STEM Women Whitepaper

Understanding the gender imbalance in STEM.

By Katie Rosa Davies
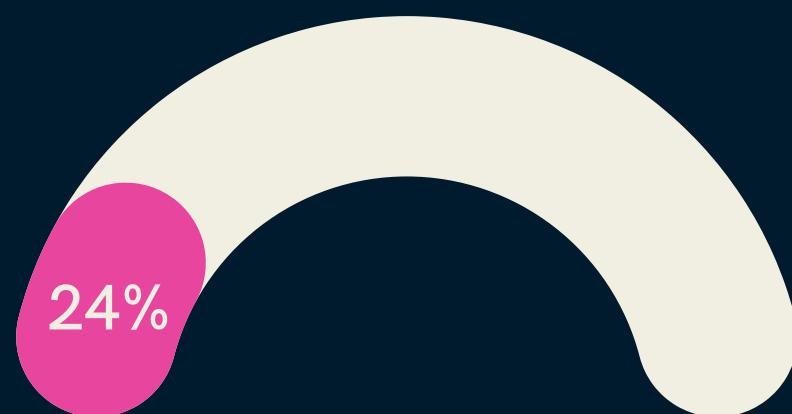
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Introduction

At STEM Women, we introduce employers to our STEM Women communities through graduate careers events, women in tech community events, research, job boards and digital marketing services. We are proud to help contribute to a more diverse and inclusive STEM workforce by helping to inspire students and graduates – particularly women and underrepresented groups – to consider careers in STEM-related industries.

Currently, women make up just 24% of the STEM workforce in the UK (WISE). In technology professions, women hold only 17% of positions, a figure which has increased by just 2% since 2009, and in engineering roles, women make up just 10% of the workforce. Our events and research are key to working towards a positive change in representation within these industries, by creating a supportive community of women, identifying role models and developing a pipeline of diverse talent.

As part of our mission to address the gender imbalance in STEM, for the last four years we have compiled a whitepaper report which aims to foster a better understanding of the underrepresentation of women in industries like science, technology, and engineering. Our report offers an insight into how our STEM Women community perceive gender differences and explores their attitudes towards working in these industries. In addition to STEM-related and gender-focused topics, the data investigates career confidence, motivations behind accepting and declining job offers, and issues surrounding imposter syndrome.

24%

Currently, women make up just 24% of the STEM workforce in the UK. (WISE UK data)

Our respondents

STEM WOMEN AUTUMN 2022 EVENT ATTENDEES BY DEGREE SUBJECT:

32% COMPUTER SCIENCE, DATA AND MATHEMATICS

Computer Science
Software Engineering
Information Systems
Computer Gaming
Artificial Intelligence
Mathematics
Statistics
Data Sciences
Other IT and Mathematical
Sciences

17% ENGINEERING

Civil & Structural Engineering
Chemical Engineering
Electronic & Electrical
Engineering
Aerospace & Automotive
Engineering
Mechanical Engineering
Other Engineering

COURSES STUDIED
BY EVENT
ATTENDEES

15% EARTH AND LIFE SCIENCES

Pharmaceutical Sciences
Bio-sciences
Geology
Environmental Sciences
Other Earth and Life Sciences

16% PHYSICAL SCIENCES AND OTHER

Chemistry
Physics
Materials Science
Other Physical Sciences

20% BUSINESS, FINANCE

Finance and Accounting
Economics
Banking
Management
Business Analytics

STUDY LEVEL

BACHELORS 42%
MASTERS 51%
PHD 4%
OTHER 3%

GRADUATION YEAR SPLIT

38% FINAL YEAR
35% PENULTIMATE YEAR
18% EARLIER YEARS
9% ALREADY GRADUATED

From 2019 - 2022, we have surveyed people who identify as female or non-binary, studying a range of STEM subjects at universities across the UK and Ireland. Over four years we have now collected data from:

858 respondents

In 2019, we collected data from 176 respondents. In 2020 there was an additional 89 respondents; in 2021 we surveyed 292 respondents; and in 2022 we collected responses from 301 respondents.

To conduct our research, we surveyed a cross-section of students who took part in our 2019, 2020, 2021, and 2022 autumn STEM Women events. These respondents were currently at university, or had recently graduated, and were actively looking to start their careers within a STEM-related industry. The adjacent diagram shows the course, graduation year and study level splits of the students who signed up for a STEM Women event in 2022.

In the surveys, we asked respondents a range of questions surrounding diversity in the workplace and what makes them choose certain career paths. As well as multiple choice questions, we allowed respondents to add comments to explain their views. We have included a range of these comments as quotes.

The questions we have asked respondents vary slightly from year to year. We have removed certain questions and introduced new themes to reflect the jobs market, and cultural and societal themes.

Diversity initiatives: How important are they?

From 2019 to 2022, we asked respondents to state how important they found diversity initiatives on a scale of 'Not at all important' to 'Extremely important'. Over these four years, the majority of respondents said that diversity initiatives are either 'Extremely important' or 'Very important' to them. When we consider the current gender and racial disparities in the STEM workforce, it's no surprise that initiatives which support diversity in the workplace are important to underrepresented groups.

Responses to the question 'How important are diversity initiatives to you?' received in 2022

Not at all important — **1%**

Not so important — **2%**

Somewhat important — **11%**

Very important — **44%**

Extremely important — **42%**
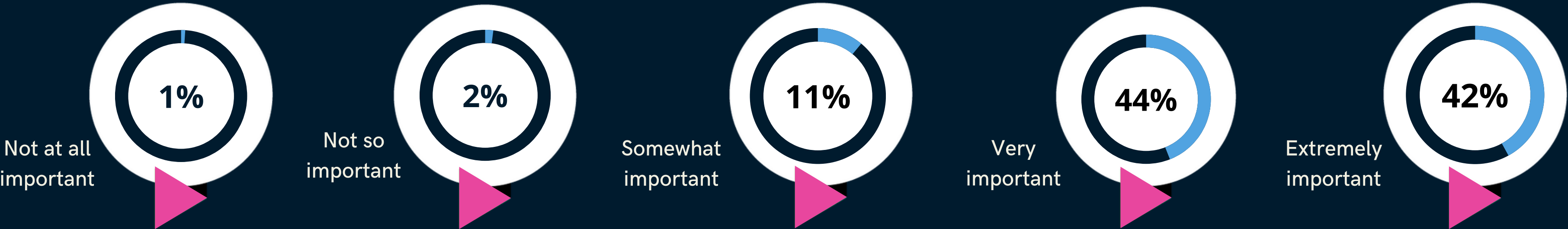
In 2019, 74% of respondents said diversity initiatives were either extremely or very important, this increased to 83% in 2020, 89% in 2021, and finally dipped slightly to 86% in 2022. From 2019 to 2022, 12% more respondents saw diversity initiatives as extremely or very important. In 2022, just 1% of respondents said that diversity initiatives were 'Not at all important'.

Many of the respondents highlighted that companies who have diversity initiatives are more attractive to them when looking for roles because it shows the employer's commitment to equality. They also explained the importance of their place of work having a sense of community.

"Being from an ethnic minority background can sometimes make you feel left out and secluded. I wouldn't want to feel that way at work." - London and Home Counties 2020 Event Attendee.

"As a woman of colour in a male-dominated field, it is really important to me that I will be at a company that values me and that I am treated the same as my male colleagues." – STEM Women Event Attendee 2022.

What is a diversity initiative?

Some examples of diversity initiatives include: the company mission statement, attending diversity events, programmes and strategies, mentoring and networking, implementing a steering group within the business to support people, employing a Head of Diversity and Inclusion and working towards a clear company target of hires.

Diversity initiatives: promoting belonging

Respondents were very vocal in wanting to feel as though they belonged within a company. Many also said that companies who do not demonstrate a commitment to diversity showed a lack of respect to their employees and could signal a negative or toxic workplace environment.

"A company that doesn't care about diversity probably isn't a very nice company to work for. If they can't respect my fellow humans, they won't respect me or their customers." Emily, HDip Software Design and Development, National University of Ireland.

"I want to be in an environment where I feel like I belong."- Muriel, Loughborough University, BSc Economics.

Respondents explained that, by promoting a sense of belonging amongst their workforce, organisations demonstrate that they value their employees as individuals. This positive environment can help people to thrive at work and achieve their career goals. Respondents also emphasised diversity as a tool for innovation, empathy, and open-mindedness.

"It suggests the people I will be working with will be from a diverse range of backgrounds, which is a much healthier environment to be working in, in my opinion. It also demonstrates the company is diversity conscious, which suggests they will be open to new ideas and the prospect of change." – Felicity, Physics, University of Bristol.

"I am a woman of colour trying to get into the male dominated field of Finance and Consulting. If a firm has diversity initiatives, it makes me feel more welcome knowing they are trying to be inclusive." - Sofia, Economics, University of Edinburgh.

The presence of diversity initiatives was also important to respondents because it shows that companies are working toward a more inclusive and equitable future. Even if a company had a gender imbalance, many respondents said that they would be influenced to accept a role if the company was committed to overcoming these inequalities.

