Department for Business Innovation & Skills

MINDSHARE

Project STEM

BOOK OF INSIGHTS

2014

Research with young people, their parents and teachers

CONTENTS

ABOUT THIS BOOK

In this book we describe young people's attitudes, beliefs, motivations and behaviours that affect their decisions on subject choice and career paths to add depth to the current understanding of how they perceive STEM careers.

This book brings together **four** phases of research activity with young people, namely; **qualitative, social listening, co-creation** and **quantitative research activities** that ran between February and March 2014.

It follows a knowledge and scoping phase that laid the foundation for the research design and approach of the above mentioned research activities.

Prior to this book of insights we carried out:

i. A thorough **review of existing research** on STEM.

ii. Heard feedback and hunches from a session held with **stakeholders** on 12 December 2013.

iii. **Depth interviews** with **career advisors** to fast track understanding of how young people make career decisions.

iv. Qualitative sessions with **STEM professionals** to determine the motivations and barriers they experienced in their learning journey and to identify the influences and critical ages when they made decisions.

In the qualitative phase, we spoke to young people aged 14-17 years (separately as year 9, year 11 and year 12/FE college years) from a wide range of social and educational backgrounds, through the lens of understanding their attitude to STEM as a career path. We interviewed parents and teachers to understand the influential role they play in young people's career choices.

To complement the qualitative research, we listened to young people's social media conversations to understand their sentiment towards STEM careers and subjects.

Our co-creation sessions with young people served to validate and probe further their career ambitions as well as to inform the development of communications that would resonate with young people.

The final research activity was an online quantitative survey with a sample of 2280 teenagers that ran on the 24th to 28th of March 2014. This final phase provided a quantifiable complete picture of their attitudes, behaviours and perceptions of career choices and a baseline measure to track intervention effectiveness.

WHO WE SPOKE TO

We interviewed friendship pairs and quads of young people in year 9 and year 11, ages identified as the key decision making points from the previous research phase with STEM professionals.

Throughout this report we will refer to high and low support young people, parents and teachers.

By high support we mean: Young people who attend schools where over 80% of pupils go on to higher education AND the school received an Ofsted grade of 'outstanding' or 'good' in the last two years. And have parents/guardians in ABC1 SEG who have had a higher education.

By low support we mean young people who attend schools where less than 60% of pupils go on to higher education and the school received an Ofsted grade of 'inadequate' or 'requires improvement' in the last two years. And have parents/guardians in C2DE SEG who have not had a higher education.

Low or high support teachers refers to the Ofsted grading of the school they teach at.

Further details of the sample mix can be found in the appendix.

Attitudes and mindsets

01

This section describes attitudes and mindsets that define today's generation of **14 to 17 year olds** across England. Although the research was designed through the lens of STEM, the insights uncovered have much broader implications. They provide the wider context in how we communicate with young people in 2014.

Sense of inner potential
Self centric not self centred
Risk aversion lowers ambition
It must work now
Passengers not drivers
Users not creators
Geek not so chic
Parents first line of influence
Celebrities are still inspirational
Secure and stable

01

SENSE OF INNER POTENTIAL

Young people feel they have ideas, but it's external conditions that prevent them from realising their potential.

"I'm thinking about being a photographer, but I know someone who did that at uni and really struggled to get a job, so I'm thinking about what I could do instead."

Girl 16, High Support, London

Young people tend to have an internal sense of potential. They all feel they have "ideas" and something to offer in life.

However, as they progress through their school career, external factors such as their perception of the job market, their exam grades, as well as social and gender expectations means their sense of potential all too often gets dampened and doesn't translate into active ambition for their future.

"I want to be a film producer but I do worry about if I'll get a job at the end of it. You don't want to have done all that work to find there are no jobs."

Boy 16, High Support, London

01

SELF-CENTRIC NOT SELF CENTRED

With limited life experience it's hard to see beyond a narrow world view

"I want to help people. You see people doing that - like the police – that's what I mean by helping people."

Girl 18, Low Support, Birmingham

For most young people, connection to the wider world and its issues is somewhat limited. Although interested in travel, their 'world' very much focuses on them, their peers and their family. It is through this lens that they mostly view opportunities and interests.

Their views on careers are often limited to what they know or have experienced and they discuss having impact on those close to hand. Young people do not readily consider the more far-reaching affect across society they could have. Focussing on the potential that their actions could have a wider impact on the world can feel daunting and overwhelming.

"My sister, my cousins they are all doing media so I think I am going to do that."

Girl, 13, High Support, Newcastle

01

RISK AVERSION LOWERS AMBITION

Unforgiving online culture amplifies fear of failure

“ The teachers are always saying that you need to do well to get on, they are giving us tests all the time. ”

Girl, 13, High Support, London

“ Our lives really depend on it – getting the marks and that will impact on the lifestyle that we can have when we are older. ”

Girl, 14, High support, Yate

There is this constant pressure from parents and teachers on young people to get the right results and qualifications so they can get a decent job.

With their lives indelibly documented and projected online, they perceive their failures are on display for their friends and peers to see.

As a result their ambition to find an interesting and fulfilling career path conflicts with the strong consideration that their chosen subjects must be achievable and ultimately lead to a guaranteed job at the end.

RISK AVERSION
LOWERS
AMBITION

For
77%
doing well in exams was one of the biggest things they worry about.

The pressure starts at an early age.

77% of 13-14 yo
rising to

81% of 15-16 yo
but dropping to

72% of 17-18 yo.

01

IT MUST WORK NOW

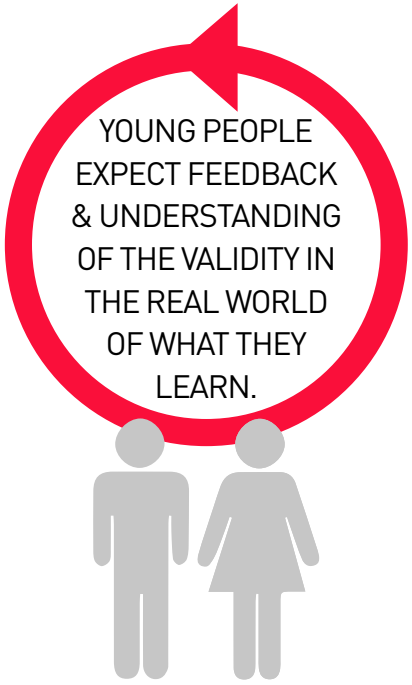
Instant gratification and the expectation for everything to work immediately

> "You get...why do I have to do algebra? Nobody ever does that. Why do I have to do fractions? Everybody uses decimals and calculators now."

Teacher, High support, Birmingham

> "If I knew why it was useful, I'd do it."

Boy 14, Low Support, Newcastle



Young people expect instant feedback in their lives. This is rooted in the technology that surrounds them which gives instant access to information and computes things fast.

This attitude manifests itself in several ways. Young people expect to see the results of their efforts immediately and they expect to see how things can be applied in the real world. They get frustrated and lose interest fast if they do not understand something and do not see the relevance of the subjects they learn.

Again the expectation for immediate results runs contrary to STEM and other subjects, where ideas and innovations are developed through a process of iteration and discovery.

82%

agree with statement

"I find it easier to learn stuff I think I'll use when I start work"

01

PASSENGERS NOT DRIVERS

Young people often shy away from the prospect of responsibility or shaping the future

"It's always a real struggle for many when they are tasked with developing their own coding project from scratch."

Computing teacher, Newcastle high support

"I don't want to be responsible for it all – what if it goes wrong or I don't do it right."

Girl, 14, High Support, Bristol

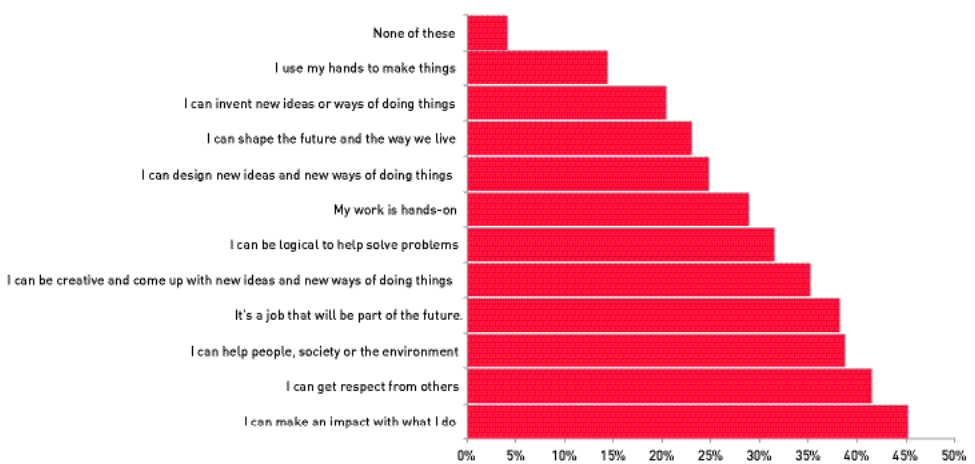
For many young people (particularly at the young end of the sample) the consideration that they could make a difference in the future felt daunting.

Personal responsibility for many felt overwhelming and 'hard' - potentially turning them away from considering some careers. For example, when presented with job descriptions where a person was personally responsible for something large, there was concern that this would be difficult. Instead young people are more drawn to opportunities where there is **shared responsibility**, i.e. working as part of a team.

Similarly - although interested in the future, the notion of creating it can feel hard and daunting for young people. The idea of being the one that could create the new game-changing piece of technology or do something to change the future was not always readily engaging. They want to contribute to innovations but cannot see themselves creating them.

PASSENGERS NOT DRIVERS

Which, if any, of the following are important to you? I want a job where...



23% want jobs where they can shape the future and the way we live

45% want to make an impact

42% want a job that earns respect from others

01

USERS NOT CREATORS

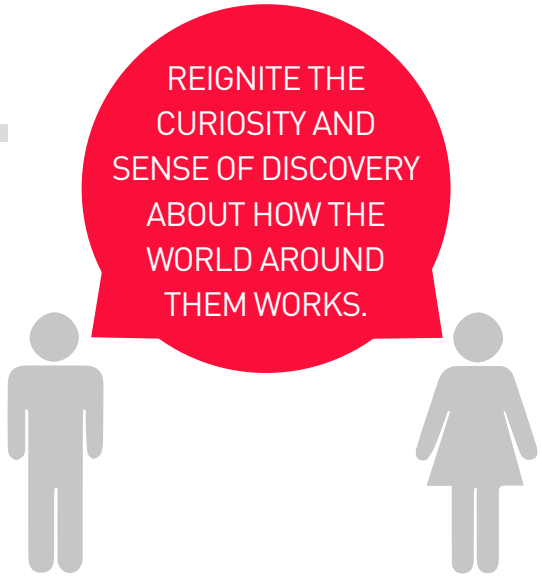
Technology valued for its utility, without questioning how it works

"I'm not that interested in technology, I like having the latest phone, that's about it."

Girl, 13, Low Support, Newcastle

"Technology has gone as far as it can go."

Girl 17, Low support, Newcastle



This is a generation that takes technology for granted. They value it's functionality and role in their lives, above most things, however there is less curiosity into how and why it works.

Genuine digital natives - today's 16 year olds have been exposed to iPhones since they were 11, Twitter since they were 10 and YouTube since they were 9. However they lack curiosity into what goes on under their phone cover, or behind their computer screens – and with modern technology being so inaccessible, this is understandable.

Similarly, the majority can only see how the technology around them affects them on a personal level and not at a macro scale, with a good proportion believing we have already seen the pinnacle of technological achievements.

01

GEEK NOT SO CHIC

Attitude towards intelligence differs by gender, age and support level

"Geek is the wrong word. But they tend to keep their heads down."

Teacher, Low Support, Birmingham

"It's ok to be good at something. As long as you don't boast about it."

Girl, 17, Low Support, Birmingham

The negativity associated with being a "geek" starts to emerge in years 8 and 9 when pupils have settled into secondary school life.

As young people progress through school, ability and intelligence becomes a clear way that they are defined. For lower achievers, their views on higher achievers are mixed. There is some respect for those that are brighter than them with a recognition that things come easier to them and in some ways a wish to be more like them.

However, there is a perception that a proportion of those higher achievers are less 'social' (i.e. very focused on school work) which generates a more negative perception of boring, dull, obnoxious and boastful – things that they don't want to associate with.

"It's cool to be smart, it's just really hard."

Boy 16, High Support, London

GEEK NOT
SO CHIC

54% of high support **vs** **45%** of low support

believe being intelligent earns their respect.

55% of 17-18 yo

vs

44% of 13-14 yo

believe being intelligent earns **respect**.

01

PARENTS FIRST LINE OF INFLUENCE

Young people respect their parents' achievements and are happy to be influenced by them

> "My mum never got to go to uni, she leads me onto the path that I should go, I listen to her."
>
> *Girl, 13, High Support, London*

> "My Dad has got a hands-on job. He's been there, so he can help me choose."
>
> *Boy 16, Low support, London*

Many young people, whether high or low support, see their parents as role models. They see their parents as resources to help them get established. They'll ask them for advice regarding subject and career choices.

Some lower support young people may look to follow more directly the footsteps of their parents in terms of career choice but in general parents are the sounding boards for the choices young people make.

However, parents often have limited knowledge of the opportunities available to their children, and although they almost universally only want what's best for their children – they can have "out of touch" gender stereotype views which hold them back.

PARENTS FIRST LINE OF INFLUENCE

13-14 yo are more likely to turn to their parents than 17-18 yo.

20% VS. **14%**

Higher support young people are more likely to turn to their parents than low support.

18% VS. **13%**

Low support are more likely to head to a career advisor than high support teenagers.

34% VS. **29%**

01

CELEBRITIES ARE STILL INSPIRATIONAL

They act as role models of aspiration and inspiration for young people

"Alan Sugar, he worked hard to get what he got."

Boy,16, Birmingham, High support

Famous business people are admired for the hard work that made them successful. For boys in particular, there is a desire to follow passions and be like their sporting heroes.

Famous actors were also aspired to, as well as celebrities linked to fashion, particularly for girls.

There is huge potential to use celebrity role models to promote certain career areas and inspire ambition, however, particularly for young people, the "cool" celebrity landscape changes at a dramatic rate so ensuring the role model is current is key.

01

SECURE AND STABLE

The post recession generation want a stable future for themselves and their family

> “ I do worry if they end up in a niche job that has no future, I mean look what happened to his dad, he was a miner. ”

Parent, High Support, Newcastle

> “ Not having to worry about being out of a job and being in debt that’s what’s important to me. ”

Boy, 13, High Support, Birmingham

Almost without exception young people crave stability for themselves and their families. The common aspiration regardless of background was that young people wanted to provide a safe and stable home for their family.

