

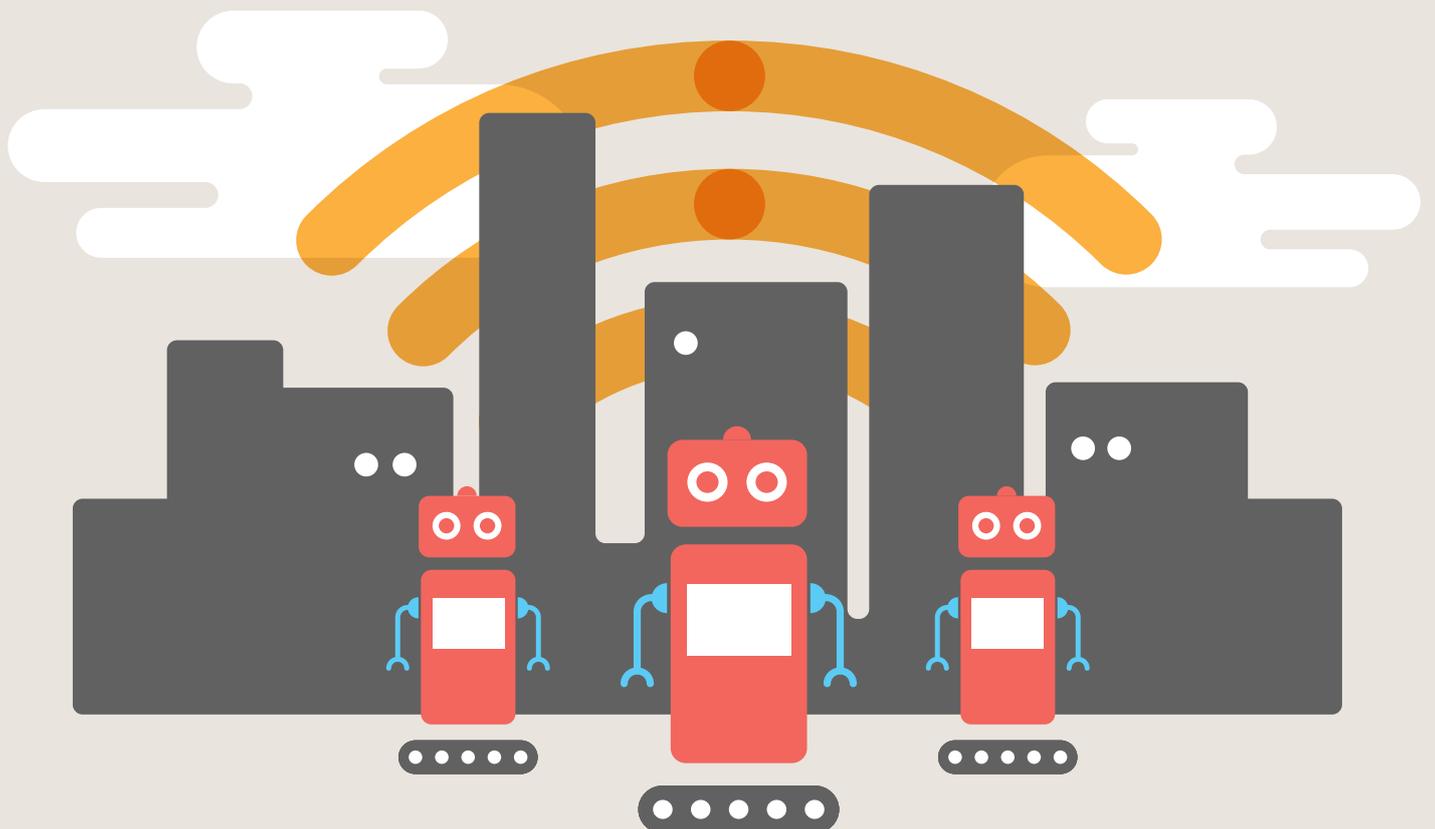
Nesta...

Young Digital Makers

Surveying attitudes and opportunities for digital
creativity across the UK

Report Summary

Oliver Quinlan
March 2015



Report Summary

This report explores the emerging field of digital making for young people in the UK. Based upon research Nesta has carried out, it charts the organisations providing opportunities for young people to make things with technology; looks at how these opportunities relate to what young people learn in school, and explores the attitudes of young people, parents and teachers towards digital making.

For most young people digital technology is an everyday part of life. Many are avid consumers of digital media. However, they often don't understand how to manipulate the underlying technology, let alone how to create it for themselves.

As technology shapes our world, young people need to be able to shape it too. As skills and work become increasingly technologically mediated, the need for digital skills is paramount with some calculating a potential £2 billion loss to the UK economy from unfilled roles requiring such skills.¹

What is digital making?

Digital skills, digital literacies, digital creativity; there are many terms used by different people in different ways in this area. Since 2012, Nesta and others have been emphasising digital making as distinct from simply using digital devices, and as the best way of understanding how technology works. Our work to date has focused on helping young people to 'look under the hood' of technology while they are making.

From programming entirely on a computer to designing and 3D printing physical objects, digital making represents a diverse range of activities. It doesn't include checking emails or browsing a website (clearly digital, but not making). It isn't the array of making activities young people take part in without technology (worthwhile though they are). Between the technical and the creative is an intersection where young people make useful projects while learning about technology.

Other groups of people refer to digital making more broadly. They include activities such as producing electronic music or editing a video in a way that may not involve understanding how the fundamental technology works. As we can see, digital making is not just about nurturing an interest in technology for its own sake or as a specialism.

Our definition of digital making

For this report we have taken a broad look at digital making. The term is used to represent a continuum of skills and understanding. In our surveys of young people, parents and teachers we defined digital making as 'learning about technology through making with it'. However, we also asked these groups about interests and activities that might be seen as more broadly digitally creative such as editing photos or making music, many of which were very popular.