"I think they're really important to reassure marginalised groups that they are valued and desired among employers. There have definitely been times that I have decided not to apply for a job because it doesn't seem like somewhere that I would fit in/looks like a boy's club. Diversity initiatives tell me that even if a company appears to be male-dominated, they are trying to address a gender imbalance and actively want women to apply."- Yorkshire, North West, & North East 2020 Event Attendee.

"I feel the struggles of feeling like an imposter and it is important to me that I don't feel this way and it fills me with joy when I see companies working so hard on this." - Lauren, Applied Engineering, Warwick University.
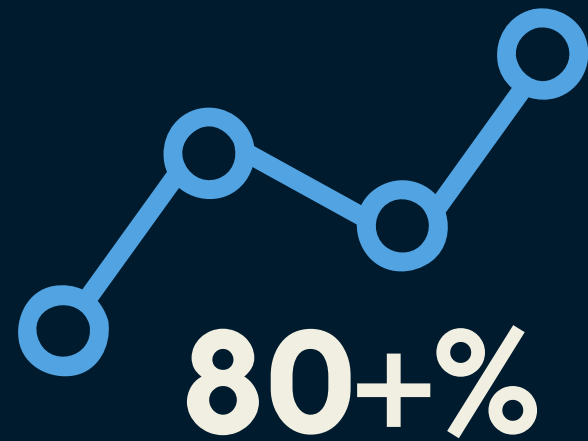
The respondents were aware that diversity is more than just something that is 'right', they also highlighted that it can lead to healthier work cultures, which impacts the success of the company and its innovation.

"Initiatives drive towards equality for all and that will always be essential for a growing society. I believe everyone deserves a chance to succeed regardless of extenuating factors." – Attendee at STEM Women London 2019 event.

"Diversity broadens thought and takes into account many concepts and points of view. This can lead to the development of more complex solutions, the achievement of superior outcomes, and the maximisation of productivity, innovation, and creativity."- Saundarya, MSc FT Investment Banking, Queen Mary University of London.

Diversity initiatives: transparency

80+%

Since 2020, over 80% of respondents said diversity initiatives were very or extremely important to them.

For those respondents who answered that diversity initiatives were only 'somewhat important', (11% in 2022), many highlighted issues surrounding the integrity of diversity initiatives and raised concerns over tokenism.

"Everyone should be examined on their merits. No one should be hired to tick a box." - Gemma, MEng Mechanical Engineering, London South Bank.

"I think diversity is very important but sometimes these initiatives can come across slightly fake and as more of a PR stunt than a genuine desire for a diverse workplace." - Emma, MChem Chemistry with Industrial Training, University of Bath.

This suggests that it is not the notion of diversity initiatives they find unimportant, but instead it is the way in which companies go about promoting these 'initiatives' and whether they actually work in the real world. With such an informed knowledge of the subject, it's unsurprising that some students see beyond a company statement and expect more tangible action.

"I want to work in a place which actively participates in improving its diversity and respecting its diverse members. Diversity initiatives, especially ones that help them get to senior management positions, indicate a commitment to creating a more fair workplace and reducing the impact of white and male privilege, rather than simply using them as a statistic for their website." - London and Home Counties 2020 Event Attendee.

These responses suggest that students and graduates are looking for organisations who do more than just set quotas or make pledges. Students want to see that employers are actually implementing these changes, whether it be through training and support networks, or new approaches to work culture and hiring.

Cultivating a diverse employee population where everyone feels able to bring their best selves to work is not only the right thing to do - it's also better for business. However, as our respondents point out, it's important that these initiatives have been properly researched and implemented. Students and graduates want to feel like they fit into a company, are supported, and are part of the bigger picture.

Gender balance in the workplace

Over four years, we asked STEM students and graduates if they would be less willing to work for a company with a demonstrable lack of diversity in its workforce. The purpose of this question was to ascertain whether the gender balance within a organisation's workforce would influence whether a student or recent graduate would accept a job offer. From 2019 to 2022 the number of respondents answering 'yes' to this question rose from 54% to 69% - an increase of 15%. It would appear that with every year that passes graduates appear more likely to factor in gender diversity when considering a job offer. This suggests that future generations will expect and demand a diverse working environment.
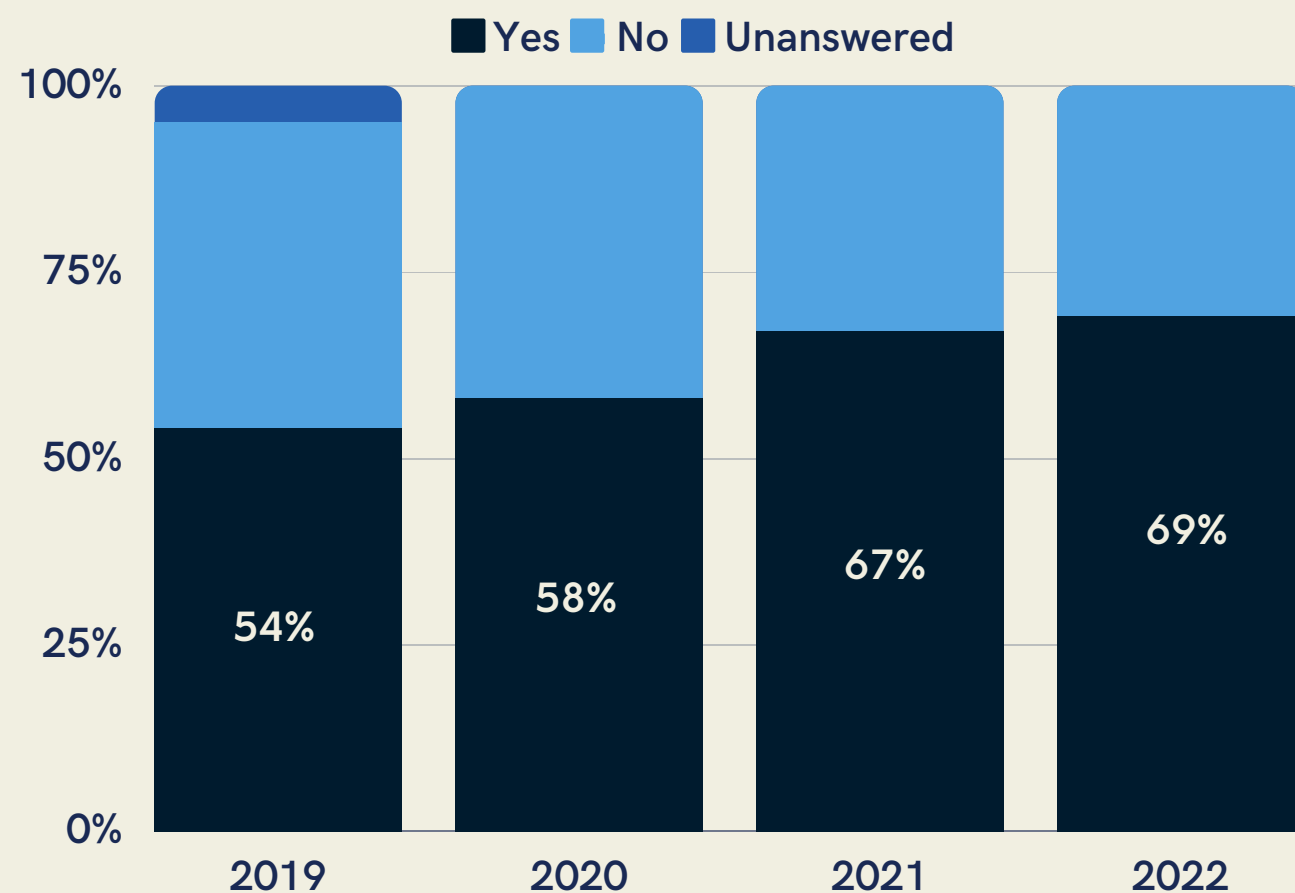
"If they (employers) do not support gender equality in the workplace, I would not choose to work there." - Theofani, Business Analysis and Technology, University of Strathclyde.

One of the key reasons stated by the respondents who answered 'Yes' was the importance of office culture and feeling comfortable at work.

"A company with no or very few women implies a "boy's club" culture that I would find very off-putting."- Ireland 2020 Event Attendee.

"I would not want to work solely in a team of men where I may feel isolated/under appreciated." – Niamh, Nanoscience, Trinity.

A key theme which emerged in 2021 and continued in 2022 was the importance of representation and role models in prospective companies. Being able to connect over shared experience and feel that they can relate to other employees is very important to the students we surveyed, especially those from underrepresented groups.

"It would make me feel more comfortable knowing that other wo[...] me in my day-to-day life at work, as they probably would have f[...] me." - Mchem Chemistry with Medicinal Chemistry, University of N[...]

"I don't want to be the only woman in the room, the only queer [...] person." General Engineering MEng, University of York.

The respondents said that having access to relatable role models [...] visualize themselves at the company and show there were clear op[...] Many respondents highlighted that if there were no women workin[...] it may signal that there is a glass ceiling and that women are [...] responses to this question demonstrate the importance, from [...] perspective, of employers being committed to motivating and [...] workplace.

