



Girls in STEM

Powering Economic Growth:
Attracting more young
women into Science and
Technology 3.0

EXECUTIVE SUMMARY



We are fast approaching a tipping point for science, technology, engineering and mathematics (STEM) in Ireland. Skills shortages, societal impact, talent development and technology trends are converging to make STEM a pressing national question.

A 2016 report, STEM Education in the Irish School System, published by the STEM Education Review Group, confirms that there are “significant gender differences” in the choice of Leaving Certificate science subjects. The ratio of male to female students was greater than 3:1 for physics and was approximately 2:3 for biology. In 2015, just 5.3% of Leaving Certificate engineering students were girls and boys outnumbered girls by almost three to one in technology (74.1% male compared to 25.9% female students).

In the workforce, it is estimated that women make up just 25% of people working in STEM-related jobs.

The gender imbalance issue has not improved since Accenture’s first Girls in STEM report in **2013** and this effectively excludes half of the population from making a significant societal and economic contribution. There is a tangible loss of intellectual capacity when girls drop out, or feel excluded from, pursuing STEM education and careers. According to the Irish Research Council gender-balanced research teams have collectively higher intelligence, their work has the greatest impact, is more innovative and delivers the most societal benefit. This third edition of the Accenture Girls in STEM report sheds further light on the barriers preventing more girls from getting involved in this area and recommends ways to overcome them.

This report identifies the obstacles that exist today:

- Negative stereotypes towards STEM subjects and careers are more suitable for boys and yet girls are influenced more by their parents, teachers and friends

than boys. This effect is more marked the younger they are.

- Parents’ influential role in their daughters’ education and career choices yet lacking information about career options.
- Fragmented STEM information and less obvious career paths than other disciplines, making it difficult for teachers, parents and children to evaluate options.
- A disconnection between industry skills needs and girls’ choices for Leaving Certificate subjects.

Another trend affecting individuals and all industries is digital disruption. Technology is fundamentally altering the world of work at a pace not seen since the dawn of industrialisation. Automation, robotics and artificial intelligence now seriously threaten many traditional jobs and functions. Rapidly developing areas like data analytics are creating roles that didn’t exist a decade ago.

ECONOMIC IMPERATIVE

At a national level, many Irish companies will not be able to compete on the national and international stage without sufficient numbers of STEM-skilled people. Together, industry, government, parents, and teachers must act now to ensure the gender gap does not pose a major economic problem for Ireland or create a skills deficit that hinders progress for future generations of women in Ireland.

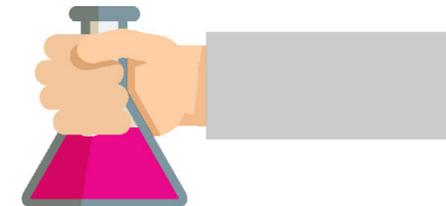
In addition to investigating why girls are less likely to study STEM and pursue careers in STEM fields, the report makes several recommendations. These include:

- **Early intervention to alleviate negative perceptions of STEM at an early age.**
- **Help parents educate themselves further about STEM subjects so that they have a positive influence on their children.**

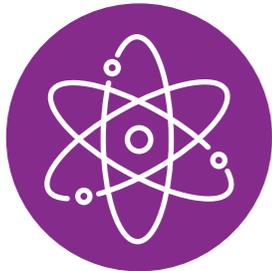
- **Alter the way we speak about careers to enable children to envisage what a career in STEM might look like.**
- **Ensure industry, the education system (teachers in particular) and Government collaborate more closely so that, together, we can deliver a consistent message, in a sustained way, at a national level.**

Combined, these factors represent a significant challenge to the workforce of tomorrow. Meeting this challenge calls for adaptability, intelligence, curiosity, creativity, and problem solving.

A STEM education equips people with these life skills and attributes.



MINISTER'S FOREWORD



The basic aim of this Government is to use our economic success to build a fair and compassionate society. No area is more central to this goal than education.

Ireland should be a leader in the provision of STEM education. For the generation of children currently in school and about to enter it, creative thinking and problem-solving skills will be absolutely key to how they develop and achieve their potential. In particular, their ability to think critically and develop solutions will be vital for their prospects in life. Providing STEM Education of the highest quality is essential if Ireland is to become an innovation leader at the forefront of technological and scientific change.

We need to encourage our existing students, as well as future generations of students, to understand and embrace areas related to STEM. We must instil in our students that a STEM education can open many doors, even for those who do not pursue a STEM career. I am determined that we should

continually improve the education system in this area.

The national five-year strategy Innovation 2020 notes that the availability and quality of graduates are essential for Ireland to maintain its attractiveness as a location for investment. Many of the jobs coming into Ireland through foreign direct investment and by the vibrant start-up community increasingly rely on skills and attributes that are nurtured through study of science, technology, engineering and mathematics. The Government is committed to ensuring that Ireland has the required skilled workforce to fulfil the existing and growing needs in STEM.

The recommendations proposed by the STEM Education Review Group will add significantly to the development of our STEM Education Policy Statement, which I will publish shortly. I have already set out 21 actions from the report which we will begin implementing immediately.

The Stem Policy Statement will build on a range of reforms and initiatives already underway such as curricular reform, with the introduction of Computer Science at Leaving Certificate in September 2019 and a new Primary Mathematics curriculum to incorporate computational thinking.

