National Numeracy
2019 Autumn Report

Building a numerate nation: confidence, belief and skills

National Numeracy
for everyone, for life

TP ICAP

Forewords

TP ICAP

At TP ICAP we know that numeracy is one of life's crucial building blocks. Our business is built on numbers and it is fundamental that our people are highly numerate.

However, poor numeracy is a serious problem in the UK. The new research contained in this report reveals that low confidence with numbers, from avoiding everyday tasks to crippling maths anxiety, is a significant and long-standing issue for millions of people.

We want to enable social mobility and remove the barriers that prevent talented people from succeeding. That's why last year we launched our Everybody Counts numeracy campaign and set ourselves the ambitious aim of reaching one million beneficiaries across our global markets to improve their confidence with numbers. We also became a strategic partner of the charity National Numeracy, to help scale-up their activities in the UK.

TP ICAP has committed, with National Numeracy, to help at least 250,000 people in the UK to start improving their numeracy skills by the end of 2021. I am pleased to report that we have already made good progress towards this target, with over 115,000 adults starting their journey to improved numeracy since we began working together.

National Numeracy is making commendable steps to raise awareness of this crucial issue, but they can't tackle this problem alone. Creating a truly number-confident nation will require much wider, collective support.

We call on everyone to join us in helping to change millions of lives for the better.

Nicolas Breteau
Group Chief Executive
TP ICAP plc

National Numeracy

National Numeracy exists to enable everyone to become confident and competent with numbers and data so that they can make good decisions in their daily life.

There has been growing awareness of maths anxiety and the fact that for many people a fear of maths is the biggest thing that's holding them back, rather than the actual skills themselves.

Yet the extent and cost of the UK numeracy issue are seriously underestimated by UK business leaders and politicians, even though evidence that the nation is lagging behind our international counterparts is now widely available.

That is one reason why this report is so timely and important. The other is that we now have clear evidence of the importance of both confidence with numbers and what is known as a 'growth mindset'; the belief that you can improve is the biggest single factor in determining actual improvement.

The findings reinforce our focus on these 'softer' areas. Twenty years on from 'A Fresh Start', the report that called for action to improve adult numeracy and literacy, we now have strong evidence as to why a purely 'skills-based' approach didn't, and doesn't, work. Shockingly, there has been no improvement in adult numeracy skills over these past two decades.

Just as a basic level of physical fitness is increasingly recognised to be within everyone's grasp, good numeracy is within the grasp of anyone who is currently held back by low confidence. With the right approach, we can collectively address this long-standing issue once and for all. But we need your support to help us make that happen.

Mike Ellicock
Chief Executive
National Numeracy

Contents

Summary: perceptions survey

To begin to solve a problem, you need to understand the scale of it.

The UK has long had low levels of adult numeracy in comparison with other countries. While adult literacy has improved, numeracy levels have remained stubbornly low over the last twenty years.

We know that policymakers and business leaders have an important role to play in tackling this issue. But do they understand the scale and the cost to the UK of poor adult numeracy?

The YouGov poll conducted for this report revealed that business leaders significantly undervalued the cost of poor numeracy to the UK economy, estimating a cost of £7 million per week[1] vs the actual £388 million per week[2].

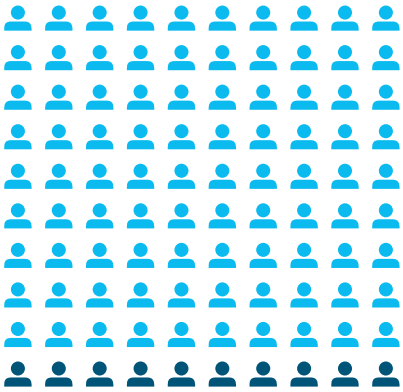
In the parallel survey of MPs[3], over 80% underestimated both the scale and cost of poor numeracy (excluding 27 MPs who responded 'don't know').

These findings may help to explain why there has been a relative lack of investment in upskilling the UK workforce in the past decade, even though around half of working-age adults have the numeracy level expected of a primary school child, and one in four would be deterred from applying for a job if the advert listed using numbers and data in the job description[4].

Encouragingly, when the true scale and the cost were revealed, over 90% of both business leaders and MPs agreed or strongly agreed that a renewed focus on adult numeracy is needed from government and employers[5].

Over 80% of MPs underestimated both the scale and cost of poor numeracy.

When faced with the true scale and cost of poor numeracy, over 90% of both business leaders and MPs agreed that there needs to be a renewed focus on adult numeracy.



Numeracy = Number Sense

Being numerate is having the confidence and competence to use numbers and data to make good decisions in daily life. Being numerate is therefore not just about skills. It is really about the interplay between skills and attitudes – and about effective use of whatever digital aids you have to hand.

1. Data Source 2 in Methodology section
2. In 2014, Pro Bono Economics estimated the cost of poor numeracy to the UK economy to be £20.2bn per annum. This is £388m per week.
3. Data Source 1 in Methodology section
4. Skills for Life + Data Source 3 in Methodology section
5. Data Sources 1&2 in Methodology section

The YouGov poll conducted for this report revealed that business leaders significantly undervalued the cost of poor numeracy to the UK economy, estimating a cost of £7 million per week vs the actual £388 million per week

Estimated weekly cost:

£7m

Actual weekly cost:

£388m

Summary: what are the barriers?

We commissioned a YouGov survey[6] of representative adults to analyse the barriers that people face when improving their numeracy. This complemented the evidence we already have from our National Numeracy Challenge database[7].

We found that **confidence with numbers** is the dominant factor linked to numeracy score, while having a belief that you could improve your skills – a '**growth mindset**' – was the biggest indicator that your numeracy score would improve.[8]

We also found that confidence with numbers has a clear age and gender component; women consistently have lower confidence, and remarkably, the lowest confidence with numbers is among those who have just exited the education system.

Jade
Building confidence with numbers

Many people struggle to build confidence with numbers, with maths anxiety affecting millions of people in the UK and acting as an emotional barrier to engagement and progress in maths[9].

Jade signed up to the National Numeracy Challenge as part of her Care Certificate at Sussex Community NHS Foundation Trust. She never thought maths was her strong point and said she felt petrified, but was able to overcome her anxiety and reach the Essentials of Numeracy.

"When I found out about the maths requirement I was mortified. At first I scored 34 and I needed 80 for the Care Certificate.

"I really thought that I wasn't going to be able to do it, I thought I'd never get to the Essentials of Numeracy but I kept trying and trying on the Check-Up.

"I was so happy and proud of myself that I kept trying and finally managed to pass. I actually cried when I realised I had done it – it was such a huge sense of achievement."

