BRITISH SCIENCE ASSOCIATION

Research Impact: Ready for REF

Ambassadors Bloomsbury Hotel, London

2 October 2019

A proud heritage

1831 — Established 27 September in York

1833 — Coined the term 'scientist'

1845 — President: William Herschel

1860 — Hosted the famous Huxley/ Wilberforce debate on Darwin's theory of evolution

1864 — President: Charles Lyell

1880 — Immortalised by Charles Dickens in the *Mudfog Papers*

1928 — Granted a Royal Charter by King George V

1960 — Royal Charter renewed by Her Majesty the Queen

1967 — First female President: Kathleen Lonsdale

1977 — President: Dorothy Hodgkin

1991 — President: Sir David Attenborough

2018 — Our programmes reach over 1 million people per year

Building science capital since 1831

The British Science Association is a charity that aims to revolutionise people's relationship with science.

Our mission is to transform the diversity and inclusivity of science; to reach under-served audiences; and to increase the number of people actively engaged and involved in science.

Statistics from 2018 Impact Report; full version available here.

Our impact in 2018

523,786 people engaged in BSA activities overall

1,055,348 young people engaged overall

Programme-level reach:

72,000 downloads of the British Science Week activity packs

34,956 students* received CREST Awards

65,394 students* took part in the British Science Week poster competition

1,278 volunteers

30,000 participants supported our citizen science project for British Science Week, *The Plastic Tide*, between them helping reach a total of 1.6 million classifications

Seven instances of influencing policy

12 Community Leaders

15,260 people attended the British Science Festival

14 Media Fellows throughout the year

27,252 professionals participated in BSA activities across the year (e.g. scientists, science communicators, teachers, policy makers)

Digital & social engagement:

2,439 pieces of media coverage generated by the BSA's activities

109,416 Twitter followers on all BSA accounts

6,041 followers on LinkedIn

21,650 engagements on BSA Facebook channels

103,901 views of BSA YouTube videos

Website visitors: **287,845**

1. Motivations
2. Audiences
3. Impact

1. Motivations
2. Audiences
3. Impact

Why do we need to engage the public about science & technology?

1. Build & diversify the pipeline of future scientists

Proportion female:

GCSE Physics entrants

50%

Figure 4.4, page 92

A level Physics entrants

22%

Figure 3.20, page 82

Engineering and technology undergraduate entrants

16%

Figure 6.10, page 145

Engineering apprenticeship starts (England only)

8%

Figure 5.8, page 116

https://www.engineeringuk.com/media/1641/7505_infographic_leaflet_2018_web.pdf

Why do we need to engage the public about science & technology?

1. Build & diversify the pipeline of future scientists
2. **Citizen decisions e.g. vaccines**

Early report

Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

Summary

Background We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods 12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings Onset of behavioural symptoms was associ by the parents, with measles, mumps, and rub a vaccination in eight of the 12 children, with meas infection in one child, and otitis media in an r. All 1 children had intestinal abnormalities rangi from lymphoid nodular hyperplasia to ar hoid u ration. Histology showed patchy chronic inflam tion in 11 children and reactive ileal mpho perplasia in seven, but no granulomas. Be loural disor s included autism (nine), disintegrative sy sis (one), a possible postviral or vaccinal encephalitis o). There were no focal neurological ab malities and I and EEG tests were normal. Abno al laboratory results re significantly raised urinary ethylma c acid compared with age-matched contro (p= 03), low haemoglobin in four children, a low n IgA in r children.

Inter tation e iden associated gastrointestinal di se and evelopmental regression in a group of prev y mal ch n, which was generally associated in time possible environmental triggers.

Lancet 199 **351:** 637–41
See Commentary page

Inflammatory Bowel Disease Study Group, University Departments of Medicine and Histopathology (A J Wakefield FRCS, A Anthony MB, J Linnell PhD, A P Dhillon MRCPath, S E Davies MRCPath) **and the University Departments of Paediatric Gastroenterology** (S H Murch MB, D M Casson MRCP, M Malik MRCP, M A Thomson FRCP, J A Walker-Smith FRCP,), **Child and Adolescent Psychiatry** (M Berelowitz FRCPsych), **Neurology** (P Harvey FRCP), **and Radiology** (A Valentine FRCR), **Royal Free Hospital and School of Medicine, London NW3 2QG, UK**

Correspondence to: Dr A J Wakefield

Introduction

We saw several children who, after a p d of apparent normality, lost acquired skills, inclu g com nication. They all had gastrointestinal mptoms, luding abdominal pain, diarrhoea, and ting and, some cases, food intolerance. We ribe clinical f ings, and gastrointestinal featu of these chi n.

Patients and meth s

12 children, con tively red to department of paediatric gastr erology a hi y of a pervasive developmenta der with loss ed skills and intestinal symptoms arrh abdominal in, bloating and food intolerance), were inv ated. All children were admitted to the ward f k, accom d by their parents.

Clinical investigations

took histo including details of immunisations and e sure to infec s diseases, and assessed the children. In 11 ca the histo as obtained by the senior clinician (JW-S). Neur l psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria.[1] Developmental included a review of prospective developmental records from parents, health visitors, and general practitioners. Four children did not undergo psychiatric assessment in hospital; all had been assessed professionally elsewhere, so these assessments were used as the basis for their behavioural diagnosis.