In talking to organisations, we sought those who self-identified as being involved in digital making, seeking to understand what kinds of activities they provide. In such a complex field we will not have picked up everything. Much digital making is happening informally between peer groups and in communities without any organisations coordinating it.

Face-to-face interaction with others is a vital part of developing learning in practical activities such as digital making, and so we have focused on those organisations that create opportunities for this kind of activity.²

The current digital making landscape

In the UK there is currently a lack of skills in making with technology, with the recent House of Lords report on digital skills warning that change is so rapid the UK could be left behind in terms of our digital capabilities.³ However, action is being taken to address this. For example, from September 2014 school children in England as young six are being taught to create and debug simple computer programmes. Outside of school, many organisations across the UK are supporting young people in learning to create with, as well as consume technology – to become digital makers. Alongside this we have some creative and high-profile industry activity lead activities such as Barclays' Digital Eagles programme and Samsung's Digital Academies. As our research found, young people across the UK are having their first experiences of digital making

Nesta has been working with partners to make this happen for some time. In 2011, we published the *Next Gen* skills review with Ian Livingstone and Alex Hope that called for changes to the National Curriculum. Since 2012 our Digital Makers Fund, set up with our partners Mozilla and Nominet Trust, has funded organisations across the UK providing opportunities for young people to learn about technology through making.

In 2010 computing became part of the curriculum in Scottish schools. September 2014 saw computing become a new subject in the National Curriculum for England, with aspects of programming and computer science in lessons for all young people aged six to 14. Many teachers in Wales and Northern Ireland are integrating aspects of digital making into their ICT lessons. However, nearly a third of UK teachers in our survey reported that their students do not currently receive enough teaching time to reach the level expected of their age group in these subjects. It is early days for computing as a compulsory subject, but the demands of studying it are becoming greater. Extra-curricular activities should play a role in achieving these high ambitions.

Enabling digital making to grow

Far too few young people have regular opportunities to engage in digital making. Half of those we questioned make things less than once a week, or never. We estimate that over 80 per cent of the ten million school age children and young people in the UK are interested in digital making, yet in 2014 there were only 130,000 face-to-face places offered by the making organisations we identified.⁴ These organisations are doing a terrific job, but their impact is currently limited.

A huge expansion is needed if we are to grow a nation of digital creators who can manipulate and build the technology that both society and industry are increasingly reliant on. This expansion cannot be left exclusively to professionals, however, as we simply don't have enough of them. It will require the mobilisation of enthusiasts and interested amateurs, from parents and non-expert teachers, to those working in the tech industry, working and learning alongside young people to help meet this demand. Encouragingly, almost two-thirds of parents and carers say they are interested in participating in digital making.

As well as greater quantity of activity, the field needs to grow by providing activity that is compelling for new and different groups of young people. They need to be engaged in digital making in a way that is relevant to them and their hobbies and interests, alongside discovering new avenues for creativity and self-expression. What children learn through this process may contribute to a skillset for future employment in a technology-related job, but these skills will also lend themselves to creative roles, which our research found is likely to become increasingly important.⁵

Making all of the above happen is a creative challenge, and Nesta calls upon organisations from media to tech companies and grassroots organisations to rise to this, so that digital making becomes part of the national psyche for the next generation. This will require innovative approaches to engaging new groups of young people through developing experiences that are rewarding. We need to convert dabbling with technology into embedded habits and normalise digital making as part of youth culture.

The full report (available at [nesta.org.uk/young-digital-makers](https://www.nesta.org.uk/young-digital-makers)) covers three areas:

1. What and where do young people make?

- **Participation:** To understand uptake, we examine who is currently taking part in digital making and how often.
- **Provision:** Exploring the infrastructure of a growing sector of organisations in the UK providing opportunities for digital making for young people. We describe the kinds of activities these organisations are providing, where these activities are available, and how these organisations are structured and growing.

2. What do people think about digital making?

- **Perceptions:** Discovering the attitudes, interests and awareness of young people, parents and teachers towards making with technology.
- **Ambitions:** Looking at what young people would like to make, how their parents think it fits into their future and the development of skills in school.

3. Conclusions, key findings and recommendations

- Information about organisations providing face-to-face digital making experiences.
- A summary of the findings from our surveys of young people, parents or carers and teachers.
- Identifying the directions that those involved in different aspects of digital making might take to increase participation and further develop skills.

How we conducted our research

Research was gathered through representative surveys across the UK of young people aged eight to 18, their parents and carers, and teachers. Our researchers collected information about informal learning organisations through analysis of online media, surveys, case studies and interviews. Any statistical comparisons quoted have been tested for significance.