Jason
Building a growth mindset

Having a growth mindset means having the belief and understanding that ability is not fixed and can be developed.

Jason is a Returns Operative in Castleford who used the National Numeracy Challenge after it was suggested by his Union Learning Representative Sean. Jason had always struggled with maths when in school, but wanted to improve his confidence.

"When you get older you realise numbers are important, and I couldn't do what I needed with them.

"If I got a quiet five minutes to myself I'd think, 'Let's log in, try and work something out that I struggle with at work.'

"I've changed to a better role at work and I love my job now. I feel more confident at being able to help my kids too. I'm 6 foot tall but it makes me feel 7 foot being able to help them out.

"If I can do it anyone can do it."

6. Data Source 4 in Methodology section
7. Data Source 5 in Methodology section
8. Analysis A in Methodology section
9. https://www.pearson.com/uk/educators/schools/subject-area/mathematics/the-power-of-maths.html

The Adult Numeracy Gap

Government data suggests that only around one in four (22%) working-aged adults (9.2m people) are functionally numerate – our findings support this

We need to find better ways to reach the adults who lack the confidence and skills they need (32.2m people)

Only a very small proportion of those who need support access publicly funded provision (524,100 in 2016/17)

References
Bartholomew, Dave. 'Further Education And Skills in England November 2017'. Department for Education, Education & Skills Funding Agency, 2017.
DBIS. '2011 Skills for Life Survey'. Department of Business, Innovation and Skills, 2012. https://www.gov.uk/government/publications/2011-skills-for-life-survey.
Figures based on a working-age population of 42 million.

Recommendations

We believe that there is now a real opportunity to work together to improve numeracy across the UK. Policymakers and businesses will be crucial to creating the structures and support to enable the UK to become a numerate nation.

Once this support is in place, individuals then have an important role to play in overcoming their own 'I can't do maths' beliefs. The first step is understanding that there should always be a 'yet' at the end of that statement, followed by starting to do something proactive about it. Doing so will benefit them, their families, their organisations and ultimately the UK overall.

For policymakers

1. Initiate a major new 'Fresh Start for Adult Numeracy' campaign. This could take the form of a national campaign to build confidence with numbers and encourage a growth mindset, particularly among women. This could follow the influential example of 'This Girl Can', which has encouraged more women and girls to take part in sport. As well as making a difference to people's lives, such a campaign would build firm foundations to increase UK productivity.

2. A significant proportion of the funds designed for training through the Apprenticeship Levy are currently being underspent because far too few people are putting themselves forward for apprenticeships – many, we believe, because they lack the confidence and competence with numbers and data to do so. We therefore recommend that either:

   - The Treasury ring-fences a portion of Apprenticeship Levy funding to be spent on improving numeracy. In time we believe this will lead to the improved confidence and competence with numbers needed to start an apprenticeship.

   - The Levy becomes more flexible to allow companies to spend some of the funds on numeracy training, and enable all staff to get the Essentials of Numeracy[10].

A national campaign to build confidence with numbers and encourage a growth mindset.

10. https://www.nationalnumeracy.org.uk/essentials-numeracy

"As a school maths teacher, I have seen too many young people (and their parents) experiencing maths anxiety. This can damage their long-term confidence with numbers. As a nation, we need to challenge the notion that only a certain kind of person can do maths. With the right attitude, effort and support, we can build a nation where everyone can be confident with numeracy."

Bobby Seagull
Maths teacher, writer,
Cambridge Doctorate student
and TV personality

"I am very pleased to be working with National Numeracy and welcome this report. It highlights the attitudinal and emotional barriers that can prevent people from improving their numeracy skills. Whilst further work is needed to tackle such a widescale issue, there is a consistent message within the report that emphasises where that work needs to be directed."

Dr Thomas Hunt
Associate Professor in Psychology
at the University of Derby

For employers

3. Recognise that a lack of confidence can cause stress in the workplace. A lack of confidence with numbers and data, which we know to be a particular issue among women, can prevent capable employees from putting themselves forward for development, promotion or jobs with a numerical component.

4. Engage with a national campaign to build number confidence as an opportunity to improve the strength of the future talent pipeline as well as the confidence and skills of current employees. As a first step, consider supporting National Numeracy Day on 13th May 2020.

5. Provide the support to enable all staff to get the Essentials of Numeracy using the National Numeracy Challenge; a free, online tool for anyone to check and improve their numeracy skills and build confidence with numbers, with over 270,000 people registered to date.

Enable all staff to get the Essentials of Numeracy, to improve their confidence and skills.

For everyone

6. Everyone can improve their numeracy skills, in the same way that everyone can get physically fitter.

7. Use the National Numeracy Challenge for free support and skills development to accomplish this – much like many people have used the 'Couch to 5k'[11] programme to gradually improve their fitness.

Everyone can improve their numeracy skills, in the same way that everyone can get physically fitter.

11. https://www.nhs.uk/live-well/exercise/get-running-with-couch-to-5k/

Context

It is now twenty years since the former Chief Statistician, Lord Moser, produced the government-commissioned 'A Fresh Start' report, which called for the levels of functional illiteracy and innumeracy to be halved within a decade. In the following years, strong progress was made on literacy, but adult numeracy levels worsened.

Disappointed but still determined, Lord Moser was instrumental in launching National Numeracy as a charity set up to address the numeracy problem specifically.

Since 2012, National Numeracy has sought to bring an unrelenting spotlight onto the issue, including challenging the social acceptability of 'I can't do maths'. We have found that this cultural and attitudinal barrier is huge – yet to date has largely been ignored. Learning the lessons from past initiatives addressing maths anxiety, and building confidence and a growth mindset, are central to our work. Given the scale of the challenge, providing digital tools that people can use in their own time is also essential as there are simply not enough teachers and tutors to tackle the issue.

The National Numeracy Challenge is our digital tool to address poor numeracy, and to date over 270,000 people have signed up. Alongside assessing people's skills, we have collected data on their attitudes to numeracy and their reasons for wanting to improve. This report is the first to analyse this combined dataset and we have done so alongside a YouGov survey of the numeracy skills and attitudes of a representative sample of UK adults.