For some the need to provide stability was more pressing owing to struggling family circumstances. Low support pre-GCSE students would talk of the need to provide for their family. An indication of the tension they already feel of finding a career path they enjoy and being able to contribute to their family’s income.

High support young people also felt the need for a career that offered stability. Having seen their parents and older siblings experience the recession, young people even at 13 years old place stability and avoiding debt as a priority for their future career.

Career goals and ambitions

This section describes the motivations, aspirations and considerations young people have when considering life after education.

02

Opportunity for success
Wanting to make a difference
Following their passions
Practical not theoretical
Passengers not drivers
All work and all play
Money is important but not critical
Fear of boredom – challenge me
University is not the only way
Creativity: motivator and barrier

02

OPPORTUNITY FOR SUCCESS

For young people success is about recognition not power

“ I want to be fairly high up and important. ”

Girl, 16, High Support, London

“ I want to be a leader, I don’t really want people telling me what to do. I want to be able to lead. ”

Girl, 16, High support, London

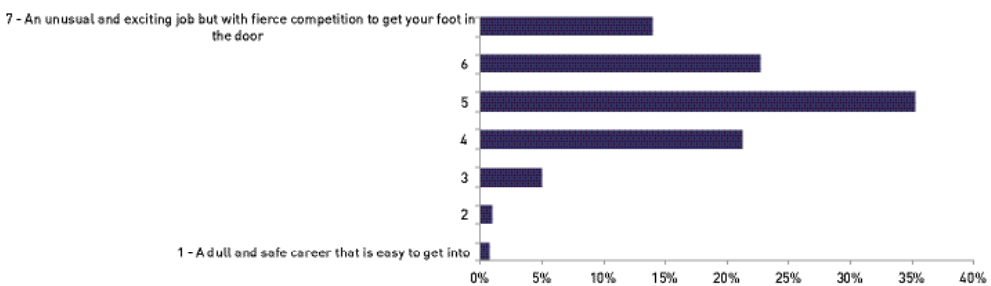
For young people success in their chosen field is something that they naturally aspire to.

Although all want to achieve a secure and stable career, for some it was also important to go beyond that and achieve notable success and responsibility either through promotion and leadership or by creating their own business. Both low and high support young people wanted to be successful, but it was more frequent that those from a high support background talked about ‘being high up’ in their jobs.

Achieving success was about recognition, as well as personal achievement and accomplishments. Recognition from their parents and peers that they had made it.

Becoming successful is about building self-confidence, a way of knowing that they were doing a good job and that they were proud of the work that they had done.

I see myself aiming for...



6% of boys **vs.** **4%** of girls see themselves high up and running a team by their mid-twenties.

72% to some extent still want to aim for a job that is unusual and exciting despite potential fierce competition.

WANTING TO MAKE A DIFFERENCE

02

Young people want the opportunity to help others and society in their career

DOING GOOD NEEDS A RANGE OF MESSAGES TO CAPTURE DIFFERENT EMPHASES

"I want a job that isn't self-centred, I like the idea of making people happy. If I am doing a job that is helping people, that is really rewarding."

Girl, 14, Low support, London

For some young people the opportunity to 'make a difference' was considered important in their career choices.

The definition of making a difference was broad ranging. For some it tended to be about 'helping others', but for others it was about wanting to 'make a difference' in their community. This was often considered on a one to one or community level (helping individuals in need) rather than on a more broader scale, global scale. It was considered that this type of work was hugely rewarding and satisfying. Focus of careers for these individuals tended to be around public services.

For a confident minority it was about making more of a societal impact and leaving a legacy.

"I like the idea of leaving a legacy – or making my mark."

Girl, 16, High support, London

WANTING TO MAKE A DIFFERENCE

18% see themselves in a job where they are helping people.

22% of girls

vs.

14% of boys

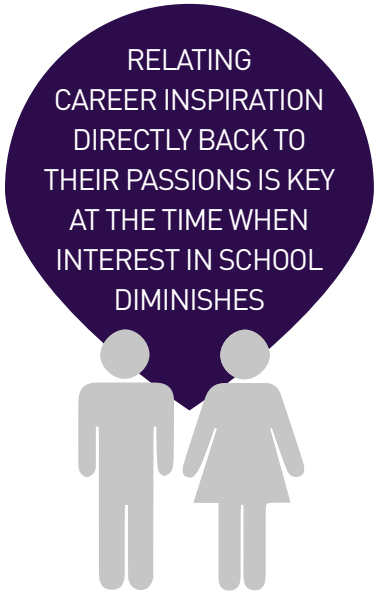
02

FOLLOWING THEIR PASSIONS

Young people use their passions as a focus when considering their careers

> “I can see how becoming a radio producer gets me close to my love of music.”
>
> *Boy, 16, High Support, London*

> “I really like sport – I really want to go into something to do with sport.”
>
> *Boy, 13, Low Support, Bristol*



Personal interests can strongly drive consideration of careers and are often the starting point. TV programmes can also prompt consideration of careers, for example, crime series, medical series.

Young people often focus on ‘their’ world when considering careers. This can be influencers in their lives but interest and passions are strong starting points too. Careers which contain elements of their current passions can resonate strongly and have increased interest and this differed across gender.

For boys, sport and music were often key starting points when thinking of their career pathway.

For girls it was more varied but fashion, food, drama and art/design were often of strong interest.

02

PRACTICAL NOT THEORETICAL

Young people are interested in careers which allow them to be hands-on

“ I’ve always been interested in doing something with my hands. When I was younger I was always building and making things. I don’t want to be sitting at an office desk answering phones. That sounds boring. ”

Boy, 13, Low Support, London

For young people, in particular boys, there was a strong interest in subjects and careers which allowed them to be more practical and hands-on.

They often cited that they were keen to have jobs which allowed them to use more practical skills, rather than jobs which were considered more theoretical or office based.

They were more inspired by subjects where they could see the end goal of their learning, that is where the theory very quickly turned into practice.

“ I like doing practicals, I like getting involved. ”

Boy, 14, Low Support, Bristol

Where work is hands-on it's more of a draw for low support

32% vs. **26%** of high support

and for older teenagers

33% of 17-18 yo vs. **23%** of 13-14 yo

02

ALL WORK AND ALL PLAY

Young people want work to be an enjoyable integral part of their life

"What I really want is where I go to work, but it doesn't feel like work because I enjoy it."

Girl, 13, High Support, London

Young people want their work life to be enjoyable and for many a strong part of that includes the ability to socialise and meet new people within the role.

There was an aversion to working alone, instead there was a strong desire to be part of a larger team and have a good social life as part of work.

There is also a desire not to work long hours as some have experienced their parents doing, but that does not necessarily mean they want to work to fixed working hours, i.e. 9-5. Having flexibility within their working lives was discussed, with the ideal job not feeling like work.

"I want to be able to make good friends at work."

Girl, 14, High Support, Newcastle

02

MONEY IS IMPORTANT BUT NOT CRITICAL

Young people aspire to have a good wage but only a few aspire to be rich

> " Money is important but it's not as important as having a good experience. Having a quality and range of experiences is really important to me."
>
> *Boy, 13, low support, London*

> " I want something that pays ok, you see a lot of people struggling. I want to enjoy my job and get paid enough to support my family. "
>
> *Girl, 14, Low Support, Bristol*

Money is important to young people when considering their careers, they want to be able to afford what they want in life and become independent.

Young people want to be independent and to be able to provide for their family as well as do what they want in life. To do this they want a good wage, however many are less concerned with having a high wage or being rich. This was because there is a belief that a 'highly paid job' can come with other issues, such as stress and long working hours.

For many, this is not a trade-off they are interested in making.

Of course, there were some (from both high and low support) who were more interested in earning a high wage. For those from low support, there were aspirations to do better than their family or current lifestyle and for those from high support an aspiration to match their parents' lifestyles.

MONEY IS IMPORTANT BUT NOT CRITICAL

£25,000

is the median annual salary young people consider to be a good salary.

47%

of young people believe £15k to £25k is a good starting salary.

30%

of boys

VS.

25%

of girls

believe £25-45k is a good starting salary.

02

FEAR OF BOREDOM- GIVE ME A CHALLENGE

Young people want their job to feel varied and different every day

“ I want something that’s a bit of a challenge, it makes it more interesting.”

Girl, 13, High Support, Bristol

“ I don’t want to be stuck in an office all day, stuck behind a computer, that would be boring. ”

Girl, 13, High Support, Bristol

Across the sample, there was a strong aversion to any sense of boredom within their job.

For young people a ‘boring’ job is one that that feels repetitious, monotonous and the same every day. An ‘office job’ was seen as the worst kind of job and appeared to act as a metaphor to represent the types of job they do not want, that is, being stuck at a desk and not going ‘out’. For some this felt like an extension of school (at a desk being given ‘work’ to do) which for many they were hoping to avoid once leaving education.

Instead for a proportion of the audience, there was a sense that they would like their job to provide them with a sense of challenge. Although not looking for their job to be too difficult, a sense of challenge suggested that they would be doing something varied and different everyday.

FEAR OF BOREDOM - GIVE ME A CHALLENGE

72% selected a job where I'm working from a desk most of the time as an aspect they do NOT want in a job.

Only **10%** see themselves in their 20s working in an office for a big corporation.

02

FEAR OF UNEMPLOYMENT OR 'DEAD END' JOB

Young people want a job where they can progress and improve

"I think it's going to be hard to find a job. My dad tells me that it used to be 7 or 8 going for a job, but now you have 100s of people going for the same job – so I have to outshine them, I can't make mistakes now."

Boy, 13, Low Support, Bristol

Young people readily cite that finding a job or the 'job they want' after school is likely to be difficult. This can make them either feel despondent or realise that there is a lot of pressure to do well at school to stand out from the crowd.

Parents and older siblings having gone through recent tough times, reminding them of the difficulty in getting a job, telling them that they need to work hard at school to overcome this.

The fear of unemployment was stated by nearly all young people but those from lower support appeared to raise it more readily. This fear of unemployment or getting a good jobs, raises concerns about not being able to provide for their families, or get the things they want out of life.

"I don't want to be unemployed without any direction, poor and struggling to pay the bills."

Girl, 13, Low support, Newcastle

FEAR OF UNEMPLOYMENT OR 'DEAD END' JOB

Of 17-18 yo

71%

were concerned how they'd be earning money.

65%

were concerned about getting a job they'd enjoy.

UNIVERSITY IS NOT THE ONLY WAY

Some young people are questioning the need for Higher Education

> “I don’t know if it’s the right term, but I think of university as somewhere where posh people go.”
>
> *Boy, 13, Low support, Birmingham*

> “I’m definitely not thinking about university, I don’t want to have loads of debt and spend 3 years there and come out and still have to find a job – I’m going to look for an apprenticeship.”
>
> *Girl, 16, Low Support, London*

02

Young people have mixed attitudes towards going to university and there is a strong difference between those from high support and low support backgrounds.

Those from high support families tend to have a natural expectation that they will go. They readily cite that university will provide them with greater opportunities through either a greater chance of employment or through allowing them to understand more fully career options.

However, some with a high support background readily raise the drawbacks of university, with concerns around debt coupled with doubts as to whether it will provide better employment prospects. They cite instances of those that have struggled out of university which reinforces these perceptions. They are open-minded towards more vocational alternatives, as are their parents but these options are not often discussed at school.

Some within low support are keen to go to university – again to better their prospects, however, for many university is not readily considered. They raise concerns about cost and being away from home as major barriers. There is also an underlying perception that university is beyond them. They can lack confidence believing it is for those that are ‘cleverer’ or ‘posher’ than them.

UNIVERSITY IS NOT THE ONLY WAY

At year 12

68%

want to go on to university.

26%

are looking at vocational options.

Apprenticeships are more for boys.

22% of boys

VS.

13% of girls.

02

CREATIVITY: A MOTIVATOR AND A BARRIER

Providing young people with the opportunity to be creative is important

> “ I like the idea of creativity because it lets you have freedom in a job, it lets you have the opportunity to create a more reliable efficient way. ”
>
> *Girl, 13, High support, Bristol*

> “ I am not so interested in creativity, I’m just not a creative person. I’m not very good at coming up with ideas, I’m more logical. ”
>
> *Girl, 13, High Support, Bristol*

For some young people the opportunity to use their skills creatively in the workplace is a strong need. In particular, they want to be able to use their creative and design skills to develop and adapt ways of doing or making things.

Being able to put their own stamp on things was felt to give them freedom and flexibility within a job – rather than following someone’s ideas and ways of doing things. Opportunity for this freedom felt liberating.

Young people, however, were less interested if creativity was positioned as ‘invention’. The notion of inventing was considered difficult and hard rather than inspiring, with a perception that it is difficult to come up with brand new ideas.

However creativity is not for everyone. For other young people, there was lower interest in the opportunity to be creative as they felt they were not ‘creative types’.

CREATIVITY: A MOTIVATOR AND A BARRIER

61%

want to be logical in their jobs.

71%

want to be creative in their jobs.

Decision points

03

This section identifies the key decision points for young people in their learning journey and the role parents and teachers play in subject and career choice.

03

THE KEY DECISION POINTS

YR 9

Year 9 when they start making decisions for their **GSCEs** and have been influenced by two years of secondary school.

YR 11

Year 11 when the reality that the next step after school is imminent and career / further subject choices have to be made.

YR 12

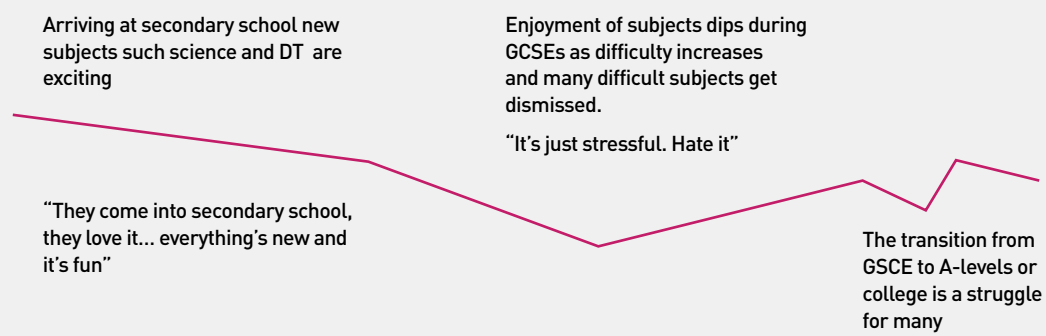
Year 12 (or equivalent age at FE college) when higher education or job choices have to be made.