Parent attitudes to digital making



89%

think it's a worthwhile activity

84%

think it's important for careers and jobs

74%

would specifically encourage a career in digital making

99%

think computing is important to be taught in schools

53%

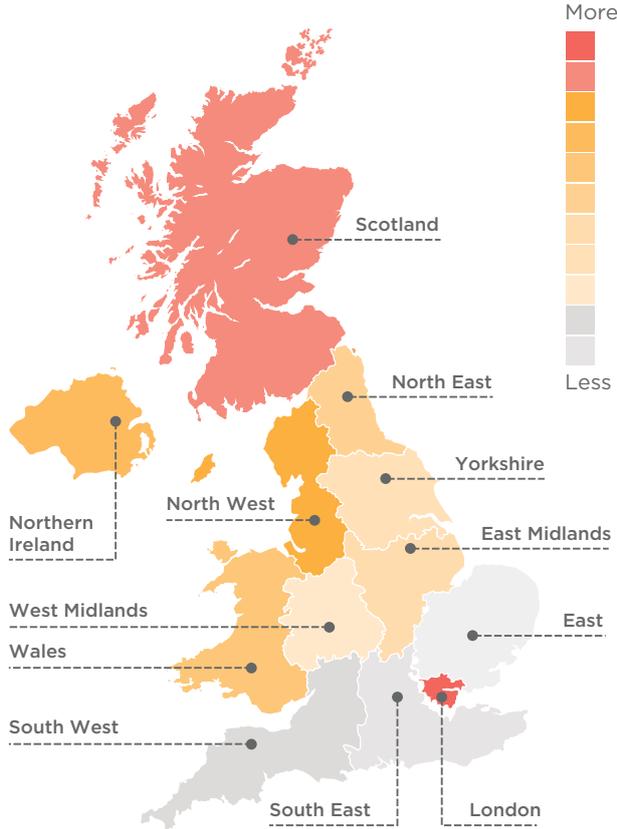
bought something to help the children do digital making

only 12%

able to signpost children to online or face-to-face resources

Opportunities for engaging with digital making face-to-face

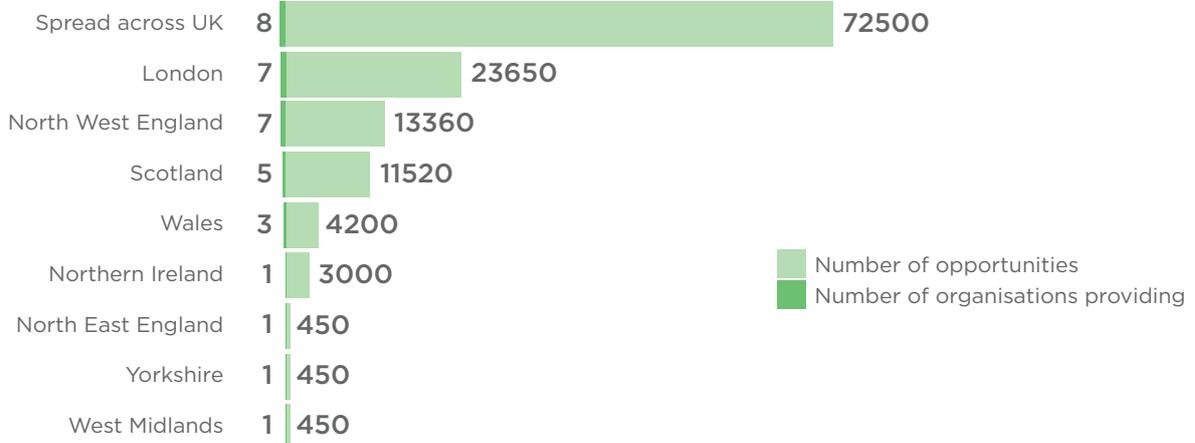
Density of local opportunities per child by region



Locations of organisation/headquarters



Locations of opportunities for engagement



Summary of research findings

1. The potential for growth

- Eighty-two per cent of young people say they are interested in digital making. However, half of young people make things with digital technology less than once a week or never.
- Parents are overwhelmingly supportive of digital making. Eighty-nine per cent think it is a worthwhile activity for their children. Seventy-three per cent encourage their children to make things with technology. Acting on these feelings, 53 per cent have purchased hardware or software to support their child in digital making. Many also see possibilities for the future: 84 per cent agree that the skills associated with digital making are important for jobs or careers for their children. This is echoed by corporate engagement with the sector, with many large companies such as Google, Samsung and Virgin Media listed as supporters by the organisations surveyed.
- Only 12 per cent of parents felt informed enough of face-to-face digital making activities to signpost their children to them. A similar number said the same was true of online resources. Less than a third were aware of the existence of online resources, kits or face-to-face activities. Similarly, 71 per cent of teachers said they are not yet aware of the face-to-face opportunities to experience digital making available outside of the formal curriculum. So far only 8 per cent are using face-to-face opportunities provided by organisations such as those in our research.

2. Geographical provision of digital making opportunities

- We identified 130,800 face-to-face opportunities to experience digital making provided by the organisations surveyed. This is a long way from providing for the interest shown by 82 per cent of our survey, which represents a possible 8.2 million school age children and young people in the UK.⁶
- The high demand from parents and young people for digital making is consistent across the UK. London currently accounts for 18 per cent of the face-to-face opportunities available. All areas have potential for growth, but regions of England other than London and the North West are proportionally very undersupplied for the numbers of young people who live there.

3. The mobilisation of volunteers and non-experts

- Digital making is powered not just by money, but also by volunteers. Two-thirds of the organisations identified said they relied on volunteers to do their work. With such high levels of interest from large numbers of young people, the comparatively small number of professionals will not be enough to meet demand.
- Rather than see the above as a deficit, it is an opportunity to create resources to support enthusiasts and interested amateurs to meet demand and learn alongside the young people. Many resources are already designed for non-experts to access. Online resources such as Scratch are designed for young people to access independently. Code Club's resources support volunteers to teach programming to children in their local schools. These should set the example for future development.
- With 65 per cent of parents interested in making with technology themselves, there is an opportunity to provide parents with resources and opportunities to engage children in digital making. There is also potential to explore how young people can support their peers in developing new skills and volunteers can support their communities.