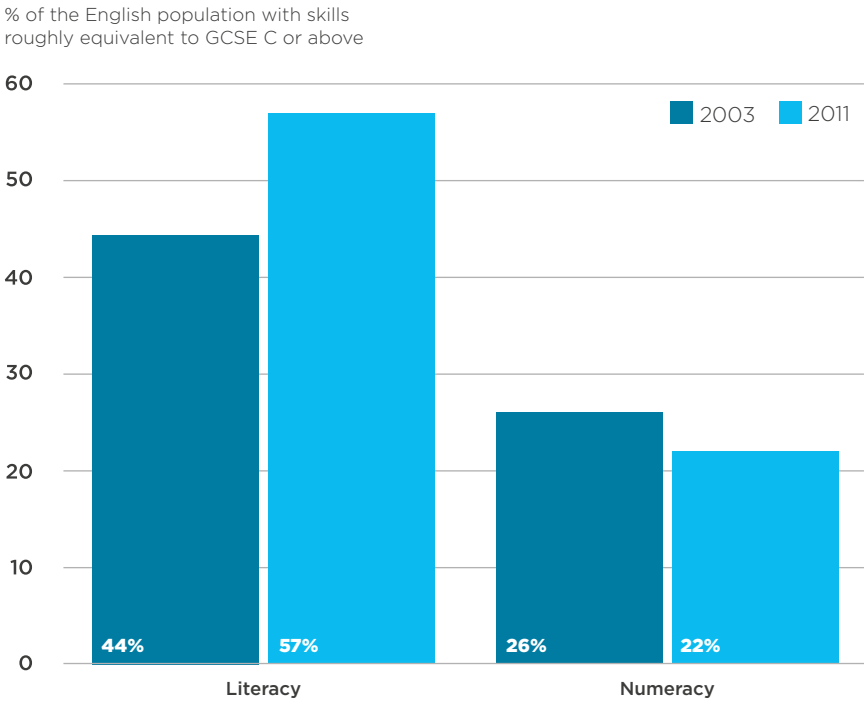
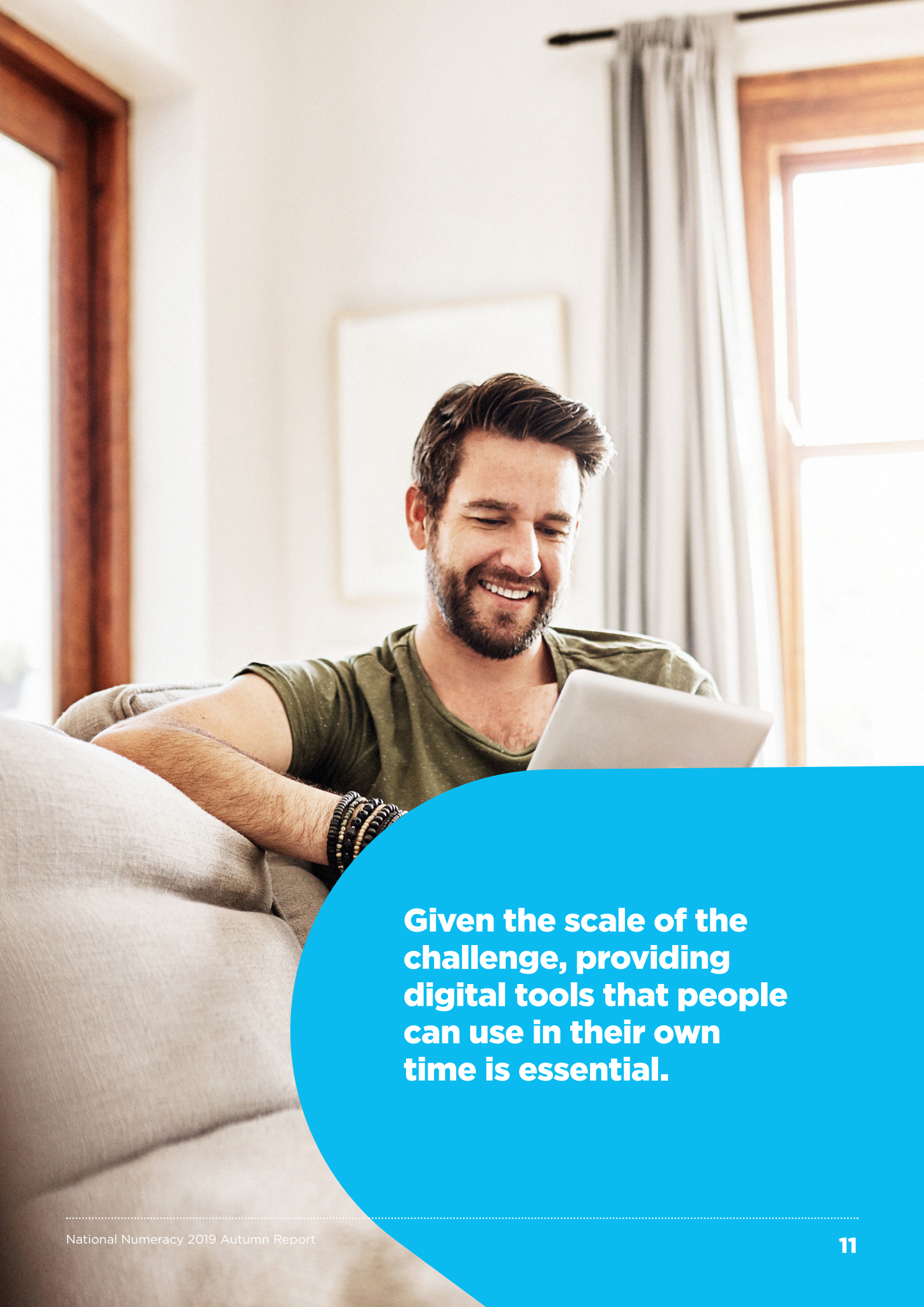


Figure 2: Adults with Level 2 skills (roughly equivalent to a GCSE pass)

Source
Department for Business Innovation and Skills. 2012. "The 2011 Skills for Life survey: A Survey of Literacy, Numeracy and ICT Levels



Given the scale of the challenge, providing digital tools that people can use in their own time is essential.

Perceptions of the numeracy issue

Earlier this year we conducted a poll of 2000 adults aged 16-75 in partnership with Ipsos MORI[12]. This included the following five multiple choice everyday maths questions. Respondents were given no time limit and were free to use a calculator or pen and paper to help work out the answers.

