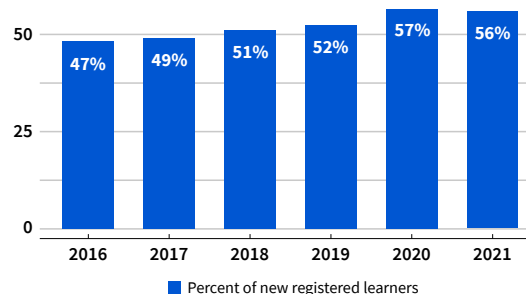
Country insights cover the same time periods noted in corresponding global insights

**Share of new women registered learners over time**



| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 47% | 49% | 51% | 52% | 57% | 56% |

■ Percent of new registered learners

**38%**
business learners are women

**46%**
government learners are women

**51%**
campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



| 2019 | 2020 | 2021 |
|---|---|---|
| 16% | 23% | 29% |

■ Percent of enrollments
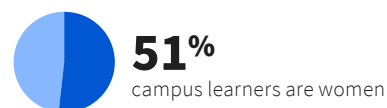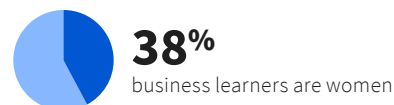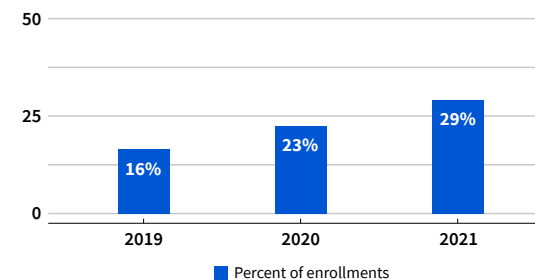
**Relative skills proficiency\* of women learners compared to others on Coursera**

| Probability and statistics | **Equal** |
|---|---|
| Data analysis | **Equal** |
| Human resources | **Equal** |
| Machine learning | **-64%** |
| Theoretical computer science | **-80%** |

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

EUROPE
# France

**Total women registered learners: 500,000**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **32** | Women: **33%** |
| Men: **33** | Men: **31%** |

**Top skills among women by enrollments**

1. Leadership and management — **150,000**
2. Communication — **140,000**
3. Probability and statistics — **130,000**
4. Entrepreneurship — **120,000**
5. Strategy and operations — **110,000**

**Top courses among women**

1. The Science of Well-Being, Yale University
2. Étudier en France: French Intermediate course B1-B2, (Study in France), École Polytechnique
3. Learning How to Learn, Deep Teaching Solutions
4. Machine Learning, Stanford University
5. Devenir entrepreneur du changement (Become an entrepreneur for change), HEC Paris, Ticket for Change
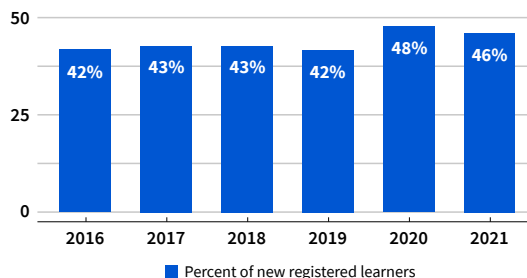
Country insights cover the same time periods noted in corresponding global insights

**Share of new women registered learners over time**

| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 42% | 43% | 43% | 42% | 48% | 46% |

■ Percent of new registered learners

**46%** business learners are women

**67%** government learners are women

**48%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**

| 2019 | 2020 | 2021 |
|---|---|---|
| 25% | 29% | 33% |

■ Percent of enrollments
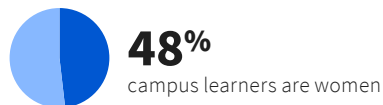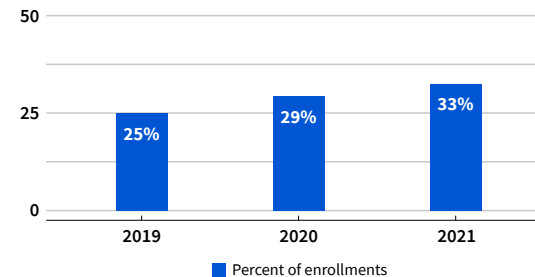
**Relative skills proficiency\* of women learners compared to others on Coursera**

| Databases | **+7%** |
|---|---|
| Data analysis | **+6%** |
| Web Development | **Equal** |
| Sales | **-35%** |
| Mathematics | **-40%** |

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

EUROPE
# Germany

**Total women registered learners: 470,000**

| **Median Age** | **Share of learners using mobile learning** |
|---|---|
| Women: **32** | Women: **39%** |
| Men: **33** | Men: **35%** |

**Top skills among women by enrollments**

1. Probability and statistics — **230,000**
2. Machine learning — **210,000**
3. Communication — **180,000**
4. Computer programming — **170,000**
5. Leadership and management — **160,000**

**Top courses among women**

1. The Science of Well-Being, Yale University
2. Machine Learning, Stanford University
3. Learning How to Learn, Deep Teaching Solutions
4. Programming for Everybody (Getting Started with Python), University of Michigan
5. Introduction to Psychology, Yale University