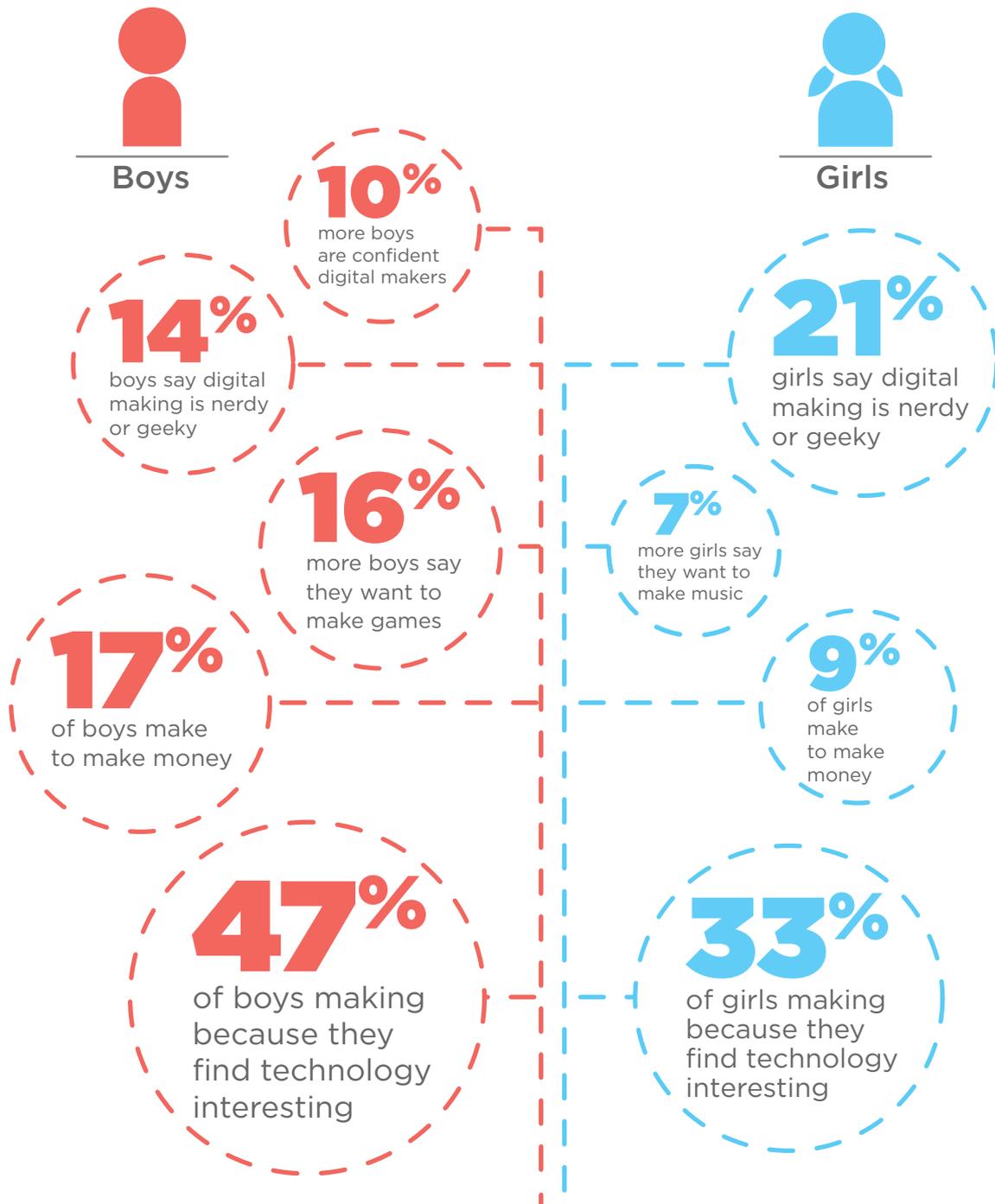
4. Tapping into young people's different interests

- Young people are already engaging in a wide range of digital making activities from music to producing 3D printed objects, but the activity is concentrated around the less technical projects. Just over half of the young people surveyed have made a website, suggesting it could be the new 'school project'. Over half (55 per cent) reported having used a programming language.
- There are some differences between the interests of boys and girls. Boys are more interested in digital making than girls (an 11 per cent difference), feel more confident (a 10 per cent gap that has grown by 4 per cent since 2014) and are more likely to identify themselves as a 'digital maker'. Boys are more interested in making games, websites and software or computer programmes, whereas girls favour music, digital pictures and drawings.
- There are different motivations for doing digital making too. 'Fun' comes first, but the second most common reason differs according to gender. For girls it is because they 'have to at school'. For boys it is because they 'find technology interesting'. There was also a notable gender difference in the numbers of young people saying they made things with technology because they want to make money (14 per cent of boys and 9 per cent of girls). The numbers of girls expressing negative perceptions of digital making such as it being 'nerdy or geeky' was higher. The answer to this is not the creation of activities exclusively focused on girls; there is evidence to suggest such a focus can be counterproductive.⁷ It is about catering for a broad and diverse range of interests that can be furthered through the means of digital making.
- Girls showed a strong interest in making digital music, which is less well catered for by the organisations we looked at, which tended to focus on programming, electronics and app development. Music is not a gendered activity, but more opportunities based on this area would engage groups who are currently less interested.

5. Digital making, computing and formal education

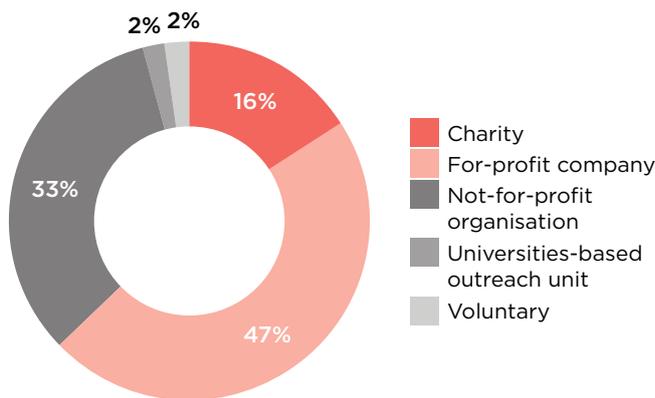
- Only 56 per cent of ICT and computing teachers agreed that their students would reach age-related expectations in computing, despite 95 per cent agreeing that their students were confident users of technology. This gap is concerning and suggests that the demands of the new subject are ambitious. Extra-curricular activities can play a part in achieving these high ambitions.
- Young people are somewhat more confident in their own digital making abilities than their teachers (68 per cent of young people felt confident). When looking at things young people want to make, the more technically ambitious projects are evident, demonstrating young people's ambition.
- Achieving young people's ambitions will require joining up informal learning activities and resources with the curriculum, to both support and extend the learning in schools. Compulsory learning is both an important introduction and a springboard for further interest-driven activity. We also need more work on designing learning pathways and skills progression for young people.