1. If a scarf costs £11.70 after a 10% reduction, what was the original price?

a) **£12.50**
b) **£13.25**
c) **£13.99**
d) **£13.00**
e) **I don't know**

2. Mike's lunch contains 640 calories of energy. What percentage is this of his target daily intake of 2000 calories?

a) **45%**
b) **62%**
c) **65%**
d) **32%**
e) **I don't know**

3. Rail tickets increased by 2% in year 1, and 5% in year 2. What was the overall increase over the two years?

a) **7%**
b) **7.1%**
c) **10%**
d) **10.7%**
e) **I don't know**

4. These are three offers on the same ketchup. Which is the best value for money?

a) **275g for £1.05**
b) **454g for £1.99**
c) **650g for £2.20**
d) **425g: buy two for £3.10**
e) **I don't know**

5. A laptop costs £899, including VAT at 20%. How much of the purchase price is VAT?

a) **£179.80**
b) **£89.80**
c) **£125.00**
d) **None of these**
e) **I don't know**

Answers 1: d, 2: d, 3: b, 4: c, 5: d

The results showed that 56% of respondents scored 2 or fewer (roughly equivalent to the level expected of a primary school child. This is broadly consistent with the government-commissioned Skills for Life survey (49.1%).

MPs' perceptions of the numeracy issue

Through a follow-up survey commissioned for this report, we asked MPs to estimate the percentage of people with poor numeracy (those scoring 2 or fewer on the five questions) and the cost of poor numeracy to the economy[13]. In both cases, a significant majority underestimated the seriousness of the issue. Of the 101 MPs surveyed, 83% underestimated the number of adults with numeracy skills at primary school levels. The mean average estimate was four out of ten adults with a wide spread of answers.

89% of MPs also underestimated the cost of poor numeracy to the UK economy, with the average of the estimates being £214 million, which falls short of the actual figure of £388 million per week[14].

However, once they had seen the true scale and cost of the issue, MPs were almost unanimous (99%) in supporting the need for a renewed government focus on adult numeracy.

The key question now is what form this renewed focus should take to avoid repeating the failures of the past that are displayed so starkly in Figure 2. The findings in this report, alongside National Numeracy's recent Department for Education-funded 'Flexible Learning' project, provide potential answers, which we consider in more detail in 'What we can do about it'.

12. Data Source 3 in Methodology section
13. Data Source 1 in Methodology section
14. In 2014, Pro Bono Economics estimated the cost of poor numeracy to the UK economy to be £20.2bn p.a., which is £388 million per week.

The cost of poor numeracy to the UK economy is £388 million per week. 89% of MPs underestimated this figure.

Business leaders' perceptions of the numeracy issue

We asked 591 business leaders the same questions, and in a similar outcome to the MP survey, 79% underestimated the number of adults at primary school levels[15]. The mean average estimate was almost identical to that of the MPs (four out of ten adults), with a similarly wide spread of answers.

We also asked business leaders to estimate the cost of poor numeracy to the UK economy. Overall, business leaders very significantly underestimated the cost of poor numeracy to the UK economy at £7 million per week compared with the actual figure of £388 million.

Again, once the true scale and cost of the issue was revealed, more than 90% of business leaders surveyed supported a renewed focus on adult numeracy by both government and employers. We have captured and represented the reactions of business leaders when the true levels of numeracy were revealed to them in the word cloud opposite.

Given that this is a hidden and underestimated problem, it is unsurprising that poor staff numeracy has not – yet – been identified or addressed. We hope that the findings here provide support for a new, and well-targeted, business and government focus on this issue.

Elements of the NHS provide a potential model to follow. In a few leading NHS trusts, there is a clear recognition that numeracy levels are low, which may impact on patient safety, efficiency, recruitment and progression. There is also growing recognition that a lack of confidence with numbers and data is one of the underlying causes of stress among staff, and that addressing this can increase staff wellbeing, which in turn improves patient care. Our work there has shown that numeracy levels in the NHS unsurprisingly reflect the national picture with around half of those surveyed at the equivalent of primary school levels, and three-quarters below the level that the government deems to be 'acceptable'. People who engaged via our programme improved their numeracy relatively rapidly (over a six-month period). Our programme focuses first on shifting attitudes, and then on using our digital tools to brush up skills, with **no face-to-face maths teaching**. This is vital for scalability and is complementary to existing government-funded provision, which is orientated towards gaining qualifications (rather than 'just' improving confidence and skills).

There is nothing to suggest that this national picture is not mirrored in most private sector workplaces, with a lack of confidence with numbers and data preventing capable people, particularly women, from putting themselves forward for development, promotion or jobs with a numerical component, with the resultant – currently hidden – impact on productivity. We want to work with all employers to enable all staff to build their confidence and competence with numbers and data and thereby get the Essentials of Numeracy. We believe that providing staff with training to improve their numeracy skills would be an excellent use of the Apprenticeship Levy underspend that has resulted from too few coming forward for apprenticeships.

More than 90% of business leaders surveyed supported a renewed focus on adult numeracy.

15. Data Source 2 in Methodology section

Representation of business leaders' reactions to numeracy levels in the UK

Numeracy skills findings

As outlined in Figure 3, the latest government survey of adult skills shows that only around a quarter of adults have 'acceptable' levels of numeracy, as defined by the government since 2010, and around half are at the level expected of a primary school child. This is in stark contrast to adult literacy, where the levels are much higher.

In the survey of a representative sample of the UK population conducted for this report[16], we found a broadly similar pattern, which is also in line with our own Challenge data[17], as well as the Ipsos MORI poll from earlier this year[18].

There are some striking findings relating to age and gender within this latest survey, which are consistent with previous work but are still not well-recognised:

- Older age groups have better numeracy skills up to the age of 54. Skills are then slightly lower among the 55-64 age group.

- There is a consistent gender gap.

While the specific implications of these findings for the education system are beyond the scope of our report, they continue to raise questions about the effectiveness of maths education in the UK. The system is still letting many people down, particularly women. International data shows that many countries have a 'legacy' gender gap among older people, but most are closing this faster than the UK with some countries, such as Denmark and Poland, closing it completely[19].

