

THE FUTURE OF WORK:

An analysis of the impact of technology on careers education

INTRODUCTION

This year marks a significant milestone for our organisation, as we celebrate 50 years in careers education.

CASCAID has long championed quality careers information and technology which supports people with their careers exploration and planning. We are privileged to support schools and colleges in providing students with the tools they need to plan their successful futures.

In this year's impact report, *The Future of Work*, we reflect on the past, examining how generational differences shaped the workplace and attitudes to work. We also take a look at how the fourth industrial revolution is affecting how we work and the types of jobs that exist today.

With these changes in mind, we consider how careers education can support students as they seek to develop the skills they need for a successful future in the modern working world.

With the support of research experts at Education and Employers, we analyse data drawn from Kudos, our careers education software for students aged 11 to 19. Drawing on real data from hundreds of thousands of students across the country, we look at how students assess their skill levels in comparison to employers and whether the aspirations of post-millennials match up to the UK's Industrial Strategy.

We'd like to say a special thank you to Dr Elnaz Kashefpakdel, Christian Percy, and the team at Education and Employers for their support.

We hope you enjoy this year's report and we thank you for taking the time to read it.

ABOUT THE CONTRIBUTORS

CASCAID is an EdTech provider and a global leader in producing careers information and guidance technology solutions. We help anyone, anywhere in the world create a successful future through self-knowledge, exploration and planning.

Education and Employers is a UK-based charity created in 2009 which aims to provide young people with the inspiration, motivation, knowledge, skills and opportunities they need to help them achieve their potential.





2018 KUDOS USAGE BY THE NUMBERS

436,195 Students

actively accessing Kudos to engage with careers education 4,846 Days

spent discovering successful futures in Kudos

22,167 Educators

actively accessing Kudos to support their students with careers guidance & education

2,100 Schools

that have chosen CASCAID

800+ Careers

researched, written & constantly updated by our in-house team of professionals

CAREER & WORKPLACE EXPECTATIONS OF THE GENERATIONS

What does your generation say about your expectations of work?

The attitudes and behaviours of previous generations towards their working environment are important aspects to consider when thinking about the role that education has to play in shaping students' preparedness for the future of work.

Much research has been done into perceived generational traits and how these characteristics manifest themselves through attitudes to work. A summary of those characteristics associated with the previous four generations, which span over 70 years, is shown on page 5.

CASCAID has been a leading provider of tools that support careers guidance and education for 50 of 70 years covered. This is a fascinating prospect to consider as you take in the changes in attitudes to the world of work illustrated.

As part of our analysis, we have drawn on data from Kudos in order to provide insights into the behaviours displayed by the post-millennial generation who are going through secondary education today.



¹ Becton, JB, Walker, HJ and Jones-Farmer, J. 2014. 'Generational differences in workplace behavior' From: Journal of Applied Social Psychology Vol 44 [Online] p.176 [Accessed 3/12/18] Available from https://onlinelibrary.wiley.com/doi/full/10.1111/jasp.12208 ² Rezvani, S and Monahan, K. 2018. 'The Millennial Mindset: Work styles and aspirations of millennials.' From: Deloitte. [Accessed 15/11/18] Available from https://

² Rezvani, S and Monahan, K. 2018. 'The Millennial Mindset: Work styles and aspirations of millennials.' From: Deloitte. [Accessed 15/11/18] Available from https:// www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-cons-millennial-mindset.pdf

⁴ Ely, B. 2016. 'Motivating a multi-generational workforce.' From: Hays. [Accessed 15/11/18] Available from https://www.hays.co.uk/blog/multi-generational-benefits/ index.htm



WORK EXPECTATIONS

Each generation has experienced social and historical events that shape their attitudes toward life. These shared experiences produce stereotypical characteristics that can affect their attitudes toward work.¹

For example, Gen X experienced economic uncertainty, high unemployment, inflation, and a high divorce rate among their parents. As a result, research shows that a significant proportion of this cohort is likely to leave an employer for more challenging work, better benefits, or a higher salary. This is attributed to them having grown up observing that organisational loyalty was not rewarded with job security.

Millennials and post-millennials are digital natives. Their expectations of work overwhelmingly reflect their technologically savvy experiences. Millennials are commonly known as the 'me generation', a title that characterises the widely-held assumption that millennials are concerned with pursuing passions to the exclusion of those benefits that were important to previous generations.