**Share of new women registered learners over time**
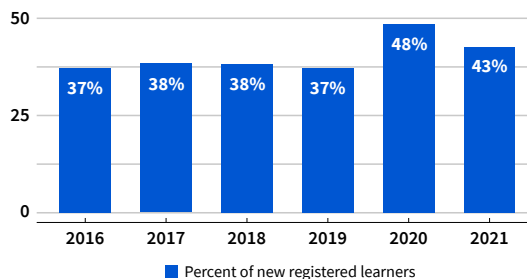
| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 37% | 38% | 38% | 37% | 48% | 43% |

■ Percent of new registered learners

**33%** business learners are women

**35%** government learners are women

**37%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**

| 2019 | 2020 | 2021 |
|---|---|---|
| 23% | 26% | 33% |

■ Percent of enrollments
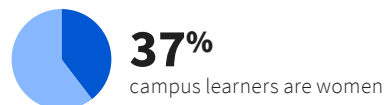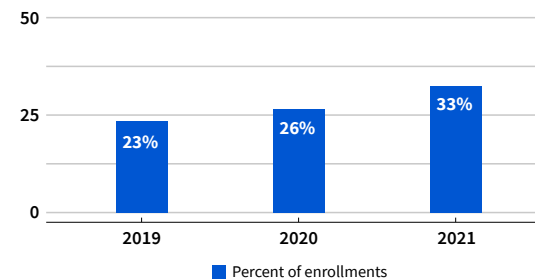
**Relative skills proficiency* of women learners compared to others on Coursera**

| Human resources | **+12%** |
|---|---|
| Web development | **Equal** |
| Data analysis | **Equal** |
| Sales | **-29%** |
| Mathematics | **-38%** |

Country insights cover the same time periods noted in corresponding global insights

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

EUROPE

# Russia

**Total women registered learners: 1.1M**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **30** | Women: **49%** |
| Men: **32** | Men: **40%** |

**Top skills among women by enrollments**

| | |
|---|---|
| **1.** Communication | **180,000** |
| **2.** Computer programming | **170,000** |
| **3.** Probability and statistics | **160,000** |
| **4.** Entrepreneurship | **140,000** |
| **5.** Leadership and management | **130,000** |

**Top courses among women**

**1.** The Science of Well-Being, Yale University

**2.** Learning How to Learn, Deep Teaching Solutions

**3.** English for Career Development, University of Pennsylvania

**4.** Основы программирования на Python (Fundamentals of Python Programming), HSE University

**5.** Основы фотографии (Fundamentals of Photography), Novosibirsk State University

**Share of new women registered learners over time**
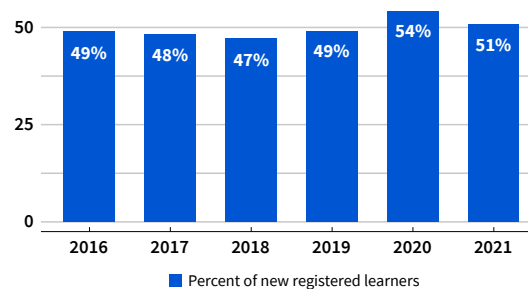


| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 49% | 48% | 47% | 49% | 54% | 51% |

■ Percent of new registered learners

**28%**
business learners are women

**46%**
campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



| 2019 | 2020 | 2021 |
|---|---|---|
| 26% | 35% | 40% |

■ Percent of enrollments
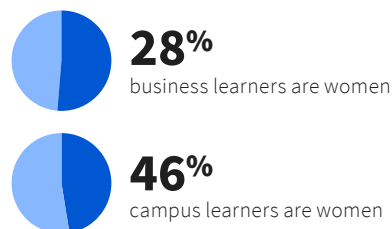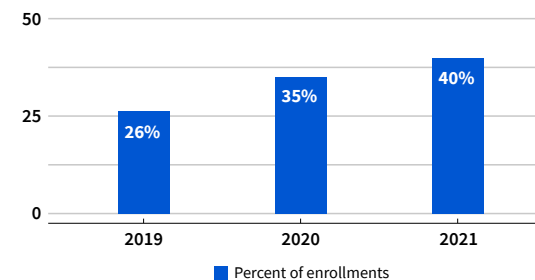
**Relative skills proficiency\* of women learners compared to others on Coursera**

| | |
|---|---|
| Human resources | **+14%** |
| Data analysis | **Equal** |
| Marketing | **Equal** |
| Operating systems | **-47%** |
| Security engineering | **-50%** |

Country insights cover the same time periods noted in corresponding global insights

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

EUROPE

# United Kingdom

**Total women registered learners: 1.2M**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **32** | Women: **41%** |
| Men: **34** | Men: **36%** |