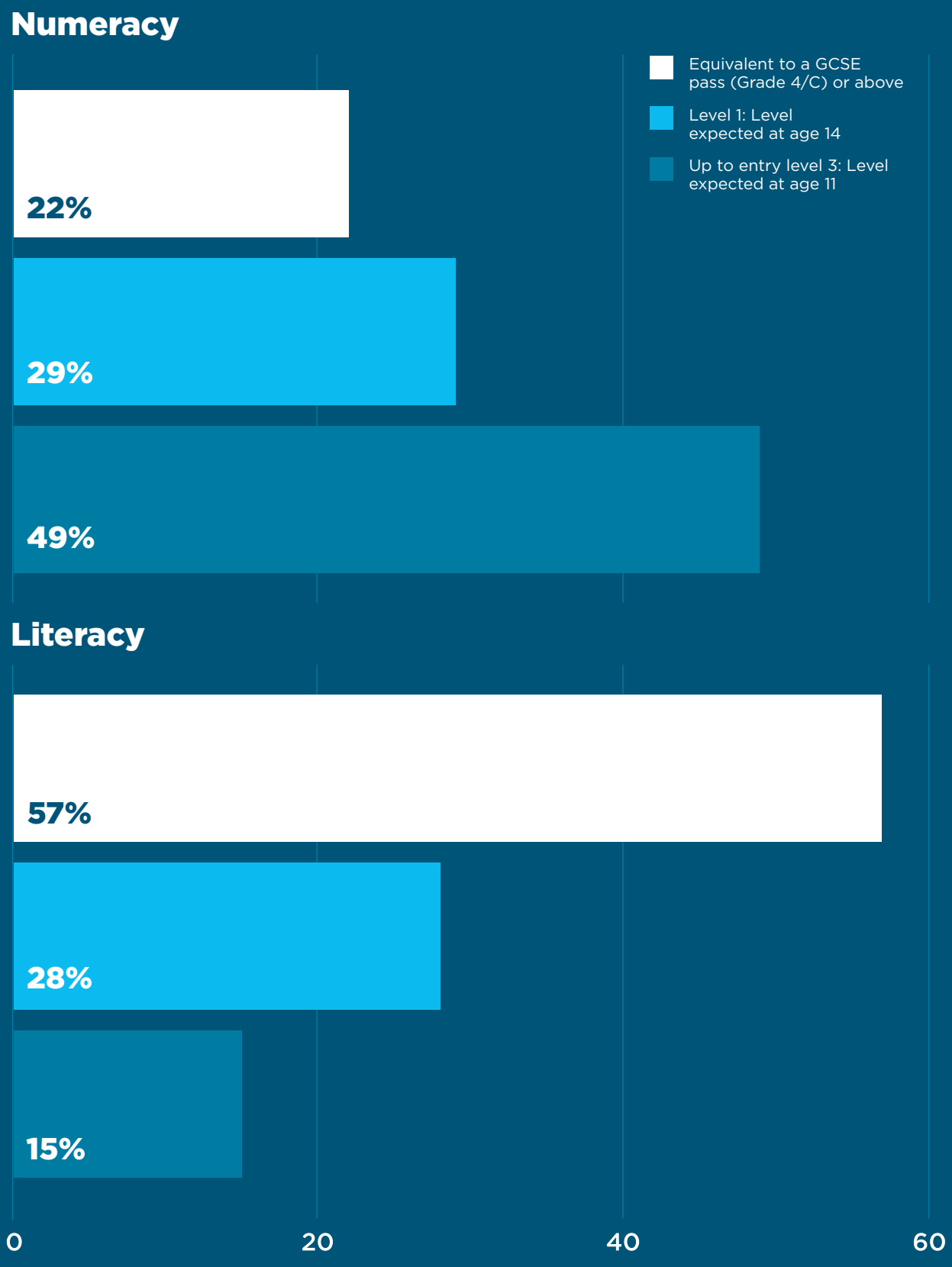
There is also a clear link between numeracy and income: on average people with a basic level of numeracy (post-primary school) earn 26% more than those without, with a residual 9% even when all other socio-economic factors such as education level are removed[20]. Given the gender gap and the wage premium for numeracy, improving outcomes for women in relation to numeracy could play a part in narrowing the gender pay gap in the UK, which currently stands at 17.9%.

The findings in the next section, along with evidence from both the compulsory education system and from adult education, suggest that improving numeracy levels for men and women will depend more upon shifting attitudes to numbers and data than on the current focus on teaching people how to do long division or some other mathematical procedure.

There is a clear link between numeracy and income; on average people with a basic level of numeracy earn 26% more than those without[20].

16. Data Source 4 in Methodology section
17. Data Source 5 in Methodology section
18. Data Source 3 in Methodology section
19. OECD. 'Skills Matter: Further Research from the Survey of Adult Skills'. Text. Skills Studies. Paris: OECD, 2016. The score differences between men and women at 16 – 24 years' old is 2.1 and 0.2 in Denmark and Poland respectively, while the UK's remains at 12 – nearly double the OECD average.
20. Bynner, J. and S. Parsons. 'New Light on Literacy and Numeracy: Full Report'. Other. National Research and Development Centre for Adult Literacy and Numeracy, 2006. http://discovery.ucl.ac.uk/1566244/

Figure 3: The difference between adult literacy and numeracy levels



Source
Department for Business Innovation and Skills. 2012. "The 2011 Skills for Life survey: A Survey of Literacy, Numeracy and ICT Levels in England."

Attitudes to numeracy

Potential barriers to improving

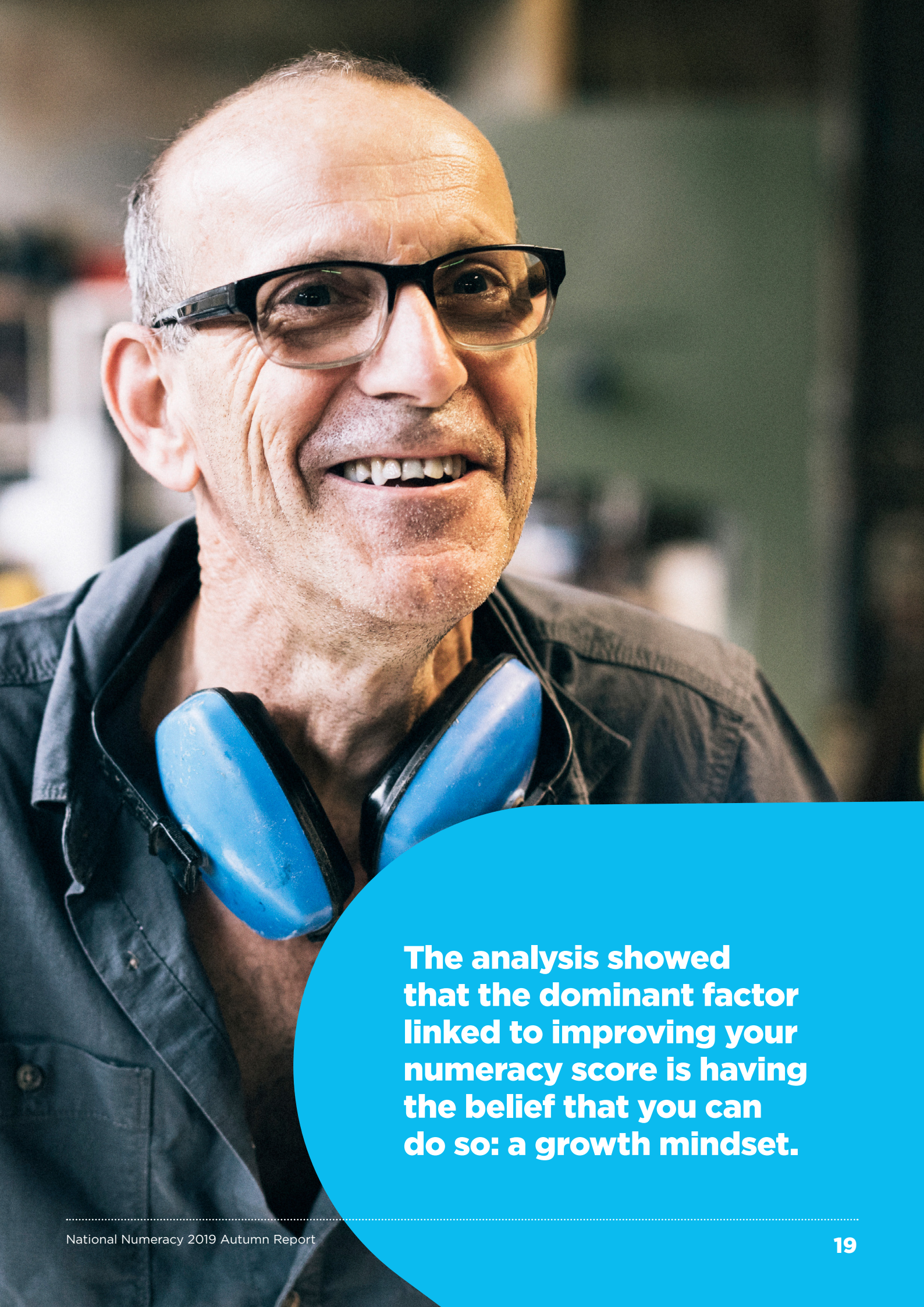
In 2017 National Numeracy developed a psychometric assessment to formally evaluate the potential barriers to improving numeracy.