After bowel preparation, ileocolonoscopy was performed by SHM or MAT under sedation with midazolam and pethidine. Paired frozen and formalin-fixed mucosal biopsy samples were taken from the terminal ileum; ascending, transverse, descending, and sigmoid colons, and from the rectum. The procedure was recorded by video or still images, and were compared with images of the previous seven consecutive paediatric colonoscopies (four normal colonoscopies and three on children with ulcerative colitis), in which the physician reported normal appearances in the terminal ileum. Barium follow-through radiography was possible in some cases.

Also under sedation, cerebral magnetic-resonance imaging (MRI), electroencephalography (EEG) including visual, brain stem auditory, and sensory evoked potentials (where compliance made these possible), and lumbar puncture were done.

Laboratory investigations

Thyroid function, serum long-chain fatty acids, and cerebrospinal-fluid lactate were measured to exclude known causes of childhood neurodegenerative disease. Urinary methylmalonic acid was measured in random urine samples from eight of the 12 children and 14 age-matched and sex-matched normal controls, by a modification of a technique described previously.[2] Chromatograms were scanned digitally on computer, to analyse the methylmalonic-acid zones from cases and controls. Urinary methylmalonic-acid concentrations in patients and controls were compared by a two-sample *t* test. Urinary creatinine was estimated by routine spectrophotometric assay.

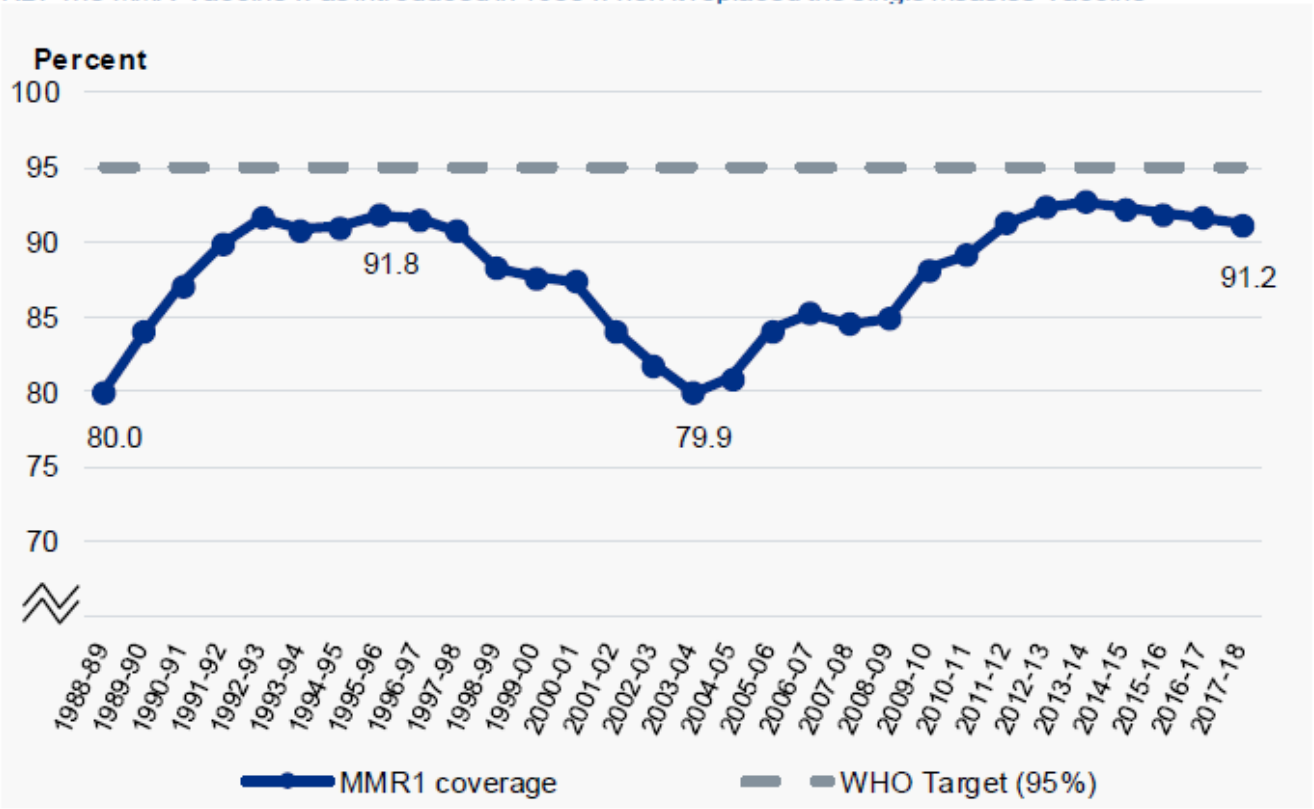
Children were screened for antiendomyseal antibodies and boys were screened for fragile-X if this had not been done

RETRACTED

Figure 6: MMR1 coverage at 24 months[7]

England 1988-89 to 2017-18

NB: The MMR vaccine w as introduced in 1988 w hen it replaced the single measles vaccine



Source: COVER - PHE, NHS Digital. See Tables 2 and 7 in the Data Tables.

Why do we need to engage the public about science & technology?