03

SUBJECT ENJOYMENT AND TEENAGE MILESTONES SHAPE THE LEARNING JOURNEY

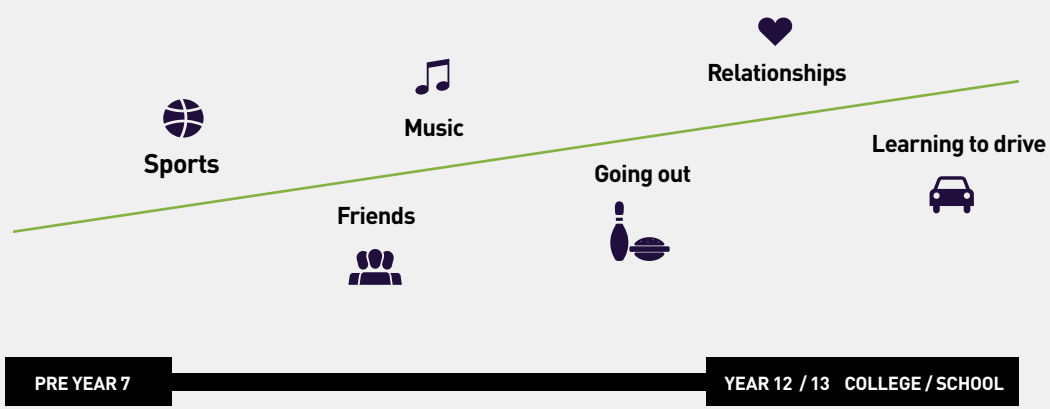
SUBJECT ENJOYMENT

Enjoying a subject is key to taking it further and after GCSEs they get to drop the ones they didn't enjoy and focus on the ones they prefer



TEENAGE MILESTONES

As they get older, life gets more interesting outside of school, their social lives become more important and there are more distractions



03

THE KEY DECISION POINTS DIFFER IN DURATION

Decision point 1: GSCE choices

GCSE options are the first key decision making point. The choices may be limited but it's the applied effort and enthusiasm for compulsory subjects that shapes subject decisions at a later stage.

Wide timeframe

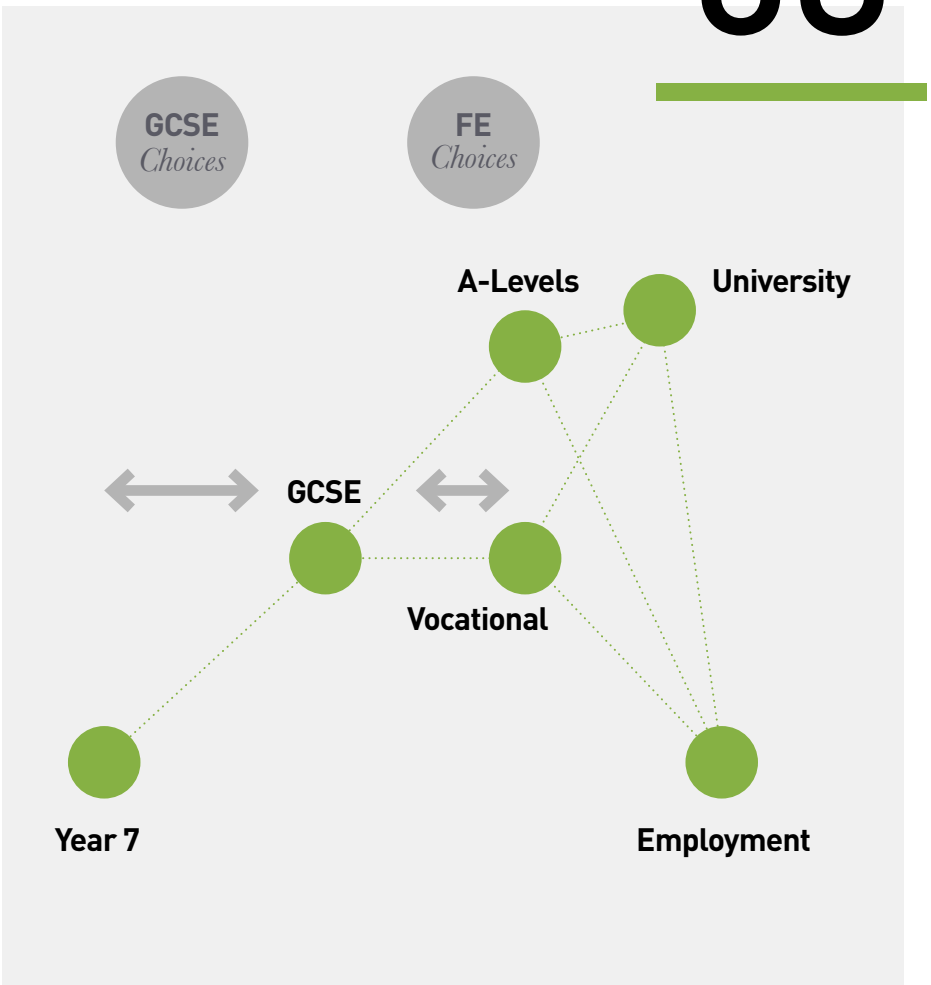
When GCSE choices are made varies considerably by school, for some it's in year 8, for others it's in late Winter year 9.

Decision point 2: Further Education choices

Subject enjoyment has been shaped significantly by the GCSE experience, tough subjects are out, subjects they enjoy and that will keep options open prevail.

Very short timeframe

After GCSE exams, the focus is on further education (FE). The thought process on what the next step should look like may have begun before, but now it's front of mind across the UK at the same time.



03

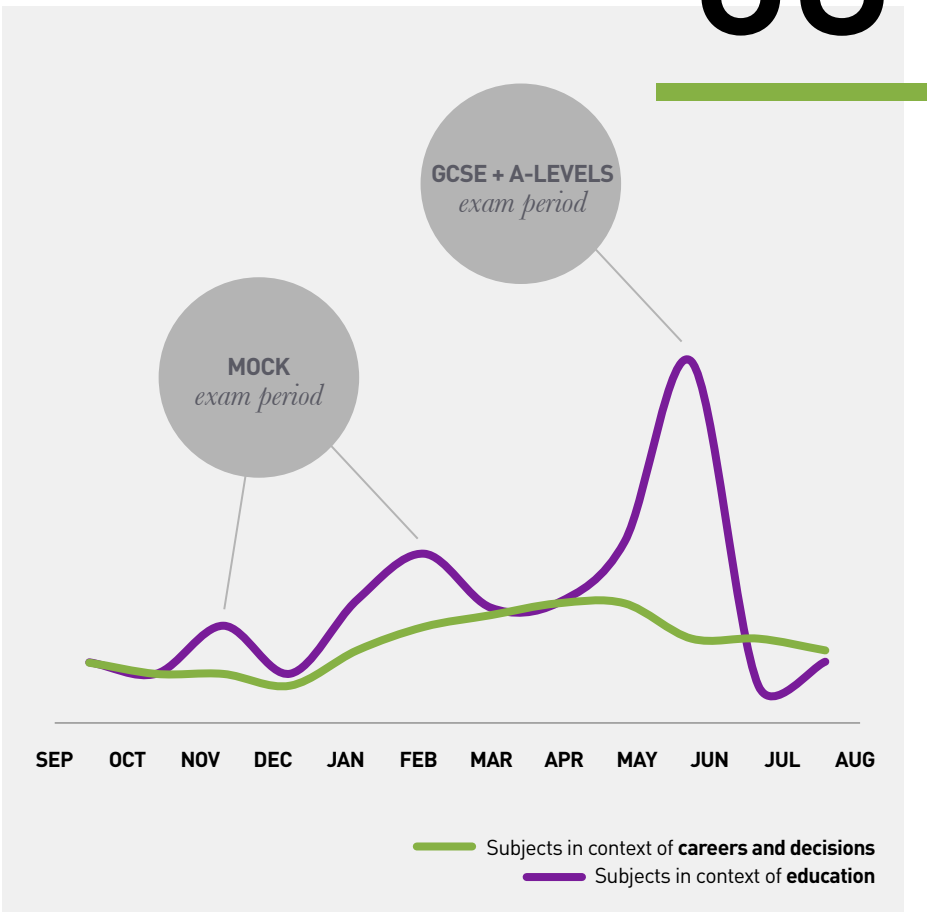
CAREER DECISIONS ARE FRONT OF MIND JANUARY TO MAY

Social media conversations around careers and subject are more focused towards the latter half of the academic year.

Conversations around subjects specifically are in line with the key exam periods, during these times the conversations are all about revision in those subjects, and sharing subject tips and exam anxieties.

There is a natural dip in career conversations during exam periods, as when exams are on, that's what is top of mind, but career conversations rise from January through to May regardless of many taking mock exams in February.

This rise in career dialogue is something natural given that many will be making the next steps, potentially into the world of work at the end of that school year.

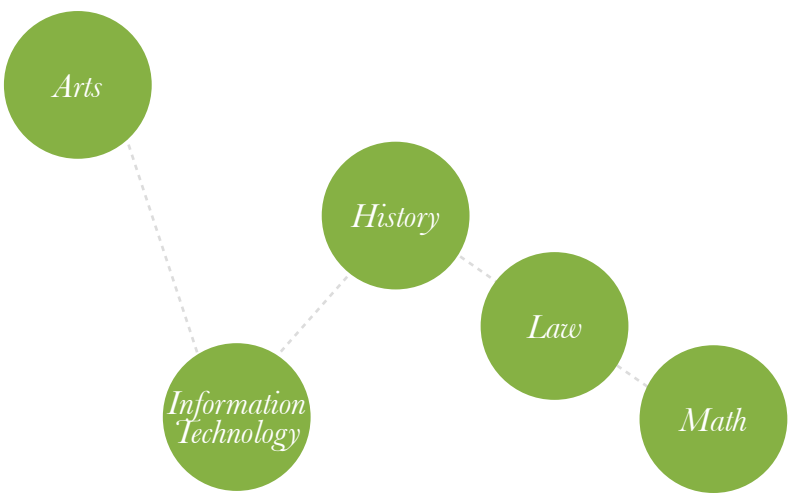


**The graph represents the seasonality of over 1M conversations from January to December 2013.*

SOURCE: *Sysomos.*

03

GCSE OPTION TIME; SUBJECT ENJOYMENT PREVAILS



Many don't know what careers they might pursue, they only know the subjects they've experienced.

Very few have a good idea about what they'd like to do as a career. Most might like the idea of a certain subject area but very few will have looked into the potential jobs in detail.

Most pick the subjects that they enjoy. If they haven't enjoyed something already, they will cast it aside if they can.

Many low support parents don't understand the importance of GCSE choices in the context of their child's learning journey and are not well informed.

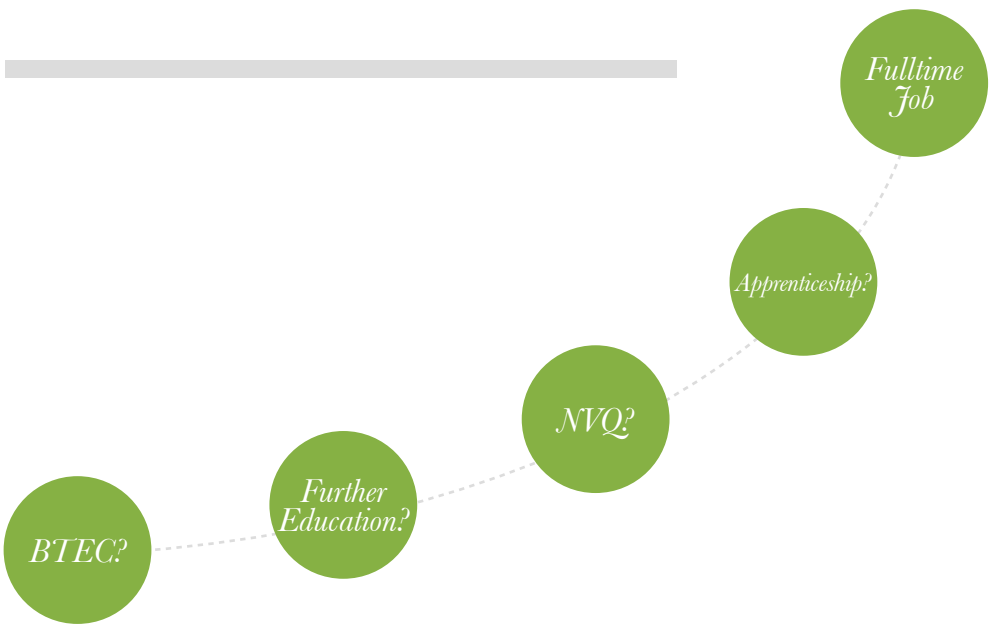
Low support parents are more likely to expect the school to lead the discussion as to what their child's strengths are and which subjects they should take.

High support parents are more aware of the importance of GCSE choices, they're better informed, and much more likely to take an active role in the decisions their child makes for GCSEs.

Those children with older siblings are much more in tune with what subjects they might take and general ideas for the future.

03

FURTHER EDUCATION OR VOCATIONAL NEXT STEPS



Many have seen just how hard certain subjects are at GCSE and are put off from choosing them for further education.

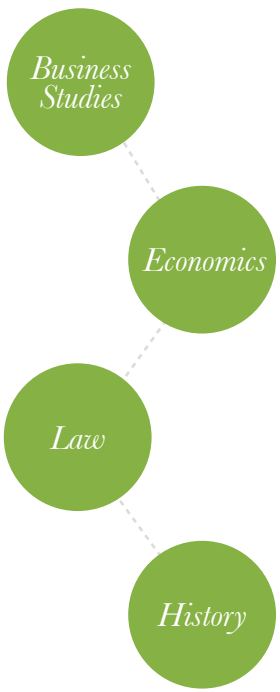
Many low-support boys who have found GCSEs very difficult have set themselves on vocational routes so they can learn and earn and ultimately be outside of the school environment.

Teachers are helpful in choosing subjects, but many students don't think their teachers have enough experience outside of education to help them with career choices.

Many reported having spoken with the schools career advisor but few reported that it was worthwhile.

03

KEEPING THEIR OPTIONS OPEN



There is a strong idea amongst young people that any decision they make is fixed and they can't go back and change things.

They worry they can't change their path and so many choose certain subjects to keep their options open. For those without a career path in mind, they will follow the advice from their teachers.

> "I enjoyed business studies at GCSE so I'm taking it at A-Level along with Economics but I want to keep my options open so I'm taking Law and History too."
>
> *Girl, 17, Birmingham, High Support*

> "Photography is my passion, but I've seen older friends really struggle to get jobs in it, so I'm thinking about web-design as well."
>
> *Girl, 16, London, High Support*

> "I'm unsure what to do, I really enjoy History so I'll keep doing that, but my teachers told me to also take English and Maths to keep my options open."
>
> *Girl, 16, London, High Support*

The pressure mounts up.
Those concerned about making the right decisions.