Gender differences in digital making

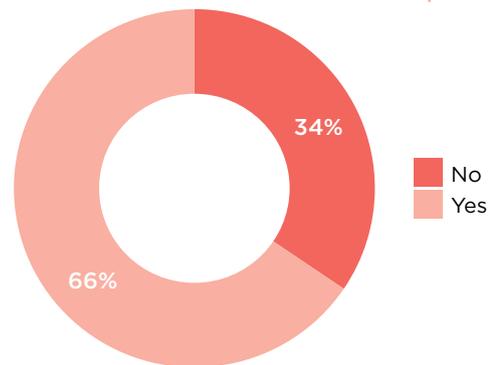


Overview of delivery organisations

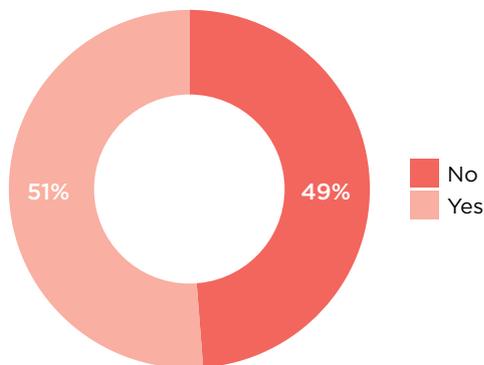
Organisation types



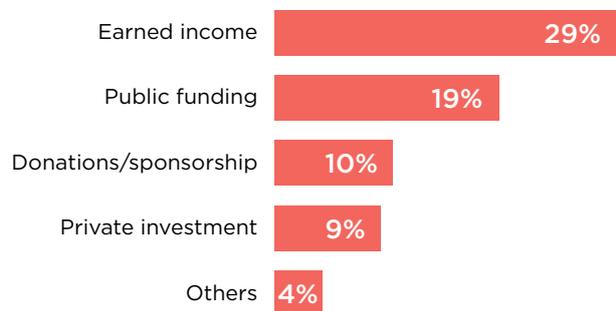
Uses volunteers



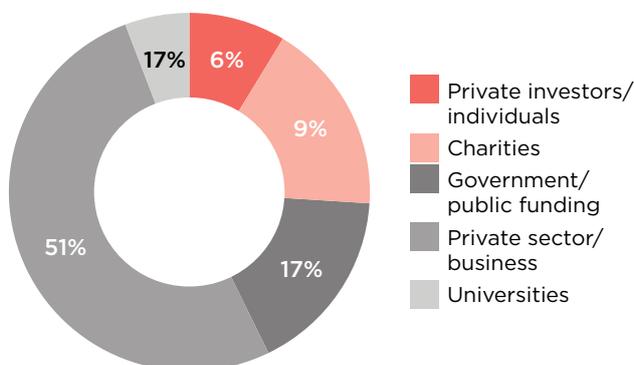
Conducted impact survey



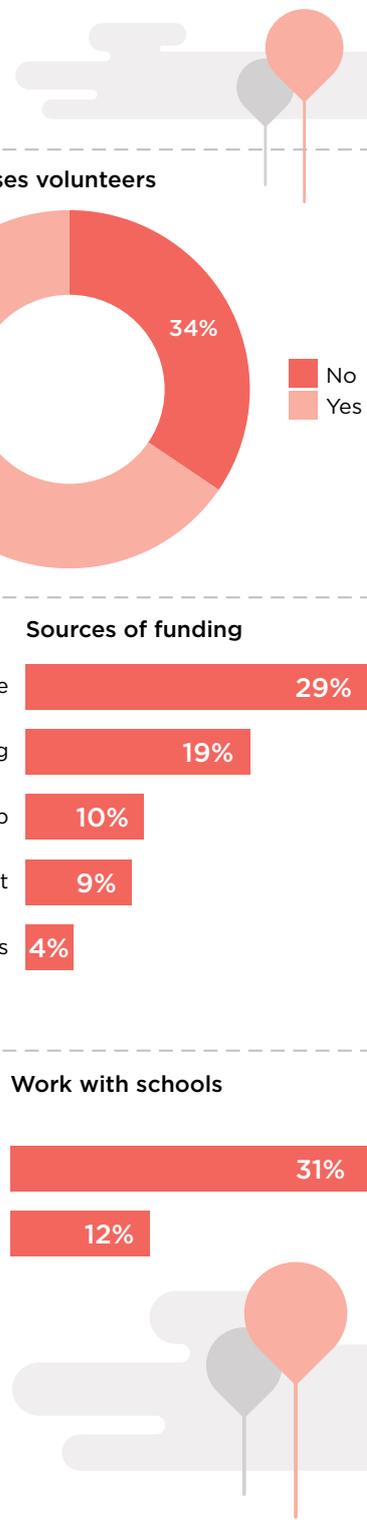
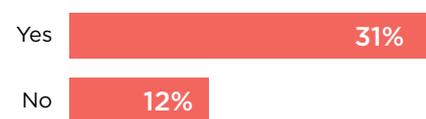
Sources of funding