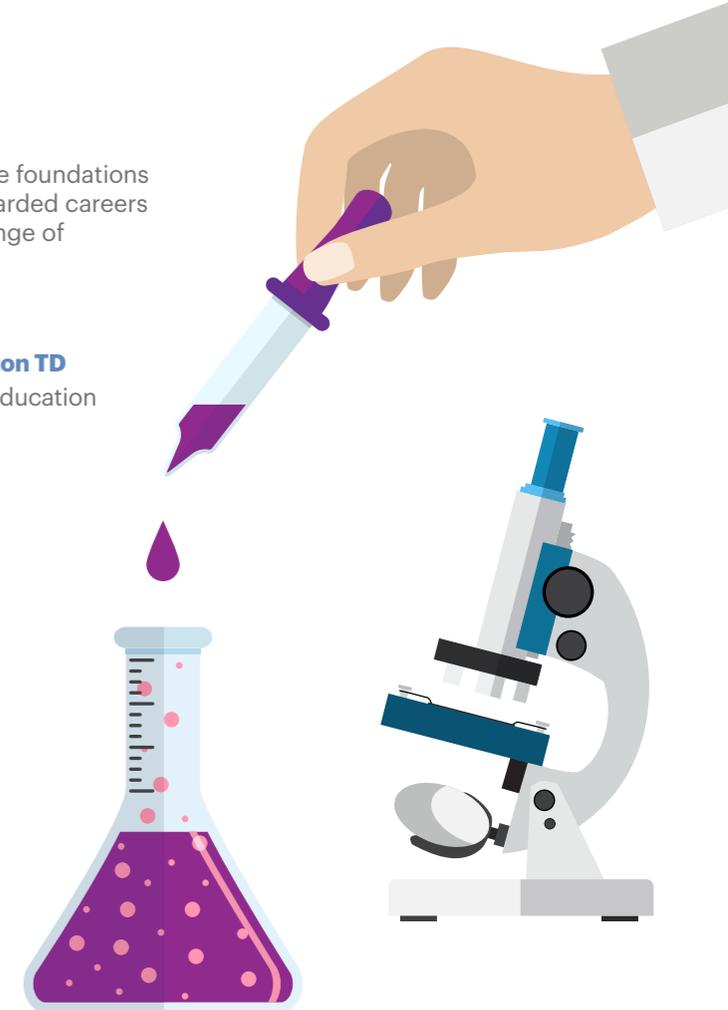
I would like to acknowledge the work undertaken by Accenture in publishing a series of three reports which provide much-needed insight into the under-representation of girls and women in STEM education and STEM careers. Accenture's research, has uncovered many important trends which can help inform the decisions we make at a policy level to make STEM as inclusive as possible to all.

It is vital that all stakeholders from the education, business and research sectors work together to remove the obstacles which have so far served to limit the involvement of women in STEM. We must ensure that guidance and support is provided along with encouragement for learning in STEM

disciplines so as to lay the foundations for fulfilling and well-rewarded careers in STEM across a wide range of industries.



Richard Bruton TD
Minister for Education and Skills



INTRODUCTION



As we introduce the third in our **series of reports** about Girls in STEM, it is heartening to be able to report some welcome progress in raising awareness of the issue. Our findings continue to show the massive influence of parents and teachers in young girls' subject choices which can lead them towards or away from a career in one of the STEM disciplines.

Many of the national economic imperatives outlined in previous reports still apply. Ireland relies heavily on foreign direct investment [FDI] for creating employment. The types of multinational companies setting up in Ireland are heavily weighted towards sectors with requirements for technical talent from ICT and software to pharmaceuticals and financial services. More than 120,000 people in Ireland work directly in roles requiring STEM experience, and this number is growing.

Yet today, women are still vastly under-represented in the STEM workforce in Ireland. The CSO estimates that fewer than 25% of the STEM workforce

are female. We need to address this shortfall in the coming years and by doing so ensure girls are being given the best chance and opportunity to secure interesting and rewarding careers.

At the same time, there is an active and rapidly growing ecosystem of home-grown start-ups. Like their multinational counterparts, many of these companies need a pipeline of skilled talent with a background in the STEM disciplines. In order to provide sufficient numbers of candidates for these companies' needs, the Irish education system needs to produce skilled graduates in sufficient numbers.

Encouraging more girls and young women to pursue STEM subjects in their second- and third-level education therefore increases the total pool of potential recruits. This will ensure Ireland remains a competitive location for FDI companies and a vibrant proving ground for early-stage entrepreneurial start-ups.

The research findings that form the backdrop to this year's report show us that it is clear we still have more to do to ensure that girls are not missing the opportunity for creative and purposeful careers.

Some of the context has changed since our last report. The scale of digital disruption is starting to be understood and discussed more widely than it was two years ago. New industries are emerging from the ashes of old ones requiring new skills while making older ones obsolete. Science and technology are at the heart of this rapid flux. It's clear that a solid grounding in STEM, starting as early as possible in the education system, will equip young people for the changes and challenges ahead.

We want to ensure that no girl is left behind. This is not just an economic issue but a societal one. We owe it to future generations to take action.



Paula Neary

Managing Director,
Accenture Ireland



If Ireland wants to be a global player in the digital future – and indeed, the present - it is crucial that it's women become more visible and active in the field of STEM.

From a very young age girls are all too often persuaded to believe that, in certain subjects, their abilities are defined by their gender. It is up to all of us, parents, teachers, politicians or leaders of industry, to change these misconceptions, to stoke girls' natural curiosity and show them that the STEM disciplines are full of exciting and genuinely fulfilling possibilities.

Reports such as this one produced by Accenture are vital in forcing us to acknowledge that this is a very real issue, and one we need to quickly resolve. Career paths in the STEM industries have for too long appeared solely the prerogative of men. If we want to re-route young women to challenge this we have to start by changing the map, and redefine how each child can identify their rightful place in the world from the moment they enter the classroom.

LORD DAVID PUTTNAM OF QUEENSGATE, CBE

INFLUENCES AND BARRIERS

ONE THIRD OF PARENTS AND TEACHERS STILL PERCEIVE STEM DISCIPLINES AS MORE CLOSELY FITTING BOYS' BRAINS, PERSONALITIES AND HOBBIES

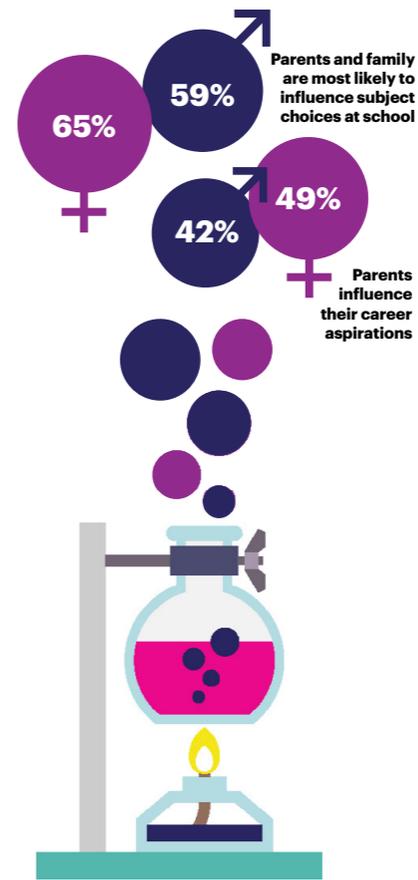


STEM provides opportunities into an incredibly broad range of interesting study areas and fulfilling work. Yet the research clearly shows many parents, teachers and students still don't fully grasp these possibilities.