59%
13-14 year olds

65%
15-16 year olds

68%
17-18 year olds

03

STICK TO STRENGTHS

Many students are very uncertain as to what career area they might pursue and so pick subjects they're good at and they enjoy.

> "The next steps you should be taking should be doing subjects you enjoyed at school."
>
> *Boy, 16, Low Support, Bristol*

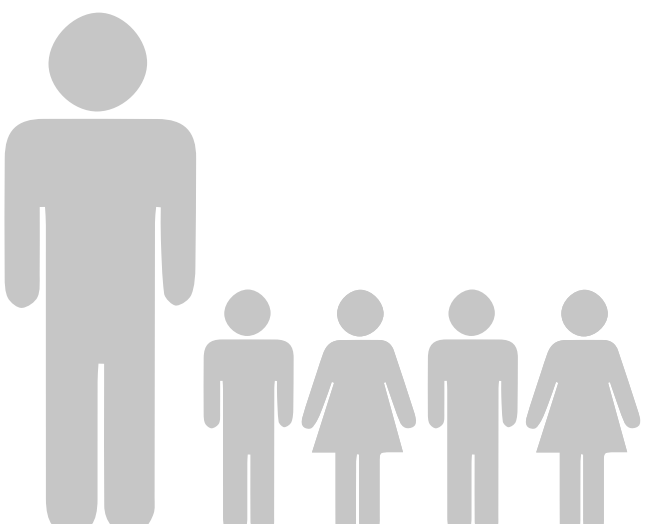
They feel it's reassuring to study what you enjoy and what you're good at, for some it meant even without looking any further to find out what the career prospects might be.

Parents encourage their children to stick to their strengths and to make sure they enjoy what they study especially if they get a job related to that subject.

> "I emphasise she's got to be happy with what she's going to do. You have to work for a long time after all."
>
> *Father of Girl, 14, London, Low Support*

03

TEACHERS ARE HELPFUL BUT TIME POOR



Teachers give advice to students where they can, and it's something they do enjoy being able to do, they just have no time to do it.

Giving career advice is not something they have to do proactively, due to the pressures of the curriculum and grade targets.

Some have tutorial obligations to talk to their students but this is not restricted to their subjects they teach.

They feel their experience is limited and they have a lack of knowledge about careers to help decisions.

Teachers who do find time to advise and inform in the classroom receive strong feedback from their students:

> "My biology teacher was really supportive. He was great and made it all really interesting."

Boy, 17, High Support, Birmingham

> "Knowledge of careers in my subject is not as good as it should be, it's difficult to stay up to date given the pressure on grades."

Teacher, Low support, London

03

TV SHOWS HOLD HUGE POWER TO INFLUENCE

For many, TV shows provided a huge inspiration for considering a career in a STEM discipline

TV shows and popular films were regularly mentioned by school students, teachers, career advisors, and young STEM professionals as sparking an interest in STEM and specific subject areas.

Those that were mentioned included science fact shows such as the Christmas lectures, wildlife programmes, and popular crime dramas that featured role model scientists such as NCIS and CSI.

TV can be a powerful tool to inspire STEM aspirations, however we did come across examples where unrealistic expectations were created by shows which did not match the reality of the career. For some young people, this disappointment resulted in them switching courses and careers paths away from STEM.

> “I loved Abbey out of NCIS, she was cool, not your typical scientist, so I wanted to be like her”

Female who took a pharmaceutical apprenticeship

> “Media can play such a big influence. We can always link back a spike in interest in a career path with a TV show”

Careers advisor

Perceptions of STEM

04

This section reports on how STEM is perceived by young people, parents and teachers.

04

THE PERCEPTIONS OF STEM ARE WELL ESTABLISHED

The issues surrounding STEM have been well researched previously. Our research was designed to uncover attitudes and influences surrounding career decisions using STEM as a focal point. Here we describe how people perceive STEM, from the way people talked to us directly and from the unprompted conversations they had online. Both methodologies complemented and reinforced our findings.

First and foremost STEM has an image problem. Negative connotations surrounding STEM came straight to mind for the majority of people. The benefits of STEM had to be carefully considered.

The message is clear. Attitudes have to be shifted.

PERCEPTIONS OF WORKING IN SCIENCE

Young people naturally mentioned careers that were relevant to the ones they have already been exposed to in their lives, so medical based professions and teachers were common. Many had been influenced by their favourite crime based TV shows like CSI resulting in aspiring to become forensic scientists.

NEGATIVES

Difficult choice beyond GCSE
Taking the subject further than GCSE felt beyond a lot of them as they had struggled with the subject at GCSE level. They felt you had to be really clever to take science to a career level, and that was definitely not them.

Fear of making a mistake
Considerable fear of getting it wrong in a science job and what the implications might be.

Stressful in the job and getting the job
Some thought it would be quite stressful and difficult trying to get a job in science.

> "If the subject at school is really hard, then a job in science must be super hard – too hard for me."
>
> *Boy, 14, Low support, London*

POSITIVES

Doing good
The benefits of science being able to cure diseases both to help other people and also to achieve respect and personal reward.

Making an impact
Many talked about how you discover new things in science, and feel like you're doing something good for the whole world and making an impact.

For the future
Some more keen on science talked about how important science was for the future.

> "In science you can cure diseases and it feels like you're doing something to help the world."
>
> *Girl, 14,Low support, Bristol*

THE MOST INTERESTING STEM: TECHNOLOGY

The range of jobs and subjects brought to mind within technology were varied and included: mending and fixing computers and IT, working with gadgets/mobile phones, graphic design or technology subjects at school, such as, resistant materials, food technology. Depending which jobs were top of mind, affected their perception of the technology discipline. Overall, however, technology was often viewed as the most interesting of the four disciplines within STEM.

NEGATIVES

Lonely and desk bound
There was a perception if they focussed on IT that working in technology was a lonely job and very desk bound.

Lack of social status
There was also some sense that working in technology (mainly IT) lacks social kudos.

> "I like this because you get to see new things – you are part of creating something new."
> *Girl, 16, High support, London*

> "I think it might be just like a desk job, a bit isolating."
> *Girl, 14, Low Support, Birmingham*

POSITIVES

It's the easiest one
Some considered a career relatively easy in terms of intellectual ability compared with other STEM careers.

Hands-on and creative
Technology careers were considered of interest as it was felt to be practical and hands-on discipline. It was also considered an area which would allow them to be creative (for those that considered graphics/design as part of technology).

Cutting edge
Working in technology was also felt exciting as it was considered to allow them to be part of a modern, cutting edge area of work.

Future proofed
It's a growing industry where jobs will always be available.

PERCEPTIONS OF WORKING IN ENGINEERING

The range of jobs that are brought up when talking to young people about engineering were quite limited. They generally consisted of jobs that involved fixing cars, trains and planes. They viewed these professions as being very hands on and practical versus other areas of STEM. Some boys were more naturally clued up about engineering as they had been exposed to a slightly wider range of professions thanks to their close family and so mentioned specific types of engineers.

NEGATIVES

It's for boys only

Most girls saw engineering as quite boring but also very male dominated, and some thought as a result it would be hard to get into.

It's difficult

Many saw it as difficult. Engineering involves too much maths, especially if they were not hands on or practical people.

Low status

Engineering is associated with boiler repair men and mechanics. A consequence of the term engineer being freely used to describe anyone that fixes things.

> "When I think of that I think of a more 'masculine' type of job – I don't think it's a feminine job."
>
> *Girl, 14, High Support, London*

POSITIVES

It's practical

Some of the lower support boys considered engineering to be very practical and less academic, and for those who were more vocationally led this was a strong reason for them to consider it.

It's collaborative

Some saw it as a job that meant working in a team and about problem solving and so rewarding as a result.

The pay is decent

Many thought that the pay was fairly decent although not as much as jobs in maths.

> "I'm definitely more open to it, it's more hands on and less academic, it's not necessarily easier but it's more exciting than science."
>
> *Boy 15, Low Support Bristol*

PERCEPTIONS OF WORKING IN MATHS

Young people struggled to bring to mind opportunities of using maths in the work place. Most common jobs raised were: accountants, bankers and maths teachers. It was less common for them to realise that it was a core part of many jobs or to see its application across other disciplines.

NEGATIVES

It's just for the really clever

The notion of continuing to study in maths was considered very difficult. Even those that were academically bright often felt further study or a job in maths would be beyond their ability and that to work in maths one would have to be 'really clever'.

It's not relevant

In addition, it was often felt that maths was not 'relevant' for 'real life' and therefore there was no real reason to continue to study in this area. This was raised as a barrier even by those that enjoyed and were good at maths.

The career pathways are boring

Beyond ability there was a perception that working in maths would be boring, more than likely an office job.

> "Maths – it's difficult, I can't really see any benefits."

Girl, 16, High support, Birmingham

POSITIVES

Appealed to the logically minded

Some young people stated they enjoyed maths and were keen to take it to the next level. They enjoyed the logical side of it – knowing that there was a right or wrong answer.

> "I like maths, I like the way that you can be logical and work things out – I am thinking about doing something to do with maths."

Girl, 16, High support, London

STEM VS. OTHER SUBJECTS IN TEENAGER'S MINDS

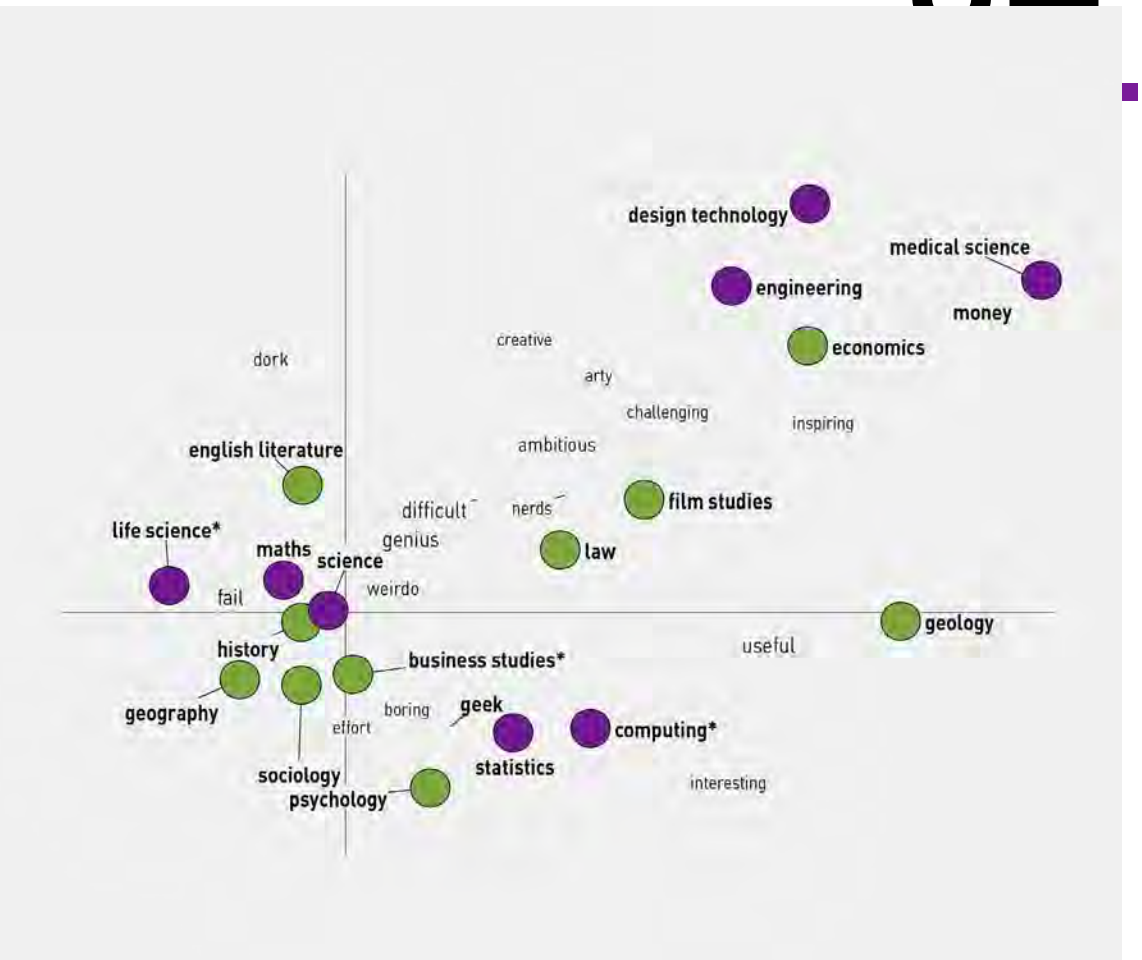
It's geeky, boring and difficult

This is a correspondence map that looks at how STEM is positioned in the minds of young people relative to the position of rival subjects.

In general, life sciences, physical sciences and maths are concentrated around concepts such as 'fail', 'weirdo', 'genius' and 'difficult'.

Social sciences are grouped around concepts such as 'effort' and 'boring' (geography, history, sociology, psychology and business studies).

Law is highly correlated to 'nerd' and 'ambitious', while economics, medical science and engineering are closely related to 'money'.



This correspondence map is based on the statistical frequencies of the concepts used to talk about different subjects by young people in real-time social media conversations.