"Seeing women and women of colour in a company with high imp[...] a good sign that the company gives those opportunities to wome[...] be able to have that opportunity too." - Sayuri, Product Design & [...] Nottingham.

"I want to work in a diverse working environment, I feel better [...] variety of people work together. If there is very little diversity, [...] issue." - Alex, MSc Chemical Physics, Bristol University.

Gender balance: representation

When talking about the reasons why they would hesitate to accept an offer from a company with a gender imbalance, most respondents said they would lack confidence, and fear that their opinion may not be heard.

"I've worked in various jobs in retail and in those jobs, when a team has a higher proportion of men than women, I've found I have less confidence than in more gender-balanced roles, find it harder to have my opinions heard, and just generally enjoy the job less."- Yorkshire, North West and North East, 2020 Event Attendee.

Of the respondents who answered 'No' to this question, many said that they recognised that change would have to start somewhere. Respondents made it clear that they would prefer companies to have a gender balance, however, they recognised that there is no hope of enacting change if women do not start accepting roles in male-dominated workplaces.

"No, because things cannot change if we choose to segregate ourselves from these environments." - Tanya, Computer Science at the University of Cambridge.

"I was the only female on my degree course of 30+ male and I can see why even just one woman in the room is necessary... I also know that to have more women, we need to hire more women and maybe that starts with me." - University of East London, Mechanical Engineering.

In 2022, respondents who answered 'No', expressed more confidence in their own abilities than respondents in previous years. Many highlighted that they would work in a company with a gender imbalance because they are confident that they can have their voices heard and contribute effectively.

"Being the only female working in an organisation will give me more opportunities to represent my gender and work differently."- Scholastica, Financial Technology, University of Bradford.

"I believe I can stand up for myself, prove myself and enact change." – Computer Science student, University of Manchester.

15%

From 2019 to 2022, the number of respondents who said that the gender balance of a company would influence whether they would accept a job offer rose by 15%.

Gender pay gap

From 2019 to 2022, the percentage of respondents who would expect to read gender pay gap reports when researching employers has fluctuated dramatically. In 2019, 65% of respondents said they would expect to read the reports. This fell to 35% in 2020, moving back up to 60% in 2021, and finally down to 50% in 2022.

There could be many factors that contributed to these fluctuating results. A running theme since 2019 is the lack of knowledge around this subject, with many respondents unaware that this information is available.

"I would like to, but I wouldn't always know how to find this information." - Alice, Natural Sciences, University of Cambridge.

One obvious factor behind these fluctuating responses is the Covid-19 pandemic. The Government decided to suspend enforcement of the gender pay gap deadlines for 2019-2020, which meant it was absent from news headlines. Since it's introduction in 2017, the gender pay gap has certainly been less prominent in mainstream media, which could explain why 50% of respondents in 2022 would not expect to read the reports when researching prospective employers.

Some respondents highlighted the unstable mid-pandemic job market as an influencing factor behind their attitudes towards the gender pay gap – many felt they could not afford to be 'picky' following the perceived effects of Covid-19 on the graduate job market.

"Unfortunately, I tend to expect a pay gap, and given that I'm a debt-ridden student, I am still willing to take on a job regardless of this. I tend not to look at the pay gap, but I do look to see what they're doing to increase diversity of gender in their institution, as well as the current percentage of women and ethnic minorities working there, especially in senior management positions."- London and Home Counties 2020 Event Attendee.

However, of those who answered 'Yes', many were keen to highlight that if a company had a large gender pay gap, it could be a deal breaker when it came to deciding to work there.

"Absolutely. I understand different roles require different pay however, two people doing the same role and being paid differently based on their gender is not acceptable." - Abbie, Biochemistry, NUI Galway.

"I would like to know if the company values my work and effort equally to a male in my position. I strongly believe in equality in the workplace and wouldn't want to work at a company that doesn't value me for who I am."- London and Home Counties 2020 Event Attendee.

Respondents also showed that they saw a gender pay gap as a potential barrier to career progression, and therefore another sign that a company does not respect its female employees.

"I always research their gender pay gap, I do not want to work somewhere where I will be getting paid less than my male counterparts, especially if our job roles are the same. I will also research how much of their higher level management is made up of women, as typically those companies will understand how to treat their employees equally regardless of gender." - Amy, Biological Sciences at Edinburgh Napier University.

When you are researching potential employers, do you expect to read their gender pay gap reports?

YES · **NO** · **UNANSWERED**
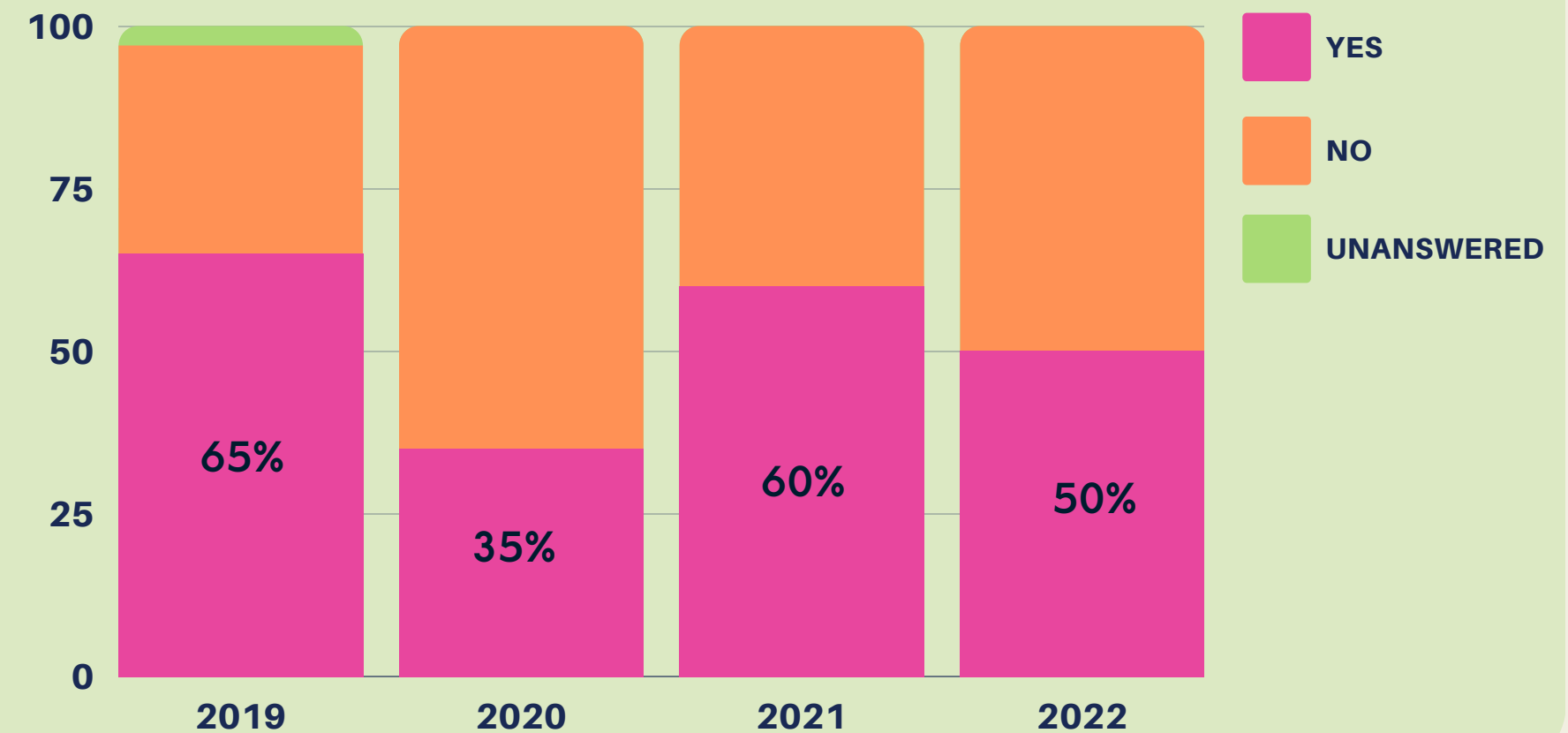
Some respondents even talked about past experiences, where they had been paid less than their male counterparts. Generally, the respondents who had either experienced a gender pay gap first hand or had done research into it were more focused on finding these reports and taking them into consideration.

"This initially interested me in my first job. I hadn't received a pay rise when other people of my level had, so I had a look into their gender pay reports and found that I should be paid the same as the males in the company. From here I always like to check as my experience is worth as much as anyone else. "- Ellen, BSc Combined STEM with The Open University.

Many of the students also felt strongly about aligning company values with their world views and that they would choose one company over another due to their equal pay policies.

"Being a woman, it is important to me that I associate myself with a corporation that reflects me." - Rama, MSc Gender and International Relations, University of Bristol.

What is a gender pay gap?

A gender pay gap is the average difference between the salary of male and female employees. In April 2017, the government made it mandatory for large organisations with over 250 employees to report on their gender pay gap. The first gender pay gap reports were published in April 2018.