**Top skills among women by enrollments**

1. Probability and statistics    **280,000**
2. Communication    **230,000**
3. Leadership and managment    **230,000**
4. Machine learning    **200,000**
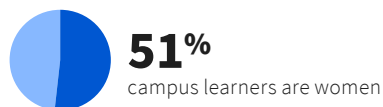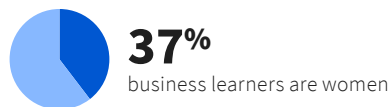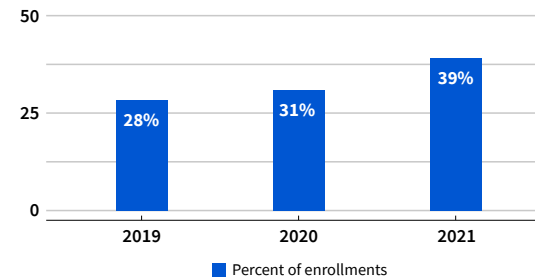5. Entrepreneurship    **190,000**

**Top courses among women**

1. The Science of Well-Being, Yale University
2. Learning How to Learn, Deep Teaching Solutions
3. Introduction to Psychology, Yale University
4. Introduction to English Common Law, University of London
5. Machine Learning, Stanford University
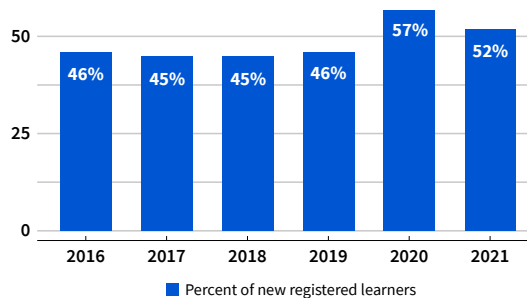
**Share of new women registered learners over time**



- 2016: 46%
- 2017: 45%
- 2018: 45%
- 2019: 46%
- 2020: 57%
- 2021: 52%

■ Percent of new registered learners

**37%** business learners are women

**46%** government learners are women

**51%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



- 2019: 28%
- 2020: 31%
- 2021: 39%

■ Percent of enrollments

**Relative skills proficiency* of women learners compared to others on Coursera**

| | |
|---|---|
| Data analysis | **Equal** |
| Databases | **Equal** |
| Communication | **Equal** |
| Theoretical computer science | **-29%** |
| Mathematics | **-31%** |

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**ASIA PACIFIC**

# Australia

**Total women registered learners: 540,000**

| Median age | Share of learners using mobile learning |
|---|---|
| Women: **34** | Women: **38%** |
| Men: **34** | Men: **34%** |

**Top skills among women by enrollments**

**1.** Communication — **100,000**
**2.** Probability and statistics — **100,000**
**3.** Leadership and management — **90,000**
**4.** Entrepreneurship — **80,000**
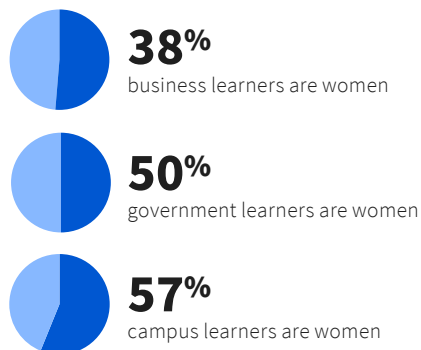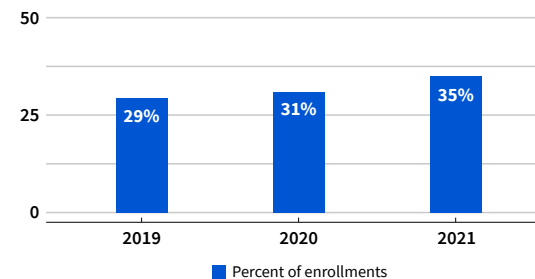**5.** Business analysis — **70,000**

**Top courses among women**

**1.** The Science of Well-Being, Yale University

**2.** COVID-19 Contact Tracing, Johns Hopkins Bloomberg School of Public Health

**3.** Learning How to Learn, Deep Teaching Solutions

**4.** Introduction to Psychology, Yale University

**5.** Machine Learning, Stanford University
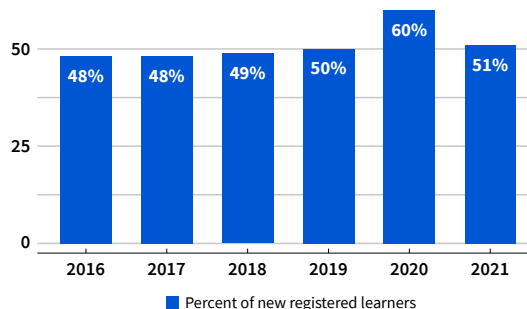
**Share of new women registered learners over time**

| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| 48% | 48% | 49% | 50% | 60% | 51% |

■ Percent of new registered learners

**Share of entry-level Professional Certificate enrollments from women over time**

| 2019 | 2020 | 2021 |
|---|---|---|
| 29% | 31% | 35% |

■ Percent of enrollments

**38%**
business learners are women

**50%**
government learners are women

**57%**
campus learners are women

**Relative skills proficiency* of women learners compared to others on Coursera**

| Data analysis | **+7%** |
|---|---|
| Mobile development | **+6%** |
| Communication | **Equal** |
| Theoretical computer science | **-41%** |
| Computer programming | **-45%** |