Types of supporters, funders and sponsors



Work with schools



6. Schools as digital making hubs

- Schools continue to be a key influence in exposing young people to new types of making and experiences. They are the most frequently reported location for digital making activity. Sixty-six per cent of young people surveyed said they did digital making in class at school.
- Only half of teachers who teach ICT or computing report being confident in teaching the curriculum. Reported confidence is considerably higher in secondary schools (70 per cent) than primary schools (46 per cent). It is still early days for the subject of computing in England and Scotland, and teachers have to adapt fast, so are taking advantage of the supportive work done by Computing At School and other advocacy groups. Much more funding for support of teachers is needed.
- In primary schools only 3 per cent of teachers identified computing as being taught by a teacher with a computing, computer science or ICT qualification. This suggests it is very rare to have an expert in the school with such qualifications to establish the new subject.
- As well as the core computing or ICT curriculum, the diverse types of digital making have the potential to touch, or be touched upon, in many subjects. Core understanding of scientific and mathematical concepts is developed through electronics and programming, while art and music are increasingly incorporating digital into their practice. Digital making embodies interdisciplinary work and cross-curricular learning.
- Teacher awareness of digital making resources for young people outside of the school curriculum is low. For example 71 per cent were not aware of the existence of face-to-face clubs and activities and only a fifth of teachers say their school has an afterschool or lunchtime club related to digital making.

7. Growing digital making organisations

- Funding for the digital making organisations we surveyed came from a wide network across the public, private and third sector. A healthy 44 per cent of the organisations we surveyed had earned income as a funding source, suggesting there are financially sustainable business models that could be replicated and scaled, although 27 per cent rely on a single source of income.
- With high interest in the field, but 71 per cent of teachers and 61 per cent of parents unaware of the existence of face-to-face opportunities, huge potential exists for growing existing digital making organisations and new entrants. This is particularly needed to service demand in parts of the country where few opportunities currently exist.
- Although digital making organisations are small, they are conscientious. Forty-nine per cent have conducted some kind of study into their social impact. Currently organisations are measuring different things, and there is a need to come together as a sector and define what measures of learning are important and how impact is assessed. This needs to be beyond simple measures such as numbers of people reached. Evaluation should be used to support the growth of new interests and new groups of young people. It should be shared as a sector to promote effective practice and encourage the 'joining up' of experiences provided for young people.
- The tech industry is an important source of support for face-to-face digital making activities, and a number of the organisations we surveyed listed large companies such as Google, Samsung and Virgin Media as supporters.

Recommendations

- 1. The high levels of interest in digital making amongst young people and parents need to be capitalised on further.** The digital making movement has had a strong start, but there is a clear need to increase action, and address the current lack of awareness of parents and teachers, if the demand for digital making amongst young people the across the country is to be met.

We would like to see: existing digital making activity given more support to grow, through the scaling-up of existing work and the creation of new digital making organisations. We would also like to see more staff and volunteers to run activities and help for parents, and teachers to navigate the digital making opportunities available for children and young people. (See point 1 of Summary of research findings.)

- 2. Young people need to be supported as digital makers across the UK, not just in London and areas that have high provision.** There is a strong interest from young people and parents across the country that is not yet met by the scale of current provision. All areas have potential for growth, but the creative and high-tech economies are disproportionately based in London and the South East,⁸ and there is a danger of educational opportunities reinforcing this.

We would like to see: digital making opportunities for young people increase across the whole of the UK, but particularly in the East and South East (where provision is especially low). We would also like digital making organisations to focus their work on geographical areas that are less well provided for. (See point 2 of Summary of research findings.)

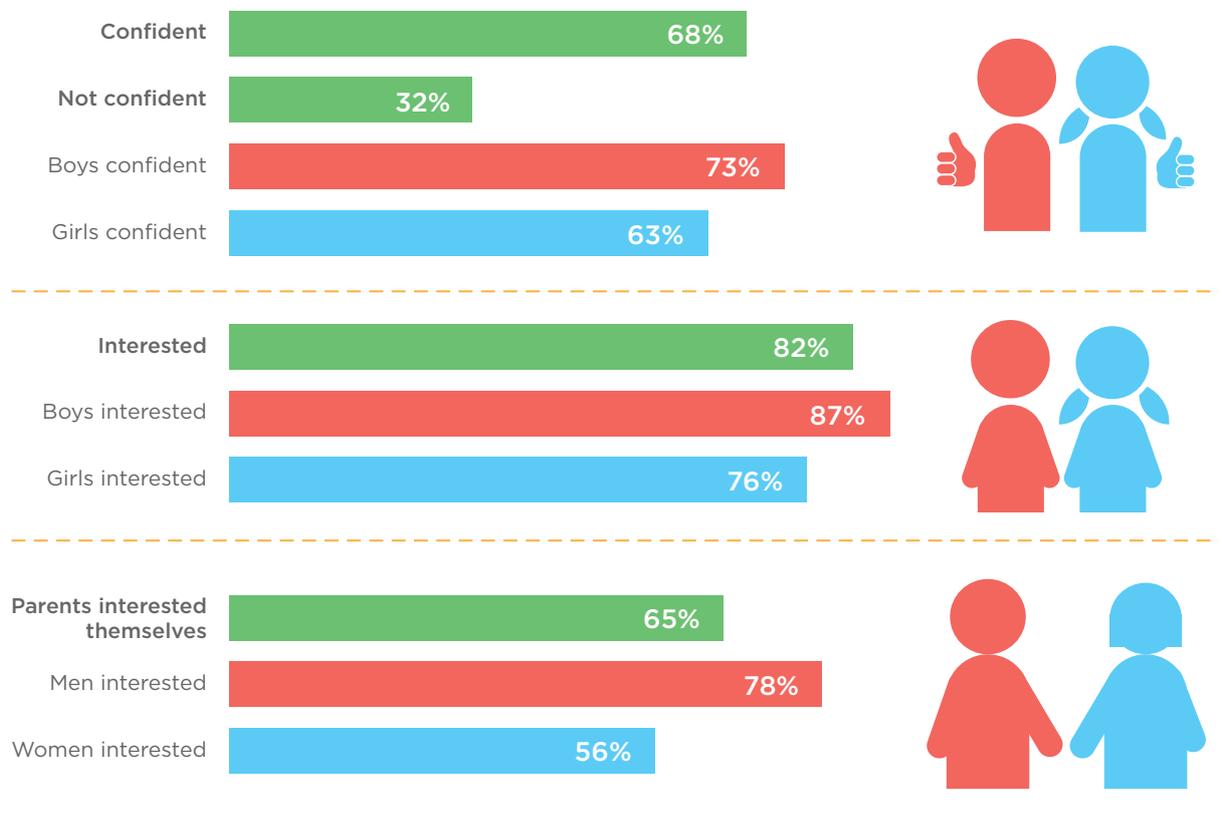
- 3. Non-professionals – such as volunteers, parents, teachers, and young people themselves – need to be mobilised.** Face-to-face interaction with others is a vital part of developing learning in practical activities such as digital making.⁹ We simply don't have enough technology professionals to work with young people at scale, but there are many examples demonstrating that non-professionals can facilitate digital making with the right resources and support. Rather than see the process as tackling a deficit, we see it as an opportunity to support enthusiasts and interested amateurs to learn alongside young people.

