

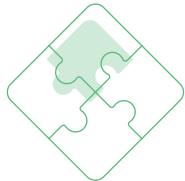


The Developer Ecosystem

EDUCATION AND THE NEW GENERATION OF CODERS / UK & IRELAND Q3



Summary



PART 1

The Developer Ecosystem of the UK and Ireland

- Tech Hubs in The UK and Ireland
- Most In-Demand Skills by Employers
- Fastest Growing Skills by Employers
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Developers Are at the Forefront of The Revolution in Education

- Formal Education Is Still the Norm
- Developers Are Diversifying the Way They Learn

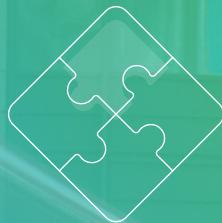
The Influence Of Formal Education on a Developer's Career

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PART 1

The Developer Ecosystem

Tech Hubs in the UK and Ireland

Most In-Demand Skills by Employers

Fastest Growing Skills by Employers

Languages and Technologies Developers Want to Work With

Introduction

Stack Overflow has created a series of reports focused on the developer ecosystem of the UK and Ireland. Each report is designed to help businesses understand how to find and connect with tech talent in the best possible way.

We source all of our data from the professional and aspiring programmers who visit Stack Overflow. Each month, 50 million people use our platform to learn, share and build their careers.



Tech Hubs in the UK and Ireland

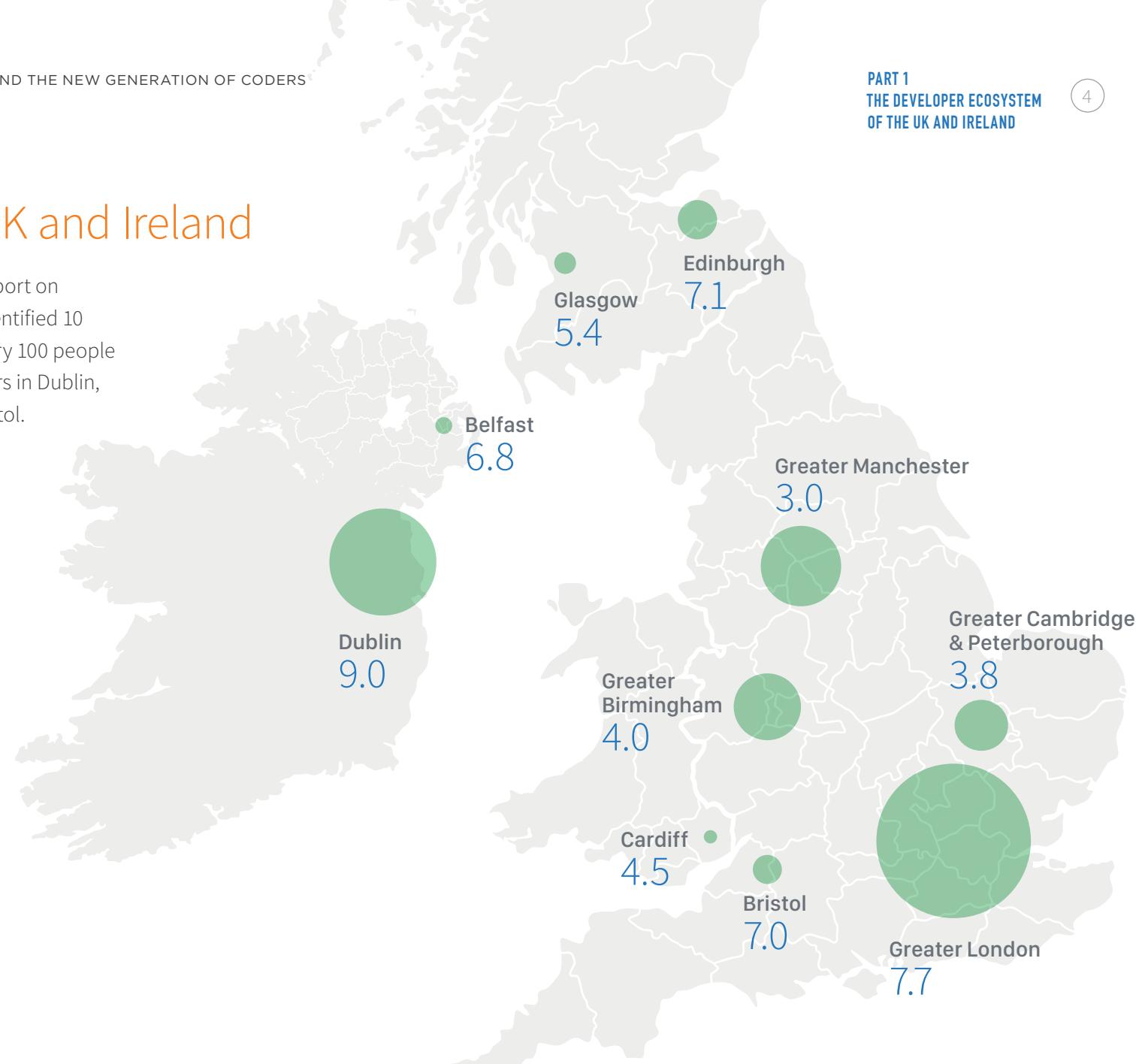
In the previous Developer Ecosystem report on [Employment Trends and Insights](#), we identified 10 tech hubs in the UK and Ireland. For every 100 people in the labour force, there are 9 developers in Dublin, 7 in London and Edinburgh and 7 in Bristol.