A 2018 study by Deloitte found that 'millennials are significantly less likely than older counterparts to be comfortable not knowing all the answers'.² Given the immediate access to information experienced by a generation who grew up with the internet, it is perhaps not surprising that millennial workers would expect to understand the whole picture in their workplace, 'preferring to have all relevant information (vs. just an idea of the end goal)'.³

Work–life balance is important to each of the generations to varying degrees. According to a 2016 study by Hays, post-millennials display a preference for home or remote working when looking for a role.⁴ This trend is forcing companies to reassess their outlook on traditional working hours in order to remain competitive to this emergent workforce.

From structure and security to autonomy and flexibility, the world of work is being influenced by the expectations of the generations. Postmillennials are on the cusp of entering the workforce. Already they are showing signs of disrupting the world of work substantially. Their 'always on' attitude towards technology coupled with a strong self-awareness may see them choosing career paths not considered by previous generations.

What can post-millennials expect from the future of work? Data from our Kudos programme gives us the edge in understanding how these individuals are responding to careers education right now. We'll explore how their skills match the needs of employers a little later in the report.

THE GENERATION GAP



Baby Boomers Born between 1945 and 1964

Described as: achievement orientated, independent, respectful of authority, loyal to organisations, and diligent on the job ⁵



Generation X Born between 1965 and 1979

Described as: outcome focused, sceptical, desiring of specific and constructive feedback, distrustful of corporations, and focused on work–life balance ⁶



Millennials Born between 1980 and 2000

Described as: having a strong desire for meaningful work, distrustful of organisations, considering lifelong learning a high priority, and valuing diversity and change ⁷



Post-millennials Born from 2000 onwards

Described as: entrepreneurial, tech savvy, globally conscious, politically minded, and 'highly attuned to the nuances of identity' ⁸

⁵ Becton, JB, Walker, HJ and Jones-Farmer, J. 2014 'Generational differences in workplace behavior' From: Journal of Applied Social Psychology Vol 44 [Online] p.177 [Accessed 3/12/18] Available from https://onlinelibrary.wiley.com/doi/full/10.1111/jasp.12208

⁸ Steinmetz, K. 2017. 'Move over, Millennials: How Generation Z is Disrupting Work as We Know It.' From: Time. [Accessed 27/11/18] Available from http://time. com/5066641/generation-z-disruption/

⁶ lbid., p. 177.

⁷ Ibid., pp. 177-178.

THE WORLD OF WORK



How has the fourth industrial revolution disrupted the state of play?

Government policy, corporate structure, and employers have historically played a central role in shaping the world of work. As part of our exploration of the future of work, we will be addressing the current state of affairs. We will look at what is happening in business today and how organisations are adapting or reacting. Drawing on our 50 years of experience in the careers education and guidance space, we'll then focus on the implications of current trends on the future workforce.

THE FOURTH INDUSTRIAL REVOLUTION

'The Fourth Industrial Revolution (4IR) describes the exponential changes to the way we live, work, and relate to one another. This is due to the adoption of cyber-physical systems, the Internet of Things, and the Internet of Systems.'⁹

The preceding three industrial revolutions are generally accepted to be: the age of the steam engine, the age of science and mass production, and the rise of digital technology. 4IR is seen as being different from the preceding three because not only is it building on the digital revolution, it is also challenging our ideas of what it means to be human. Technological innovation within 4IR has been incredibly fast-paced. It is disrupting multiple sectors at once rather than slowly making careers obsolete as was the case during the first industrial revolution.

As a result, organisations reviewing their long-term strategies are starting to embrace things like artificial intelligence (AI). They also recognise how the technology can help revolutionise business, industry, and the workforce. Corporations are beginning to accommodate a range of new technologies that may help them with future challenges and opportunities.

The trend towards a gig economy has emerged in response to digital disruption. Organisations are being forced to react, acknowledging the changing needs of their workforce. More emphasis is being placed on flexible working and work–life balance.