In 2019, 8 in 10 organisations recorded a gender pay gap. The World Economic Forum's Global Gender Gap Report 2021 found that the time it will take to close the worldwide gender gap has increased by a generation from 99.5 to 135.6 years.

Career confidence

We asked respondents to identify the biggest barrier they felt could prevent them from pursuing their chosen career path. We gave respondents a variety of 'barriers', of which they could only choose one.
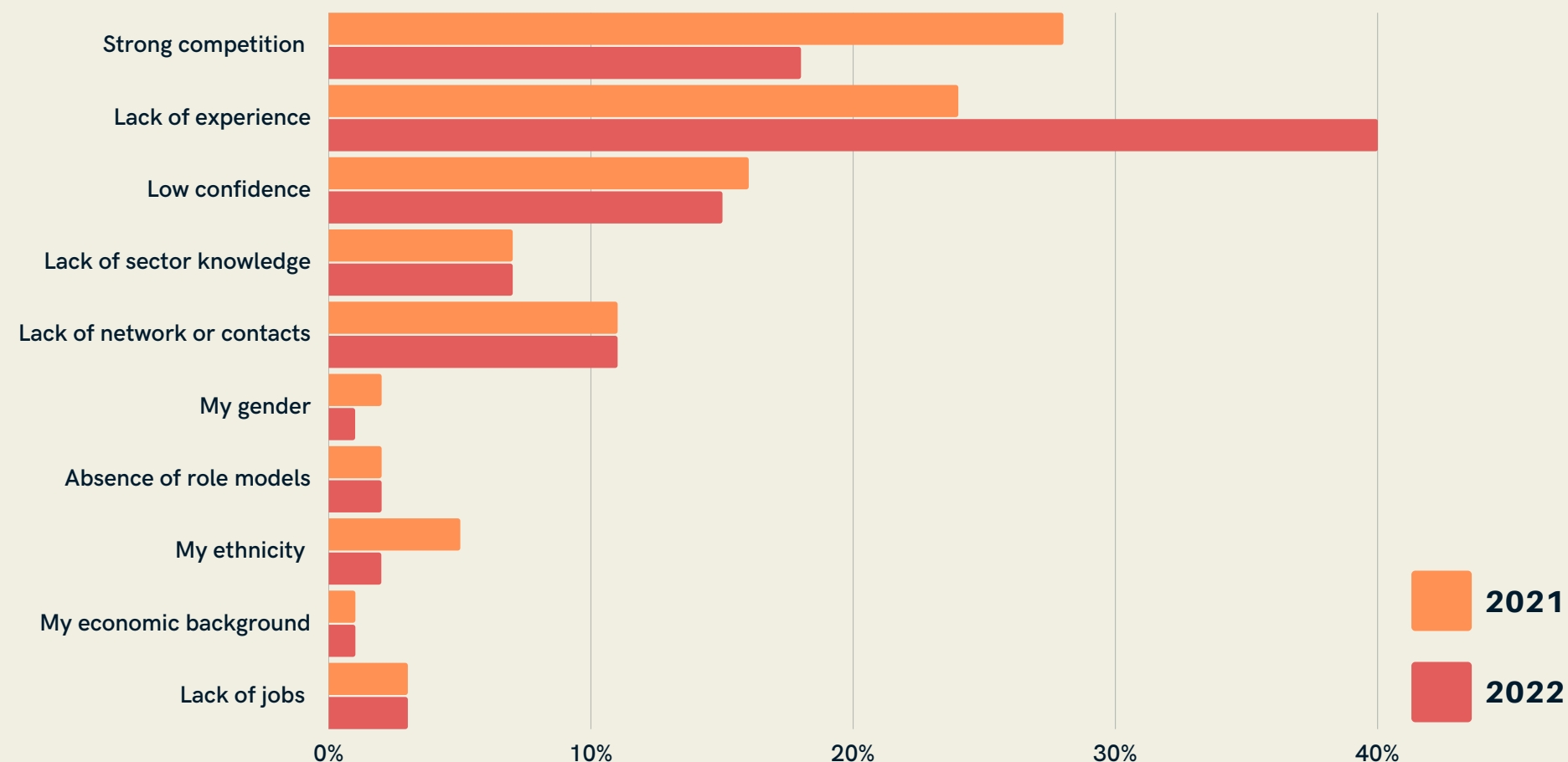
In 2021, the barrier chosen the most was 'strong competition', which 28% of respondents chose as the main barrier they felt they would need to overcome. This was followed by 'lack of experience' at 24% and 'lack of confidence' at 16%. The least frequently chosen 'barriers' were 'my economic background' and 'absence of role models'.

In 2022, 'lack of experience' was chosen most with 39% of the votes, this was followed by 'strong competition' at 18% and 'lack of confidence' with 14%. The potential 'barriers' which received the lowest number of responses were 'my economic background' and 'my gender'.
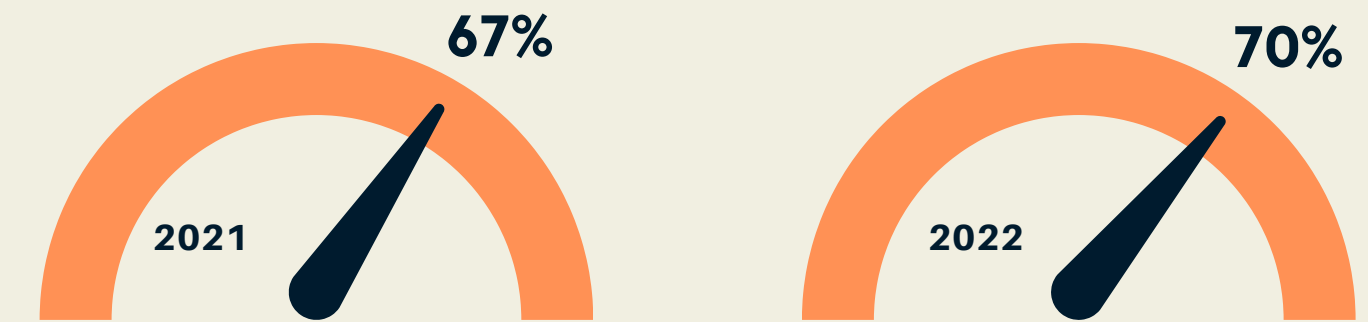
It's interesting to note that from 2021 to 2022, 'lack of experience' was chosen by 11% more respondents, making it the biggest barrier for almost 40% of those we surveyed. This could signal the continuing fallout from the Covid-19 pandemic, in which many students were unable to complete internships and work placements during their university studies due to lockdowns and hiring freezes. This has clearly had a knock-on effect for 2022 final year students as they begin their job search.

In the comments, respondents also added some extra 'barriers' they believe they are faced with. In 2021, these included location, native language, visa requirements, gap in work history, and general uncertainty. In 2022, the additional barriers identified were language barriers, being a single mother, and difficulty getting sponsorship.

What do you think is the biggest barrier to overcome if you would like to pursue any career path you wish?

Barrier	2021	2022
Strong competition		
Lack of experience		
Low confidence		
Lack of sector knowledge		
Lack of network or contacts		
My gender		
Absence of role models		
My ethnicity		
My economic background		
Lack of jobs		

2021
2022

On a scale of 0-100, how confident are you that you will have a successful career after graduation?

67% 2021

70% 2022

We wanted to understand more about the confidence students and recent graduates have when entering into the world of work after leaving university.

In 2021, we asked respondents to measure their confidence on a scale of 0-100. For all respondents that answered, the average score was 67%.

Although this shows a high level of career confidence for the majority, the average score for confidence is still low. It's clear that many respondents have doubts about their future career prospects, despite being very high calibre candidates for a range of roles within STEM industries.

In 2022, we asked this question again, and saw that it had increased by 3% to 70%. Although this is a positive increase, it shows that respondents believed that there is still a 30% chance that they would not have successful career after graduation. This is despite studying in-demand STEM-related subjects at university, proactively looking for roles by attending graduate careers events and entering into a healthy graduate jobs market.