SPOTLIGHT ON¹

Types of developers

Full Stack Web	60%
Back-End Web	14%
Front-End Web	10%
Mobile Developers	4%
Machine Learning specialists	4%
Android Developers	3%
iOS Developers	2%

- Total Developer Population
- Developers per 100 people in the labour force



1. Percentage of the total number of developers with an identified developer type, as identified by our machine learning platform on Stackoverflow.com. Note: Our machine learning platform doesn't tag a given individual with a single classification. In some cases, a developer may be counted as both a full-stack web developer and a mobile developer. Data sourced by Stack Overflow Insights, April 2017.

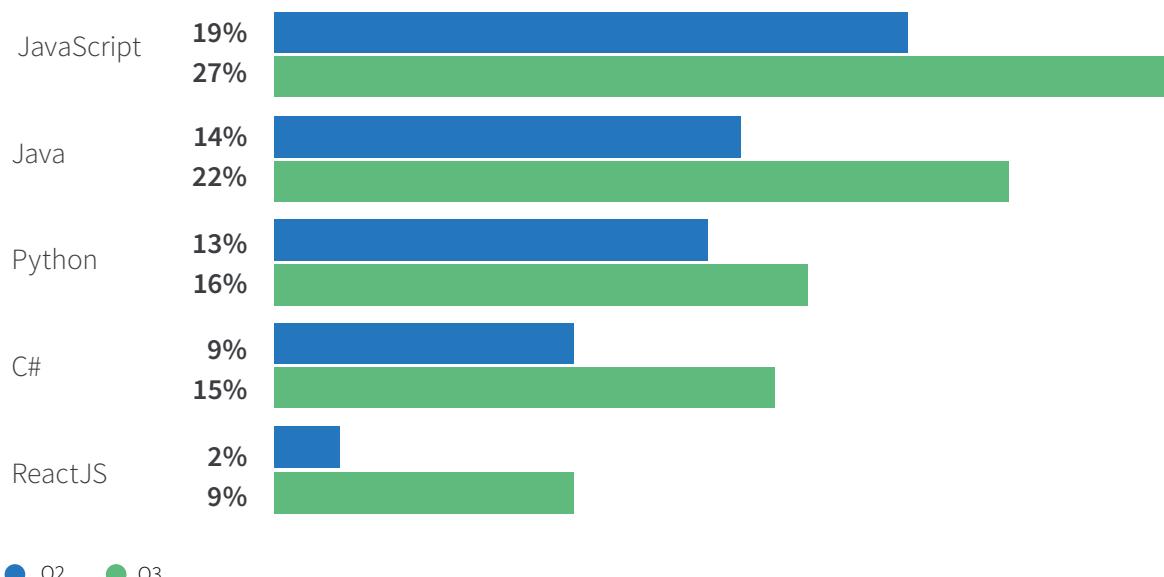


Most In-Demand Skills by Employers

What are the tech skills employers look for the most?

Between April and June 2017, we've seen a big increase in the percentage of jobs tagged with JavaScript, Java and Python. The number of C# jobs increases slightly and Amazon-web-services is knocked off the leaderboard by ReactJS.

Top 5 in-demand skills²



SPOTLIGHT ON

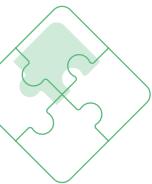


In computing, React (sometimes styled React.js or ReactJS) was created by a Facebook engineer and is an open-source JavaScript library for building user interfaces³. Worldwide, it is the most loved technology by developers⁴.

2. Percentage of jobs tagged with keywords between April and June 2017 on stackoverflowbusiness.com. Data sourced by Stack Overflow Insights, July 2017.

3. React (JavaScript library) Wikipedia page

4. According to the global Stack Overflow Survey 2017, 66.9% developers who are developing with React have expressed interest in continuing to develop with it.