1. Build & diversify the pipeline of future scientists
2. Citizen decisions e.g. vaccines
3. **Society's decisions need to be made by all of us**

Society’s decisions…

Natural hazards

Food security

Water security

Sustainability

Energy-water-food stress nexus

Big data

Keeping pace with technology

Plastic pollution in the oceans

Digital divide in the UK

Technology for development

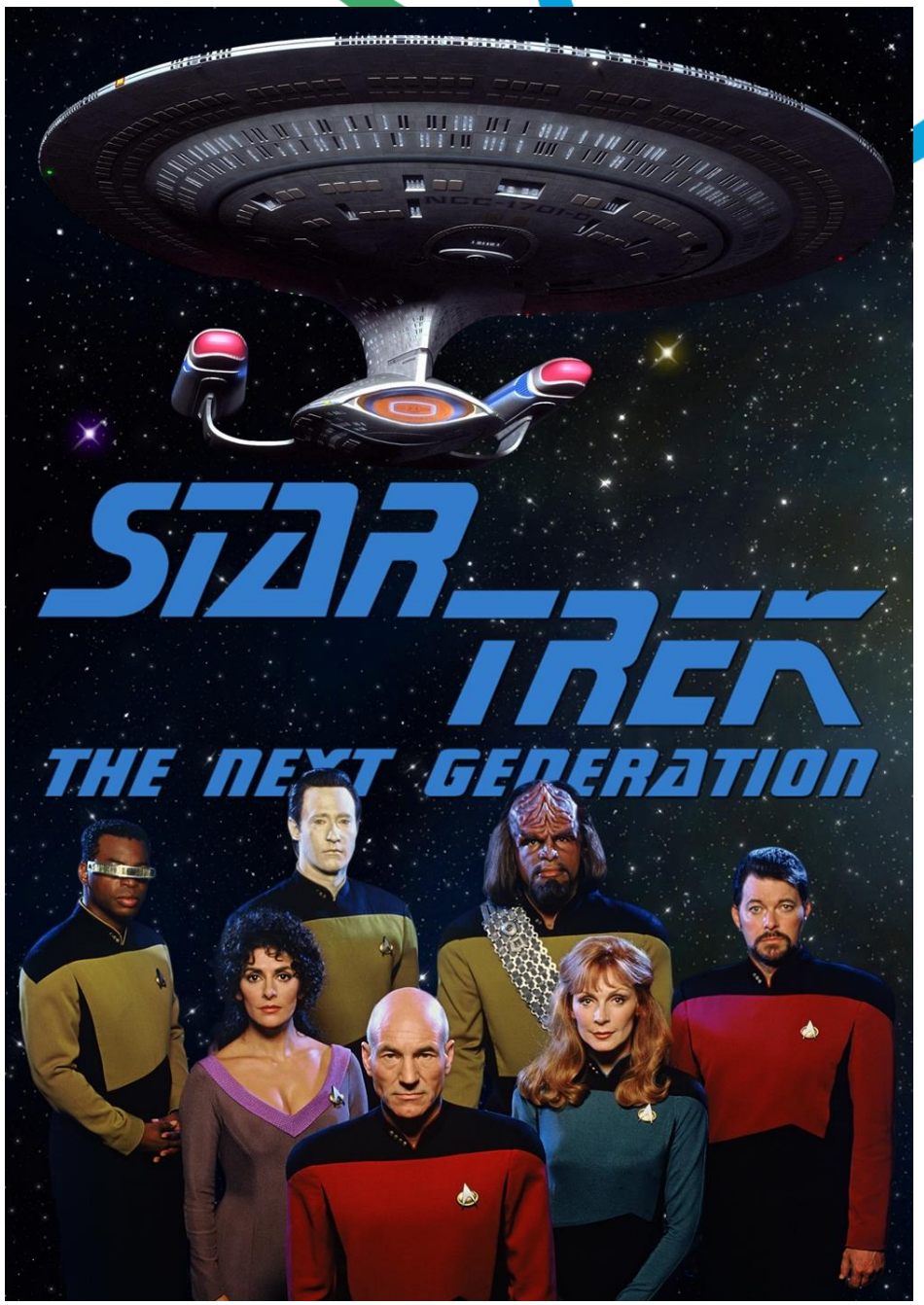
Changing class systems

Economic growth

Why do we need to engage the public about science & technology?