Girls are influenced more by their parents, teachers and friends than boys. This effect is more marked the younger they are.

Almost two thirds of girls (65%) said their parents and family are most likely to influence subject choices at school compared to 59% of boys.

49% of girls said their parents influence their career aspirations compared to only 42% of boys.

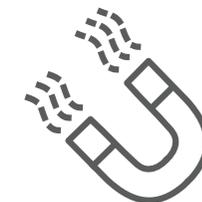


Almost one in four Irish parents (24%) feel “very informed” and 48% “fairly informed” about the variety of career opportunities available for their sons and daughters in STEM.

This is a significant improvement from the **2015** report, where just one in seven parents felt very informed about career opportunities.

It is encouraging that close to two-thirds of parents (65%) feel either very informed or fairly informed about the benefits of studying STEM as a key stepping stone to career take-up. Coming out of the study is a clear indication that work experience helps towards the understanding of career opportunities, with 59% of students agreeing it is a good way to help them to understand the opportunities available to them.

GOOD NEWS ON CAREER OPPORTUNITY. AWARENESS UP & VARIETY APPRECIATED



PARENTS AND TEACHERS

Unfortunately, this increased awareness is not improving the dropout rate of students studying STEM.

More than half of teachers (53%) said they have seen girls drop STEM subjects due to pressure from parents, while 58% of parents said they have witnessed children drop STEM due to issues with the teacher.



ASSOCIATIONS AND PERCEPTIONS

Enjoying and performing well at STEM subjects is a key driver to continuing study with 52% of students saying that enjoying the subjects encouraged them to keep up their studies, and 50% said being good at STEM mattered

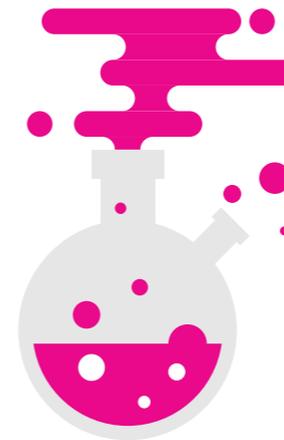
to them. To encourage more girls in STEM, we need to ensure they enjoy these subjects and are made to feel they are good at them. Parents echoed these sentiments: 55% said the most important consideration in making career choices is enjoyable work.

Parents and teachers agree that doing something enjoyable is most likely to influence girls' and boys' career choices.

However, this is where the similarities end and disparities become apparent. The research shows teachers believe girls are more likely to be influenced by social aspects, such as making a difference and the environment (girls 33% vs. boys 8%), as well as doing something that pleases their parents (girls 44% vs. boys 33%) while they feel that boys are more likely to be influenced by money (boys 71% vs. girls 54%). For teachers, the biggest perceived influence is earning potential.

Biology is the only STEM subject where there is no difference in perception between girls and boys. Girls are less likely than boys to rate subjects like computer science, design and technology, chemistry and maths as "cool". When asked why few girls choose STEM, 32% of students said their peers don't think of it as cool, and 21% said they don't find the subjects interesting or enjoyable.

Changing the words we use to describe STEM subjects and careers could improve positive perceptions about them, and encourage increased participation amongst girls. Four in ten girls would be encouraged to continue with a STEM subject if it helped them to secure a wider range of life skills. Girls would also take up or continue STEM if it supported the career they wanted to explore (42%), or if they enjoyed the subject more (38%). The figures show considerable disparity between girls and boys for the triggers to take up or continue STEM subjects at school or college.



The gender imbalance in STEM careers in Ireland is not improving. We must make this inequity and waste of talent a priority. We need to set ambitious targets and invest in a multi-faceted approach now.

PROF. BRIAN MACCRAITH
PRESIDENT, DCU

CAREER CHOICES

For students, their individual personal interests play a significant role in choosing a career, with 50% saying it's "very important" and 29% saying it's "somewhat important". Parents and teachers understand this, although both groups still have more stereotypical views when asked which job types appeal to which gender. More than three out of four parents (76%) think engineering and manufacturing jobs appeal more to boys, 65% feel that way about game and app development and 40% think science is a profession pitched more towards boys. Though the figures differ slightly for teachers, the same trends hold true.

More than one third of parents and almost half of teachers think students don't understand what career options follow from a STEM education. Only 15% of parents believe their children understand the STEM career options. Clearly there is more work to be done.

Despite excellent and varied career options and the promise of high salaries, many girls don't seem to understand what a STEM career looks like. One in four girls don't think there are financial rewards for a career in STEM and 13% said they don't know if they could earn more by working in a STEM role. Just under one-third of parents (31%) say they believe girls are put off because there's inadequate information about the career options that STEM subjects provide.

Girls are more likely to be influenced by social aspects



Boys are more likely to be influenced by money





One of the greatest challenges facing the global technology sector is the lack of gender diversity. At a time when the industry is expressing concern over skills and talent availability, it is obvious that if we correct this imbalance the talent demand will abate and we can focus all of our efforts on innovation and turning ideas into real assets, products and services. It is Technology Ireland's flagship goal that Ireland becomes the world leader for gender diversity in the technology sector. This starts with encouraging more girls into STEM.