We would like to see: resources and support targeted at skilling-up non-experts in order to engage new groups of young people in digital making, beyond tech enthusiasts. The potential of peer-to-peer learning should also be tapped into. Many online resources, such as Scratch, are also already designed for young people to access independently, while Code Club supports volunteers to teach programming to children in schools. These should set an example for future development. (See point 3 of Summary of research findings.)

4. There needs to be greater access to a variety of making opportunities catering for a wider variety of young people and their different interests, ages and genders. For instance, our survey showed girls are interested in digital making, but less interested in learning about technology for its own sake. Much of the public discourse has been around programming and fostering an interest in technology, and these are the most common activities provided by organisations. However, the demand from young people is to make things that are a culturally relevant part of their lives.

We would like to see: opportunities for engaging with digital making targeted at a broader range of young people's passions (for instance, music or fashion), rather than simply an interest in technology itself. (See point 4 of Summary of research findings.)

Confidence and interest in digital making



5. Clear pathways to excellence should be built to grow young people's ambitions as digital makers and help them fulfil their potential, in and out of school.

Many young people and their parents report confidence in computing, but some teachers do not think young people are reaching their expectations.

We would like to see: digital making opportunities that take account of young people's prior learning and aim to deepen their skills, providing regular activity and not just first-time experiences. Accredited informal learning with Open Badges would allow providers to build on this for progression. Achieving these ambitions will require joined-up informal learning activities and resources, some linked to the curriculum. (See point 5 of Summary of research findings.)

6. Schools must exploit their potential as a hub for digital making opportunities, work with informal learning organisations, raise parents' awareness and recruit volunteers. Three-quarters of digital making organisations are already working in schools, but with very low teacher awareness of their activities there is enormous room for growth.

We would like to see: teachers supported at all levels to provide digital making activities across the curriculum; extracurricular opportunities in schools expanded; and the provision of the space and resources young people need to collaborate. The continued expansion of professional development is also needed to ease this transition. (See point 6 of Summary of research findings.)

7. Digital making organisations need to be supported to grow sustainably through new and existing partnerships with grassroots organisations and private companies. Most digital making organisations are early-stage but promising, with huge opportunities for growth. They and their public and private sector partners have so far worked closely together with great success. As new organisations emerge, efforts must be made to sustain this collaborative approach.

We would like to see: an increase in industry support – financially, through sharing expertise and providing volunteers. Scaling the collaboration between digital making organisations and the wider industry will ensure that young people have a range of opportunities that are diverse but complementary. We would also like to see digital making organisations develop their use of evaluation in order to refine their understanding of the most effective ways to engage young people, and for them to explore what the long-term impact of digital making is on young people. (See point 7 of Summary of research findings.)

Endnotes

1. O2 and Development Economics (2013) 'The Future Digital Needs of the UK Economy.' Available at: <http://cdn.news.o2.co.uk.s3.amazonaws.com/wp-content/uploads/2013/09/The-Future-Digital-Skills-Needs-of-the-UK-Economy1.pdf>
2. Brown, L. and Sefton-Green, J. (2014) 'Mapping Learning Progression in Digital Creativity.' London: Nominet Trust. Available at: <http://www.nominettrust.org.uk/knowledge-centre/articles/mapping-learner-progression-digital-creativity>
3. See: <http://www.parliament.uk/business/committees/committees-a-z/lords-select/digital-skills-committee/>
4. See page 55 of the 'Young Digital Makers' report for a list of organisations. See: nesta.org.uk/young-digital-makers
5. Nesta (2012) 'Creativity vs Robots.' Nesta blog. Available at: <http://www.nesta.org.uk/blog/creativity-versus-robots>
6. Data from England's Department for Education, The Scottish Government and Northern Ireland Department of Education.
7. Mulqueeny, E. (2012) 'How to put girls off from all forms of programming.' Available at: <https://mulqueeny.wordpress.com/2012/06/12/how-to-put-girls-off-from-all-forms-of-programmingtech-by-emma-der-mulqueeny/>
8. Bakhshi, H., Davies, J., Freeman, A. and Higgs, P.(2015) 'The geography of the UK's creative and high tech economies.' London: Nesta. Available at: <http://www.nesta.org.uk/publications/geography-uks-creative-and-high-tech-economies>
9. Brown, L. and Sefton-Green, J. (2014) 'Mapping Learning Progression in Digital Creativity.' London: Nominet Trust. Available at: <http://www.nominettrust.org.uk/knowledge-centre/articles/mapping-learner-progression-digital-creativity>

Acknowledgments

We would like to thank all those people and organisations working in the area of digital making who have contributed information and their perspectives to this report. Thanks are also due to all the organisations and partners we have worked with on the Digital Makers Fund and Make Things Do Stuff programme in recent years.