ZOOMING INTO HOW STEM SUBJECTS ARE POSITIONED

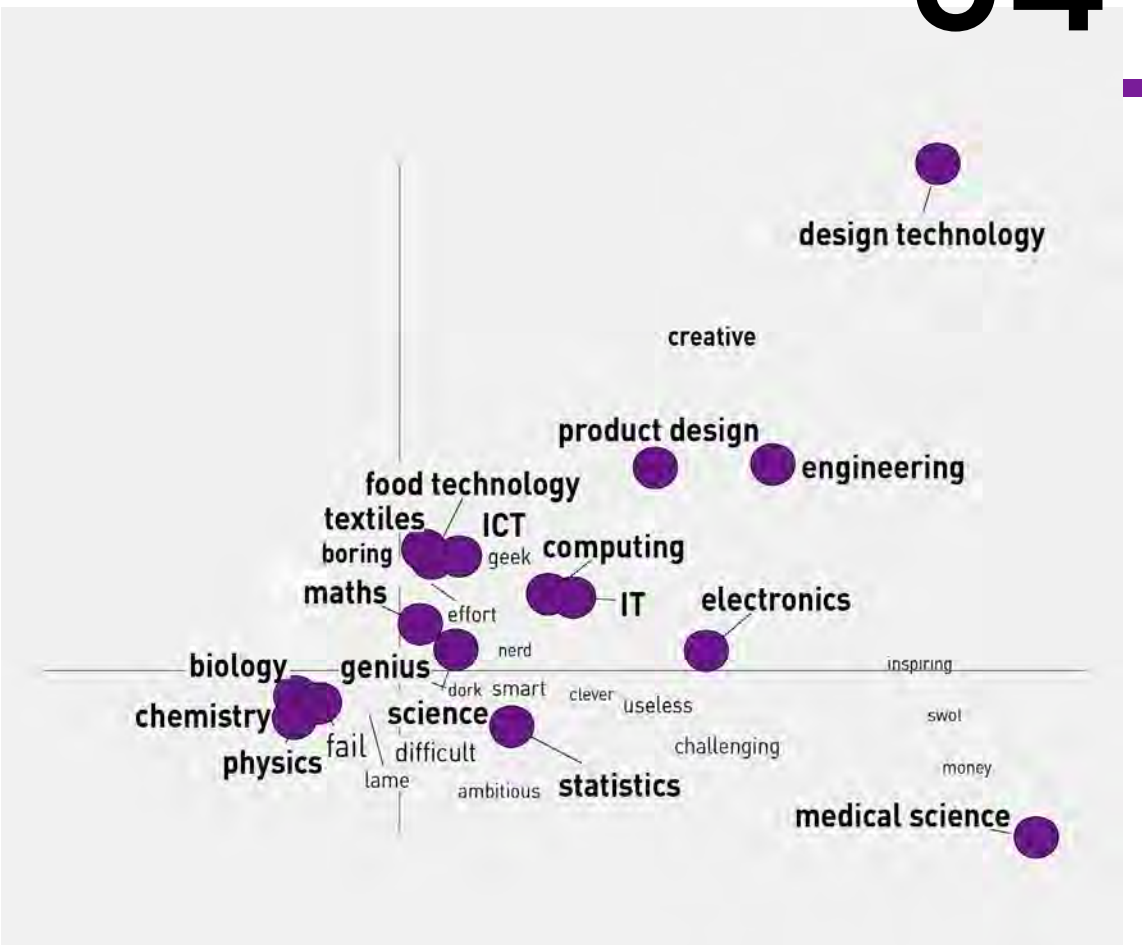
This correspondence map zooms into how STEM subjects are positioned relative to each other.

The **sciences**, close to **maths**, and **statistics** are all gathered around 'fail', 'difficult', 'genius', 'smart', 'nerd', 'dork', 'ambitious' , 'effort' and 'useless'.

More technical-oriented subjects are further away from these concepts. **ICT, computing, IT, textiles, food technology and electronics** are all concentrated around the concepts of 'geek', 'boring' and 'effort'.

Design technology, product design and engineering are closer to the 'creative' concept.

Medical science is the subject most associated with financial rewards.



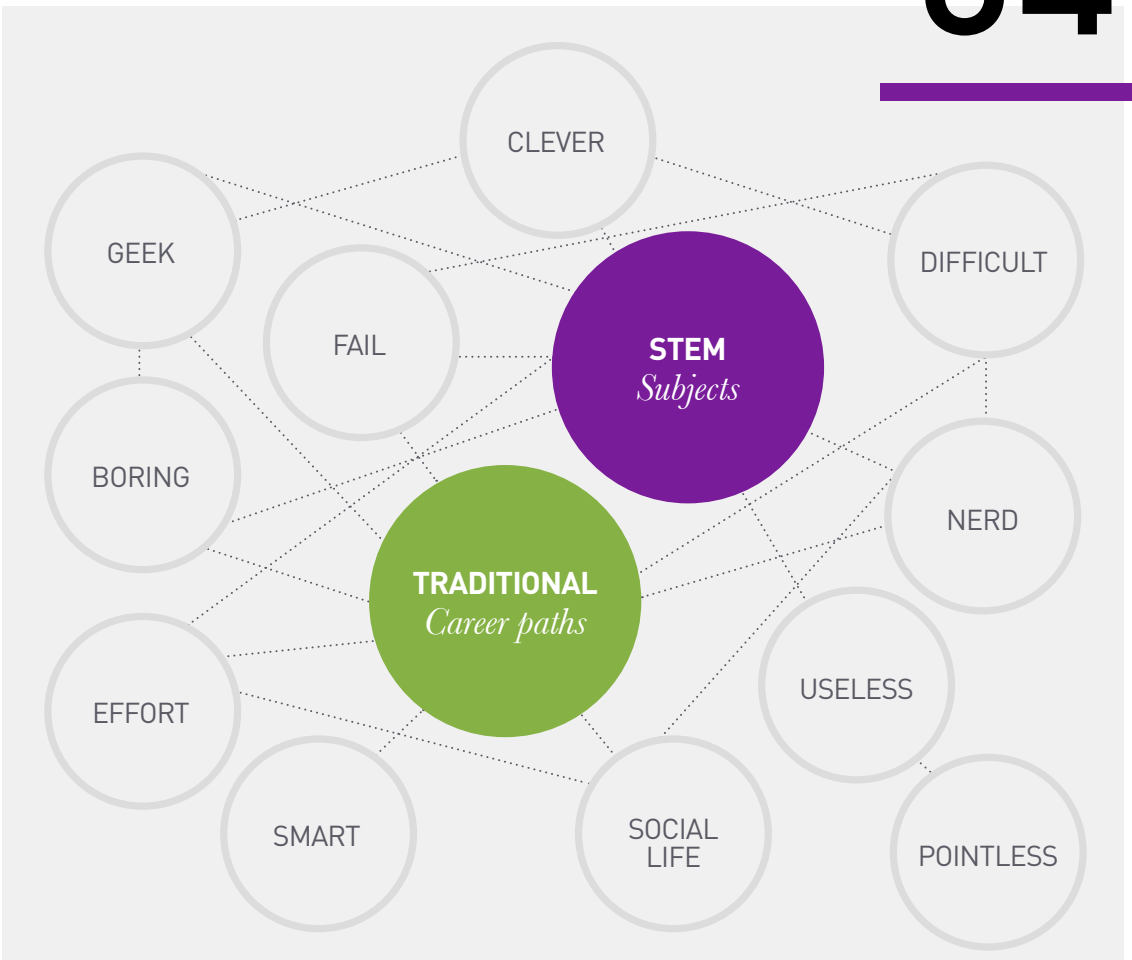
04

HOW YOUNG PEOPLE ARE TALKING ABOUT STEM

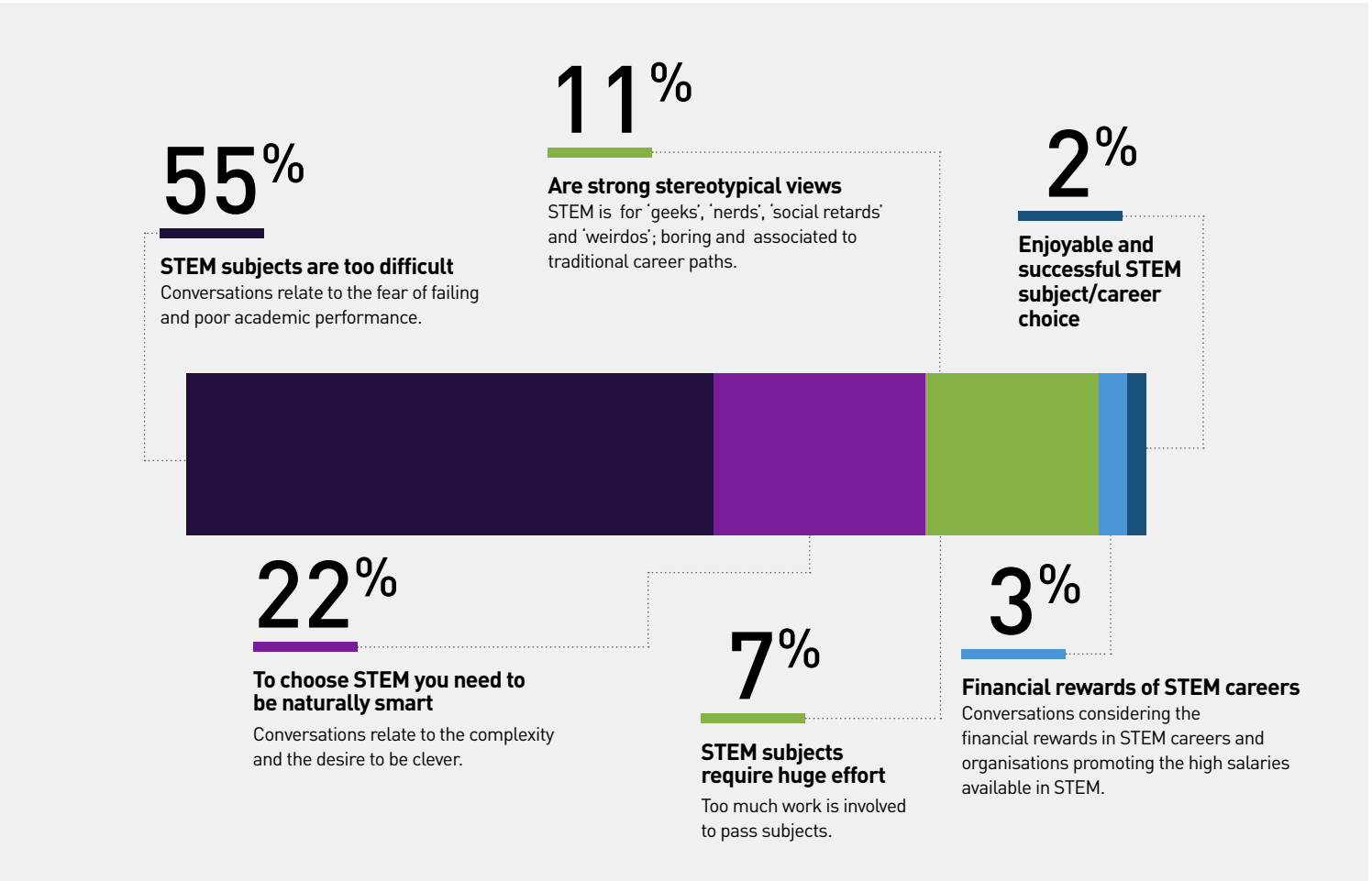
To understand how STEM is perceived by young people, we looked at the concepts they use when talking about STEM on social media. This visual represents a map of the conceptual associations derived from real-time Twitter conversations.

By looking into the concepts people use when talking about STEM and based on talkability*, this map aims to understand perception on a large scale.

**Our analysis is based on talkability: the quality or state of being talked about. It is a direct function of the volume of conversations, without any necessary implications regarding the sentiment of those conversations.*



HOW YOUNG PEOPLE ARE TALKING ABOUT STEM ONLINE



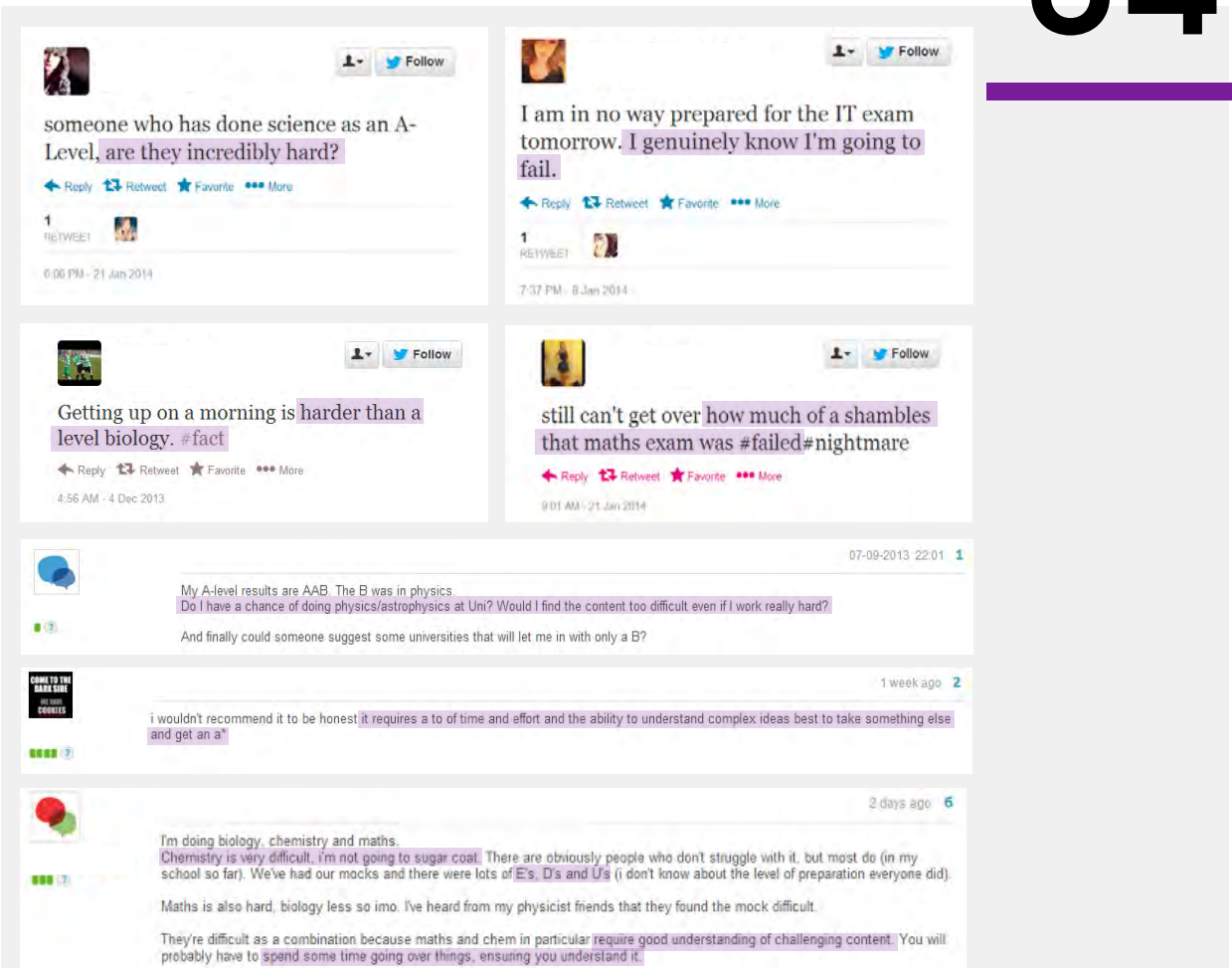
SOURCE: *Sysomos.*

04

STEM SUBJECTS ARE TOO DIFFICULT AND THERE IS A FEAR FAILURE

STEM is perceived as being too difficult and complex, hence young people fear STEM choices will lead to poor academic performance and they will end up with unachievable goals.