PAUL SWEETMAN
DIRECTOR
TECHNOLOGY IRELAND, IBEC

List A	List B
Video Game / App Designer / Programmer	Chef
Special Effects for Film and Music Industry	Accountant
Software Designer	Banker
Mobile Phone Technology and Communications Developer	Insurance Broker
Sports Equipment Inventor	Civil / Construction Engineer
Sports Physiotherapy	Mechanical Engineer
Working in the Fashion Industry	Electrical / Electronic Engineer
Medical / Pharmaceutical Research	Builder
Renewable Energy Engineer / Scientist	Town Planner
Landscaping and Designing Gardens	Farmer
Designing Bridges, Buildings, Roads etc.	Programmer
Creating Smart Towns / Infrastructure	Solicitor
Developer of Technology to Help Reduce Famine and Hunger	Barrister
Creating New Recipes and Foods for Supermarkets	Medical Researcher
Developing Satellites, Planes and Rockets	Doctor
Military Surveillance	Nurse

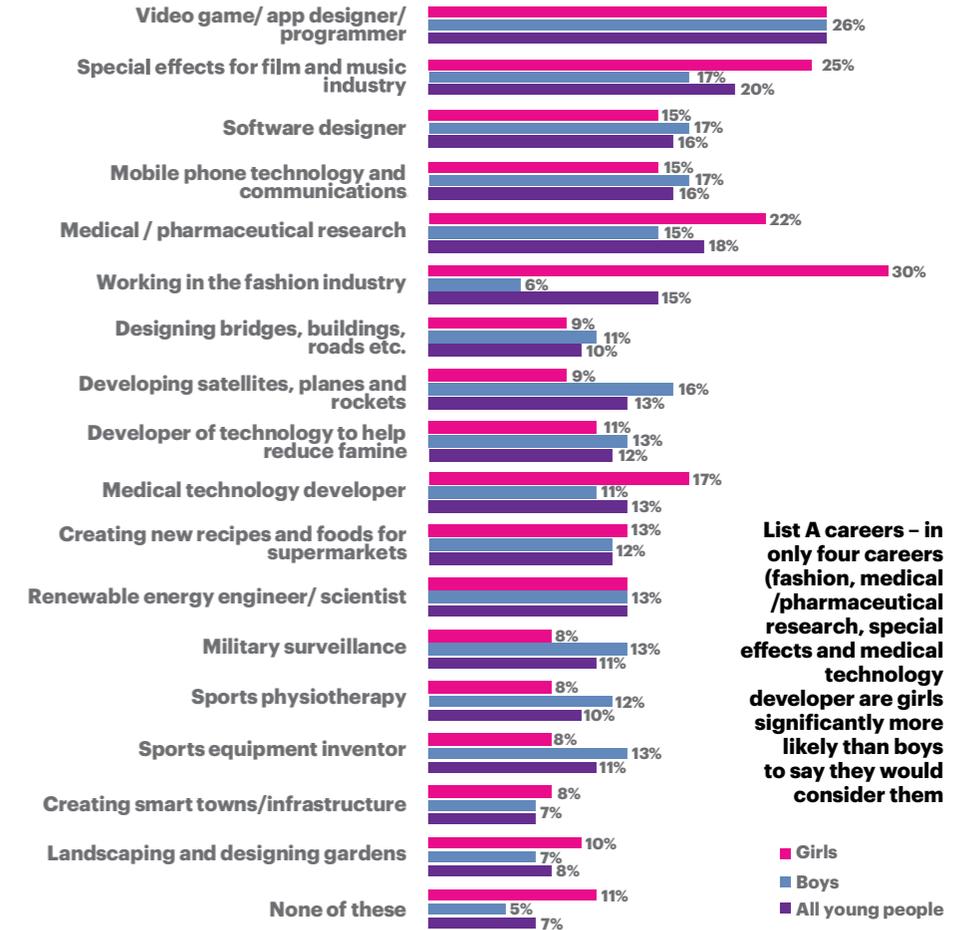
LANGUAGE MATTERS

To understand this phenomenon better, all groups were shown two lists of jobs during the interview process for this research. List A included titles such as video game and app designer, medical/pharmaceutical research, creator of smart towns. List B was limited to largely single-word job titles like programmer, chef, accountant, or nurse.

Overall, young people are most likely to say that List A jobs sound the most exciting. However, just 24% of girls said they know more about the roles in List A than in List B - lower than the 43% of boys who said so.

This highlights the importance of labels and descriptions, particularly when developing STEM messages that appeal to girls. Specific, definable words such as "bridge building" or even "sustainable energy" appears to create more positive associations rather than terms such as electrical engineering which may be too broad for people to fully understand what it means and what jobs it could ultimately lead to.

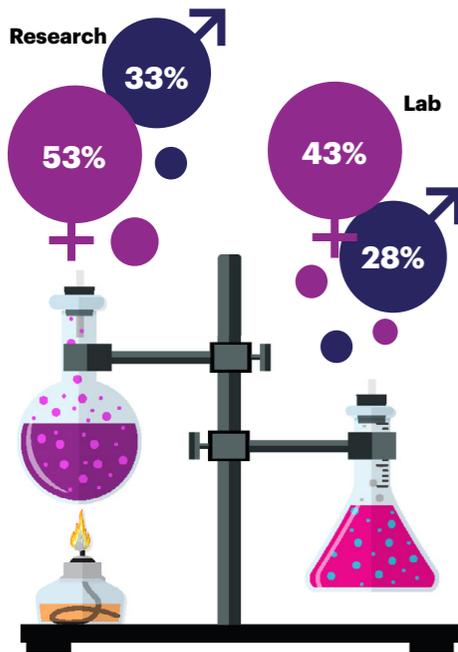
CAREERS FOR CONSIDERATION



List A careers – in only four careers (fashion, medical/pharmaceutical research, special effects and medical technology developer are significantly more likely than boys to say they would consider them

Girls
Boys
All young people

Girls are still most likely to associate a career in science and technology with “doing research” (53%) and “working in a laboratory” (43%), than boys (33% and 28%).



ROLE MODELS

Parents and teachers (82% and 89%) and young people (68%) agree that the science and technology sector lacks high-profile female role models.

Almost all parents and teachers think that work experience, talks from industry professionals and case studies from successful women in STEM could help, but young people are less convinced, with only 34% thinking that work experience in companies that use STEM skills would be beneficial.

INFORMATION BREAKDOWN

Another problem identified in previous reports also endures: 31% of parents and 37% of teachers say there is inadequate information about subjects and the resulting career opportunities.

Schools and educational institutions are seen as being the most effective in their activities to encourage women into STEM and are seen by young people as those with the responsibility to do this.

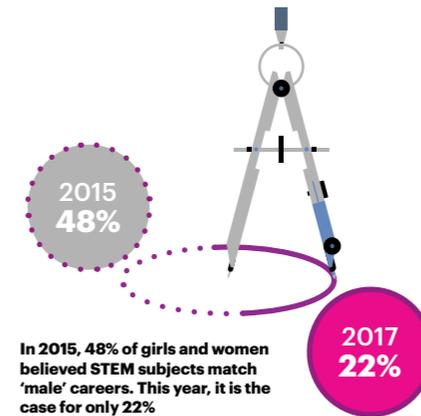
The research asked which factors would most encourage students to take up or continue STEM subjects at school or in college. One third of young people (34%) said securing a wider range of life skills was the most popular reason for studying STEM.