Fastest Growing Skills by Employers



Mat Keep

Director Product & Market Analysis at Mongo DB

Proficiency in MongoDB is the fastest growing skill employers look for on Stack Overflow. How do you explain this popularity?

Our commitment to making developers successful.

MongoDB's document model is simple for developers to learn and use, while still providing all the capabilities needed to power the most complex requirements at any scale. We provide natural language drivers for 10+ languages, and the community has built dozens more. This combination of ease of use and production readiness has resulted in thousands of organisations making MongoDB their preferred platform to transform, grow and build applications. We've already seen great adoption by some of the biggest organisations in every industry.

What advice would you give recruiters trying to hire a MongoDB developer?

Show and tell. At every opportunity evangelise about the technology problems your organisation is solving. Be transparent about what you're using and how you're using it. Speak at conferences, put on hackathons and produce technical content. It's not always natural for businesses to be open like this, but these are the activities that will engage and excite the best developers. It's the only way to demonstrate that developers will be doing meaningful, interesting and challenging work.

WHAT ARE THE NEW SKILLS EMPLOYERS LOOK FOR⁵



MongoDB +3.0%



Unix +2.6%



Jira +2.2%



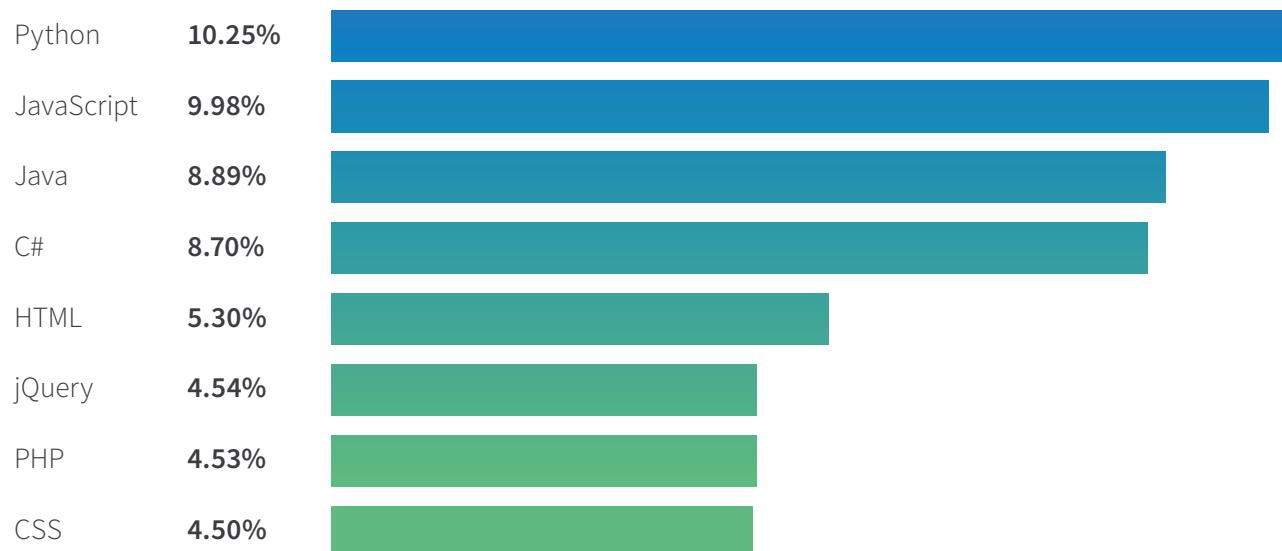
Java-ee +2.2%



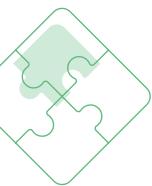
Languages and Technologies Developers Want to Work With

Since the start of 2017, the most visited tags in the UK and Ireland⁶ are Python, Javascript, Java and C#.
Unsurprisingly, they are also the most commonly used technologies in the UK and Ireland.

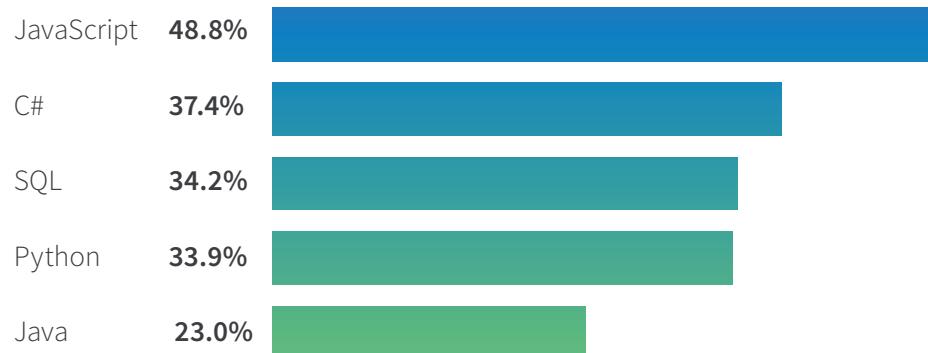
What are the technologies that were visited most often on Stack Overflow since the start of 2017?