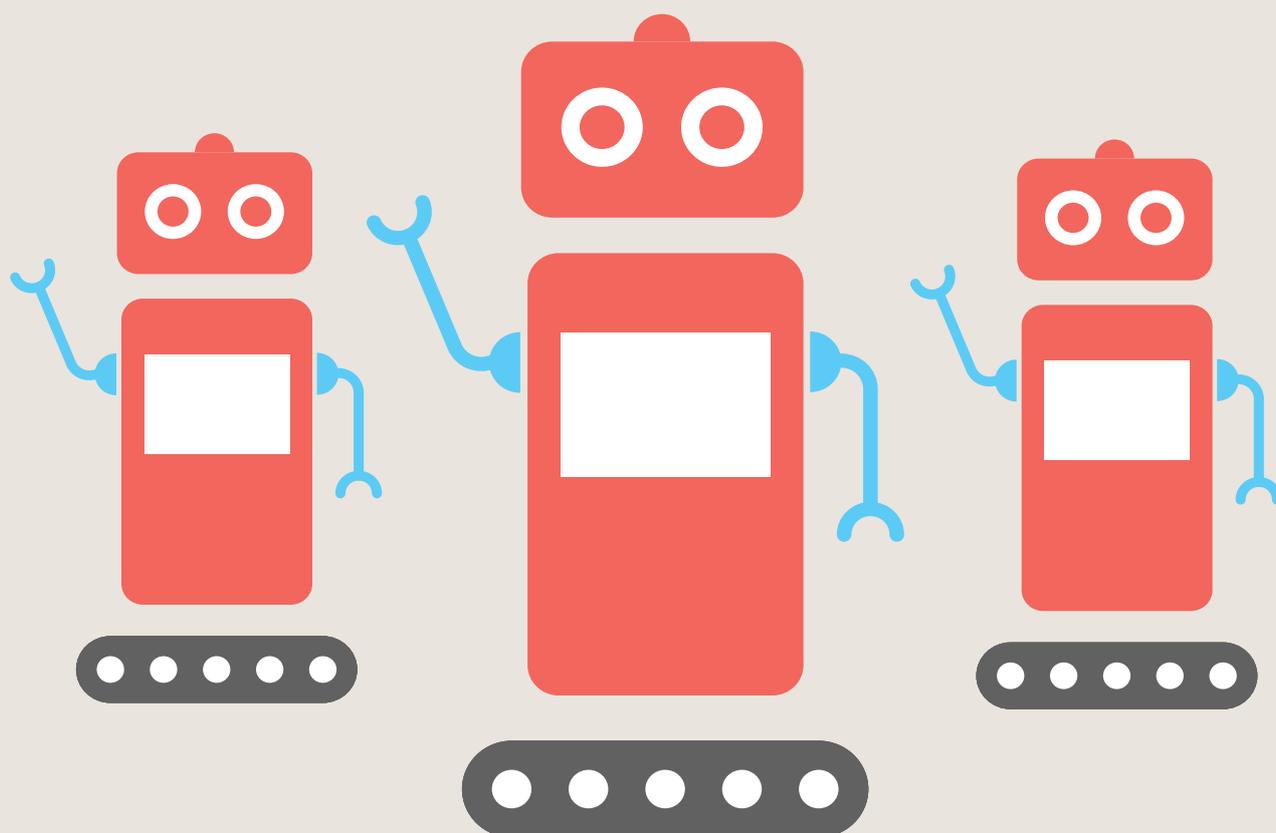
Particular thanks to **Simon Humphreys** at Computing At School, **Laura Kirsop** at Code Club UK, **Dee Saigal** at Drum Roll and **Miles Berry** from the University of Roehampton for giving their perspectives on this report as it was developing. Thanks to **Adam Lofting** at Mozilla and **Dan Sutch** at Nominet Trust for discussing their work in the area to inform this work. Thanks also to Freeformers, Roundhouse, Computing At School Scotland, Decoded, MadLab, CoderDojo Scotland and the Scouts for contributing to the case studies.

Thanks to **Martin Wilson**, **David Ullman** and **Tom Kenyon** at the BBC for their discussions on digital creativity as we were developing this work.

This report could not have been produced without the support of many colleagues at Nesta. Thanks to **Geoff Mulgan**, **Helen Goulden**, **Hasan Bakhshi**, **Amy Solder**, **John Bevan**, **Helen Drury**, **Helen Durham**, **Natalie Hodgson**, **Sarah Reardon Bell**, **Kathleen Stokes** and **George Windsor**. Thanks to **Sylvia Lowe** who was instrumental in the process of producing this research.

Thanks to colleagues as BOP Consulting, TNS global and YouGov for their work on collecting and analysing data.

Nesta...



Nesta

1 Plough Place
London EC4A 1DE

research@nesta.org.uk

[@nesta_uk](https://twitter.com/nesta_uk)

www.facebook.com/nesta.uk

www.nesta.org.uk

March 2015

Nesta is a registered charity in England and Wales with company number 7706036 and charity number 1144091. Registered as a charity in Scotland number SCO42833. Registered office: 1 Plough Place, London, EC4A 1DE.