Peer-to-peer advice focuses on the challenging nature of the content and the need to prepare to ensure deep understanding of the subject matter in order to succeed.

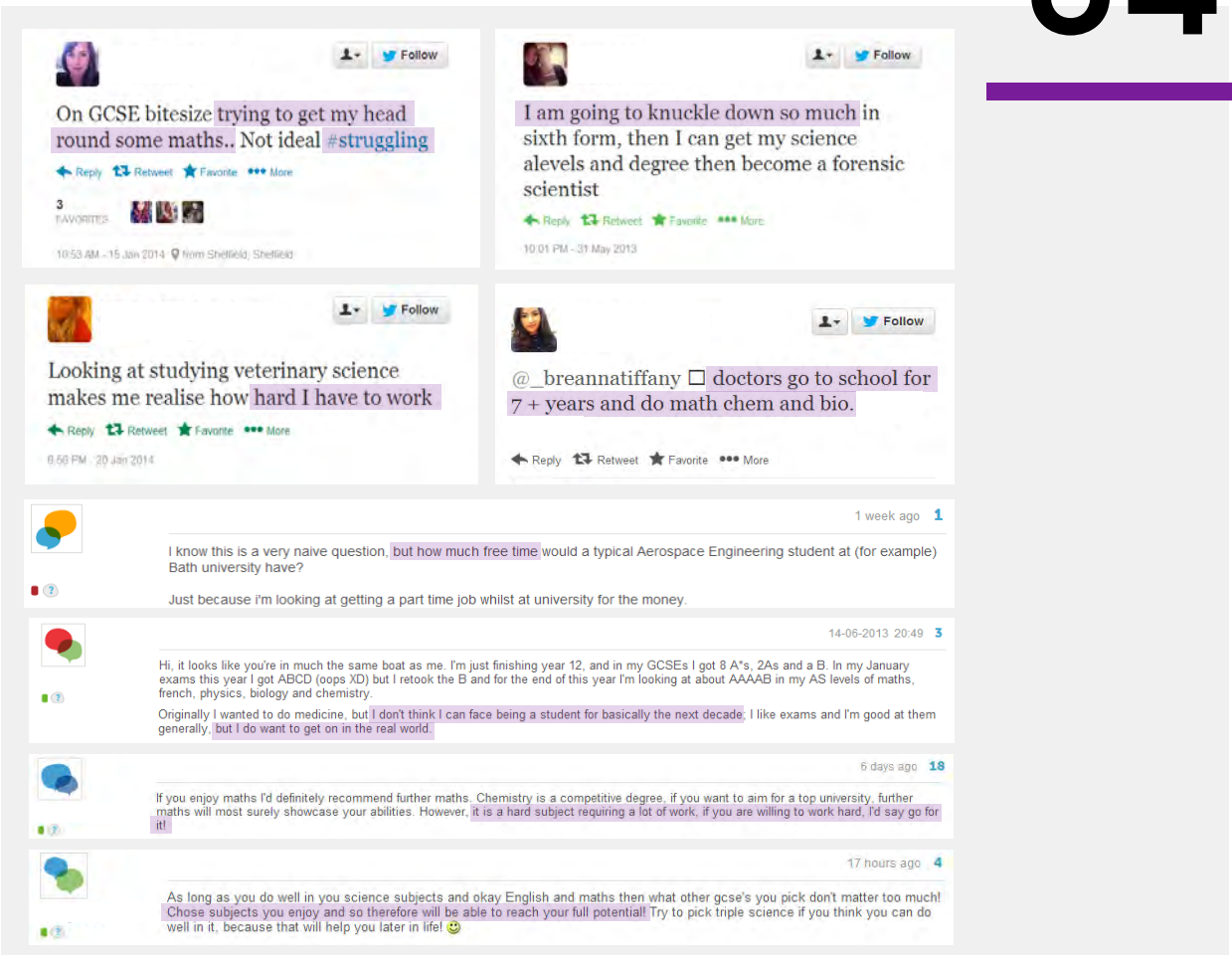


04

STEM SUBJECTS & CAREERS REQUIRE TOO MUCH EFFORT

STEM is perceived to involve a heavy workload and personal commitment. Young people believe that if they choose these type of subjects they will struggle and end with huge amounts of stress.

Peer-to-peer advice consists of the importance of enjoying and being interested in the subject matter. They openly recognise the time consuming aspect, and therefore the given advice converges on the fact that the only way of enduring the workload is by being genuinely motivated.

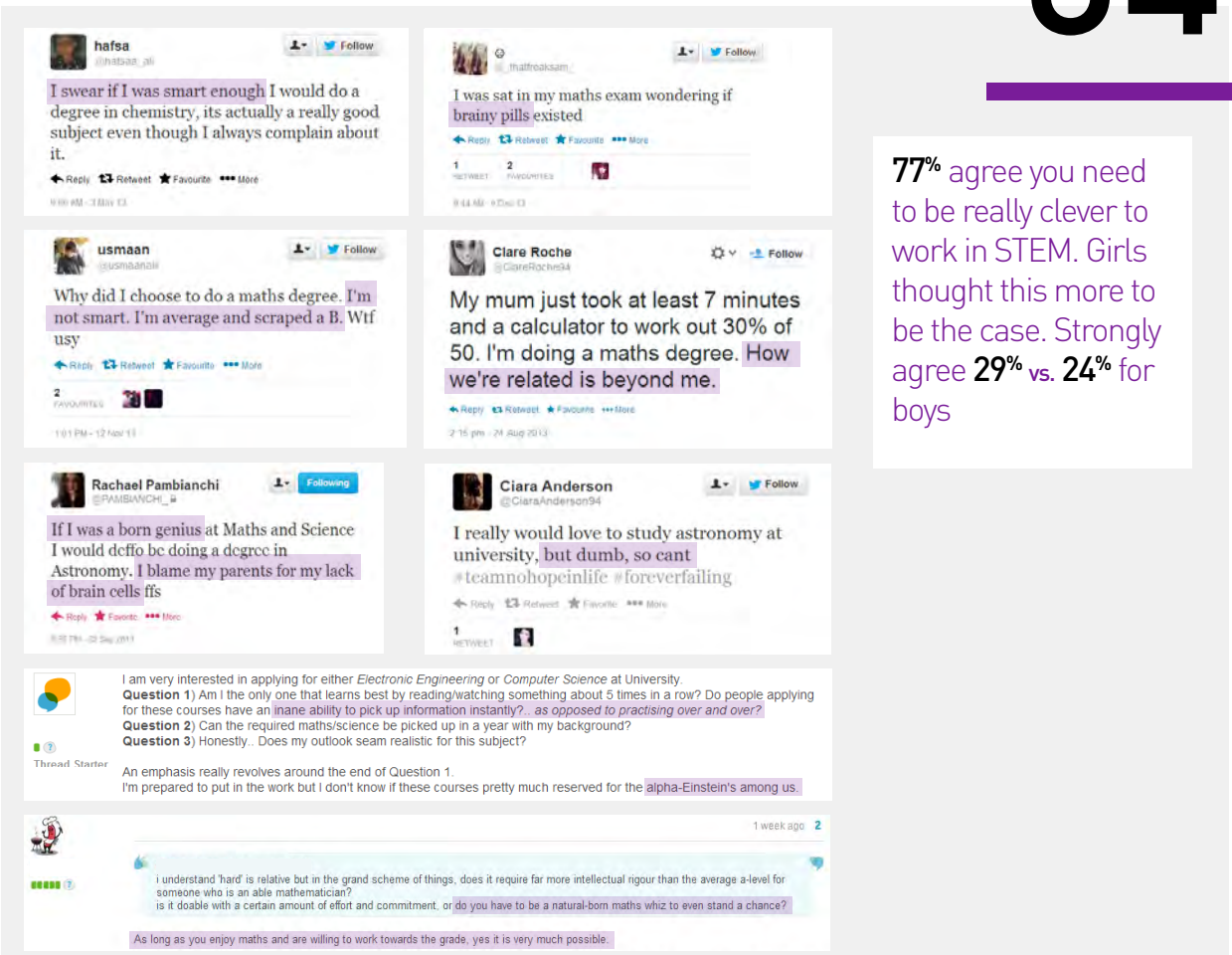


04

YOU NEED TO BE NATURALLY SMART TO EXCEL AT STEM

There is a strong association between STEM and the idea of being naturally smart. There is the idea of having to be "born clever" as a precondition to choosing STEM. There is therefore the feeling of not being good or bright enough to take STEM further.

Peer-to-peer advice focuses once again on enjoyment as a key element to gain the motivation to deal with the complexity of the content, and the determination to face the hard work.

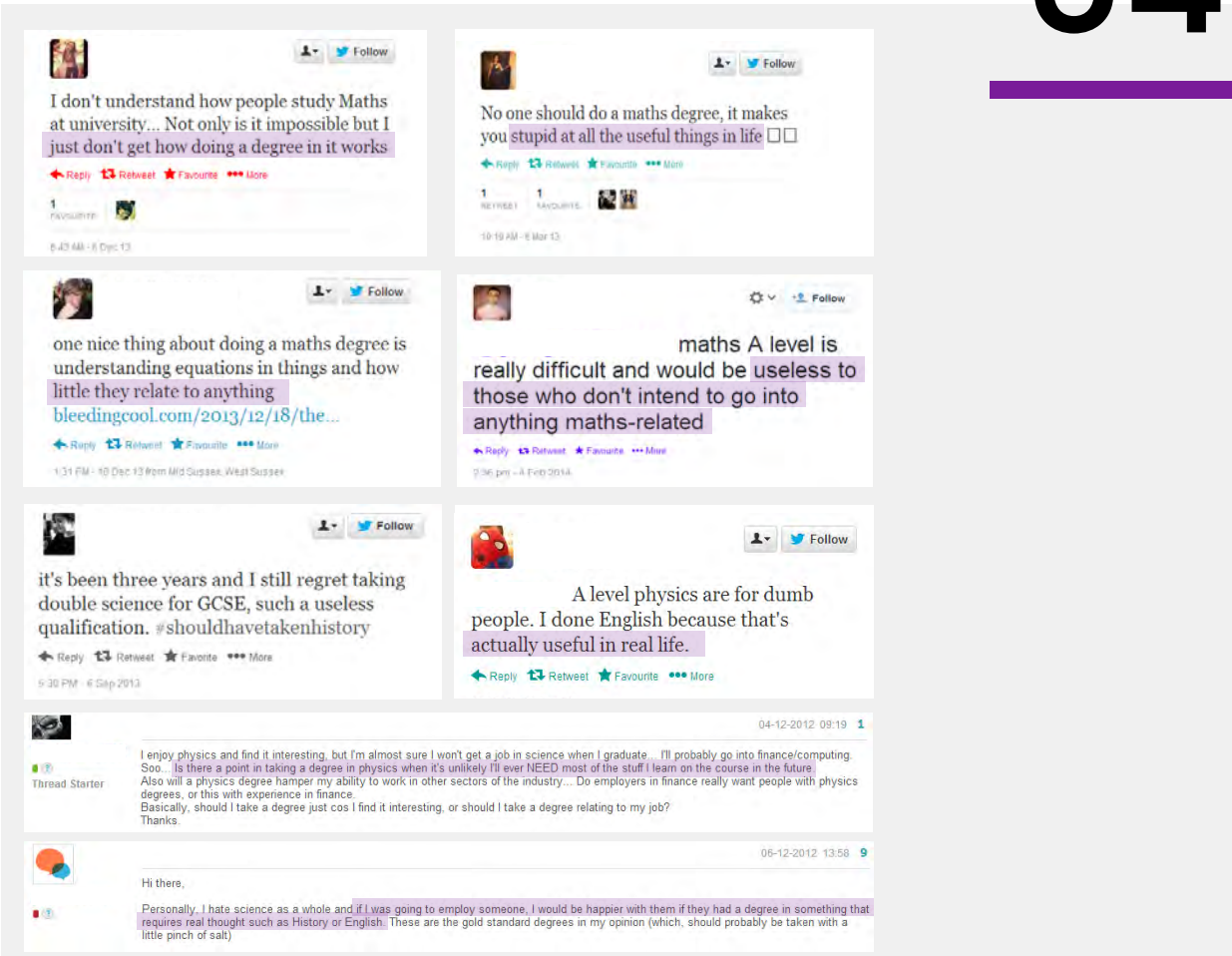


77% agree you need to be really clever to work in STEM. Girls thought this more to be the case. Strongly agree **29%** vs. **24%** for boys

04

STEM SUBJECTS AREN'T RELEVANT IN REAL LIFE

STEM subjects are perceived as too abstract and academic. Young people believe they are useless in real life and there is no point choosing them since they do not see how they will use or apply such abstract knowledge in the real world.

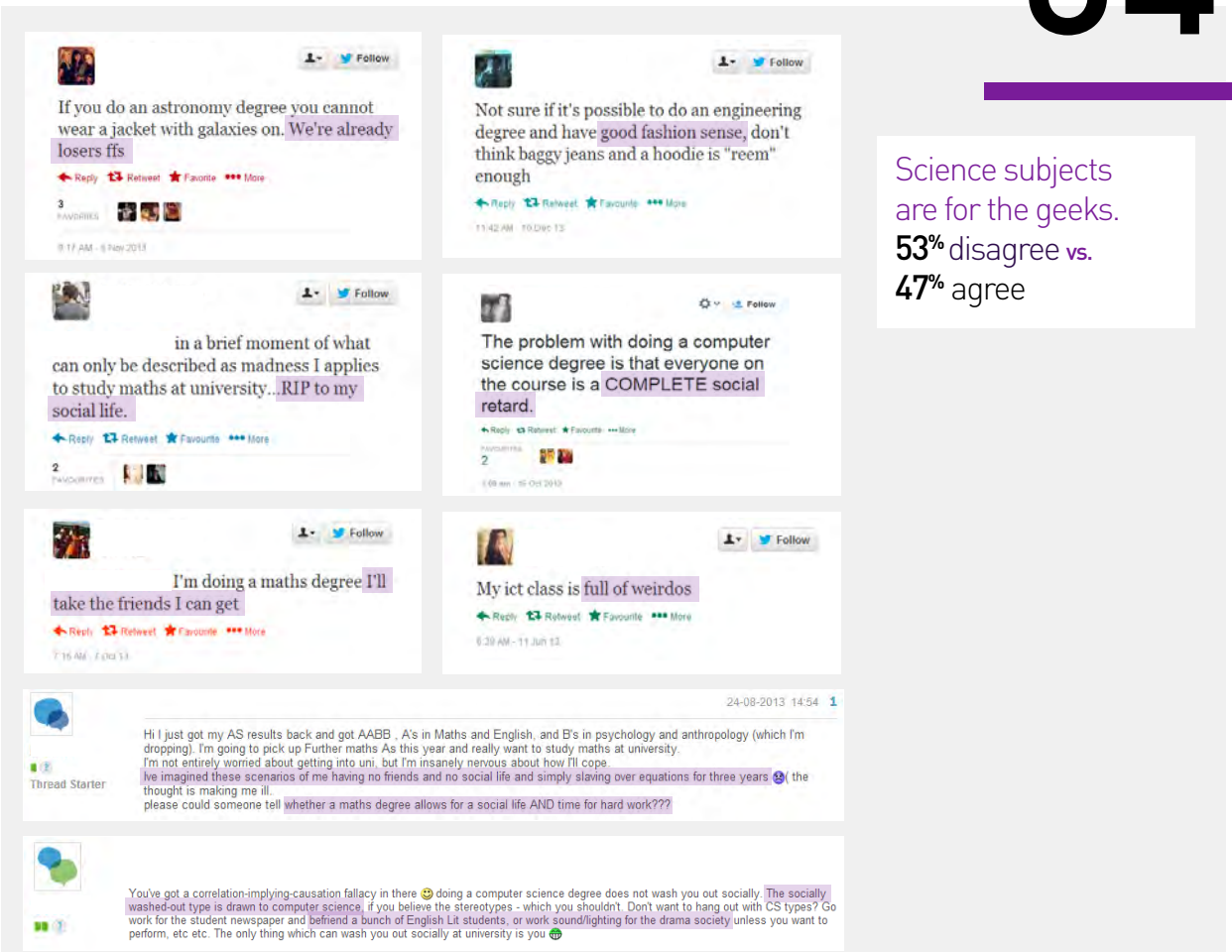


04

STEM IS SOCIALLY UNCOOL

STEM is associated with a 'lame lifestyle' to use the current language of teenagers. People going into STEM are perceived as 'uncool' and associated with a lack of social skills and boring social life.