6. Tags that were most visited since the start of 2017 on Stackoverflow.com, along with the % of UK and Ireland traffic they represented. Data sourced by the Data Team, July 2017.



Which languages do you want to work in over the next year?⁷



Let's note some interesting fast growing languages that have been popular with developers recently:

One of the fastest growing tags is TensorFlow (Google's machine learning framework), but it's very small so has a lot of 'room' to grow. In contrast, tags like Python and R used by Data Scientists and Machine Learning specialists are both large and showing a growth trend in the UK and Ireland region.

SPOTLIGHT ON



Data Scientists and Machine Learning specialists who make up for respectively 6.8% and 2.4% of the developer population in the UK and Ireland but are highly in demand and amongst the highest salaries of developers.

Indeed, a Data Scientist earns an average annual salary of £45,355 and it goes up to £55,027 for a Machine Learning specialist. In comparison, a Web Developer earns an average annual salary of £41,204.

7. Annual Developer Survey 2017, UKI Edition



PART 2

Focus on Education

Developers Are at the Forefront of the Revolution in Education

The Influence of Formal Education on a Developer's Career

What Employers Can Do to Appeal to the New Generation of Developers

Introduction

There is a shortage of tech skills in the UK and Ireland. Yet the rate of unemployment among new Computer Science graduates is high (11.7%⁸), 6 months after their graduation.

Could it be that the formal education has become obsolete?

What do developers think about the role of formal education in their career?

And what can employers do to appeal to this new generation of developers?