⁹ Marr, B. 2018. 'The 4th Industrial Revolution Is Here – Are You Ready?' From: Forbes. [Accessed 05/11/18] Available from https://www.forbes.com/sites/ bernardmarr/2018/08/13/the-4th-industrial-revolution-is-here-are-you-ready/#6a9cd570628b



POLICIES TO PROMOTE GOOD JOBS & GREATER FARNING POWER

In the government's white paper, Industrial Strategy: building a Britain fit for the future,¹⁰ one of the five foundations to support the government's vision for a transformed economy is people – specifically, good jobs and greater earning power for all

In order to achieve this, the government's key policies include:





Establishing a technical education system that rivals the best in the world.

Investing in maths, digital and technical education to help address the shortage of science, technology, engineering, & maths (STEM) skills.



Supporting people to re-skill, beginning with investment for digital & construction training.

Delivering high-quality careers support and provision underpins the government's economic and social mission. It requires national effort. Businesses and employers must play an active role in helping individuals create their successful futures.

THE EMERGENCE OF THE GIG ECONOMY

The gig economy is a labour market characterised by the popularity of short-term contracts, freelancers, or temporary workers.

Employees today are looking for more flexible working hours. A full-time job with one employer was considered the norm for the baby boomers. However, subsequent generations have expressed the expectation to shape their own independent work lives.

From our first section, we have seen that work-life balance is important to each of the generations. However, where flexible working is concerned, post-millennials display a notable preference. This generation chooses

to be independent. They value the autonomy and flexibility that technical innovation has helped make possible.

Consequently, organisations are being forced to address these preferences. They are faced with the need to empower workers with maximum flexibility and minimum constraints in order to optimise performance and deliver value and customer service.

The report Towards a Twenty-First Century Education System by the Edge Foundation explores the skills employers are looking for in future employees. The report finds that meta-skills, which are defined as 'timeless, higher-order skills' such as problem-solving and teamwork, as well as behaviours like confidence and resilience, are critical to success 'in whatever context the future brings'.¹¹

The world of work is constantly changing. The top 10 'in demand' jobs of 2010 did not exist in 2004. Careers education is about preparing people for future work. The inclusion of strong careers education provision is helping students today understand the impact of new technology on future careers and to plan their future career pathway accordingly, not only through academic learning but also by developing those all-important soft skills.

¹⁰ HM Government. 2017. 'Industrial Strategy: Building a Britain fit for the future' From: Contains public sector information licensed under the Open Government Licence v3.0. [Accessed 12/11/18] Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrialstrategy-white-paper-web-ready-version.pdf ¹¹ Newton, O, Laczik, A, Emms, K, Beardmore, H and Cohen, K. 2018. 'Towards a Twenty-First Century Education System.' From: Edge Foundation. [Accessed 05/11/18]

Available from http://www.edge.co.uk/sites/default/files/documents/edge_future_learning_report_final.pdf

A SNAPSHOT OF POST-MILLENNIAL DATA IN KUDOS

How do students assess their skill levels in comparison to employers?

Kudos captures students' self-reported skill levels against 45 different fine-grained skill areas. Completing the skills assessment, as part of the transparent journey connecting suggested career paths with skills, is voluntary. However, it is widely used with around 36k female students and 28k male students answering different questions.

SKILLS ASSESSMENTS: KUDOS VS. CBI ANALYSIS*

CBI Skills	Kudos Skills
Analysis skills	Evaluating Finding and using information Observing things Organising and storing information Paying attention to detail
Basic literacy / use of English	Reading Understanding and analysing written information Writing skills
Basic numeracy skills	Using maths & statistics
Communication skills	Asking questions to find things out Explaining things Giving a presentation Giving people advice Listening to other people Persuading people
Foreign language skills	Using a foreign language
IT skills	Understanding computers Using a computer
Problem solving	Solving problems Thinking of new ideas and using your imagination
Teamworking	Being able to reach agreement with other people Dealing with people in difficult situations Leading and motivating people Managing people and projects Supporting people Teaching and training Understanding how people behave

We compared the results of skills assessments from Kudos with data from the Confederation of British Industry (CBI)/ Pearson Employer and Skills Survey 2017¹² to see how students' self-reported skill levels compared to employers' lived experience of hiring school leavers. While different terminology is used to describe skills, a set of broadly comparable core skills can be created for analysis.

*Where multiple Kudos skills correspond to a single CBI skill level, the simple average across the Kudos skills is taken to create an aggregate measure for comparison purposes.