Through an item-reduction process, linking attitudinal responses to numeracy scores and improvement data, seven discrete factors emerged.

The responses to the questions for each of these factors were combined with responses to the numeracy skills questions in the YouGov survey[21] to explore the respective predictive power of each.

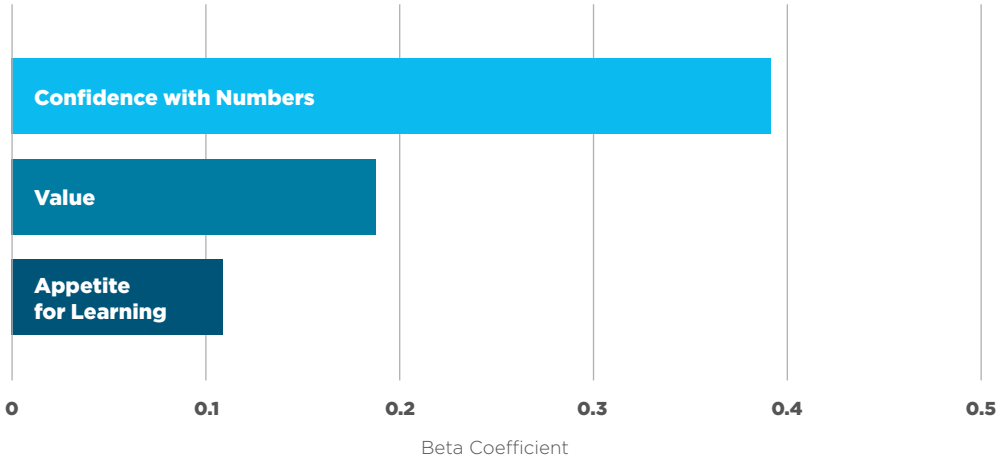
1. Self-confidence	Having confidence that you can deal well with unexpected situations which arise.
2. Confidence with Money	Believing in the importance of budgeting, being happy with your approach to budgeting, feeling in control of and finding the time to sort out your finances.
3. Confidence with Numbers	Being comfortable with situations that involve numbers and data.
4. Appetite for Learning	Have an enthusiasm for learning new things.
5. Value	Seeing the value of numeracy skills in daily life and the workplace.
6. Belief	Feeling that you are able to improve your numeracy skills.
7. Persistence	Sticking with things (not just improving numeracy skills) until you reach your goals.

21. Data Source 4 in Methodology section



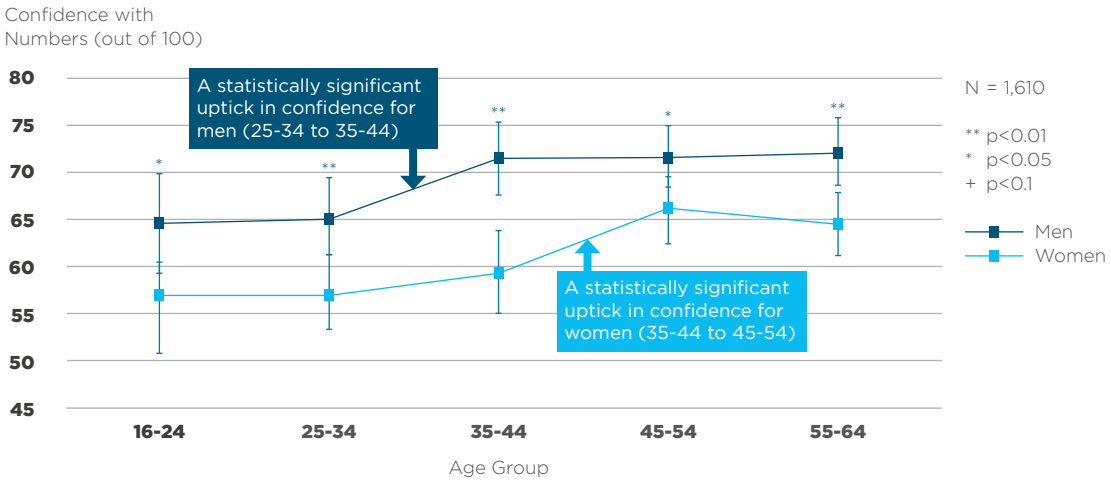
The analysis showed that the dominant factor linked to improving your numeracy score is having the belief that you can do so: a growth mindset.

Attitudinal factors as predictors of skills



Regression analysis[22] of the YouGov data conducted by Dr Tom Hunt at the University of Derby shows that the dominant factor linked to numeracy score is Confidence with Numbers (or absence of maths anxiety). Other factors that were strongly correlated with skills were Value and Appetite for Learning.