8. Shadbolt Review of Computer Sciences Degree Accreditation and Graduate Employability, April 2016

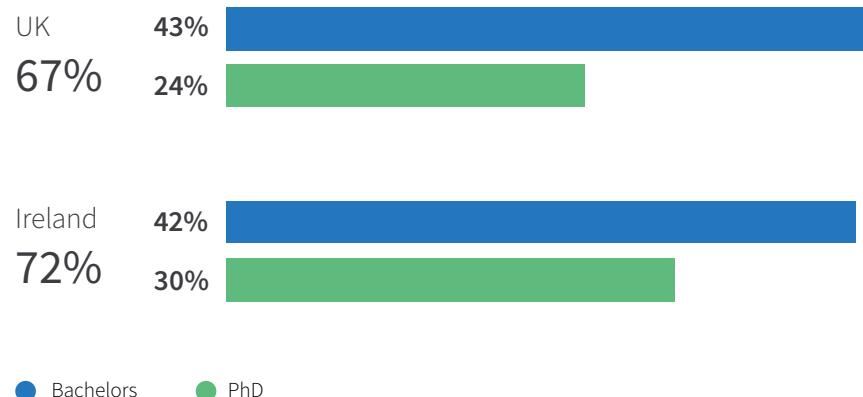


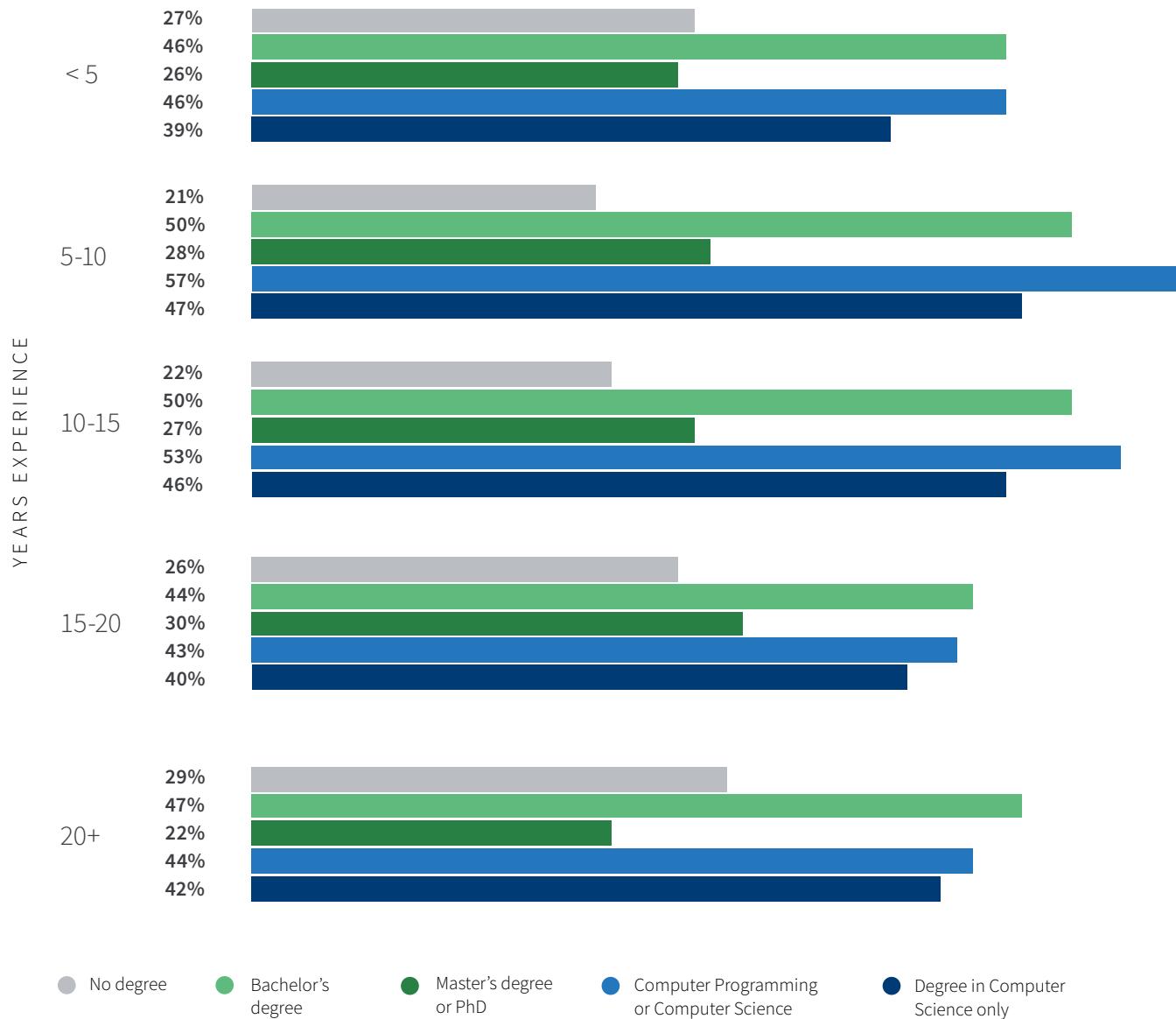
Developers Are at the Forefront of the Revolution in Education



Formal Education Is Still the Norm

Regardless of their level of experience, in the UK and Ireland the majority of developers have some level of formal education, with 42% developers on average having a bachelor's degree and 27% having a master's degree or PhD.





SPOTLIGHT ON



How are developers teaching themselves?

37% of current professional developers in the UK and Ireland said that their formal education was 'not very important' or 'not at all important' to their career success. On the same note, a striking 94% said they are at least partially self-taught.



Developers Are Diversifying the Way They Learn

There are countless opportunities for people to learn how to code. Engineering and technology courses are in the vanguard of the massive open online course (MOOCs) industry.



Nicolas Dittberner

Regional Manager, Europe at Udacity

Who participates in software development online courses and why?

What Udacity's students have in common is their motivation to learn new skills and advance their career. They come from various backgrounds, ranging from recent humanities graduates looking to launch a career in tech, all the way up to professional developers looking to upskill to advance in their existing role.

What do you think has changed in the education landscape for developers over the past years?

Developers, employers and society at large are changing the way they think about technical education - with a clear shift towards the concept of 'lifelong learning'. It's clear that skills requirements are continually shifting. We believe that the most successful developers will be those who are excited and willing to continue learning throughout their careers in response to industry changes.

What advice would you give companies who want to attract the new generation of developers and hire the best tech talent?

I would advise companies to follow three simple rules to attract the best developers: First, hire for skills, not degrees. Second, hire developers with a learning mindset and third, hire developers who identify with your company mission. If you follow these three rules, you'll create a company culture that fosters innovation and attracts people who work together towards one mission.



Udacity works with industry leaders to create project-based online learning programmes, to give as many people as possible the ability to gain the skills needed to get a job, advance their career, and shape the digital future.





Jake Schwartz

Co-Founder & Chief Executive Officer at General Assembly

Who participates in your coding bootcamps and why?

General Assembly works with adults looking to pursue a new skill or career. Students who come to our campuses for classes, workshops, and longform training are typically looking explore a new career path, build a business or change careers. Our corporate clients work with General Assembly to assess their current talent pool and provide training to ensure that their workforce has the most relevant tech, design, data, and marketing skills.

According to you, what do companies need to do to appeal to the new generation of developers?

The new generation of developers are looking for relevant and meaningful work at companies that promote innovation, creativity, and learning. As part of this, companies must recognize that lifelong learning is an imperative, and develop career pathways that ensure that their workforce is constantly building new skills and taking on new challenges. Employer investment in training not only benefits the employer, but also improves retention and morale.