Even the young people who are already engaged with STEM are self-conscious about being perceived as socially uncool or "weird". The advice they give each other focuses on the fact that while this perception is indeed drawn to STEM , it should not necessarily be drawn to the students themselves. They advise each other to be more confident and positive about their own university experience.



Science subjects are for the geeks.
53% disagree vs.
47% agree

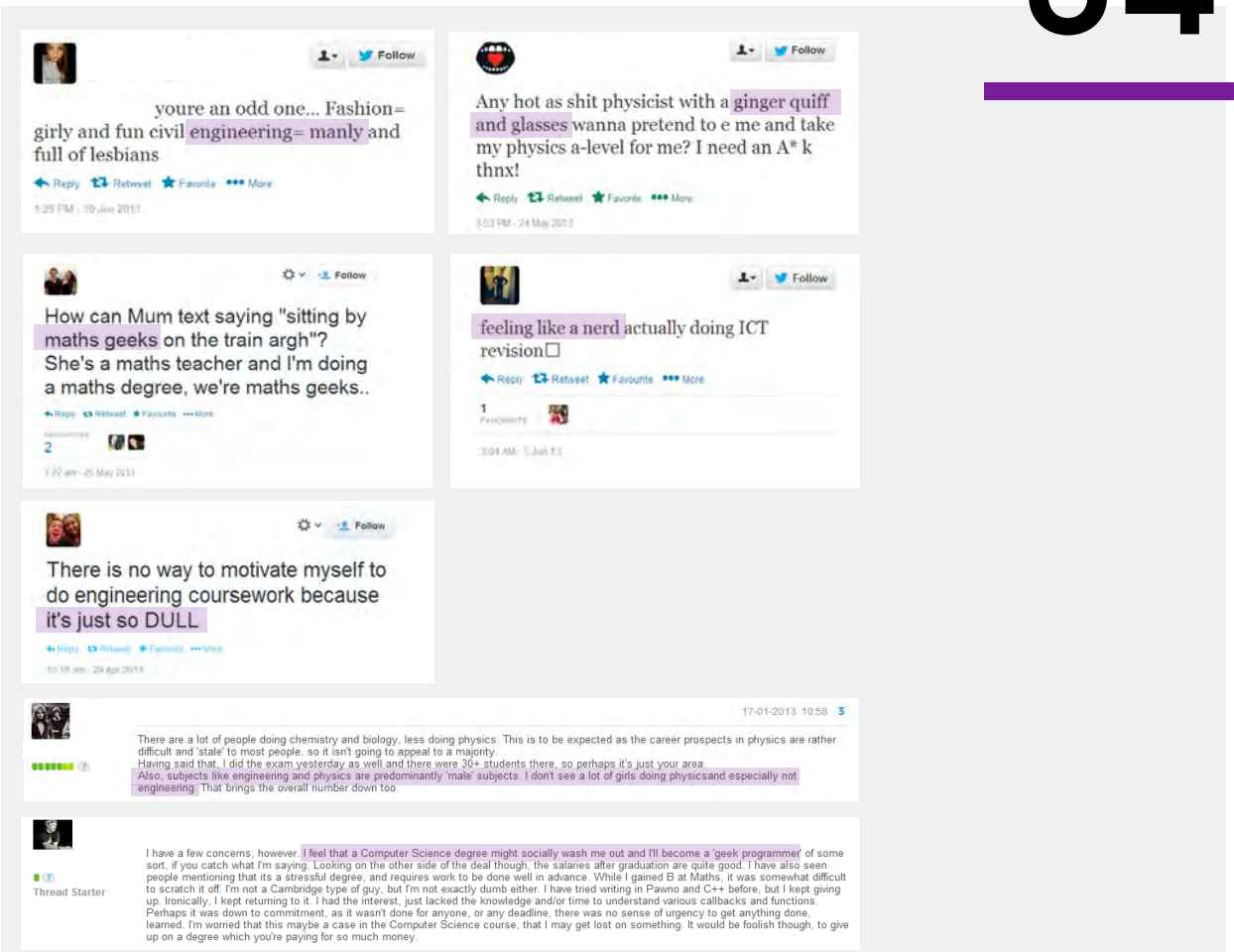
04

YOUNG PEOPLE HAVE AN ENTRENCHED VIEW TOWARDS STEM

STEM has a set of stereotypical concepts. It's perceived as too boring and dull, and the people opting for STEM are considered to be geeks or nerds.

In addition, there is a gender-biased view perceiving STEM as a predominantly male field.

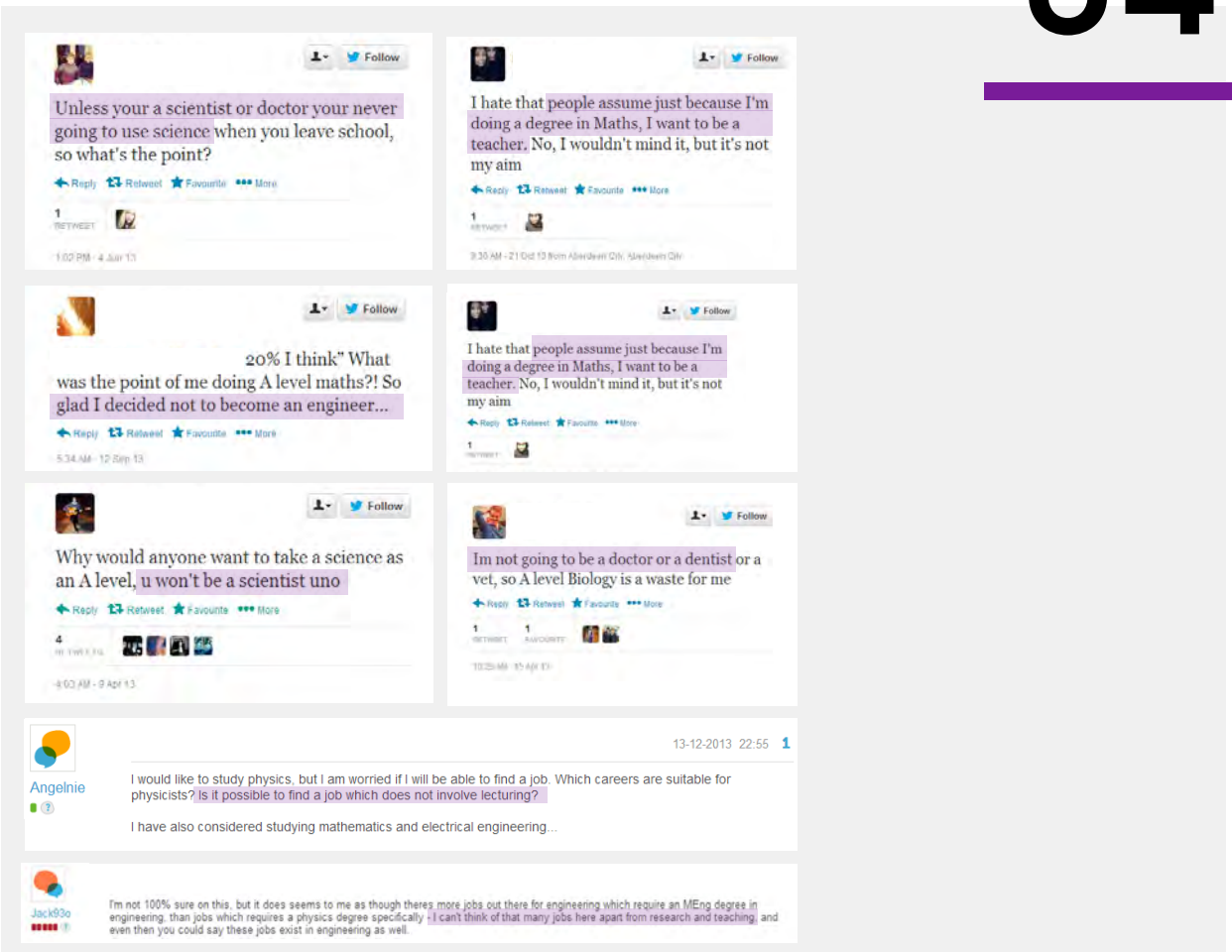
On online forums this stereotypical view is not an active topic of discussion but more of a latent issue that young people seem to assume while speaking to one another.



04

STEM SUBJECTS ONLY LEAD TO LIMITED CAREER PATHS

There is a lack of awareness of the alternative career options in STEM. Young people associate STEM subjects with the traditional career paths of scientist, biologist, engineer, doctor, which require higher education, or with academic activities such as research or teaching.

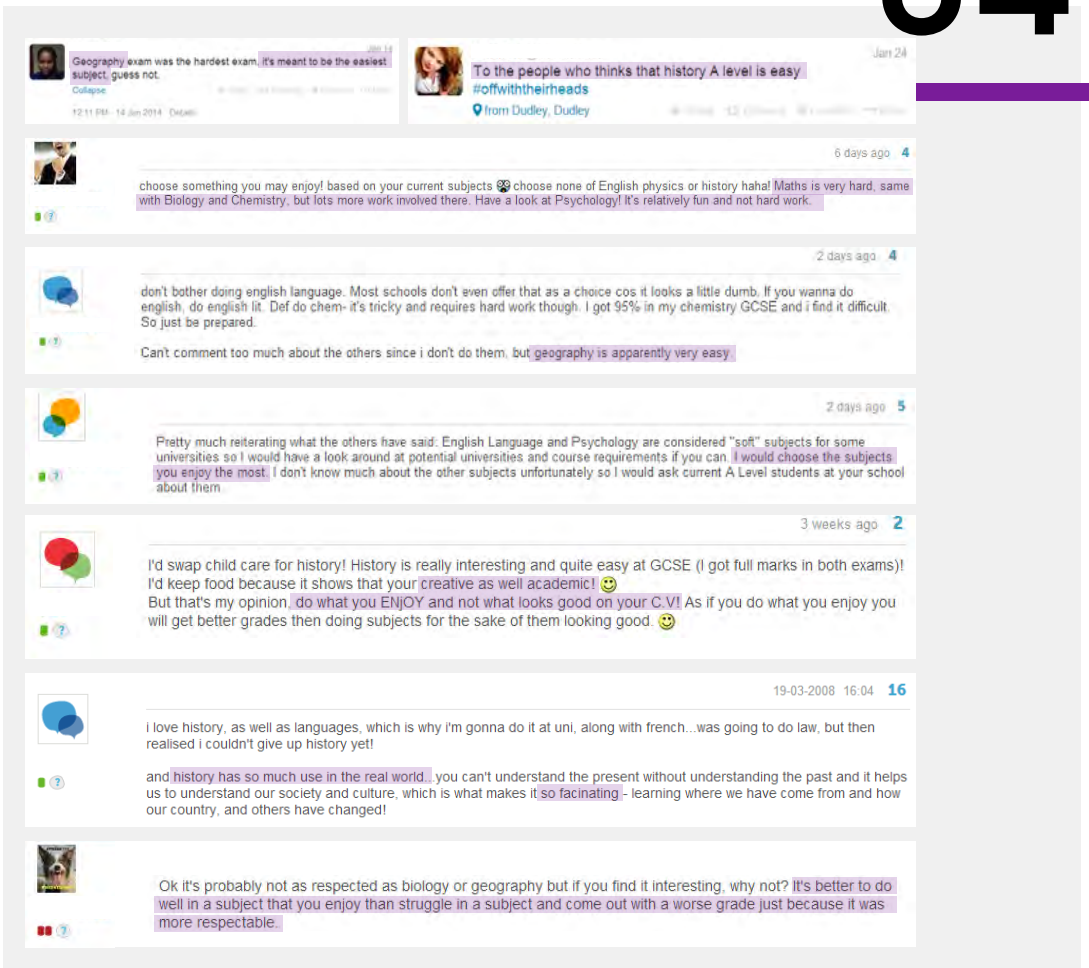


SOCIAL SCIENCE SUBJECTS ARE BOTH MORE FUN AND ACHIEVABLE

When speaking about social science subjects young people bring up the easier and "softer" aspect of the content, in that they are more achievable than STEM. In addition, they also point out they are more interesting and fun, making them more appealing in any decision-making process.

When giving advice to each other, young people recognise that social science subjects are not held in the same regard as STEM in university applications. They believe that there is no need to 'be a genius', even someone "dumb" or "thick" could study these subjects.