There have been numerous reports which have looked into the confidence differences between men and women. A Hewlett Packard internal report found that men are more likely to apply for a job or promotion when they meet only 60% of the qualifications, but women are more likely to only apply if they meet 100% of the criteria. Another study also found that men are far more at ease with self-promotion than women, which may contribute to a broad disparity in promotions and pay.
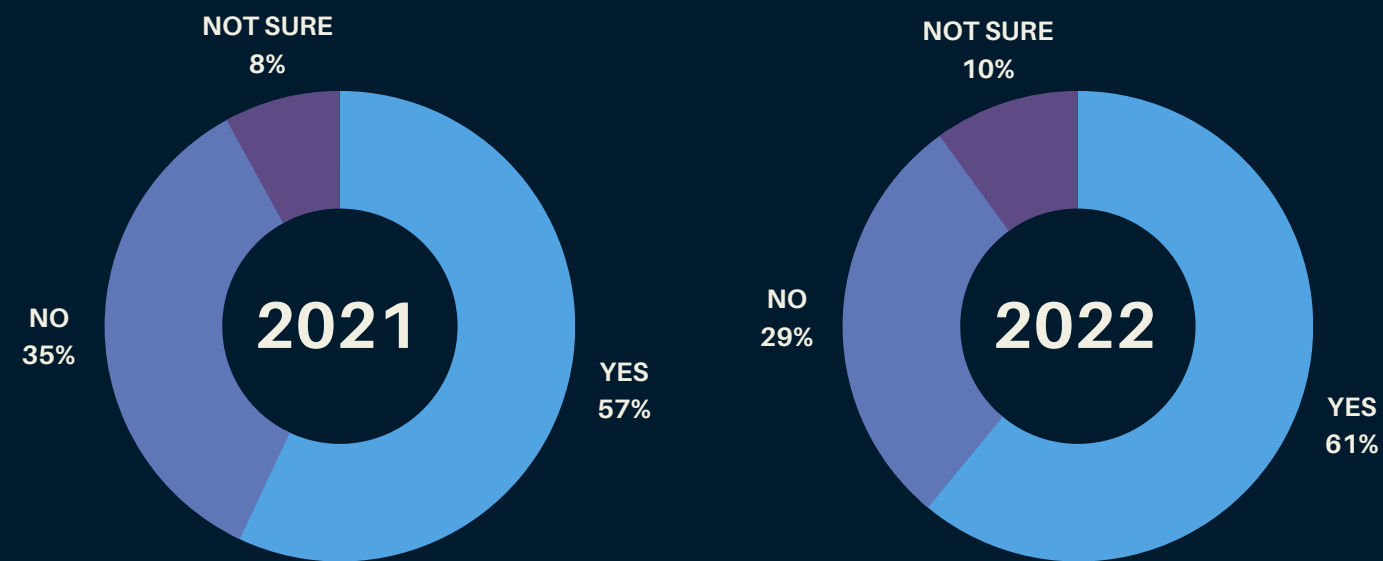
Career confidence: imposter syndrome

In 2021, 57% of respondents to our survey said they had suffered from or experienced imposter syndrome. In 2022, this increased to 61% of respondents answering 'yes' to having experienced imposter syndrome.

In recent years, we have seen many more people talk openly about their struggles with imposter syndrome, both in the media and also during careers events and keynote speeches. In fact, it's estimated that 70% of people feel insecure and unworthy of their accomplishments, according to Dr Valerie Young, an international expert on impostor syndrome. (The Secret Thoughts of Successful Women, 2011).

Have you ever suffered from/or experienced imposter sydrome?

2021
NOT SURE 8%
NO 35%
YES 57%

2022
NOT SURE 10%
NO 29%
YES 61%

What is imposter syndrome?

Imposter syndrome is a term that was first used by psychologists Suzanna Imes and Pauline Rose Clance in the 1970s. It can be defined as a collection of feelings of inadequacy that persist despite evident success. 'Imposters' suffer from chronic self-doubt and a sense of intellectual fraudulence that override any feelings of success or external proof of their competence. (Harvard Business Review).

When the concept was first introduced, it was mainly applied to high-achieving women. However, since then, it has been recognised as being more widely experienced. It is usually closely linked with perfectionism and can cause stress, anxiety, low self confidence, and low motivation.

Research has shown that imposter syndrome is usually more prevalent in high achievers or people who work in high-stress environments, such as academics, researchers, business people, and university students. It is a form of intellectual self-doubt.

"I interviewed for 2 software development internships, got 2 interviews and 2 offers. I still think I fooled them somehow in the technical interviews. Or worse, they only hired me because of my gender." – London Event Attendee.

Many respondents highlighted that these feelings usually arose from 'feeling out of place' or not having a sense of belonging.

"It stemmed from a lack of confidence in my capabilities and being surrounded by only men." – Bristol Event Attendee.

In STEM-related industries, imposter syndrome is more common because the rate of change and advancement is so rapid, no human could ever keep up – but we feel we should.

"Technology is always changing, new tools are always coming up, so I constantly feel like I don't have enough experience. I feel this really holds me back." Neha, Software Development, University of Strathclyde

To succeed as a graduate in the STEM fields you must become accustomed to a few concepts that aren't always promoted as a positive experience in early education: failing, exploring things that have never been done before, and getting out of your comfort zone. These are all a normal part of graduate STEM education that can lead to the feelings associated with imposter syndrome. When you are exploring a new concept you may feel like a fraud but it's the only way to make world-changing breakthroughs.

"I have this constant self doubt, knowing that I have done my best, still I feel I'm not enough." – Anonymous.

Imposter syndrome affects people across the world - it isn't linked to gender. However, when we look at environments where there are gender imbalances or underrepresented groups, feelings of imposter syndrome are much more prevalent. For example, if you are the only woman working in a tech company, you may feel added pressure to represent 'all women', which can contribute to feelings of imposter syndrome.

"I have always doubted my abilities, but I don't fully know if this is as a result of being in a male-dominated field or my own characteristics." - Emily, Environmental Geoscience, Swansea University.

A sense of belonging can foster confidence. Studies have shown that the more people that sound and look like you, the more confident you will feel.

"Ever since I started pursuing a career in engineering I saw the difference in attitude towards me. I had often been subjected to jokes and because of that, I was really questioning whether engineering is for me. No person should ever question themselves, because of the 'normalised' opinions of the others." - Plamena, Computer Hardware and Software Engineering, Coventry University.

In addition to understanding these concepts, organisations can actively reduce and eliminate unnecessary external barriers and stereotypes that make graduates feel like they do not belong. Creating an inclusive culture where students can bring their full selves to work is one of the most underrated contributors to innovation.

In 2021, 35% of respondents said they felt confident in their own abilities and did not identify with the concept of Imposter Syndrome. In 2022, the response was at a similar level at 29%, with respondents showing a belief in meritocracy.

"I believe that I've worked hard. If I did not get a job, it means that a better one is waiting for me." - Ran, BEng Architectural Engineering, Cardiff University.

Attitudes to careers events

Since 2018, STEM Women have run a combination of in-person, virtual, and hybrid graduate careers events. During 2020, in response to the pandemic, virtual events rapidly grew in popularity. However, in 2022 there has been a resurgence in traditional face-to-face networking events.

We wanted to discover what attitudes our event attendees had to different event formats and how they feel following the reintroduction of physical events in comparison to online events.

In 2021, 33% of respondents said their preference was for in-person events, with 20% preferring virtual events and 47% stating no preference. In 2022 the preference for in-person events has increased to 43%, with the preference for virtual events dropping slightly to 17%, and 40% stating no preference for either.

This shows that respondents are eager to get back to in-person interactions, with many highlighting that they found physical events more enjoyable and interactive. Respondents explained that they found it easier to make more meaning connections at in-person events, and they found the atmosphere more inspiring.

That said, virtual interactions are now firmly embedded in our daily lives and so there are still many reasons to maintain a virtual offer. They allow for greater accessibility and inclusion, and many respondents who are perhaps a little shy or anxious said they felt more comfortable in a virtual environment.

Do you prefer virtual careers events or face-to-face events?

2021
Virtual 20%
Both 47%
Face-to-face 33%

2022
Virtual 17%
Both 40%
Face-to-face 43%
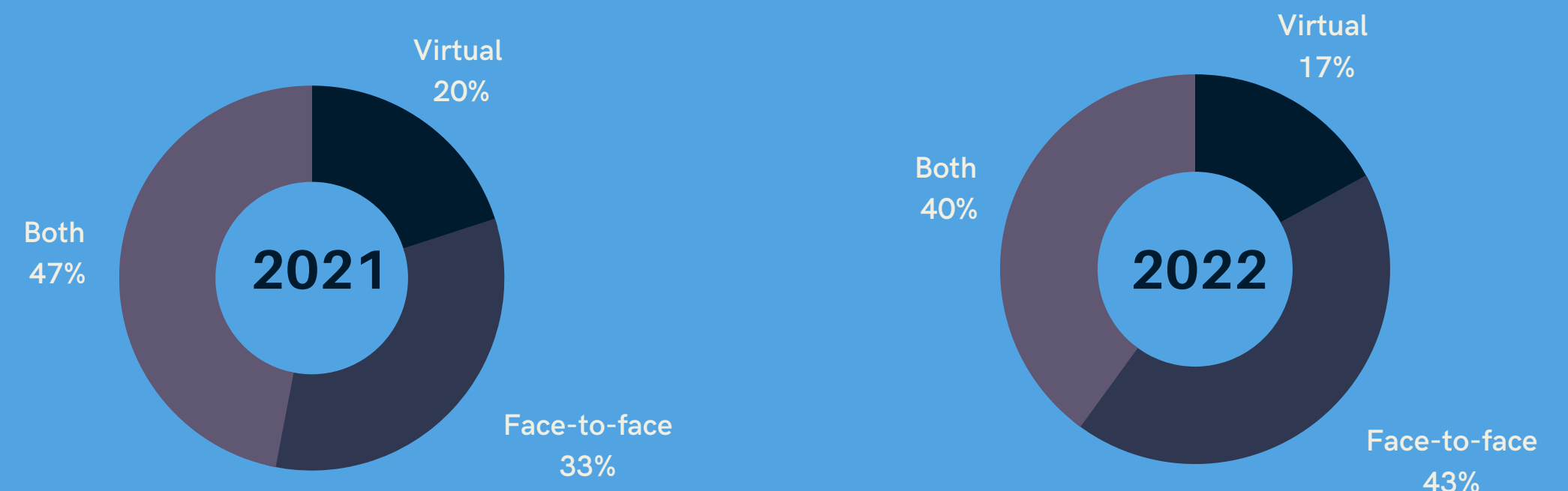
Careers events: authenticity

Because our respondents had all attended one or more of our STEM Women events. We wanted to ask how they had found these events, what they get out of them and how certain aspects of the agenda influence their decisions.