How do you envision the future of tech recruitment?

Skills-based hiring is the future of tech recruitment - evaluating candidates based on skills, not where they went to school or the reputation of their past employer. This approach can reduce bias and create equitable talent pathways, which will streamline recruiting and increase diversity. GA is tackling this issue through a suite of technology assessments for web development, digital marketing, data analytics and related fields to help employers quickly gauge candidate readiness through a validated process.



General Assembly (GA) works with individual students and corporate clients to offer employer-driven, practitioner-taught education and training programs in data, design, business, technology, and other relevant, in-demand skills.





Education Types

Regardless of their level of education, developers attend evening courses, bootcamps and other flexible training systems. They also learn a lot by themselves with the resources they find online (hello Stack Overflow and Github!). Among UK and Ireland developers, 76% code as a hobby and 26% contribute to open source projects. Developers who do both? They make up about 22% of total respondents.



Educational Backgrounds

Recent graduate developers are likely to have different educational backgrounds than the veterans on the team. They are less likely to have a Computer Science related specialisation and tend to have a different combination of undergrad specialisations. This may cause friction and require special management attention in the form of coaching, mentoring, and/or continuing education & professional development.

We do not yet see a significant difference of education between experienced and new developers. However, the rapid growth of bootcamps, MOOCs and other flexible learning alternatives could very well change the game in the years to come.

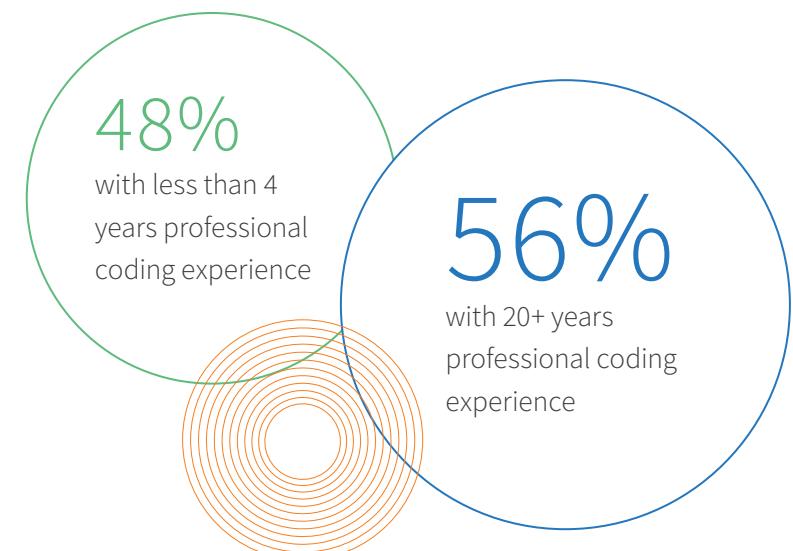
SPOTLIGHT ON



Are MOOCs the future of education for developers?

49.3% developers with less than 4 years experience said they participated to an online course, higher than all the other more experienced developers.

What percentage of developers have a Computer Science-related Undergraduate degree?





Sophie Rimington-Pounder

Junior Web Developer at Simply Business

Can you explain to us your career path and how you managed to land a job as a software developer?

I used to be a technology and entrepreneurship journalist, but I wanted to become more involved in the sector I was reporting on. I changed careers by doing a four month coding bootcamp. After the course, the school helped me find my first job in a small startup. I then moved to a much larger company through a recommendation from a bootcamp coursemate who was already employed there.

How do you view the role of non-formal education⁹ in preparation for becoming a professional developer?

Very positively. A bootcamp helped me to change careers in a comparatively short space of time, and provided me with an instant peer network of professionals. As the course was short, the tutors emphasized that the onus was on me to fill in any computer science or technical knowledge gaps I might have. This learning philosophy is invaluable for a developer, who needs to adapt in industry and learn at an accelerated rate.

What were your challenges along the way, and what would you advise employers to do to appeal to the new generation of developers?

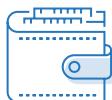
I found starting from the beginning again challenging; suddenly I was back at the bottom of the knowledge ladder. However, the best way to build up confidence is to work in an atmosphere which fosters open and non-dismissive conversation about code, and offer a continuous learning environment with approachable seniors. Employers should do their best to encourage these atmospheres to attract juniors. It is also good to see companies promoting diversity programs.

9. By 'non-formal education', we mean everything that is not a Computer Science or related degree, whether it's bootcamps or any kind of MOOCs.



The Influence of Formal Education on a Developer's Career

You do not need a Computer Science degree to be a successful developer. Actually it has little influence on the level of salary and is not the first factor that developers value in their colleagues.