Almost one in three young people are yet to be convinced that STEM offers equal opportunities to all.



It is not only an economic imperative that we bridge the gender gap when it comes to the realms of technology, science and design, it is a critical societal one. The growth of Artificial Intelligence and other digital disruptors mean that the products and services of the future are currently being created by, for the greater part, one homogeneous group of people. If this continues, we are literally building traditional biases into the algorithms that will be at the heart of future products. There is no time to lose in ensuring we are offering equal opportunity to young men and women of all backgrounds to enter these careers, if we are to build a world designed for all of us. This not only means cultivating the pipeline inward, but ensuring that we adapt business cultures to ensure our talented young women are not ‘leaking’ out of the pipeline further down the line. This is going to take a serious mindset shift at an industry level and there is no time to lose.

ANN O’DEA
FOUNDER, INSPIREFEST



In 2015, 48% of girls and women believed STEM subjects match ‘male’ careers. This year, it is the case for only 22%

STEREOTYPES

Two years on from our previous report, there has been some welcome progress in tackling negative gender stereotypes around STEM. In 2015, 48% of girls and women believed STEM subjects match ‘male’ careers which was making girls far less likely than boys to choose STEM subjects. This situation improved noticeably for this year’s research: only 22% of young people still believe STEM subjects match male careers.

However, a significant minority still perceive that STEM disciplines more closely fit boys’ brains and their personalities and hobbies. In 2015, 29% of young people believed the

former and 27% believed the latter. This year’s research showed it was 18% and 29% respectively. Almost one in three young people, therefore, are yet to be convinced that STEM offers equal opportunities to all.

What’s more, 50% of teachers and 34% of parents perceive STEM subjects are more geared towards boys and this is why relatively few girls take those classes. A significant number of both groups also believe stereotypical career paths, such as nursing and childcare, appeal to girls and are promoted to them. This belief has, unfortunately, endured in the time since the [2013](#) and [2015](#) reports.

PERCEPTION OF STEM DISCIPLINES





This year's report is a timely reminder of the ongoing gender imbalance challenge in STEM. Gender equality is an essential element of an inclusive, innovative workplace and key to competitiveness. We need to give young women the strategy, education and skills to reach their full potential, and we need to increase visibility of the many and diverse role models to inspire them and show them what is possible. This was the drive behind the 'Women on Walls', campaign by Accenture in partnership with the Royal Irish Academy, to make women leaders visible through a series of commissioned portraits of twelve leading women academics in Ireland. The disruptive nature of the campaign helped to engage people on the topic of gender inequality and the need for role models that break down barriers. This year, for the first time in its 230-year history, the Royal Irish Academy has portraits of women on its walls. Role models need to be front and centre so younger girls can look up to and aspire to be like them so that boys and girls can take it for granted that advances in the sciences and humanities have been the result of the work of women and men, not just men.

The future workforce is an equal workforce. We plan to have a 50/50 gender balance across Accenture globally by 2025. I would urge all women to use their own voice to bring about change too, and ask more men to join the movement to advocate for equality and inclusion in every boardroom, every newsroom and every locker room. Perhaps now more than ever we need to listen to diverse views, and find a new language to build inclusion.

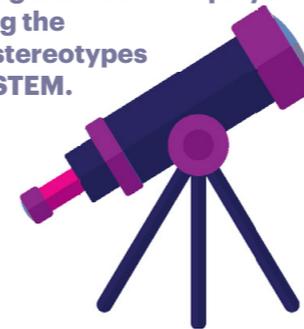
DR MICHELLE CULLEN,
HEAD OF INCLUSION & DIVERSITY
MANAGING DIRECTOR, ACCENTURE IRELAND

GENDER IMBALANCES

One of the goals of this year's research was to delve deeper into the reasons why many girls choose to drop out of STEM subjects. More than four out of five parents (82%) and teachers (88%) agree that there is unconscious gender stereotyping and bias when it comes to STEM subjects and careers.

More than half of both parents (52%) and teachers (57%) admit to having personally made subconscious stereotypes about girls and boys when it comes to STEM subjects.

Additionally over 80% of parents and teachers feel that media and marketing have a role to play in removing the gender stereotypes around STEM.



EARLY INTERVENTION IS KEY

A quarter of parents and teachers feel that the 11-14 age group is the point at which the gender gap becomes most apparent. Teachers, however, feel that this gap is already evident at an earlier stage. One in ten teachers believe the gender gap begins to appear before primary school. We believe positive STEM messages would benefit children at the early stages of primary level.

Girls aged between 7-11 years are no more likely to think that maths is more interesting or easier than when they are between ages 11-14. This stage coincides with the move from primary to secondary school and it marks the start of students being streamed by performance and when they start to make choices about what subjects to study. The research suggests that girls' perceptions that STEM subjects are difficult or boring are formed before they begin secondary school. In fact, 46% of girls say they find the subjects too difficult to learn – more so than boys (38%).

One in four parents and teachers feel that 11-14 years is when the gender gap becomes apparent



One in ten teachers believe the gender gap begins before primary school

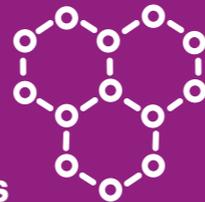


46% of girls and 38% of boys, say that STEM subjects are too difficult to learn

These findings may be the evidence we need to show that our efforts to encourage STEM take-up needs to start at the earliest stages of the school cycle.

NEXT STEPS

MORE THAN HALF OF PARENTS ADMIT TO HAVING PERSONALLY MADE SUBCONSCIOUS STEREOTYPES ABOUT GIRLS AND BOYS WHEN IT COMES TO STEM SUBJECTS



EARLY INTERVENTION: START STEM SCHOOLING EARLIER

In the 2015 report, we recommended putting Computer Science on the curriculum, adding our voice to calls from a variety of academic and industry groups. The previous report showed how in England, primary school children from the age of seven receive practical lessons in coding and are taught about how the internet works. The Irish Government has already announced its intention to include Computer Science on the Leaving Certificate curriculum starting in 2018 as part of the new Digital Strategy for Schools 2015-2020 Action Plan 2017 announced in June.