¹² The 2018 survey data is also available, but does not disaggregate employer experiences of school/college leaver skill levels from that of higher education graduates.



STUDENT SELF-REPORTED SKILL LEVELS COMPARED WITH EMPLOYER EXPERIENCE



[%] of CBI/Pearson Employers "Very Satisfied" with the skill level of school/college leavers, 2017

The chart to the left compares the proportion of students who think they are "highly skilled" at the skill area. This is compared to the proportion of employers who are "very satisfied" with the skill level of school leavers.

This chart combines two subjective assessments: both how good students think they are at particular skills compared with how satisfied with the skills of school leavers employers are.

For instance, employers are much more satisfied with the IT skills of school leavers than they are any other skill area analysed. Meanwhile, students – in aggregate – tend to think of themselves as similarly skilled at IT as they are in problem solving, communication and literacy. Employers are generally critical of analysis, communication, and problem-solving skills in a way that students do not seem to recognise.

SKILL RANKING: EMPLOYER SATISFACTION VS. STUDENT SELF-PERCEPTION

	Skill rank by employer satisfaction	Skill rank in terms of student self-perception	
1	IT skills	Problem solving	
2	Basic numeracy skills	Communication skills	
3	Teamworking	Basic literacy / use of English	
4	Basic literacy / use of English	Analysis skills	
5	Problem solving	Teamworking	
6	Communication skills	IT skills	
7	Analysis skills	Basic numeracy skills	
8	Foreign language skills	Foreign language skills	

This difference in relative rankings can be seen more clearly in the table to the left. An overall skill level assessment is used which is derived from all the Kudos measures for students (Highly Skilled, Skilled, Some Skill and Unskilled) and all the CBI measures for employers (Very Satisfied, Satisfied, Unsatisfied).

Here we can see that students and employers agree, in broadly relative terms, with regard to foreign language skill levels, but otherwise there is little match.

Employers are most satisfied with students' IT, numeracy, and teamwork skills, whereas students consider these to be areas where they lack skill. Employers, by contrast, are more concerned about problem solving, communication skills and analysis.

Patterns by gender reveal that male students are more confident in their IT and numeracy skills (particularly IT skills), than female students. Female students, on the other hand, are more confident in their literacy, communication, and teamworking skills (particularly literacy skills).

THE EVOLUTION OF EDUCATION

What steps are being taken to adequately prepare students for the workplace?

We have explored the way in which generational traits affect expectations of work. We've also looked at how the behaviours of particular generations have contributed, in part, to the current shape of the world of work in the UK. We will now look at how the education system can support students in becoming future ready.

A DEMAND FOR SOFT SKILLS

The Edge Foundation's report on **The Digital Revolution** found that 'nearly 50% of subject knowledge acquired during the first year of a four year technical degree is outdated by the time the student graduates'¹³. The impact that digital disruption is having on the world of work is significant.

In previous sections we've seen employers calling for greater emphasis on the development of soft skills as students traverse the education system. A broader range of skills is thought to better prepare students for the future of work, but how is the education system in the UK teaching students skills, behaviours, and attitudes?

We believe that the answer is a well planned out and strategic careers education programme. This helps students know themselves, explore their options, develop a plan, and learn and reflect on their individual skills.

If students develop skills that empower them to manage their career paths – whatever the external influences and circumstances are – they are much more likely to succeed.

HARNESSING 4IR TECHNOLOGICAL ADVANCES TO SUPPORT CAREERS EDUCATION

Current Department for Education (DfE) policy is heavily focused on promoting a 'knowledge-rich' curriculum up to age 16. However, we've seen recent policies, including the government's pledge to reinforce the Baker Clause¹⁴ and the Gatsby Benchmarks, introduced that lay the groundwork for educators to create opportunities for students to be exposed to different career pathways and a multitude of related skills.

A successful careers education programme will present all options to students in equal measure without bias. This includes further education (FE), apprenticeships and higher education (HE). The pathways available to students nowadays are numerous. Embracing careers education technology within schools eliminates the need for educators to manually research and depict multiple career trajectories in the classroom, this is the perfect example of utilising 4IR technological advances. A complementary programme will save time, save administrative work and empower individuals to focus on the wider goal at hand: creating successful futures for all students.