Country insights cover the same time periods noted in corresponding global insights

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**ASIA PACIFIC**

# India

**Total women registered learners: 4.8M**

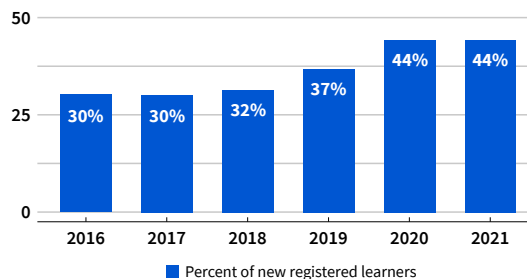| Median age | Share of learners using mobile learning |
|---|---|
| Women: **27** | Women: **62%** |
| Men: **27** | Men: **58%** |

**Top skills among women by enrollments**

**1.** Computer programming     **2M**
**2.** Machine learning     **1.9M**
**3.** Probability and statistics     **1.8M**
**4.** Theoretical computer science     **1.6M**
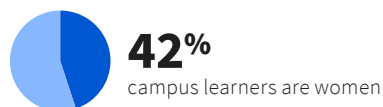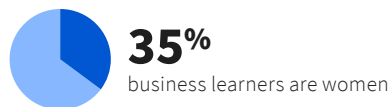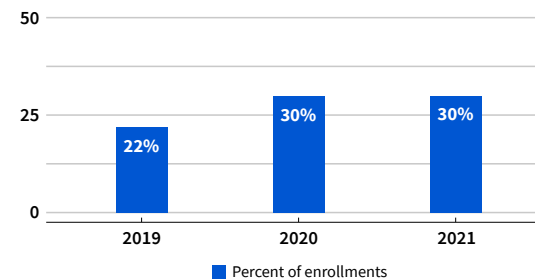**5.** Communication     **1.5M**

**Top courses among women**

**1.** Programming for Everybody (Getting Started with Python), University of Michigan

**2.** Machine Learning, Stanford University

**3.** English for Career Development, University of Pennsylvania

**4.** The Science of Well-Being, Yale University

**5.** Financial Markets, Yale University

**Share of new women registered learners over time**



Bar chart: 2016: 30%, 2017: 30%, 2018: 32%, 2019: 37%, 2020: 44%, 2021: 44%
■ Percent of new registered learners

**35%** business learners are women

**41%** government learners are women

**42%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



Bar chart: 2019: 22%, 2020: 30%, 2021: 30%
■ Percent of enrollments

**Relative skills proficiency\* of women learners compared to others on Coursera**

| Human resources | Equal |
|---|---|
| Communication | Equal |
| Web Development | Equal |
| Machine learning | -25% |
| Theoretical computer science | -25% |

Country insights cover the same time periods noted in corresponding global insights

**ASIA**

# Malaysia

**Total women registered learners: 190,000**

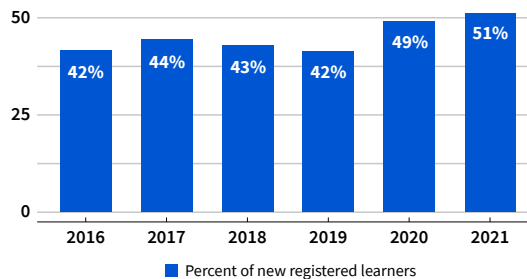| Median age | Share of learners using mobile learning |
|---|---|
| Women: **30** | Women: **44%** |
| Men: **31** | Men: **41%** |

**Top skills among women by enrollments**

1. Communication **70,000**
2. Probability and statistics **50,000**
3. Leadership and management **50,000**
4. Entrepreneurship **50,000**
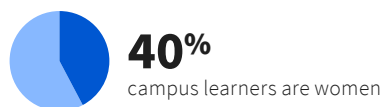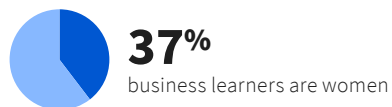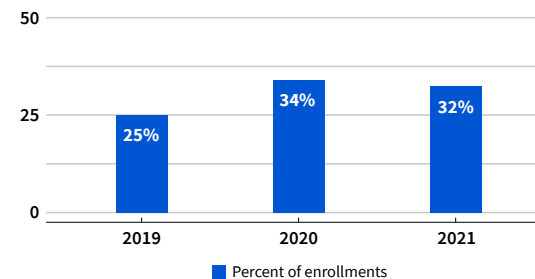5. Computer programming **40,000**

**Top courses among women**

1. First Step Korean, Yonsei University
2. Chinese for Beginners, Peking University
3. The Science of Well-Being, Yale University
4. Programming for Everybody (Getting Started with Python), University of Michigan
5. Learning How to Learn, Deep Teaching Solutions

Country insights cover the same time periods noted in corresponding global insights

**Share of new women registered learners over time**



Percent of new registered learners: 2016: 42%, 2017: 44%, 2018: 43%, 2019: 42%, 2020: 49%, 2021: 51%