The research in this report clearly shows that young girls need to be exposed to computer science at a much earlier age or else we risk losing them in the transition between primary and secondary education. Focusing on students – and girls in particular – below the age of 11, increases the chances of preventing this gap from appearing.

The success of initiatives like CoderDojo and Girls Hack Ireland shows there is a model for reaching girls with positive messages about computer science, web design and coding in a way that makes the subject entertaining and enticing.

Schools could follow suit by starting STEM-related classes on a trial basis earlier than Transition Year. In addition the Government's plan to introduce coding as part of the primary school maths curriculum is a welcome step in the right direction and the commitment to new annual action plans for schools is vital.



Our goal is to achieve greater gender balance within the CoderDojo community globally. This year we launched the CoderDojo Girls initiative and there are two core purposes to this. Firstly to start a conversation around what we can do to attract and retain more girls into the movement, document and share best practices that are working for Dojos. Secondly to highlight role models in the movement that are making efforts to increase girls attending Dojos. Every year the number of female mentors directly correlates with the number of female attendees, therefore the importance of role models within the movement cannot be underestimated. Our goal is that within the next five years more than 40% of attendees in Dojos are girls!

GIUSTINA MIZZONI
EXECUTIVE DIRECTOR, CODERDOJO FOUNDATION

PARENTAL OWNERSHIP: NEW THINKING AND ATTITUDES

Pursuing a STEM education and building skills in those disciplines during further study opens up a vast breadth of possibilities in the workplace. In order for that message to reach children at the right age, it is essential that parents know about those opportunities to support their children as they make those choices.

We call on parents to ensure they are sufficiently well informed to guide their children.

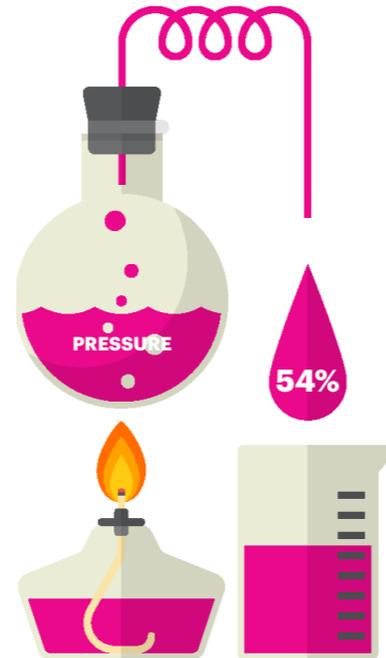
The evidence from our research suggests mothers and fathers may be making their daughters' decisions for them. Some 54% of teachers report seeing girls drop STEM subjects due to pressure from parents or guardians.

We ask parents to start to re-frame their own thinking and attitudes to STEM in order to promote positive messages for their daughters. Discovering more about the diversity of opportunities in STEM means they can have a more evidence-based conversations with their children.

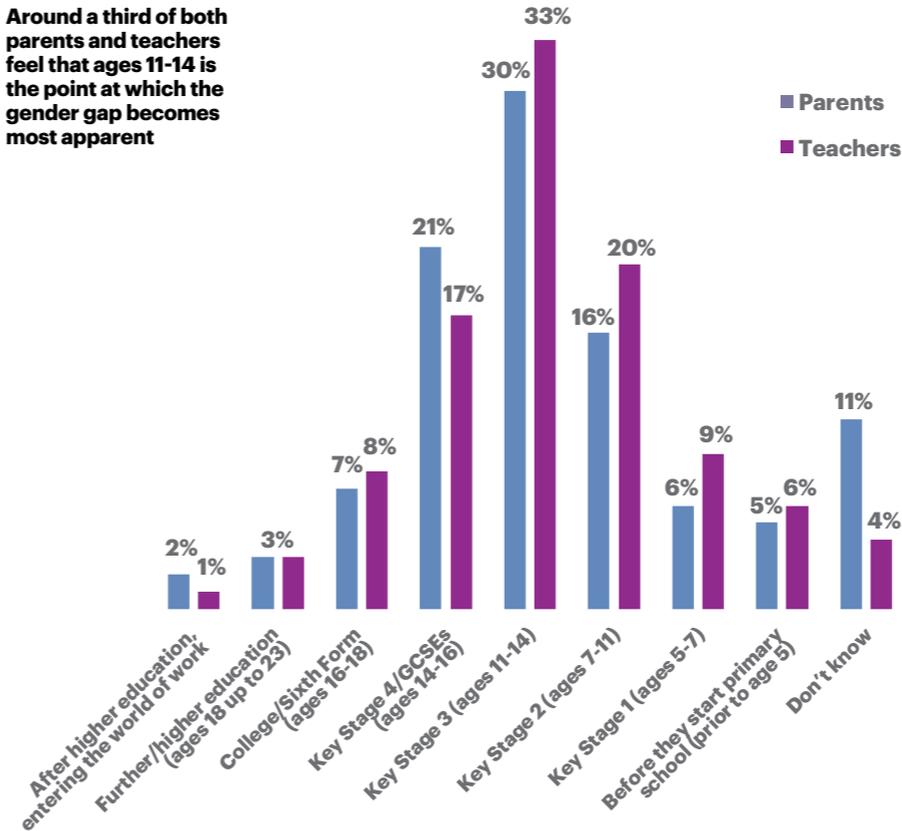
Seeking out proof of the breadth of skills that girls can acquire through STEM, such as logical problem-solving, creativity, design and critical thinking is key. Irrespective of their eventual careers, girls with a foundation of STEM learning are best equipped to adapt to a huge variety of potential roles throughout their working lives. This is also a call-out to the STEM community to support parents in their efforts to get informed.

Girls with a foundation of STEM learning are best equipped to adapt to a huge variety of potential roles throughout their working lives

54% of teachers report seeing girls drop STEM subjects due to pressure from parents or guardians



Around a third of both parents and teachers feel that ages 11-14 is the point at which the gender gap becomes most apparent



Personally, I felt that I gained a huge amount from the internship. Talking to different employees in the company gave me a good insight into their different career paths and skill sets that they have used to get to where they are. This illustrated exactly the kinds of qualities needed to be successful in industry. It's not about the subjects you study, it's about the skills you gain and how you use them. This is a lesson that I try to pass on to my students.