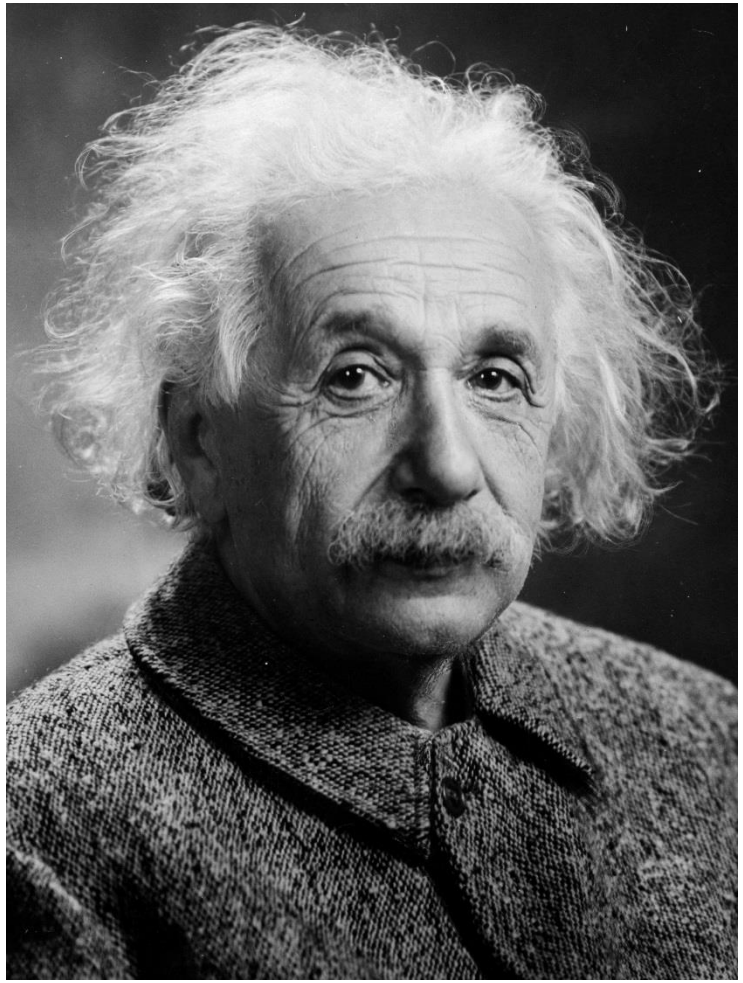
1. Build & diversify the pipeline of future scientists
2. Citizen decisions e.g. vaccines
3. Society's decisions need to be made by all of us
4. **Enjoyment, awe & wonder**

BBC earth
BLUE PLANET II
Take a deep breath

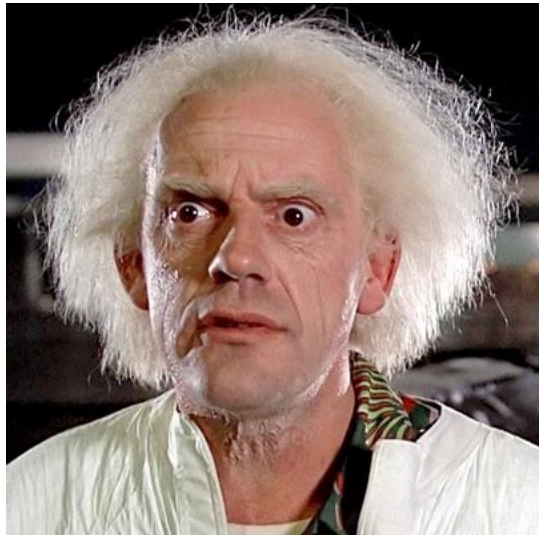

STAR TREK
THE NEXT GENERATION

1. Motivations
2. Audiences
3. Impact

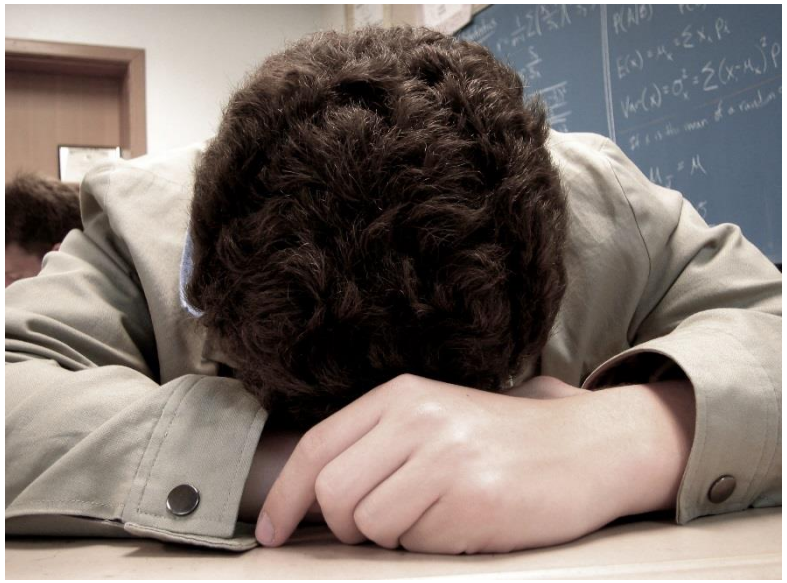
When people think of science or scientists, they often think of this…