■ Percent of new registered learners

**37%** business learners are women

**35%** government learners are women

**40%** campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



Percent of enrollments: 2019: 25%, 2020: 34%, 2021: 32%

■ Percent of enrollments

**Relative skills proficiency\* of women learners compared to others on Coursera**

| Communication | **Equal** |
|---|---|
| Human resources | **Equal** |
| Accounting | **Equal** |
| Theoretical computer science | **-39%** |
| Mathematics | **-47%** |

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

ASIA
# Philippines

**Total registered women learners: 650,000**

**Median age**
Women: **29**
Men: **30**

**Share of learners using mobile learning**
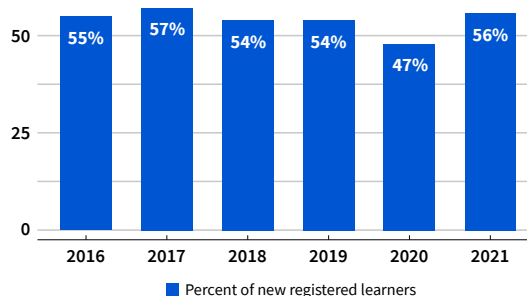Women: **60%**
Men: **60%**

**Top skills among women by enrollments**

**1.** Communication — **1.2M**
**2.** Leadership and mangement — **880,000**
**3.** Entrepreneurship — **740,000**
**4.** Probability and statistics — **680,000**
**5.** Marketing — **630,000**

**Top courses among women**

**1.** COVID-19 Contact Tracing, Johns Hopkins Bloomberg School of Public Health

**2.** First Step Korean, Yonsei University

**3.** The Science of Well-Being, Yale University

**4.** Excel Skills for Business: Essentials, Macquarie University

**5.** Write Professional Emails in English, Georgia Institute of Technology

Country insights cover the same time periods noted in corresponding global insights

**Share of new women registered learners over time**



| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|------|------|------|------|
| 55% | 57% | 54% | 54% | 47% | 56% |

■ Percent of new registered learners

**44%**
business learners are women

**57%**
government learners are women

**54%**
campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**



| 2019 | 2020 | 2021 |
|------|------|------|
| 33% | 52% | 47% |

■ Percent of enrollments
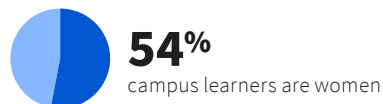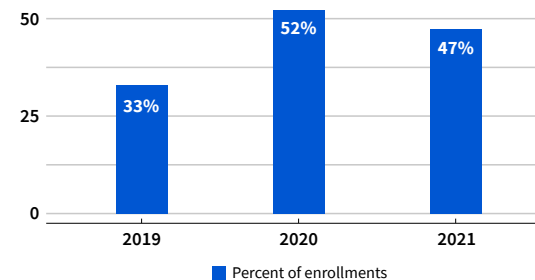
**Relative skills proficiency* of women learners compared to others on Coursera**

| | |
|---|---|
| Human resources | **Equal** |
| Web Development | **Equal** |
| Accounting | **Equal** |
| Theoretical computer science | **-41%** |
| Machine learning | **-63%** |

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

ASIA
# Singapore

**Total registered women learners: 320,000**

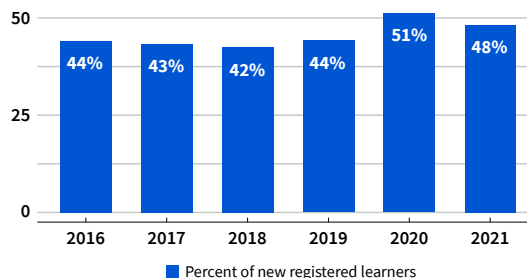| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **31** | Women: **41%** |
| Men: **32** | Men: **38%** |

**Top skills among women by enrollments**

1. Probability and statistics     **110,000**
2. Communication     **110,000**
3. Leadership and management     **90,000**
4. Machine learning     **90,000**
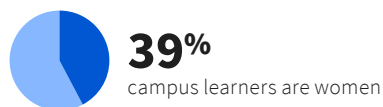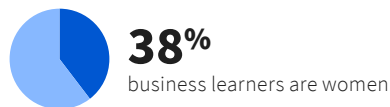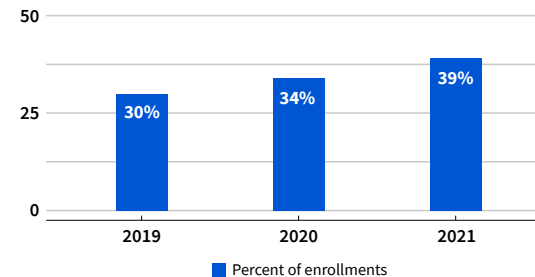5. Entrepreneurship     **90,000**

**Top courses among women**

1. The Science of Well-Being, Yale University
2. First Step Korean, Yonsei University
3. Programming for Everybody (Getting Started with Python), University of Michigan
4. AI For Everyone, DeepLearning.AI
5. Introduction to Psychology, Yale University

Country insights cover the same time periods noted in corresponding global insights

## Share of new women registered learners over time



Bar chart — Percent of new registered learners:
- 2016: 44%
- 2017: 43%
- 2018: 42%
- 2019: 44%
- 2020: 51%
- 2021: 48%