In 2019, 70% of respondents says they were more likely to apply to a company that they had heard speak during an event, this increased to 77% in 2021, and stayed at a similar level (73%) in 2022.

Are you more likely to apply to a company that you heard present at a careers event?

✓ **70%** 2019 ✓ **77%** 2021 ✓ **73%** 2022
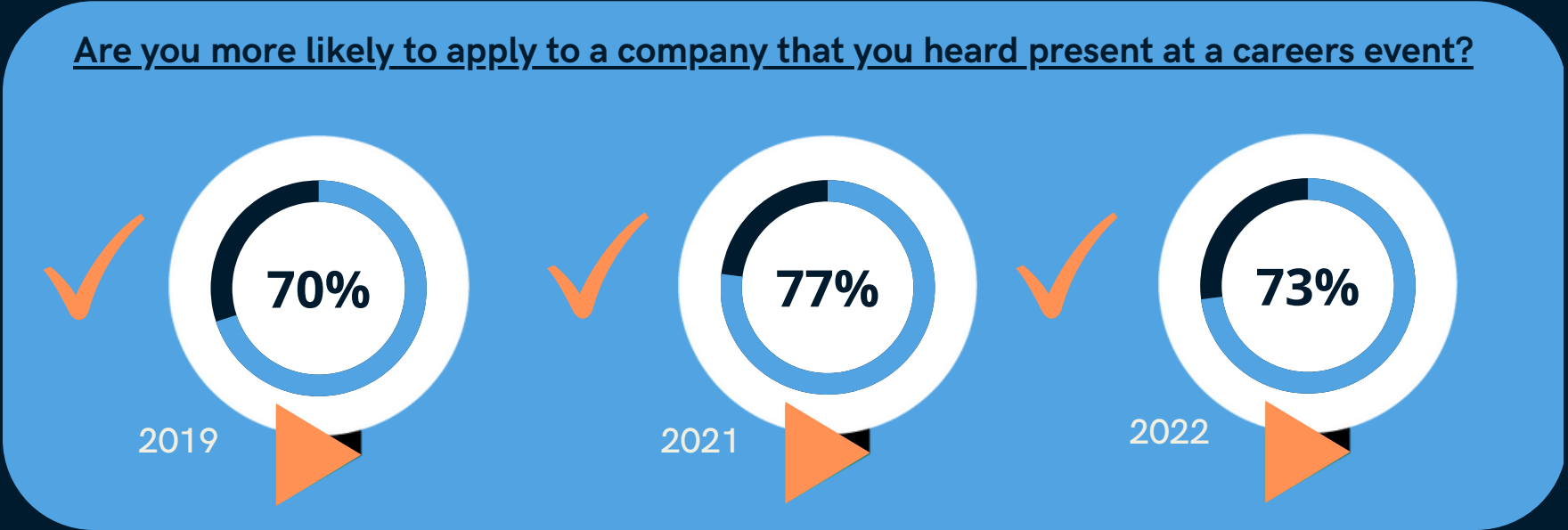
"Hearing someone talk with enthusiasm about their company definitely makes it a more attractive place to apply as you can tell their company treats them well." - Millie, Durham University, Computer Science.

Having a representative present at a careers event promotes the company culture in an authentic and transparent way - something that our respondents value very highly. Students are interested in hearing about the reality of working life. They respond best to companies which give an honest, real-life reflection of the working culture. Now more than ever, graduates want to get to know the people behind the brand, and they are interested in aligning the personality and values of a company with their own.

"Human interaction is much more honest and informative." - Emma, Theoretical Physics BSc, Lancaster University.

"It gives you a better feel for the ethos of a company and makes you feel more connected." - Hannah, Environmental Science, University of the Highlands and Islands.

In previous questions, respondents highlighted that if they could see people like them working at prospective companies, they were more likely to apply for roles there. Many respondents highlighted the power of seeing strong female role models talk at careers events, showing the company is committed to improving diversity and supporting women.

"When they speak about their honest personal experience it's inspiring, especially if it includes challenges they overcame. – Audra, MEarthSci Geology, University of Edinburgh.

Respondents relate most to authentic and honest accounts of career mistakes and setbacks. They want to hear about the reality of being underrepresented within an industry and learn practical tips to succeed in this space. They can easily spot tick-box statements, jargon and 'greenwashing'.

"When a speaker regurgitates company values, this puts me off." – Tanya, Computer Science, University of Warwick.

Some of the most inspiring talks at STEM Women events are when role models speak openly and passionately about how they have advocated for themselves in the workplace, overcome imposter syndrome, and fought against unconscious bias. Speakers who can talk about combating confidence issues, developing skills, or reference non-linear career paths, are hugely engaging to this audience. There's no better endorsement for an organisation than having recruited and retained these strong women working in industry.

Careers events: representation

With representation being a key theme throughout our 2021 data, we wanted to learn more about how students and graduates felt about their place within STEM. We asked our respondents whether they felt underrepresented in their field or course.

49%
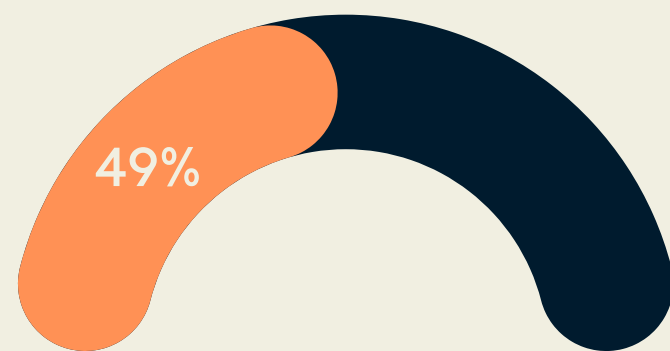
49% of respondents said they felt underrepresented in their field or course.

33% said they did not feel underrepresented, and a further 19% said they were unsure. Earlier in the report, we demonstrated how important feelings of belonging, community and inclusion were to our respondents. However, almost half of the students we asked said they did not feel represented within STEM. It is no wonder then that they are searching for diversity initiatives and inclusion when looking to start their careers.

"I am the only Indian woman on my course in one the most diverse cities in the UK. I don't often see other influential Indian or south Asian women in my field." - Ria, Chemistry, University of Manchester.

"I am a PhD student studying Petroleum Engineering. There are 9 students in my research group, and I am the only female." - Oluwakemi, Petroleum Engineering, Heriot-Watt University.

As well as being women or non-binary, many of our respondents represent the intersections of diversity, so inclusivity matters to them in real terms; EDI and sustainability are both incredibly important to this generation and they want to see this in practice right from the beginning, including in recruitment.

"I am a disabled woman, and we are massively underrepresented in my field and course because a lot of employers are not looking to put in place things to help us work comfortably." – Rebecca, Biology BSc, University of Greenwich.

> "I used to think I was underrepresented, but thanks to this event [STEM Women] I gained more confidence in what women can achieve. Today I felt represented and understood by these successful women." - Giusy, Mechanical Engineering, Politecnico di Bari.

Of the 33% that said they felt represented in their course or field, many said they were surprised by the levels of diversity amongst their course mates, but that it has boosted their confidence. This highlights that changes are being made across STEM disciplines to encourage more women and minority groups to participate and thrive.

"I thought I would be [underrepresented] but there were many women on my course." - Tara, Mathematics with Finance, University of Southampton.

"There's a 50/50 split of male-female classmates on my course. We have also had talks from outside companies and many of those speakers have been female." – Anonymous.

Graduate careers events are the perfect opportunity to highlight representation, as companies can showcase role models and diverse teams of staff to talk to students and reassure them that the organisation is committed to promoting inclusivity.

The influence of careers events

Did the STEM Women event change your mind about potential career paths?

2019

| YES 58% | NO 38% |

2020

| YES 59% | NO 41% |

2021

| YES 72% | NO 28% |

2022

| YES 78% | NO 22% |

From 2019 to 2022, the percentage of respondents who said that a STEM Women event had changed their mind about potential careers grew from 58% to 78%. Many highlighted that the events introduced them to new industries or roles that they had never heard of. This increase of 20% over four years shows the growing influence careers events have on students and graduates when it comes to deciding their career paths.

"It opened my eyes to jobs I never knew existed. It also gave me hope and sense of calm that there are many different pathways I can transfer my skills to." - Aleksandra, Forensic Science MSci, University of Kent.