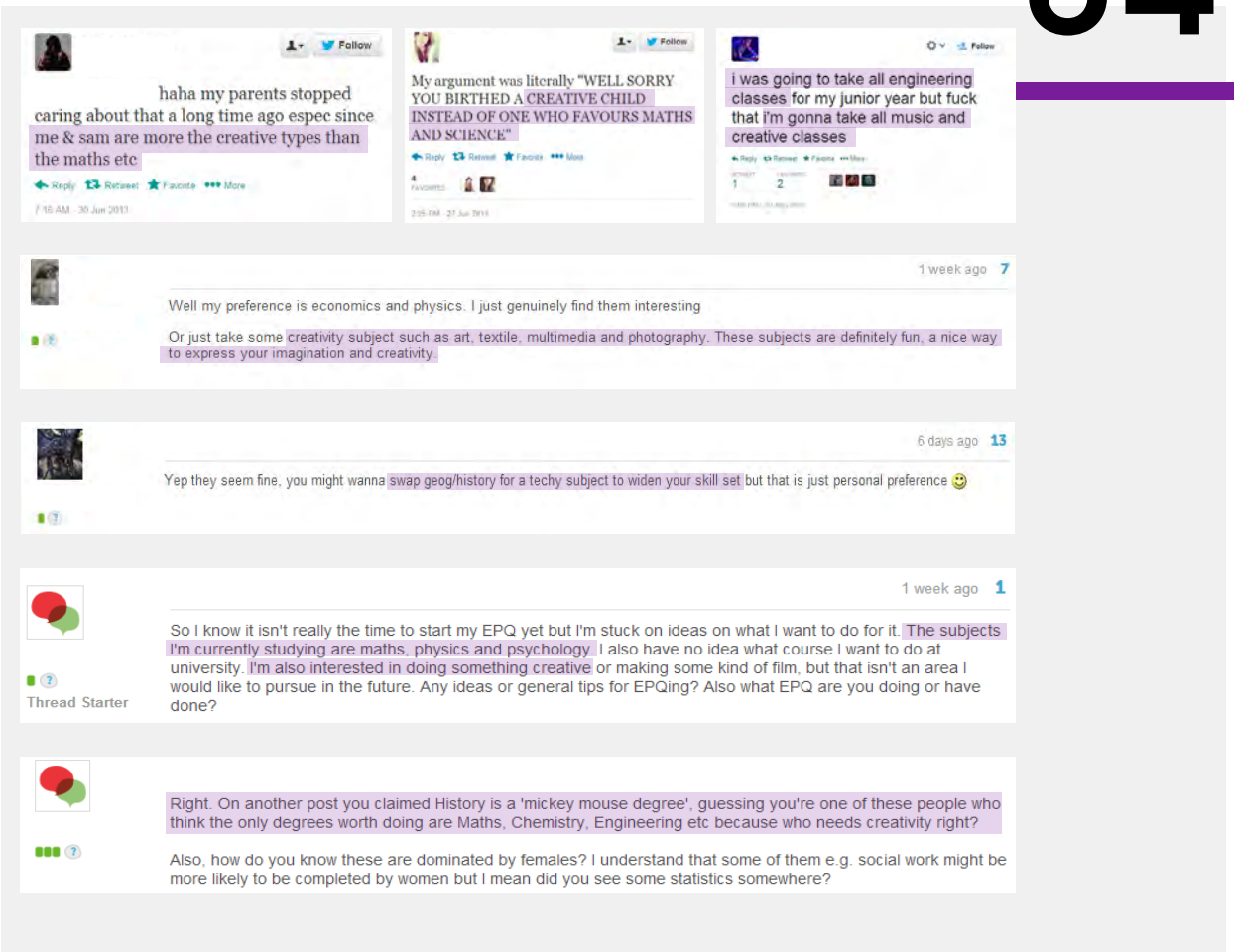
The peer-to-peer advice concentrates on choosing a subject based on enjoyment and passion instead of either the way it is perceived by universities or the financial rewards brought in the workplace. People tell each other that opting for what you enjoy will ensure you put in the effort and ultimately, get better grades and success.



STEM ISN'T CREATIVE

Conversations comparing STEM against other subjects not only highlight that the language used for the latter is more positive but also shows a latent dichotomy around being 'techie (or into STEM) vs. arty or creative'. This mental imagery associates STEM subjects and careers with rational logical thinking as opposed to creative thinking.

The conversations that show this contrast suggest that for those who enjoy or are looking for subjects/careers that allow creative thinking and expressing their own imagination, STEM should not be considered. The young people that question this view are the ones that are already engaged with STEM and therefore have further knowledge of the spectrum of opportunities to design and be creative.



STEM CAREERS' MOST POPULAR DISCUSSION THREADS:

Salary concerns, job prospects, difficulty involved and choice of university

*Based on number of views and replies on career – related discussion threads on The Student Room.

Engineering	What can I do with this degree? What jobs can I do? What salary can I expect?
Life Sciences	What are the best / more prestigious Universities? How hard is it? Is it worth the effort?
Health & Emergency Services	What can I do with this degree? What jobs can I do? How hard is it?
Physics & Chemistry	What can I do with this degree? What jobs can I do? What salary can I expect?
Pharmacy	What does the course involve? What salary can I expect? What are the best Universities?
Investment, Banking & Consultancy	What are the highest paid jobs? How do I become a Commodity Trader/Banker? Company-related threads.
Dentistry	How much do dentists get paid? What is the average starting salary?
Armed Forces	What is the minimum service required? What are the medical requirements? How hard is joining the RAF?
Finance & Accountancy	What is the average starting salary? How do I become a Finance Director/Accountant? Company-related threads.
IT & Technology	Do I need a degree to get a job in IT? What salary can I expect? Are IT apprenticeships worth it?
Veterinary Science	What is the average salary? What are the best/more prestigious Universities?
Property, Construction, Transport & Logistics	What to do with a Science/ Engineering Degree? What jobs can I do? What salary can I expect?

Appendix

05

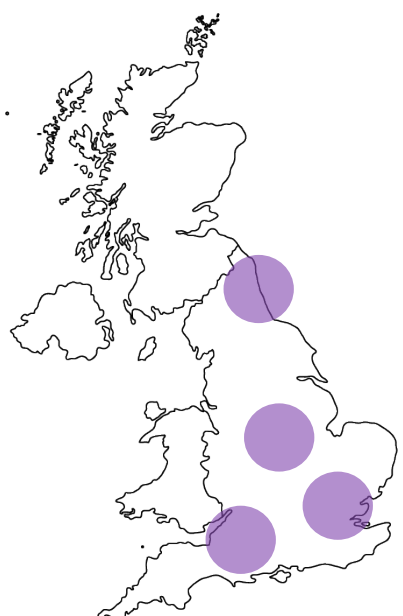
Our approach and what we did:

Over **132** participants consisting of **56** interview hours
80 young people
8 teachers
12 parents
Co-creation sessions with **32** young people
Social listening over of **150,000** social media conversations

ONE HUNDRED PARTICIPANTS AND 52 RESEARCH HOURS

05

We held qualitative interviews with young people, their parents and their STEM teachers in February 2014. We spoke with young people from two distinct home and school environments we identified as high support vs. low support. In addition we recruited against their interest level in STEM from those doing double science and unsure of their next steps to young people with a strong interest in taking STEM as a career. We spoke with 12 parents and 8 teachers.



Location	High support: *school and home environment*	Low support: *school and home environment*	Post 16 *education establishment*
London	**2 x** paired interviews with boy and girl pair at year 9 1 x quad with mixed group at year 11	**2 x** paired interviews with boy and girl pair at year 9 **1 x** quad with mixed group at year 11	**1** quad interview at 17/18 years old. Sixth form college
Birmingham	**2 x** paired interviews with boy and girl pair at year 9 1 x quad with mixed group at year 11	**2 x** paired interviews with boy and girl pair at year 9 **1 x** quad with mixed group at year 11	**1** quad interview at 17/18 years old. FE college
Newcastle	**2 x** paired interviews with boy and girl pair at year 9 1 x quad with mixed group at year 11	**2 x** paired interviews with boy and girl pair at year 9 1 x quad with mixed group at year 11	**1** quad interview at 17/18 years old. FE college
Yate	**2 x** paired interviews with boy and girl pair at year 9 **1 x** quad with mixed group at year 11	**2 x** paired interviews with boy and girl pair at year 9 **1 x** quad with mixed group at year 11	**1** quad interview at 17/18 years old. Sixth form college

05

CO-CREATION WITH 32 YOUNG PEOPLE

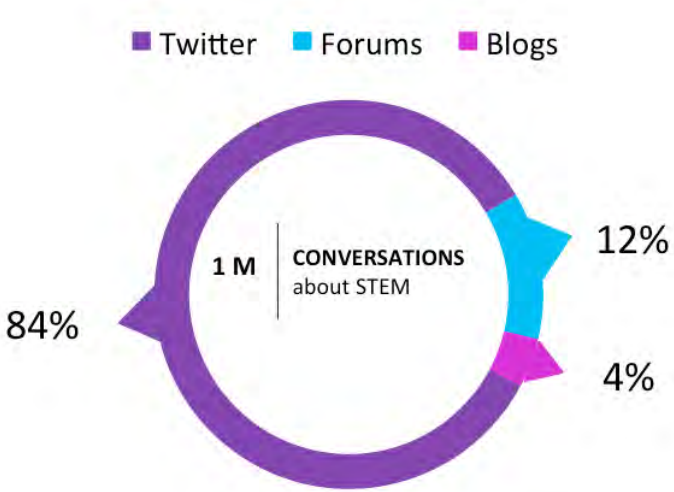
We ran co-creation workshops with young people in early March 2014. We used the insights from the qualitative sessions as stimulus to build on our understanding of their hopes and fears and designed creative tasks that would inform the inspirational messaging that would encourage young people to take the first step to finding out more about STEM.

We ran four sessions across the following sample range:

Year 9 Low Support
Year 11 High Support
Year 9 High Support
Year 11 Low Support

05

OUR SOCIAL LISTENING APPROACH



Social listening allows us to blend qualitative and quantitative approaches. By taking a qualitative approach to a quantitative scale we analysed tens of thousands of unprompted online conversations, listening to people's conversations on STEM and career choice.

Creating a smart approach we continually iterated our approach following qualitative fieldwork sessions, identifying specific themes and subjects to listen to.

The purpose of the social listening was to:

Understand the sentiment towards STEM careers and subjects. How they are perceived and how they are spoken about.

We identified three key sources for this research project.

Twitter gave us vast research. Potentially anyone could be talking about STEM and 25% of Twitter users are 15-24 years old.

Going into forums and blogs allowed us to explore conversations more deeply than the 140 character limitation Twitter imposes. Forums such as the studentroom.co.uk proved an invaluable source of rich conversations on the subject of STEM and career choice.

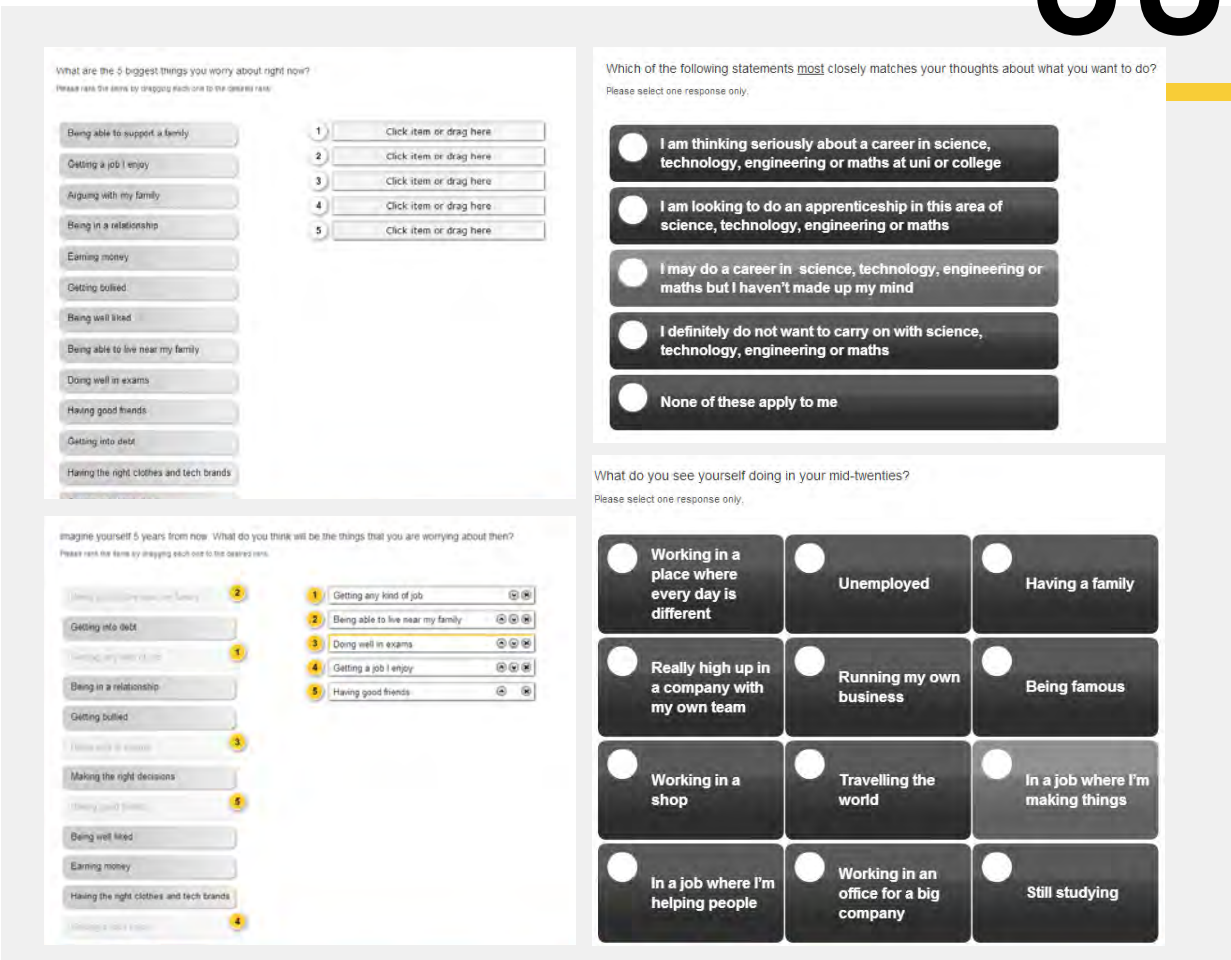
By analysing Twitter and social media conversations we could analyse STEM in the context of self-expression (what people are thinking) and peer-to-peer advice (what people say to each other regarding career and subject choice).

OUR QUANTITATIVE APPROACH

We ran a 15 minute online survey with 2280 teenagers aged 13-14, 15-16 and 17-18 (760 per year group) between 24th and 28th March 2014. The sample was evenly split by gender, socio-economic groups and regions in England.

The questionnaire was designed to quantify young peoples' attitudes, behaviours and perceptions of career choices that we uncovered during the qualitative research phase, as well as provide a baseline measure of young people's attitude to STEM careers.

An online methodology allowed us to reach an age group fluent in the digital world and an age group that are harder to reach by phone or face to face approaches.



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