Confidence with Numbers – age and gender



Along with the finding that Confidence with Numbers is the dominant factor overall, the survey[23] shows that confidence is particularly low in women, across all age ranges. The data is not longitudinal (i.e. not following an individual over time) but it does reveal a clear upward shift in confidence for certain age groups and shows that these are different for men and women. This needs further investigation but may relate to grappling with the numbers and data associated with making decisions at significant life moments.

However, it is important to recognise that alongside numeracy skills, confidence with numbers is higher amongst those who are further away from the education system and that there is a clear gender divide.

22. Analysis A in Methodology section
23. Data Source 4 in Methodology section

"The myth of talent prevents millions of people from fulfilling their potential and 'I can't do maths' is a particularly problematic manifestation. I share National Numeracy's belief that we have the potential to become a numerate nation – if we can bring a focus onto challenging the myth of a 'maths gene'. This starts with a seemingly small shift: from 'I can't do maths' to 'I can't do maths yet'."

Matthew Syed
Journalist, broadcaster and best-selling author of *Rebel Ideas* and *You are Awesome*

"Far too many people have a broken relationship with maths – and this becomes a barrier to them realising their potential in the rest of their lives. It is great to see that National Numeracy's work, particularly in the NHS, is starting to enable people to overcome this. Policymakers please take note!"

Jo Boaler
Professor of Mathematics Education at Stanford University and co-founder of YouCubed

Attitudinal factors as a predictor of improvement

Unlike the YouGov survey[24], through the National Numeracy Challenge dataset[25], we were able to analyse not just the static link between skills and attitudes, but also which factors were most closely correlated with people improving their numeracy skills score. The analysis[26] showed that the dominant factor linked to improving your numeracy score is having the belief that you can do so: a growth mindset. There has been a growing body of work around this phenomenon in recent years, led by Carol Dweck and Jo Boaler at Stanford University in the US.

Dweck's research emphasises that if we want to learn something, we need to believe it is possible. Maths is the most common area for people to have a fixed mindset; believing that they either do, or don't, have a maths gene and that there is nothing they can do about this. There is now an overwhelming body of evidence to show that any genetic element is very small. Therefore, the belief that you have the potential to improve, i.e. moving from 'I can't do maths' to 'I can't do maths yet', is crucial for any improvement to take place. Our findings here are in keeping with this.

No one has made more progress in dispelling the deeply damaging idea that maths ability is an innate quality that a person either does or does not have, than Jo Boaler. Her work applies the latest research into neuroscience and brain plasticity as well as growth and fixed mindsets into the maths domain, demonstrating how our brains respond to new maths challenges by growing and building new pathways. She has demonstrated that a child's attainment is not linked to their parents' maths attainment but instead to their parents' levels of maths anxiety, and also that our mindset can shape our cognition. The attitude and lens through which we view a problem (fixed or growth mindset) changes our level of brain activity. When we believe we are able to improve, our brains fire extra synapses to learn from our mistakes. Moreover, through a range of case studies, she has demonstrated that whatever a person's starting point everyone is able to improve their numeracy – many to a far higher level than might be supposed.

24. Data Source 4 in Methodology section
25. Data Source 5 in Methodology section
26. Analysis B in Methodology section

What we can do about it

Breaking down the barriers to becoming a numerate nation

The findings here provide further evidence that a different approach is needed if we are to break down the barriers to the UK becoming a numerate nation.

We believe that everyone can be numerate – in other words, successfully answer the kind of questions provided in the poll – but that to achieve this we need to do a better job of enabling everyone to build what is sometimes described as 'mathematical resilience'[27]. This involves seeing the value of learning, believing that improvement is possible (building a growth mindset as outlined previously) and then persevering, recognising that everyone struggles in order to succeed.

The analysis of the data from the National Numeracy Challenge provides clear evidence for the importance of a growth mindset if people are to improve. In addition, it also provides strong underlying evidence of the other two factors due to the self-selecting nature of the dataset. We only have data on people who have chosen to engage with the Challenge in the first place, have completed an initial Check-Up to get a baseline score and have then repeated this for at least a second time. People who do not value numeracy are already filtered out; they won't engage with this process[28] and people who do not persevere will not complete the Check-Up once, let alone a second or third time.

Our work in the NHS has provided the first opportunity to override this self-selection; a few enlightened trusts have built the Challenge into existing staff development programmes such as the Care Certificate for healthcare assistants. Among these groups, which are predominantly made up of women, we have seen many people significantly improving their skills. The numbers are still small at the moment, but we have worked with cohorts in which every learner who has needed to improve their numeracy has done so. In a few cases all staff achieved the Essentials of Numeracy; one example is displayed overleaf, where their average score rose from 64 to 95.

In an analysis of the data from the National Numeracy Challenge, a growth mindset was found to be the biggest single factor in determining improvement.

27. Johnston-Wilder, Sue, and Clare Lee. 'Developing Mathematical Resilience', 16. University of Warwick, 2010.
28. Analysis C in Methodology section

Figure 4: Schematic used to highlight the importance of the value, belief and persistence concept