■ Percent of new registered learners



**38%** business learners are women

**50%** government learners are women

**39%** campus learners are women

## Share of entry-level Professional Certificate enrollments from women over time



Bar chart — Percent of enrollments:
- 2019: 30%
- 2020: 34%
- 2021: 39%

■ Percent of enrollments

## Relative skills proficiency* of women learners compared to others on Coursera

| Communication | **Equal** |
|---|---|
| Data analysis | **Equal** |
| Human resources | **Equal** |
| Sales | **-32%** |
| Machine learning | **-54%** |

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information. Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**MIDDLE EAST AND NORTH AFRICA**

# Saudi Arabia

**Total registered women learners: 180,000**

**Median age**
Women: **30**
Men: **34**

**Share of learners using mobile learning**
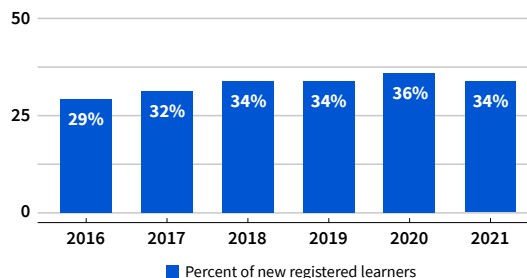Women: **61%**
Men: **54%**

**Top skills among women by enrollments**

**1.** Communication                   **60,000**
**2.** Probability and statistics       **50,000**
**3.** Leadership and management   **50,000**
**4.** Entrepreneurship                 **40,000**
**5.** Machine learning                  **40,000**

**Top courses among women**

**1.** Learning How to Learn, Deep Teaching Solutions

**2.** English for Career Development, University of Pennsylvania

**3.** Machine Learning, Stanford University

**4.** The Science of Well-Being, Yale University

**5.** Write Professional Emails in English, Georgia Institute of Technology

**Share of new women registered learners over time**

| Year | Percent |
|------|---------|
| 2016 | 29% |
| 2017 | 32% |
| 2018 | 34% |
| 2019 | 34% |
| 2020 | 36% |
| 2021 | 34% |

■ Percent of new registered learners

**12%**
business learners are women

**38%**
government learners are women

**47%**
campus learners are women

**Share of entry-level Professional Certificate enrollments from women over time**

| Year | Percent |
|------|---------|
| 2019 | 21% |
| 2020 | 22% |
| 2021 | 20% |

■ Percent of enrollments
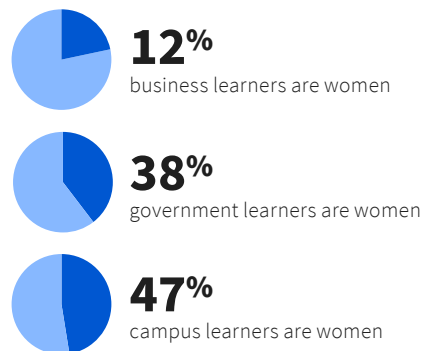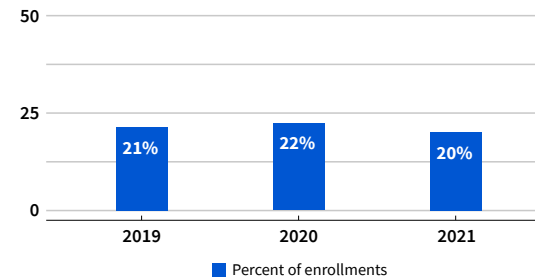
**Relative skills proficiency* of women learners compared to others on Coursera**

| | |
|---|---|
| Operating systems | **+25%** |
| Software engineering | **+18%** |
| Security engineering | **+18%** |
| Accounting | **-39%** |
| Databases | **-40%** |

Country insights cover the same time periods noted in corresponding global insights

*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

**MIDDLE EAST AND NORTH AFRICA**

# United Arab Emirates

**Total registered women learners: 220,000**

| **Median age** | **Share of learners using mobile learning** |
|---|---|
| Women: **32** | Women: **45%** |
| Men: **34** | Men: **44%** |

**Top skills among women by enrollments**

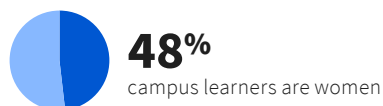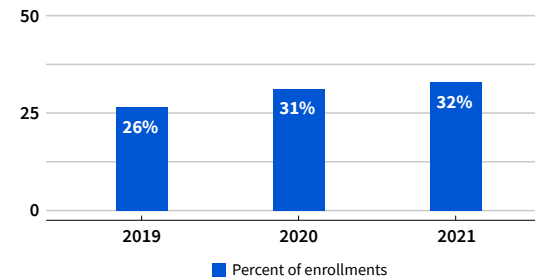| | |
|---|---|
| **1.** Communication | **110,000** |
| **2.** Leadership and management | **100,000** |
| **3.** Entrepreneurship | **80,000** |
| **4.** Probability and statistics | **70,000** |
| **5.** Marketing | **70,000** |