Sometimes, they might think of this…



But mostly, they think of this…



https://news.northwestern.edu/stories/2018/march/draw-a-scientist/

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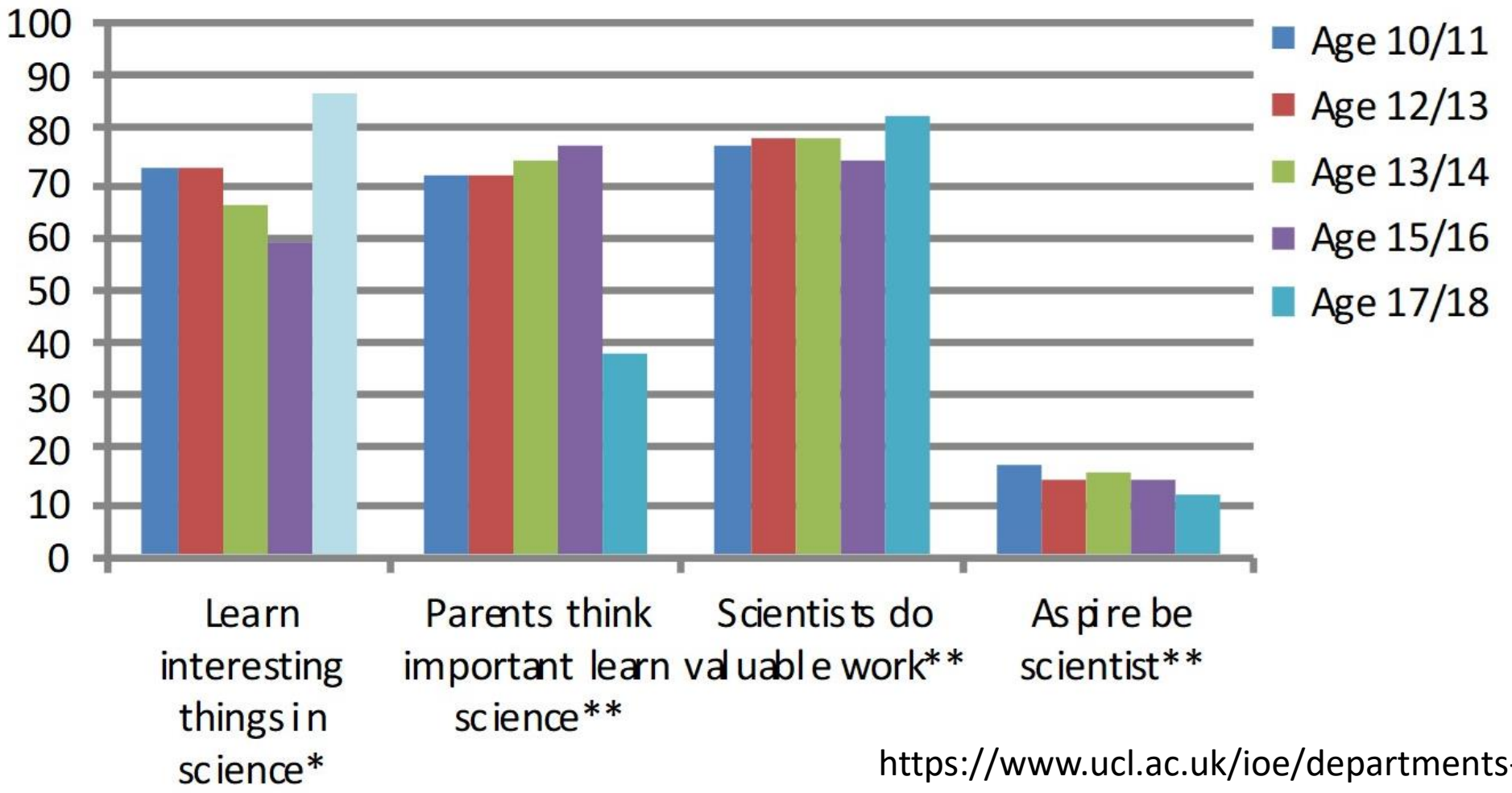
https://www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/aspires-2

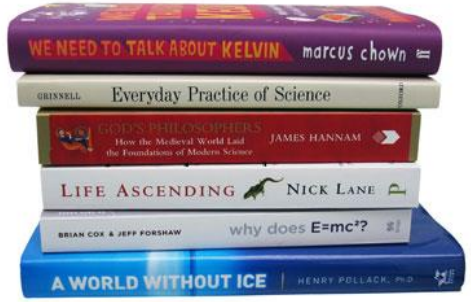
Comparison of survey responses from Y6, Y8, Y9, Y11, Y13 students

(% strongly/agreeing)



https://www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/aspires-2

When people think of science and scientists, we'd like them to think of something more like this…