¹⁴ Milton, A. 2018. 'Ensuring young people have the 'best possible' careers advice' From: FE Week. [Accessed 05/11/18] Available at: https://feweek.co.uk/2018/08/07/ what-were-doing-to-ensure-young-people-have-the-best-possible-careers-advice/

¹³ Baker, K. 2018. 'The Digital Revolution: the impact of the Fourth Industrial Revolution on employment and education' From: Edge Foundation. [Accessed 05/11/18] Available from http://www.edge.co.uk/sites/default/files/publications/digital_revolution_web_version.pdf



A SNAPSHOT OF POST-MILLENNIAL DATA IN KUDOS

Is there evidence that technology is enhancing careers provision?

In this section, we offer three examples evidencing the way in which technology is enhancing careers provision. We know through our own research that careers technology should simplify access to large amounts of information, curate up-todate information from independent sources, and create a space outside of the classroom for students to explore their options.

1 UNDERSTANDING HOW SUBJECTS ALIGN WITH STUDENTS' TARGET CAREERS

Research by our partners at Education and Employers on the 2017/18 cohort of Kudos users reveals that the most popular subjects chosen by students typically align well with target careers. On average, students are selecting between 10 and 12 favourite subjects – although research has found this average is skewed upwards slightly by a small group of young people selecting hundreds of subjects.

The research shows that the 10 most popular careers are being shortlisted by between 5% and 10% of all students in the 2017/18 cohort. What remains uncertain is whether students are shortlisting popular subjects based on what they would like to study, what is currently available in their school or college, or from among the subjects they are currently studying.

Kudos is providing high-quality information about a wide variety of subjects and illustrating how those subjects link to a student's shortlisted careers. This level of transparency is key in supporting students to build selfknowledge, learn and explore options, create personalised plans, and take control of future decisions. It also helps educators achieve Gatsby Benchmark 4.

SUMMARY DATA ON SHORTLISTED CAREERS VS. POPULAR SUBJECTS

Target career (most popular in terms of students shortlisting it*)	Total students aged 15-19 selecting it	% selecting it as a possible target career	Number of popular subject choices made	Most popular subject within those selecting this career (potentially as one among several careers), and the percentage who selected it	Equal most popular subject (if tied)
1. Counsellor	750	9.7%	8,096	Psychology - 37%	
2. Photographer	732	9.5%	8,930	Photography - 44%	Art & Design - 44%
3. Lawyer	674	8.7%	7,128	Applied Law - 50%	
4. Graphic Designer	570	7.4%	6,503	Art & Design - 61%	
5. Scriptwriter	550	7.1%	6,598	Creative Writing - 39%	
6. Psychologist	540	7.0%	5,191	Psychology - 56%	
7. Animator	526	6.8%	6,476	Art & Design - 57%	
8. Design Assistant	522	6.8%	6,602	Art & Design - 63%	
9. Doctor	483	6.3%	4,931	Biology - 69%	
10. Psychotherapist	466	6.0%	4,981	Psychology - 52%	
11. Veterinary Nurse	463	6.0%	4,542	Animal Care - 72%	
12. Presenter - Broadcasting	434	5.6%	5,388	Drama & Theatre Studies - 26%	Drama - 26%
13. Computer Games Developer	432	5.6%	5,122	Computer Games Development - 55%	
14. Computer Games Designer	417	5.4%	4,831	Computer Games Development - 47%	
15. Designer	417	5.4%	5,610	Art & Design - 65%	

NB. Not all subjects are likely to be available to all ages and at all institutions, especially given the age range of 15-19.

*Shortlisting is defined as marking with a "thumbs-up" in the Kudos programme.

2

KEEPING CAREER PROFILES UP TO DATE SO THAT STUDENTS EXPERIENCE A TRUE PICTURE OF THE FUTURE OF WORK

On page 13 is a selection of careers that have been professionally researched, written, and added into Kudos by our in-house team. The world of work is constantly changing and we recognise the need to keep our careers relevant.

The relevancy of our career profiles is a key part of how our programme supports educators.







Music Producer

You will oversee the development of songs. This includes the writing of the song as well as the recording process.

Skills needed

A passion for music, good communication skills, IT skills, an understanding of how new technologies are used to produce and promote music, and an artistic flair.