The Salary of New Developers

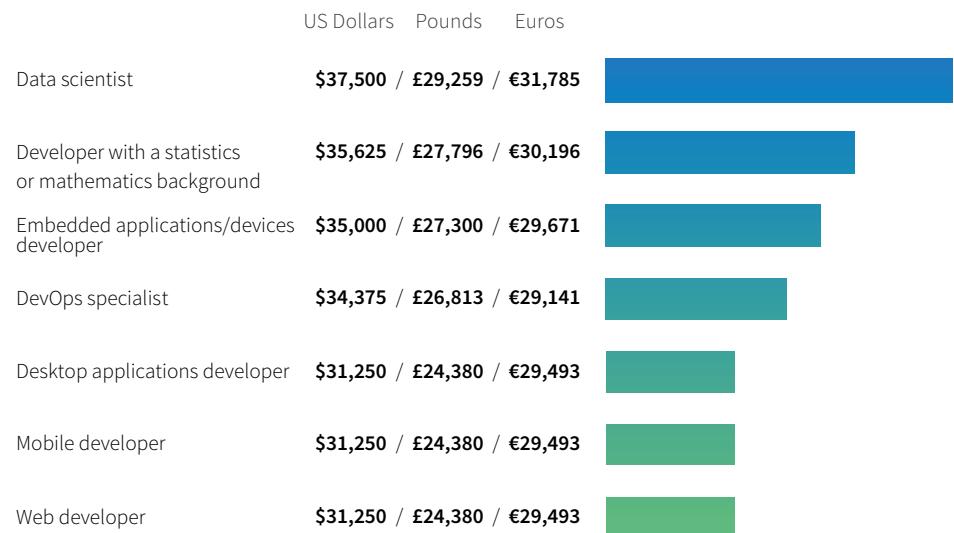
New developers in the UK and Ireland have an annual salary of around £27K (\$35K), depending on their specialisation. It contrasts with the level of salary in the US where new developers earn more than \$60K.

These salaries for developers just beginning their careers are lower than the overall medians in these regions, just as we would expect.

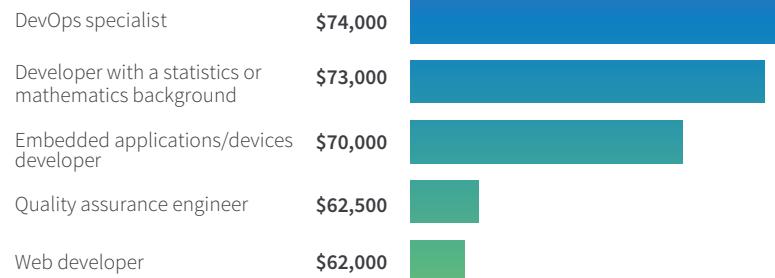
Median annual salaries of new developers by country¹⁰

For developers with less than 2 years of experience

United Kingdom/Ireland



United States



10. 'New Kids on the Block: Understanding Developers Entering the Workforce Today' by Julia Silge, Stack Overflow blog, June 12, 2017



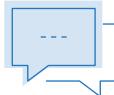
Influence of Formal Education on the Salary of Developers

A higher level of education does not always command higher salaries.

In the UK and Ireland, there are modest increases in the salaries of developers with their level of education. It is interesting to see that, although the majority of developers have a bachelor's degree, being a developer is less about education than it is about lifelong learning, talent and passion.

Level of education	Median Salary
Some college/university study without earning a bachelor's degree', 'Secondary school', 'Primary/elementary school' and 'I never completed any formal education.'	\$46,000 £35,000
Those that answered 'Bachelor's degree'.	\$48,000 £38,000
Those that answered 'Master's degree'.	\$52,000 £42,000





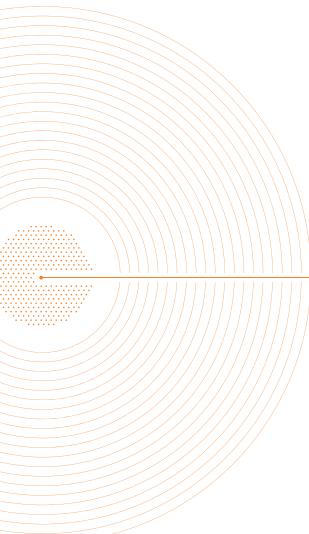
What Developers Think of Education

37% of current professional developers in the UK and Ireland said that their formal education was ‘not very important’ or ‘not at all important’ to their career success.

Moreover, developers do not evaluate their colleagues on the level of their education but on a well-rounded skillset. When asked what they would value most when hiring a new team member, developers answered first ‘communication skills’ followed by ‘a track record of getting things done’. Education arrives in sixth position only.