AMY BENNETT
ACCENTURE STEM TEACHER INTERN

COLLABORATION: TEACHERS, INDUSTRY AND GOVERNMENT WORKING TOGETHER

The findings show that teachers are one of the biggest influences in young girls' lives. The nature of their job means there is a powerful multiplier effect, as teachers potentially influence thousands of students over the course of their career. Like parents, teachers must also re-frame their thinking around STEM subjects and the opportunities that follow from it. They need the backing of national curriculum and teacher training programmes that emphasise positive STEM messages.

In 2016, Accenture, DCU and the 30% Club launched a pilot summer internship programme to give trainee teachers hands-on experience of working in STEM roles. Models like this show how industry can play a crucial role at the teacher training

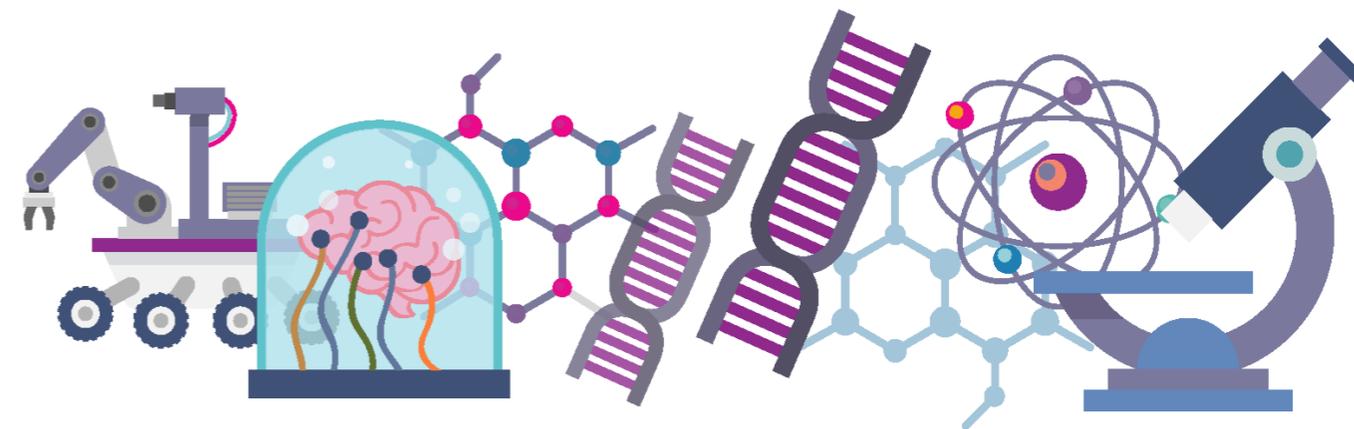
stage, or during career in-service training, enabling them to confidently articulate the breadth and vast range of possibilities from a STEM career. Is it now time to make workplace STEM teacher training mandatory? As potential employers of the future, the industry as a whole needs to do everything it can to drive change.

Companies in STEM areas can also market themselves better to schools and in particular to guidance counsellors who can encourage positive perceptions of STEM study and have an extremely important part of play in the future careers of their students. The Teen-Turn programme looks to provide the kind of access to tech industry internships for girls in Transition Year. The programme was created specifically with the aim of breaking traditional gender stereotypes around STEM careers.



While on placement I wanted to complete something that would stand out and would encourage students to take up STEM subjects. I started a Computer Science, Coding and Careers in STEM club which encourages students especially females to take up STEM subjects. I completed a survey also and found that females are afraid of the stereotype that STEM is more suited towards males. It has been a success and girls are now very interested in the careers that are out there. A lot more work, however, needs to be done.

SEAN O'DONNELL
ACCENTURE STEM TEACHER INTERN



As has been seen in the report, the key reason that parents and teachers feel that relatively few girls take up STEM subjects at school is because they are seen as 'just for boys'. Young people think along the same lines, with a third saying that more boys take these subjects than girls because they match 'male' careers.

Work experience and practical talks are key to helping encourage women into STEM subjects and careers – as cited by more than 90% of parents and teachers. Drawing clear connections with real-life STEM work through personal examples of successful women who can act as role models for girls and young women is essential.

Initiatives such as I WISH provide a model for making an explicit link between STEM and solving pressing societal issues – which the research shows is a factor that appeals to many girls who want to study STEM. In early 2017, I WISH organised events around Ireland aimed at explaining to girls how STEM skills can help to solve global problems such as overpopulation, food shortages, urbanisation, ageing populations and climate change. These events also put female role models centre stage to show them the real jobs in STEM that can help solve these problems.

Other existing public programmes that have a positive effect on STEM awareness and understanding include Engineers Ireland's STEPS, Science Foundation Ireland's Smart Futures, or Microsoft's Go for IT Girls event.

However, these important initiatives are driven by advocates. We need consistent, standardised, sustainable nationwide programmes to make a real difference and redress the gender imbalance in education and industry.

GIRLS ALLOWED

The research shows that girls would be more likely to enjoy STEM subjects if there were more girls in the class. This becomes a virtuous circle: if we start to encourage more girls to study STEM in significant numbers, this will have a knock-on effect, prompting other girls to take these subjects. The question is how to reach a point when this momentum occurs?

Starting STEM earlier in the school cycle, while encouraging girls to participate, addresses the problem of those who find science and maths subjects too difficult to learn.