**Top courses among women**

**1.** COVID-19 Contact Tracing, Johns Hopkins Bloomberg School of Public Health

**2.** The Science of Well-Being, Yale University

**3.** Learning How to Learn, Deep Teaching Solutions

**4.** English for Career Development, University of Pennsylvania

**5.** Excel Skills for Business, Macquarie University

**Share of new women registered learners over time**
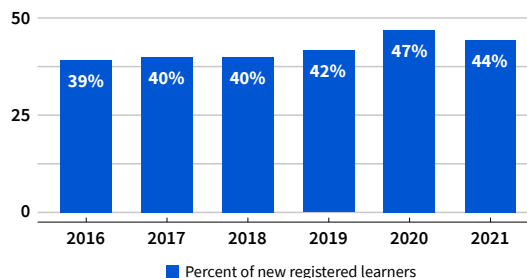


Bar chart: 2016: 39%, 2017: 40%, 2018: 40%, 2019: 42%, 2020: 47%, 2021: 44%

■ Percent of new registered learners

**Share of entry-level Professional Certificate enrollments from women over time**



Bar chart: 2019: 26%, 2020: 31%, 2021: 32%

■ Percent of enrollments

**36%**
business learners are women

**45%**
government learners are women

**48%**
campus learners are women

**Relative skills proficiency\* of women learners compared to others on Coursera**

| Human Resources | **+10%** |
|---|---|
| Communication | **Equal** |
| Web Development | **Equal** |
| Mobile development | **-40%** |
| Mathematics | **-79%** |

Country insights cover the same time periods noted in corresponding global insights

\*Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat" may negatively impact women's performance. See Data Methodology for more information.
Source: Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology. 2019.

# Data methodology

# Technical appendix

## OVERVIEW

The Coursera Women and Skills Report assesses the skills and learning trends among women and men on Coursera globally using enrollment and performance data pre-pandemic through June 30, 2021 from 87 million registered learners on the platform. Building this report involves data from several components:

**1.** Share of registrants and enrollments by gender
**2.** Skills women and men are more likely to learn
**3.** The Coursera Skills Graph
**4.** Coursera Skills Benchmarking

## SHARE OF REGISTERED LEARNERS AND ENROLLMENTS BY GENDER

The share of registered learners that are women is computed as the number of registrants that are women divided by the number of registrants that are either men or women. The share of enrollments accounted for by women is computed as the number of enrollments from women divided by the number of enrollments from either men or women.

Inferred number of women relearners is the total number of learners multiplied by the share of registered learners that are women, as computed above.

Gender is based on a combination of self-reported gender in profile field and in linked social accounts and gender as inferred from first name. The approximately **42%** of registrants and **39%** of enrollments for which we cannot identify binary gender are excluded from these statistics.

## SKILLS WOMEN AND MEN ARE MORE LIKELY TO LEARN

Skills that are disproportionately popular among either women or men are measured by the number of enrollments from each gender in courses associated with specific skills. While top skills reveal what is most popular, more likely skills reveal what is disproportionately popular within a particular group.

The methodology is fairly straightforward and works as follows:

1. Compute the share of enrollments in courses teaching skill S overall (say **20%**)
2. Compute the share of enrollments in courses teaching skill S from students within group G (say **30%**)
3. Compute the "skill-quotentient" of skill S for group G as (**30%** / **20%** = **1.5**)

For example, women are 1.6 times more likely than men to enroll in a course teaching resilience.

We restrict to skills with greater than **1,000** enrollments to ensure the over-indexing skills are sufficiently popular (and then use the "skill-quotient" formula to show the ones that are disproportionately popular within a given group of learners).

The notion of whether a course teaches a skill is derived from the Coursera Skill graph, described later in this appendix.

## THE COURSERA SKILLS GRAPH

The Coursera Skills Graph maps the connections among skills, content, careers, and learners on the Coursera platform.
For the Women and Skills Report, we leverage the following parts of the Skills Graph:

- **Skill to skill:** Describes the connections among skills and generates a skills taxonomy where broad, higher-level skills are parents of more granular, lower-level skills.
- **Skill to content:** Maps skills to the Coursera courses that teach them.
- **Skill to assessment:** Maps skills to the graded items that assess them. Graded items on Coursera can be of several types: multiple choice quizzes, peer review assignments like essays and projects, or programming assignments.
- **Skill to learner:** Connects skills to learners who have demonstrated them by passing relevant graded items. We measure this using a variant of the Glicko algorithm, described further below.

**Figure 1: The Coursera Skills Graph**
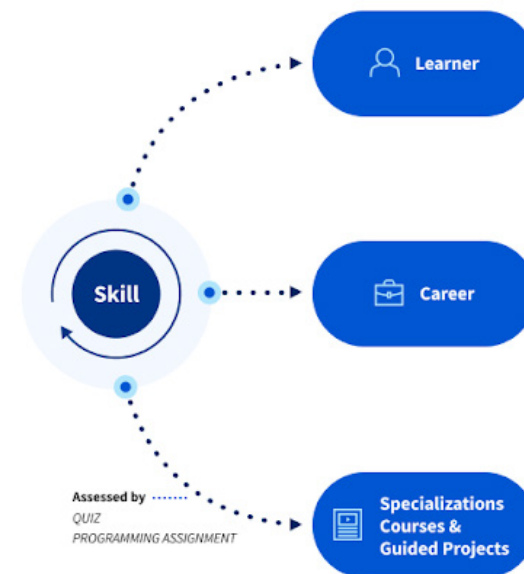
**Relationships Among Skills**

We assemble a vast skills taxonomy of over **38,000** skills in the subject areas of business, technology, and data science through a combination of open-source taxonomies like Wikipedia and crowdsourcing from Coursera educators and learners.