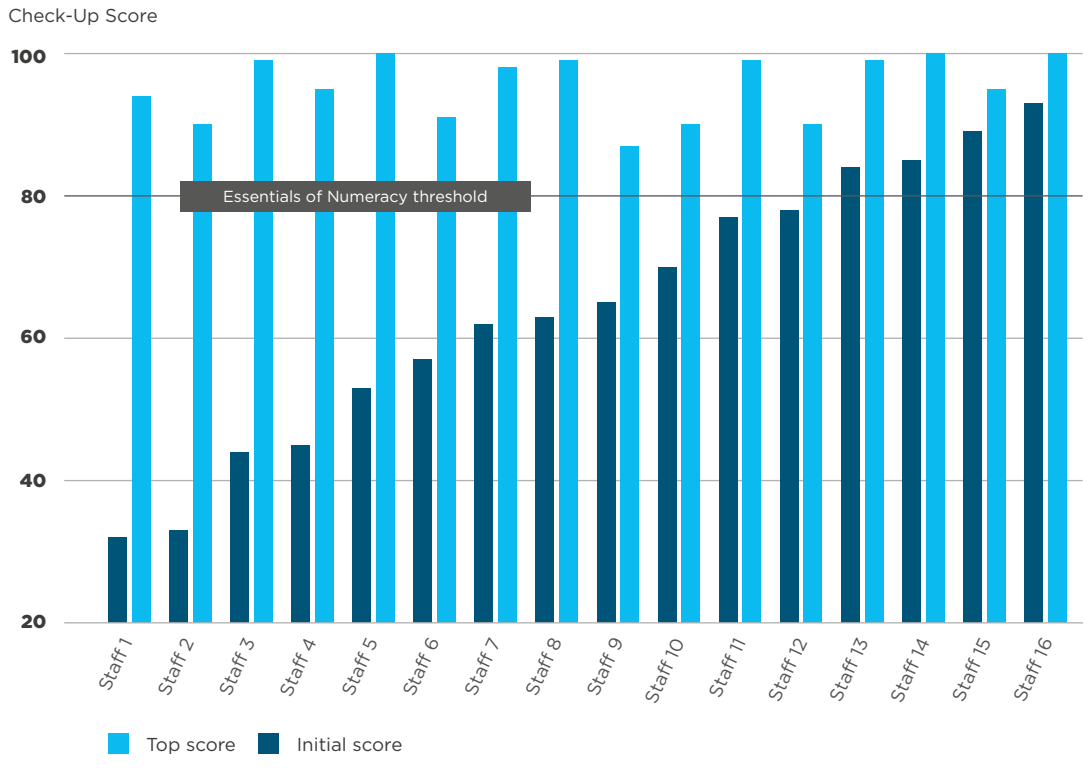
These participants improved their numeracy relatively rapidly having followed our attitudinally-led approach, and then used our digital tool to check and improve their numeracy, over a six-month period. Our work suggests that skills-based initiatives are unlikely to work if the people involved don't believe they can improve; the attitudinal dimension needs to be addressed first and in parallel with skills support, which for many can be digitally delivered. This is vital for scalability and the Apprenticeship Levy underspend is a potential source of funding to enable this. If successful, this would lead to more staff building the confidence and competence with numbers and data needed to embark on an apprenticeship – which in time would absorb the current underspend and start to achieve the government targets for apprenticeships.

At National Numeracy, we are actively trying to reach the millions of adults who would benefit from improving their numeracy but are not being supported to do so currently by their employer. However, having reached a quarter of a million out of the approximately 30 million who could benefit from improving their numeracy, we have only scratched the surface of the issue. That is why we are now calling for a national awareness raising campaign to reach the additional 29+ million people who could benefit from this support.

Through a national campaign, we believe that there is now a real opportunity to work together to address this hidden issue that is holding the UK back. Policymakers, businesses and individuals themselves all have a role to play in enabling the UK to become a numerate nation.

National Numeracy Day on 13th May 2020 is the next major opportunity to raise awareness of the importance of improving numeracy and confidence with numbers. We call on businesses and government to support the day.

Staff Development Programme



We believe that there is now a real opportunity to work together to address this hidden issue that is holding the UK back. Policymakers, businesses and individuals themselves all have a role to play in enabling the UK to become a numerate nation.

About the organisations

TP ICAP

TP ICAP is a global firm of professional intermediaries that plays a pivotal role in the world's financial, energy and commodities markets.

Operating through our core businesses, Tullett Prebon, ICAP, PVM, Coex Partners, Tullett Prebon Information, ICAP Information Services and PVM Data Services, we create strong networks in person and through technology. We provide comprehensive analysis and insight into market conditions and long-term trends. We combine data, knowledge and intelligence into contextual insight and commercial guidance. By engaging with our clients, and providing innovative products and services, we enable our clients to transact with confidence, facilitating the flow of capital and commodities around the world, enhancing investment and contributing to economic growth.

Our values of honesty, integrity, respect and excellence underpin everything we do.

National Numeracy

National Numeracy is an independent charity established in 2012 to help raise low levels of numeracy among adults and children across the UK, and to promote the importance of everyday maths skills. It aims to challenge negative attitudes and encourage effective approaches to improving numeracy both within the education system and more broadly within the community. Where possible, it works in partnership with other organisations.

National Numeracy Challenge

The National Numeracy Challenge is a free, online service to enable everyone to check and improve their numeracy skills and build confidence with numbers. Over 270,000 people have registered to date.

National Numeracy exists to enable everyone to become confident and competent with numbers and data so that they can make good decisions in their daily life.

Methodology

Data Sources

There are multiple data sources that we have analysed to produce this report:

1. YouGov survey of a representative sample of 101 MPs (September 2019) to gain insight into their evaluation of the scale and cost of the numeracy issue.

2. YouGov survey of 591 senior decision makers (September 2019) to gain insight into their evaluation of the scale and cost of the numeracy issue.

   All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 591 adults. Fieldwork was undertaken between 23rd - 30th September 2019. The survey was carried out online. The figures have been weighted and are representative of British business size.

3. Both of these surveys in turn referred to an Ipsos MORI poll we conducted of the nation in May 2019 of over 2000 adults aged 16 to 75 in the UK to assess levels of numeracy among the public and explore attitudes towards maths and numbers.

There is a larger analysis piece that forms the final two sections of the report, titled 'Attitudes to numeracy' and 'What we can do about it', which comprises two data sources:

4. YouGov survey of the nation (c.2000 people aged 16+) (September 2019), designed to replicate a short version of in-house numeracy assessment, plus the attitudinal survey.

   All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 2,172 adults. Fieldwork was undertaken between 10th - 11th September 2019. The survey was carried out online. The figures have been weighted and are representative of all UK adults (aged 16+).

5. Our own data from National Numeracy Challenge users which we have cut in 3 ways:

   a. The whole user group (c.250,000 users).

   b. The c.55,000 users that answered the attitudinal part of our tool as well a baseline assessment of their numeracy level.

   c. Specific groups of health sector cohorts.

Analyses

A. On two data sources, (4) and (5)(b), we performed a regression analysis in order to ascertain the factors that best 'predict' a person's numeracy score.

B. We also conducted a logistic regression on data source (5)(b) to ascertain the factors that best predict improvement.

Both these analyses were conducted by Dr Tom Hunt, Associate Professor in Psychology from the University of Derby.

C. Finally, because of the self-selecting nature of Challenge data, we needed to conduct a comparative analysis to compare and contrast the Challenge data (5)(b) and YouGov UK data (4) in order to ratify our logistic regression findings (B). We did this by performing a battery of t-tests of comparable cuts of the two data sources and identifying key elements of similarity and difference. This last piece was conducted internally by Paul Foss, our data analyst. The approach and findings were ratified by Jenny Thomas, a member of the Royal Statistical Society.

For our full appendices visit
www.nationalnumeracy.org.uk/numerate-nation

“National Numeracy is making commendable steps to raise awareness of this crucial issue, but they can’t tackle this problem alone. Creating a truly number-confident nation will require much wider, collective support.

We call on everyone to join us in helping to change millions of lives for the better.”

Nicolas Breteau
Group Chief Executive
TP ICAP plc

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