Like football…

Or politics…

DEBATE MATE

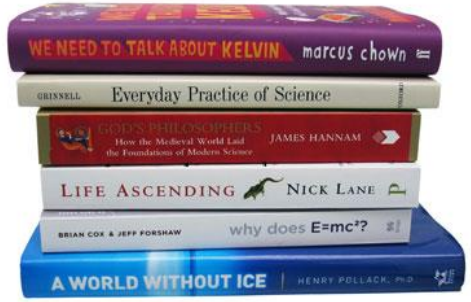
Vote

WOMEN'S
MARCH
BAY AREA - SAN JOSE
STOP THE
WAR
ON WOMEN
GRAB
'EM BY

Questionline

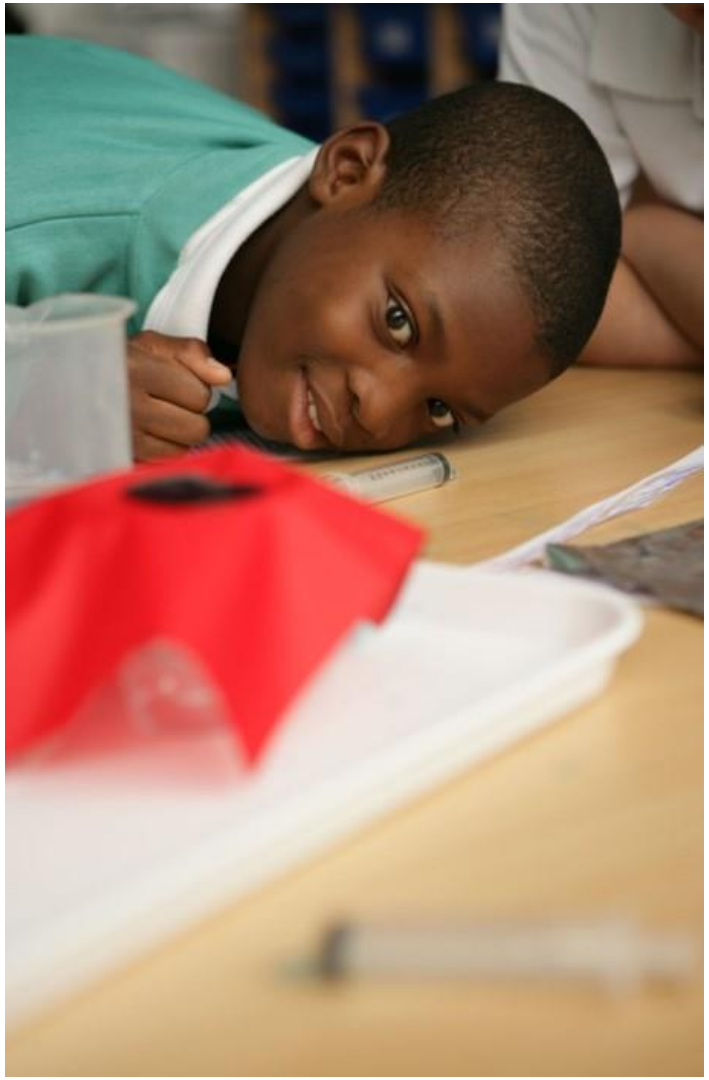
Or music…

When people think of science and scientists, we'd like them to think of something more like this…

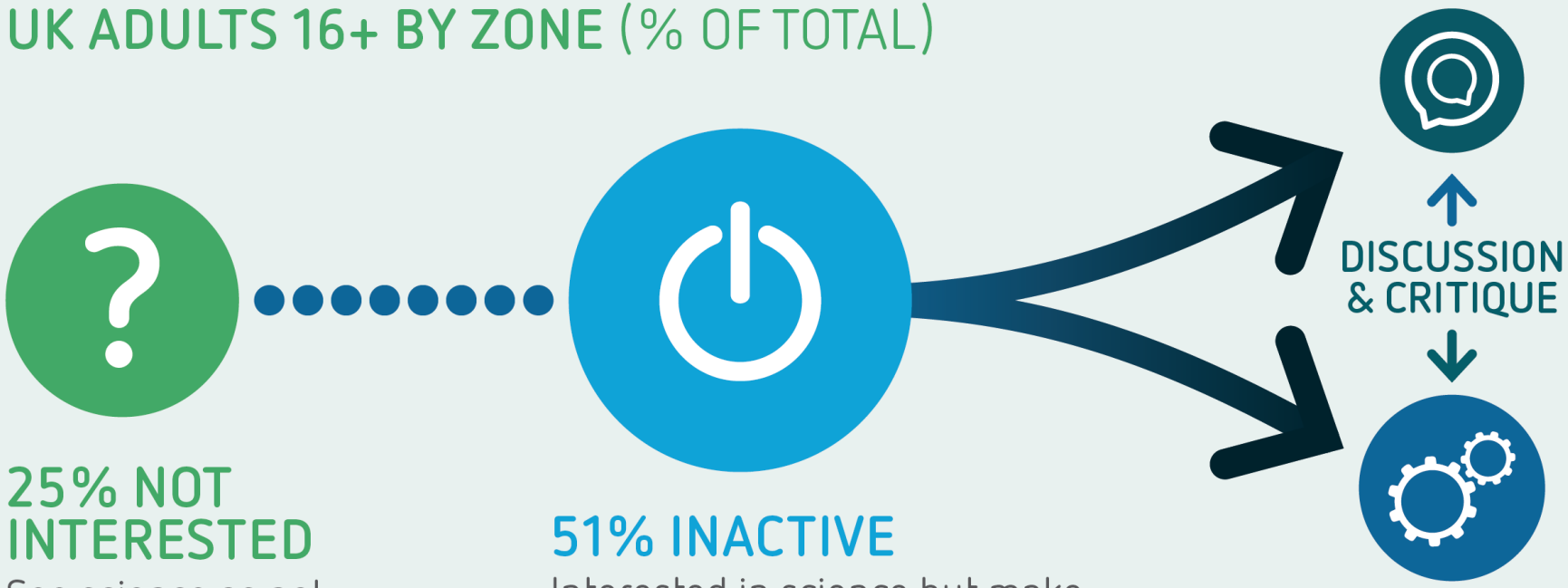


- Can soggy crisps be made crispy again?
- What components are required to produce the most effective sparkler that remains alight for the greatest duration whilst providing a consistent amount of sparks?
- Can hamsters be trained to use a potty?
- Build a bridge and get over it!
- What do animals have that humans don't, and does this make them more intelligent?
- How does a slinky defy gravity?
- Camel adaptations: designing shoes for the desert.
- What materials do bubbles bounce best on?
- Can a potato tell the time?
- Can discussing riddles improve autistic children's ability to comprehend?
- Do octopuses have a favourite tentacle that they use more often?
- Does the shape of a dog's ear affect how good its hearing is?
- Does time fly if you're having fun?
- Can girls find Wally faster than boys?