One of the key points made was how the events educated them, not only on roles they were unaware of, but also companies and industries. There was also an emphasis on the events boosting confidence, prompting attendees to apply for roles they may not have felt qualified for beforehand.

"I never realised how many career paths there were, the event introduced companies I had not heard of before. It was the first time I have considered a tech role." - Chloe, Business Management, Accounting and Finance, Nottingham Trent University.

"Employers I had not considered myself suitable for came forward and spoke to me about how I could be suitable for their programmes." - Kirsty Mitchell, Chemical Engineering - Heriot-Watt University.

Respondents also said that the events showed that they could apply to roles that weren't directly linked to their degree background, and so opened up more opportunities.

"It showed that you could be using your degree in different fields and different disciplines which I hadn't really heard about before, it also encouraged people to think more about what they enjoy rather than being insistent on using their degree knowledge." – Scotland 2020 Event Attendee.

"As a chemist I would only have thought about lab-based work but after the career fair, I could see that the skills acquired from my degree are interchangeable and could be applied in finance and data science." – Anonymous.

Finally, in 2021 and 2022, the majority of respondents said that the inspiring nature of the events was one of the key reasons they felt more confident about entering into different industries within STEM. Yet again, respondents were very vocal about the importance of seeing and hearing from real women working at these companies, talking honestly about their experiences.

"It allowed me to see real people and hear about their authentic experiences. Before, I thought that the people in these career paths were above me. However, they were all very encouraging." - Felicity, Physics and Philosophy, University of Bristol.

"Seeing women in positions I could imagine myself being in 5 years has motivated me and given me confidence"- Rebecka, Bsc Computer Science, Brunel University.

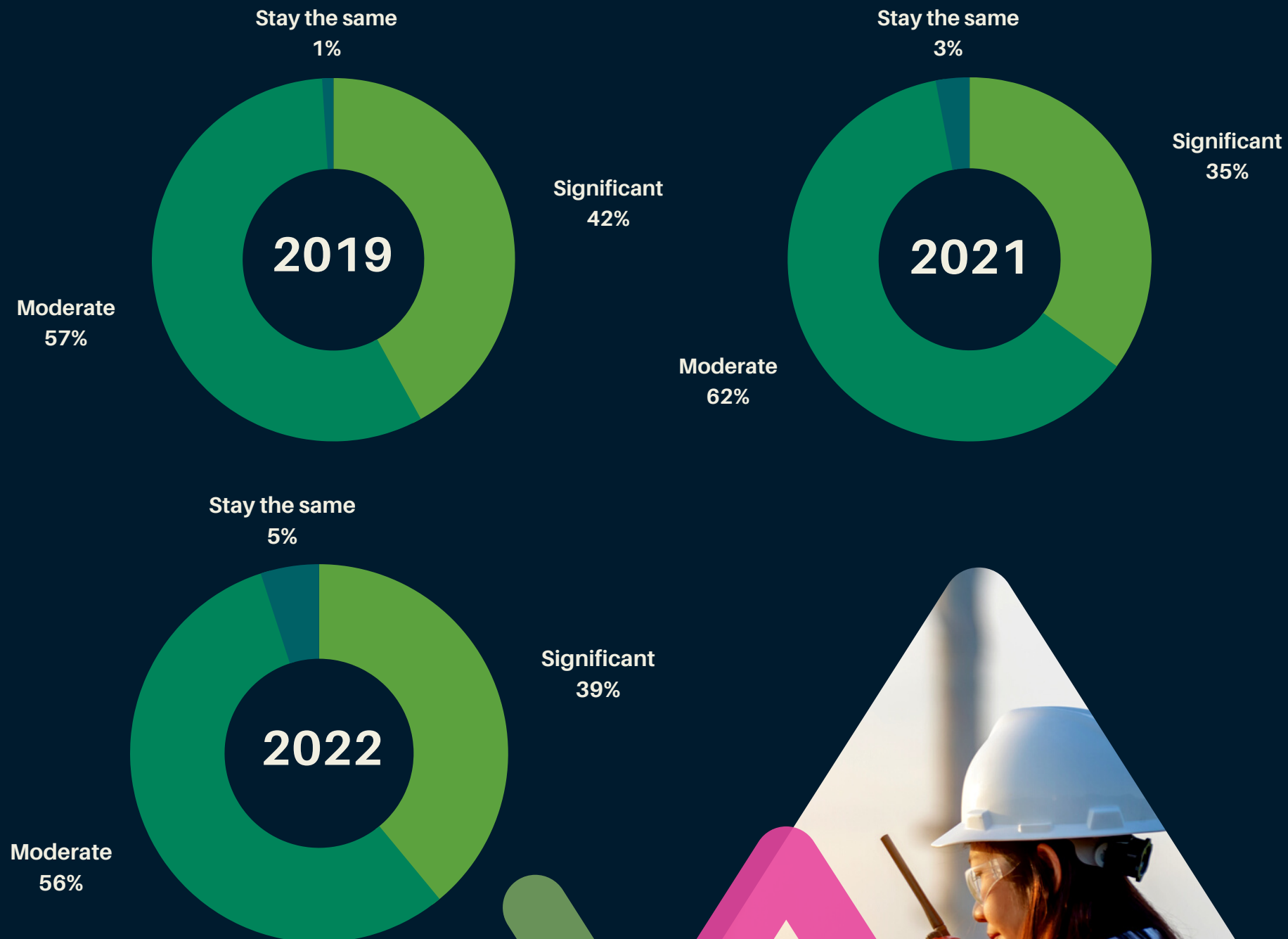These sentiments were echoed in our 2022 data;

"Meeting women in the IT industry and learning from their experiences showed me that there is no limit to the jobs I can work in. It felt amazing seeing all these successful women talk about their experiences. – Zohra, University of London, MSc in Data Science.

Of those who answered 'No' to whether the STEM Women event had changed their mind about potential career paths, many said that the event had confirmed the career path they were already interested in.

Will we see change in the future?

IT and Engineering industries have some of the lowest diversity statistics out of all of the STEM-related sectors, with women making up just 10% of engineering professions and 16% of IT professionals.

In 10 years time, how do you think the gender imbalance will have changed in IT and Engineering industries?

2019
- Stay the same 1%
- Significant 42%
- Moderate 57%

2021
- Stay the same 3%
- Significant 35%
- Moderate 62%

2022
- Stay the same 5%
- Significant 39%
- Moderate 56%

In 2019, 2021 and 2022, we asked our respondents how they think the gender imbalance will have changed in 10 years' time. In 2019, 41% of respondents said they thought that the gender imbalance in IT and Engineering industries will have significantly changed in 10 years' time. However, 56% said that they thought there would only be moderate change and just 1% believed that the gender balance will stay the same.

In 2021, 35% said they expect a significant change, 62% said there would be a moderate change and 3% said it would stay the same. And finally, in 2022, 39% said they would expect significant change, 56% moderate change and 5% expected the balance to stay the same.

So, from 2019 to 2021, respondents felt slightly less confident of a significant change and thought it would be closer to moderate. However, in 2022, almost 40% of respondents felt there would be significant change, a similar number to 2019.

Of those who believed that there would only be a moderate change, issues were raised surrounding ingrained beliefs within society that make drastic change difficult to enact.

"With the rise of female movements such as '#MeToo' and a larger number of people speaking out for equal pay there will be a slight/moderate change. However, 75% of males are CEOs of FTSE 100 and if attitudes do not change rapidly, I believe the change will not be significant."- Sumaiyah, Global Health, Queen Mary.

"There will always be a perceived perception of male and female industries/clothes/toys etc, society needs to improve before companies can." - Gemma, Mechanical Engineering, London South Bank University.

It's clear that respondents understand that to see a significant change, there are larger, societal issues that need to be addressed before the male-dominated industries make a significant transition. However, some students believed that the movement towards change would gain traction quickly and in 10 years' time there would be significant differences in these fields.

"As gender stereotypes are made less and less relevant, men and women will feel less pressured to join a specific industry or take on a gender-specific role. Change is a positive feedback loop in this case, as the industries that adopt positive change will reap the benefits more than industries or organisations that refuse to update their ideas." – Dublin 2019 Event Attendee.

"I believe that there have been positive changes and these will continue, there is much more in the news and more initiatives to help combat this imbalance. I believe we will see significant changes soon. – Anonymous

Executive summary

This report offers a unique insight into how our STEM Women community perceive gender differences, exploring their attitude towards science, technology, engineering and mathematics (STEM) related industries. Our surveys have investigated career confidence, motivations behind accepting and declining job offers, and issues surrounding imposter syndrome.

Key themes and insights:

- Diversity, gender imbalances and the gender pay gap
- Imposter syndrome, confidence and career barriers
- Attitudes to careers events and their influence
- The future outlook

Throughout the report, we have demonstrated that diversity initiatives have remained either extremely or very important to the majority of our respondents from 2019 to 2022, and over half of respondents, year on year, said that the gender balance of a company would influence their decision on job offers. Respondents see the value and importance in a diverse workplace, explaining that they believe these environments help them to thrive, and to feel a sense of belonging and community. They recognise that this leads to innovation, empathy, and a healthy work culture.