Meanwhile, on Stack Overflow...

We see evidence that developers with more education are more engaged on Stack Overflow with modestly higher reputation points.



Universities that asked the most Stack Overflow questions

Based on the years 2014-2016

Top 5 Universities in the UK

1. Imperial College London
2. University of Cambridge
3. Oxford University
4. The University of Manchester
5. Edinburgh University

Top 5 Universities in Ireland

1. University College Cork
2. Trinity College
3. University College Dublin
4. Maynooth University
5. Dublin Institute of Technology



Daniel Kroening

CEO of Diffblue and Professor of Computer Science at University of Oxford

How important do you think formal education is to the career of a software developer?

The way software is built changes very rapidly, and, even considering any fixed point in time, is very varied. The speed at which a developer can adapt to new tech is the key differentiator, both for the developer and his/her employer. That speed and flexibility is what you get from formal education.

How do you find and select the tech talent that will help you build your company?

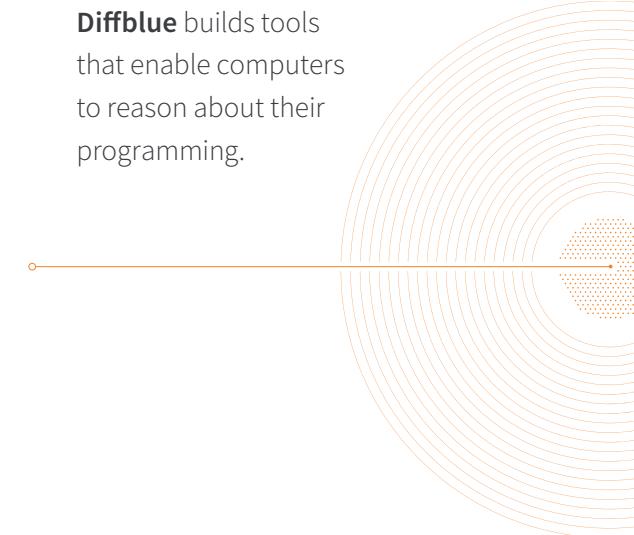
We don't look for a highly specific skillset, or fit for a particular application domain. We look for curiosity, ability to deal with complexity, and the desire for rigour. We then deliver in-house training for specific bits of missing short-term knowledge.

What do you think should be done to attract and train the best tech talent in our country?

Attracting talent is storytelling. Make it interesting. Aspire to do those things people will want to spend their lifetime on! Training is remarkably similar. Demonstrate how impact could be delivered, and do so in digestible units.



Diffblue builds tools that enable computers to reason about their programming.





What Employers Can Do to Appeal to the New Generation of Developers



Formal Education Should Not Be a Prerequisite

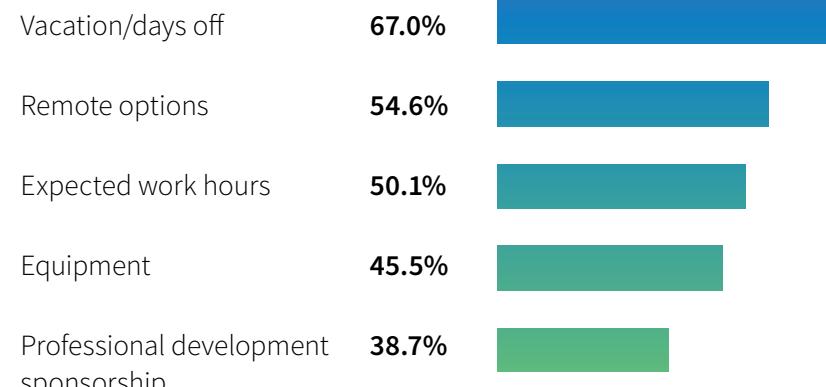
Recruiters would have a larger pool of qualified candidates if they did not ask for a Computer Science degree or any kind of formal education, except for some specialised positions. Do yourself a favour, remove the education requirement of your job listing!



Fulfill the Need for Development and Education Support

As mentioned in [The Developer Ecosystem: Employment Trends and Insights](#) report, developers are drawn to specific benefits. We see that professional development sponsorship ranks high, and it is a key benefit to offer developers if you want to attract and retain the best tech talent.

Top 5 benefits wanted by developers





Hiring Developers is Hard. We Make it Easier.

With Stack Overflow Talent, you can:



UNDERSTAND

Learn all about developers and the industry they work in.



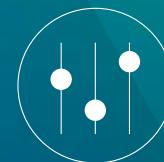
BUILD

Create an employer brand and message that resonates with developers.



SOURCE

Find technical talent with our tools to engage with active and passive candidates.



MANAGE

Get help optimising your hiring process.

Talk to an Expert