Entry routes and training

2/3 A levels, including music, or BTEC level 3 qualifications. A relevant degree in music, such as music production, will help you enter this career.

FUTURE CAREER

Urban Farmer

Skills needed

You will create & maintain farmland which is set on the roofs of buildings in busy cities & towns. The roofs of buildings will become the new fields.

Strength and stamina, farming experience,

after specialist equipment, practical skills, and to care for the environment.

Entry routes and training A background in farming, horticulture, botany and agriculture will certainly help. Training will likely be on the job.

to not be afraid of heights, the ability to look

FUTURE Career

3D Printing Specialist

You will print items using 3D printers. 3D printers can create an amazing variety of things. Your customers might ask you to print products for them that include: mechanical parts, furniture, prosthetics, clothes and shoes, & jewellery.



Skills needed

3D design skills, creativity, photography skills, a good eye for detail, great IT skills, and computer modelling skills.

Entry routes and training

Studying subjects such as engineering ϑ maths could help. Useful degrees could include: art and design, 3D design, 3D modelling, fashion, management, ϑ construction. Computer modelling ϑ CAD skills obtained in work experience could be beneficial.



Nano-Medic

You will inject small implants into a patient's bloodstream to monitor their health. This can help Doctors to observe a patient's wellbeing.

Skills needed

An understanding of biotechnology, to enjoy working as part of a team, knowledge of anatomy & physiology, & good IT skills.

Entry routes and training

Useful degrees could include nanotechnology, biomedical engineering, science, physics, engineering, and chemistry. Another way that you could get into this career is through an internship.



Humanitarian Aid Worker

You will be helping people in areas that have been affected by war ϑ destroyed by natural disasters ϑ other environmental problems.

Skills needed

A willingness and passion to help people, to be able to cope with distressing situations, excellent listening skills, and the ability to ask the right questions to help others

Entry routes and training

Depending on your job role, the qualifications needed for this career can vary. A great way to get into this career is through an internship.

3

QUESTION TIME WITH THE MYADVISER TOOL IN KUDOS

Students can ask their advisers questions outside of careers education sessions using the MyAdviser tool. Typically, we find that most questions are related to specific careers or courses that students wish to study. However, many questions require personal guidance and often we see advisers referring students to one-to-one sessions to continue the conversation.

This demonstrates the role that technology is playing in engaging students and relieving the burden on the educator. The MyAdviser tool enables many schools to offer personalised guidance to their students; thereby assisting educators with achieving Gatsby Benchmarks 3 and 8.

Below, we have included three example conversations between students and their advisers to illustrate the positive impact of this tool.

Student: Can I do photography as a job?

Advisor: Yes you can! You need to think about what type of photography you are interested in (portraits of families etc., journalism, art/creative, etc.) There are lots of areas you can get involved in. The best thing at this stage is to practise lots and build up a portfolio of photos to show the types of photos you can take. Feel free to pop into the Careers Office for a chat.

What uni courses should I take to become a Paramedic?

You could take a BSc in Paramedic Science or Paramedic Practice at University, or you could become a Student Paramedic and learn on the job or look for an Apprenticeship to become a Paramedic with the Ambulance service.

How do you get your parents to agree on a job that you like?

Talk to them. Keep [on] about your interest in this area. [G]et other family member[s] to talk to them. Drip feed them about the positives of working in your chosen field.



CONCLUSION

Over the past 50 years, we have witnessed the development of careers education firsthand. We have also seen how technology can enhance careers provision. From paper-based interest assessments to resources on CD-Roms to interactive web-based applications, we've seen how technology can be used to engage students in careers management and to ease the burden on educators.

When young people are inspired through technology to engage with careers education they realise that they can take charge of their career plans. Time and time again, educators using Kudos reveal their belief that this connection — like a light bulb switching on — is very powerful indeed.

66 Technology offers a solution to how we provide students with up-to-date information on skills and careers in a continually changing landscape.

We believe that technology has a role to play in supporting students and educators as they navigate the increasingly complex world of work. Technology offers a solution to how we provide students with up-to-date information on skills and careers in a continually changing landscape.

We are always improving and developing our products in order to support the changing needs of educators and students. We are currently working on what we believe to be the next generation of careers technology. We hope you'll keep an eye out for what's to come in the year ahead.