One key way for companies to promote these characteristics is through representation and authenticity. Being able to connect over shared experience and to feel that they can relate to other employees is very important to the students we surveyed, especially those from underrepresented groups. There was a clear importance placed on employers being committed to motivating and empowering women in the workplace.

When it came to discussing the gender pay gap, we found a staggering number of respondents who either were unaware that these reports were available or had never even thought to question them. From 2019 to 2022, the percentage of respondents who would expect to read gender pay gap reports when researching employers has moved from 35% in 2020, up to 60% in 2021, then down to 50% in 2022. Fluctuations which can be attributed to the instability caused by the pandemic. The Government decided to suspend enforcement of the gender pay gap deadlines for 2019-2020, which meant it was absent from news headlines. Since its introduction in 2017, the gender pay gap has certainly been less prominent in mainstream media.

Next, we wanted to explore the key themes surrounding career confidence, career barriers, and imposter syndrome. We asked respondents to highlight a key barrier they faced when pursuing a career path. In 2021, the barrier chosen the most was 'strong competition' (28%). This was followed by 'lack of experience' (24%) and 'lack of confidence' (16%). In 2022, 'lack of experience' was chosen most (39%), this was followed by 'strong competition' (18%) and 'lack of confidence' (14%).

From 2021 to 2022, 'lack of experience' was chosen by 11% more respondents, making it the biggest barrier for almost 40% of our survey. This could signal the continuing fallout from the COVID-19 pandemic, in which many students were unable to complete internships and work placements during their university studies due to lockdowns and hiring freezes. This has clearly had a knock-on effect for 2022 final year students as they begin their job search.

We wanted to understand more about the confidence students and recent graduates have when entering into the world of work after leaving university. In 2021, we asked respondents to measure their confidence on a scale of 0-100. For all respondents that answered, the average score was 67%. In 2022, this increased by 3% to 70%. Although this is a positive increase, it still shows that respondents believed that there is a 30% chance that they would not have a successful career after graduation. This is despite studying in-demand STEM related subjects at university, proactively looking for roles by attending graduate careers events and entering into a healthy graduate jobs market.

Looking further into confidence issues, we asked respondents whether they had suffered from imposter syndrome. In 2021, 57% of respondents said they had suffered from or experienced imposter syndrome - that is over half. In 2022, this increased to 61% of respondents answering yes to having experienced imposter syndrome.

Many respondents said they believed the feelings of imposter syndrome arose from not having a sense of belonging or feeling like the 'odd one out'. We wanted to highlight how prevalent feelings of imposter syndrome are in STEM-related industries. This may be due to the rate of scientific advancement making those studying in STEM subjects feel they are unable to keep pace with rapid change.

Next, we investigated further into the impact of careers events and how they can influence the future career paths of graduates. We found that respondents are eager to get back to in-person interactions, with many highlighting that they found physical events more enjoyable and interactive. Event attendees were more heavily influenced by companies who presented as part of company insight talks, with 73% saying they would be more likely to apply for roles at companies who spoke during an event (2022). The key to success during these presentations is authenticity and honest accounts. When speakers talk about the challenges they have overcome and the lessons they have learnt during their career journey, it resonates more with the audience. The attendees want to hear about the reality of being underrepresented within an industry and learn practical tips to succeed in this space.

Finally, from 2019 to 2022, the percentage of respondents who said that a STEM Women event had changed their mind about potential careers grew from 58% to 78%. Many highlighted that the events introduced them to new industries or roles that they had never heard of. This increase of 20% over four years shows the growing influence careers events have on students and graduates when it comes to deciding their career paths.

This brings us to the question of how our respondents view the future of diversity in STEM. We asked for their views on how they think the gender imbalance in IT and Engineering may change in the next 10 years. From 2019 to 2021, respondents felt slightly less confident of a significant change and thought it would be closer to moderate. However, in 2022, almost 40% of respondents felt there would be significant change, echoing the response levels previously seen pre-pandemic in 2019.

It's clear that respondents understand that to see a significant change, there are larger, societal issues that need to be addressed before the male-dominated industries make a significant transition. However, 39% of respondents believed that the movement towards change would gain traction quickly and that in 10 years' time there would be significant differences in these fields.
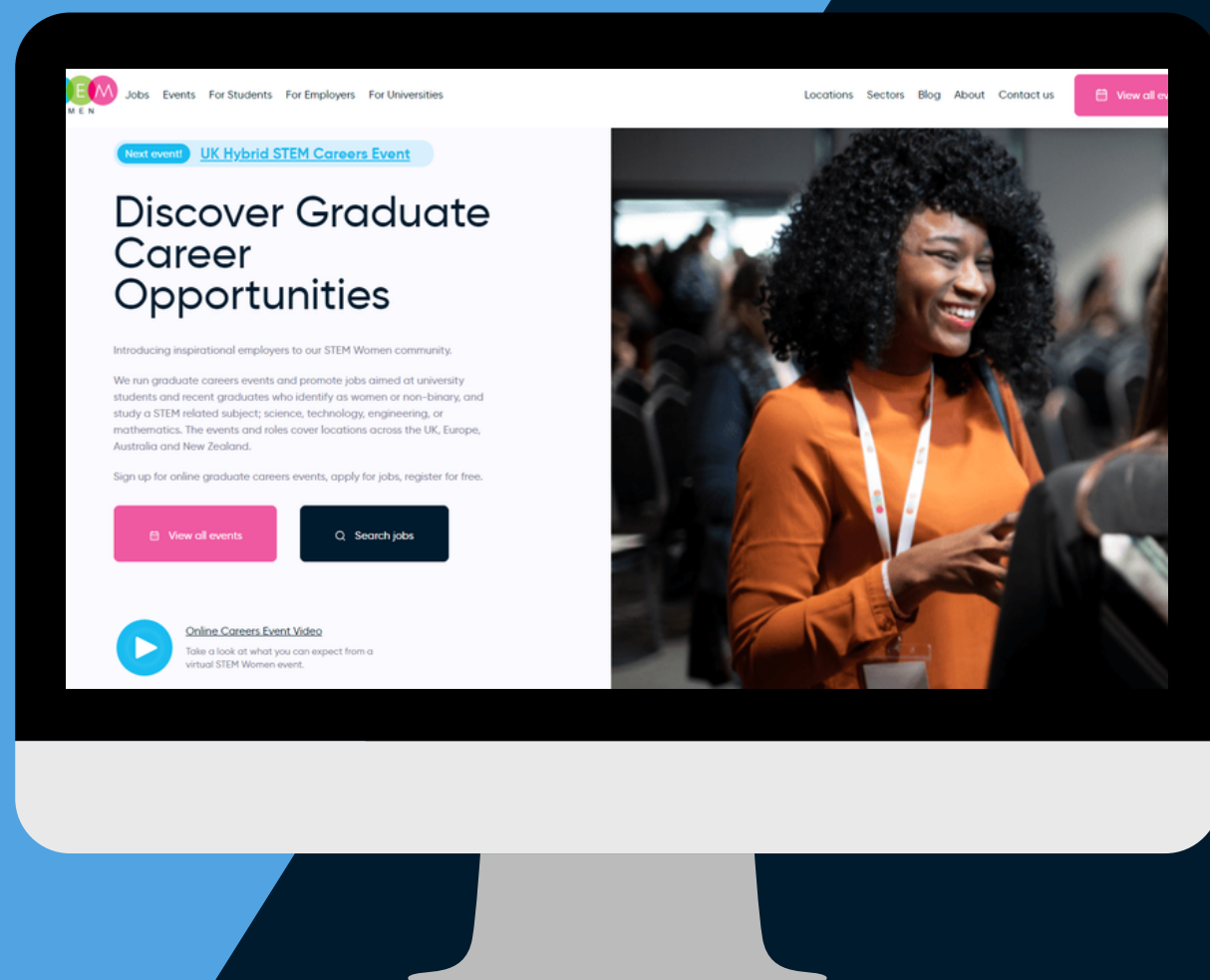
About STEM Women

We run graduate careers events and promote jobs aimed at university students and recent graduates who identify as women or non-binary, and study a STEM-related subject; science, technology, engineering, or mathematics. The events and roles cover locations across the UK, Europe, Australia and New Zealand.

Our graduate events allow students and recent graduates to network with a range of top employers, hear talks from a range of representatives working in STEM, and get inspired to follow in their footsteps.

Alongside our general STEM career events, we run industry specific events, and bespoke career events for companies who are looking to recruit more diverse candidates. We also offer employers access to a year-round job board and can provide recruitment shortlisting services.

350+
Employers have exhibited with us since February 2018.

60+
Events held across UK, Ireland, Europe and Australia since 2018

30,000+
Students have registered for an event since autumn 2020.

56,000+
Page followers across our social media accounts.

Discover Graduate Career Opportunities

Introducing inspirational employers to our STEM Women community.

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Sign up for online graduate careers events, apply for jobs, register for free.

View all events   Search jobs

Online Careers Event Video
Take a look at what you can expect from a virtual STEM Women event.

Contact

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Thank you to everyone who took part in the research and contributed to this report.

If your company would like to exhibit at a future STEM Women event then please contact us.