When talking about the factors that influence career options, girls were far more likely than boys to be swayed by doing work they enjoy, that's personally interesting, is creative

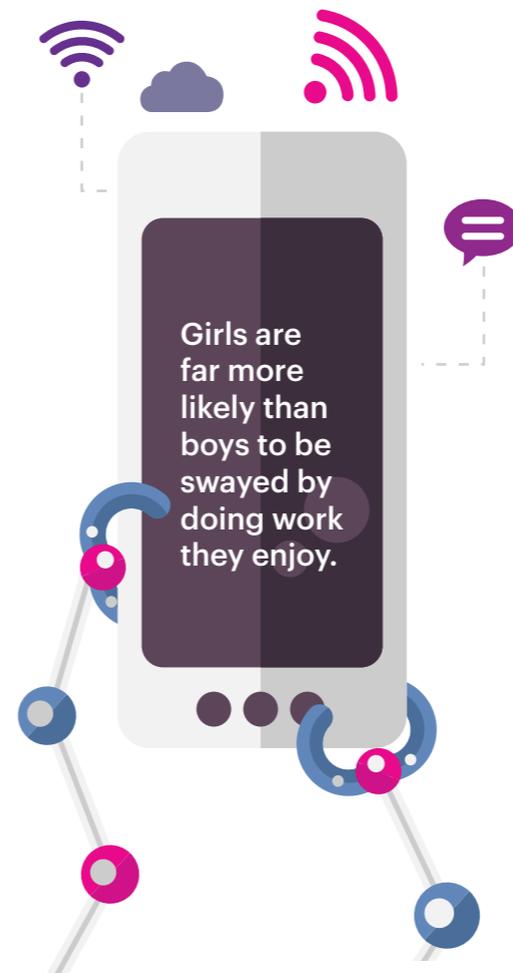
and benefits society. Given that peer influence counts for 28% of cases, the need to reach girls with positive messages about STEM is particularly acute. This way, these messages will resonate and echo among this key group of girls and their peers.



Once again Accenture Ireland identifies key next steps to address this challenge, based on a very extensive 'Girls in STEM' 2017 report. Since 2013 Accenture Ireland has carried out research which has influenced our design of the I WISH offering to students.

Many of the findings in this report reflect our own learning from the I WISH surveys. The key role of parents and teachers in influencing both subject and career choices is often underestimated by both parents and teachers. However the enthusiasm and energy expressed by the girls who attend the I WISH events does mean girls are reconsidering their career choices. The feedback from their teachers endorses this. The way forward is indeed through teachers, industry and Government working together.

CAROLINE, GILLIAN AND RUTH
I WISH FOUNDERS



Encouraging girls to fully develop and exploit their talents - particularly in STEM subjects - was never more important. Accenture's research continues to deepen our understanding of what needs to change and again highlights the key role which teachers play.

Given this key role and what the report terms "the multiplier effect", initiatives such as the 2016 Accenture/DCU/30% Club pilot internship which gave trainee teachers direct experience of working in STEM roles was an imaginative and impactful response. Expanding this initiative to include more employers and trainee teachers at both second and primary levels could help bridge the gap in understanding of STEM-related opportunities and of their match with girls' interest in solving societal challenges.

30% Club welcomes Accenture's continued commitment to this interesting and informative research into an area of such importance to women's future careers and to our economy and to society and that endorsing the recommendations.

BRID HORAN
NON EXECUTIVE DIRECTOR / FORMER DEPUTY CEO, ESB

CONCLUSION

OVER HALF OF TEACHERS SURVEYED HAVE WITNESSED GIRLS DROP STEM SUBJECTS IN SCHOOL DUE TO PRESSURE FROM PARENTS



As we hurtle towards the digital economy and technology-powered disruption, the need to ensure equality of opportunity in STEM has never been greater. The case for doing so is economic, and the message is empowerment. There is a percentage of the population that are disenfranchised. Our girls are missing out on this opportunity.

Based on what our research has shown, the following are our recommendations for action. We need to intervene much earlier in the education system to prevent gender disparities in STEM from becoming apparent, and to adjust girls' perceptions of maths as less enjoyable.

It's imperative that in order to maximise parents' influence on their children, and promote positive messages about STEM, they must educate themselves more about STEM subjects.

Societal benefits are a key motivator for girls to follow STEM studies and, subsequently, careers. Industry needs to use this knowledge when crafting messages that target and encourage girls into those disciplines. Groups should also change the language they use when speaking about STEM careers, by using more specific job roles and words that help students to envisage the kind of work they will do.

Given parents' and teachers' concerns about gender stereotypes and the damaging effect of biases – even unconscious ones, we encourage the Government to implement the recommendations of the STEM Education in the Irish School System report. These include: focusing on supply of qualified STEM teachers at post-primary level; developing a coherent policy framework for continuous professional development for STEM educators; recognising student participation in extracurricular STEM activities; exploiting digital

technology to support multiple approaches to learning and engagements between schools and enterprises; and, promotion of STEM disciplines as crucial to personal development and citizenship.

This is a multifaceted agenda, and it is why we make this our last recommendation: we encourage industry, the education system and Government to collaborate more closely so that, together, we can deliver a consistent message, in a sustained way, at a national level.

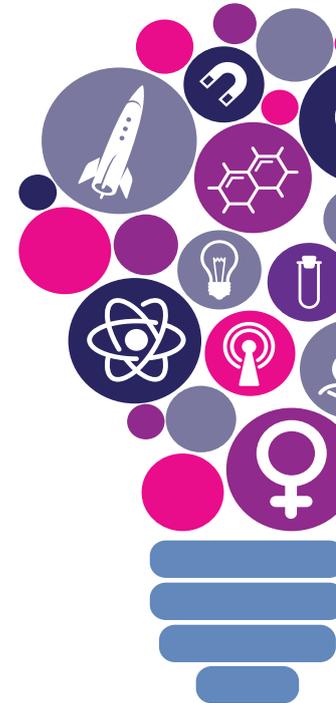


ABOUT THIS REPORT

Powering Economic Growth: Attracting More Young Women into Science and Technology 3.0 sheds further light on the barriers to encouraging girls to study STEM subjects and to sustaining that path through secondary education and into third-level and beyond. Undertaken in January 2017, it builds upon the research carried out for the **2013** and **2015** reports. In the Republic of Ireland, the sample size was approximately 600 people, including students, teachers and parents. The students surveyed ranged from 7 – 23 years covering Key Stage 2 (ages 7 – 11), Key Stage 3 (ages 11 – 14), Key Stage 4 (ages 14-16), Further / Higher Education (ages 17 – 23). Half of the teachers we surveyed work in Key Stage 2, covering students between the ages of 7 and 11. Just under a quarter teach at Key Stage 3, ages 11-14.

ABOUT ACCENTURE

Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology and operations. Combining unmatched experience and specialized skills across more than 40 industries and all business functions – underpinned by the world's largest delivery network – Accenture works at the intersection of business and technology to help clients improve their performance and create sustainable value for their stakeholders. With more than 411,000 people serving clients in more than 120 countries, Accenture drives innovation to improve the way the world works and lives. Visit us at www.accenture.com.



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