1. Motivations
2. Audiences
3. Impact



UK ADULTS 16+ BY ZONE (% OF TOTAL)

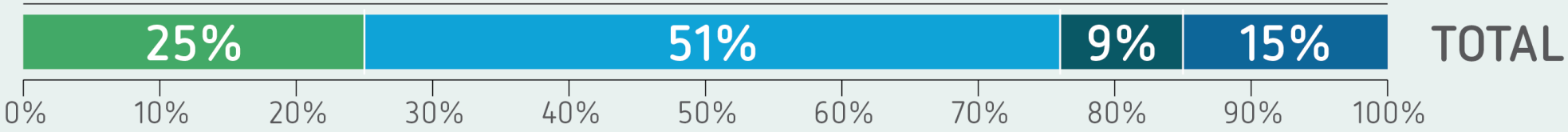


25% NOT INTERESTED
See science as not for them

51% INACTIVE
Interested in science but make no particular efforts to engage

9% ENGAGED
Enthusiastic about science and actively seek out information and events

15% PROFESSIONALS
Study, produce or curate scientific knowledge



Source: *King's College London 'Culture Tracker' 2016*, which questioned a representative sample of UK adults about their relationship with science.

BRITISH SCIENCE FESTIVAL

COVENTRY & WARWICKSHIRE
10-13 SEPTEMBER 2019

Festival Highlights

Partner activities on campus

Join us on campus for a taster of some of the latest innovative & cutting-edge technology.

LEARN MORE

Discussions

From climate change to body image, our thought-provoking discussions span a range of topics.

LEARN MORE

University of Warwick events

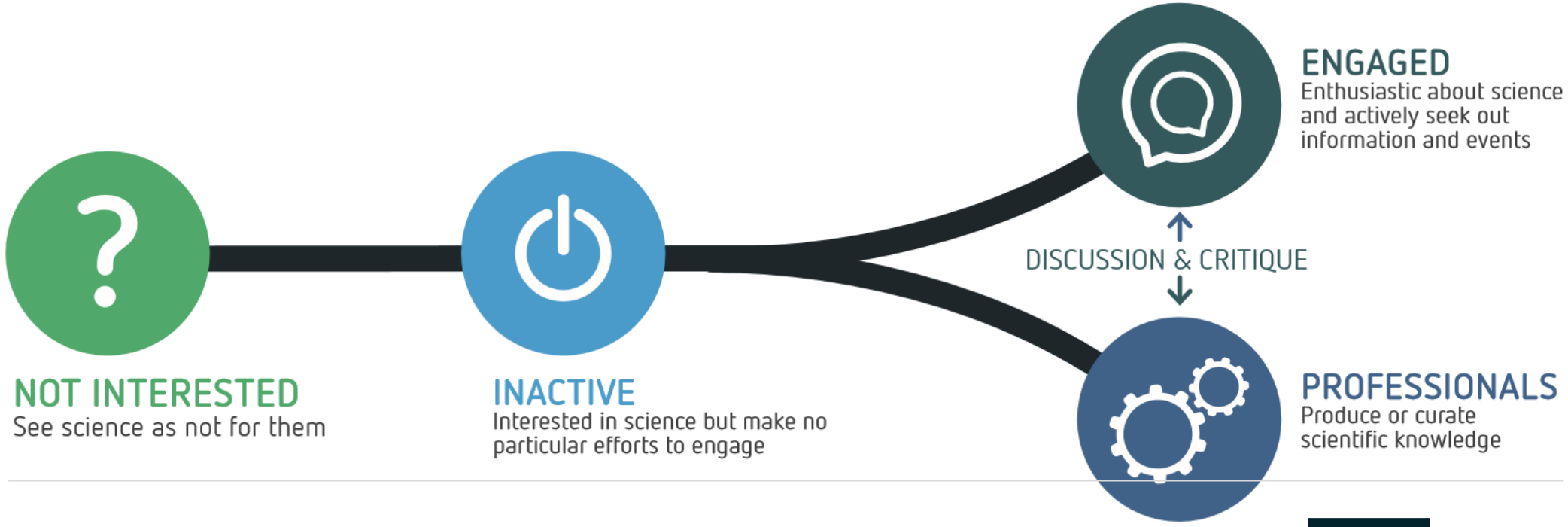
Check out the fantastic range of events organised by the University of Warwick.

LEARN MORE

Late events

Browse all the exciting activities taking place after dark!