Guided by open-source data combined with knowledge from industry experts, we assemble a structured taxonomy that connects Coursera domains to the set of skills within them, ranging from competencies (granularity 2 skills) down to very specific skills (granularity 3+ skills). For the Women and Skills Report, we focus on measuring performance at the competency level.

To illustrate the mapping among domains, competencies, and skills, Figure 2 shows a subsection of Coursera's Skills Taxonomy.

**Relationships between Skills and Content**

The skills in the Coursera Skills Taxonomy are mapped to the courses that teach them using a machine learning model trained on a data set of university instructor and learner-labeled skill-to-course mappings. Features of the model include occurrence counts (e.g., in the lecture transcripts, assignments, and course descriptions) and learner feedback.

With over **2,500** courses in business, technology, and data science from top-ranked university and industry partners around the world, our catalog spans the wide variety of skills that are relevant to the competencies in this report.

For each skill-course pair, this machine learning model outputs a score that captures how likely it is that the skill is taught in the course. To define the set of skill-to-course tags that power this report, we tune a cutoff threshold based on expert feedback from our content strategy team.

When a skill within a competency is tagged to a course, we extract the graded items in that course as being relevant for assessing a given competency. These competency-to-assessment mappings were reviewed with industry experts to ascertain their fidelity and adjusted as needed. This final set serves as the pool

we use to measure individual learners' skill proficiencies.

# COURSERA SKILLS BENCHMARKING

To benchmark skill proficiency at the industry level, we first benchmark the skill proficiency of each learner in each skill. Then, we aggregate those proficiencies to compute statistics like the industry skills proficiency and the company skills proficiency in a particular skill.

**Individual Skill Scores**

With the set of assessments for each skill defined by our skills graph, we consider grades for all learners taking relevant assessments and train machine learning models to simultaneously estimate individual learners' skill proficiencies (i.e., how proficient each learner is in each skill) and individual assessment difficulties (i.e., how challenging each assessment is). Each skill has its own model to estimate these parameters.

This methodology allows us to measure learner skill proficiencies adjusting for item difficulty. This is essential because the Coursera platform contains a wide variety of courses ranging from the introductory college level to the advanced graduate level. Adjusting for item difficulty ensures we neither penalize learners for taking difficult courses nor over-reward learners for strong performance in easy courses.

Because learners attempt various numbers of graded items at various levels of difficulty, we also assess the precision with which we are measuring skill proficiency for each learner through the calculation of standard errors. The full details of our methodology for individual skill scoring are detailed in a public technical paper.[1]

**Relative skills proficiency of women learners compared to others on Coursera**

Learner skills proficiency is based on assessment attempts on Coursera during the period of July 1, 2020 - June 30, 2021. Relative skills proficiency of women

learners compared to others on Coursera compares the average skills proficiency among women learners to the average skills proficiency of their men learner counterparts. Each snapshot includes the three skills where gender skills proficiency gaps are smallest (+ or equal), and two skills where gender skills proficiency gaps are largest (-).

There are many factors why gender skill differences might exist. Prerequisite training and exposure, access and time available for learning, and "stereotype threat"[2] may negatively impact women's performance.

**Figure 2: A portion of the Coursera Skills Taxonomy**



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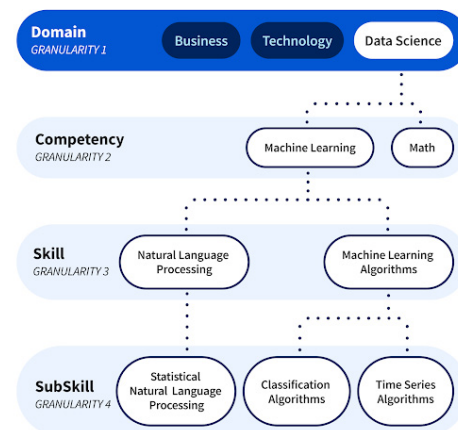
1. Using a Glicko-based Algorithm to Measure In-Course Learning. Educational Data Mining Conference Proceedings, July 2019

2. Under threat but engaged: "Stereotype threat" leads women to engage with female but not male partners in math. Contemporary Educational Psychology, 2019

## ABOUT THE DATA SCIENCE TEAM AT COURSERA

The Data Science team at Coursera develops the statistical and machine learning models that power a personalized learning experience, leads the experimentation and inference that informs Coursera's strategy, and builds the products to access data for the company's university partners and enterprise customers.

The team has ideated and launched learner and enterprise-facing products powered by machine learning that have been covered in **TechCrunch, Harvard Business Review, MIT Technology Review, and the World Economic Forum. See more of their work on the Coursera Data Blog.**

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