LEARN MORE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DISCUSSION & CRITIQUE
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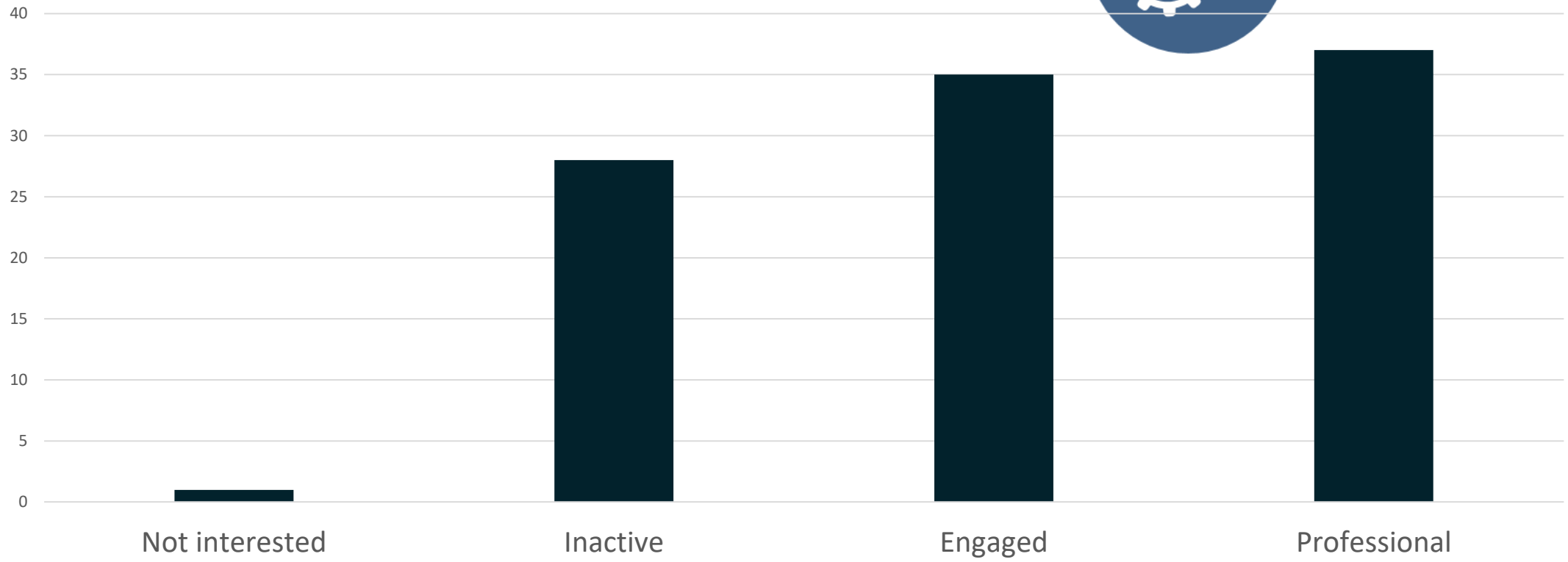
PROFESSIONALS
Produce or curate scientific knowledge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Not interested
Inactive
Engaged
Professional

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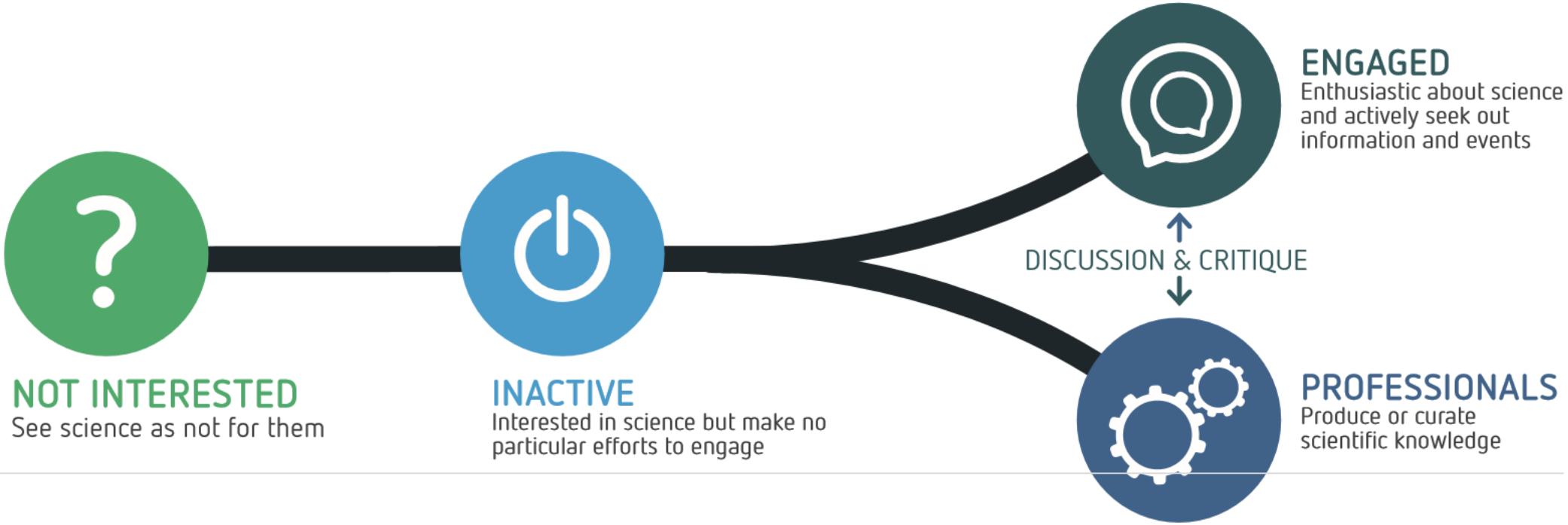
THE BUZZIE BUZZ
#FreedomToExplore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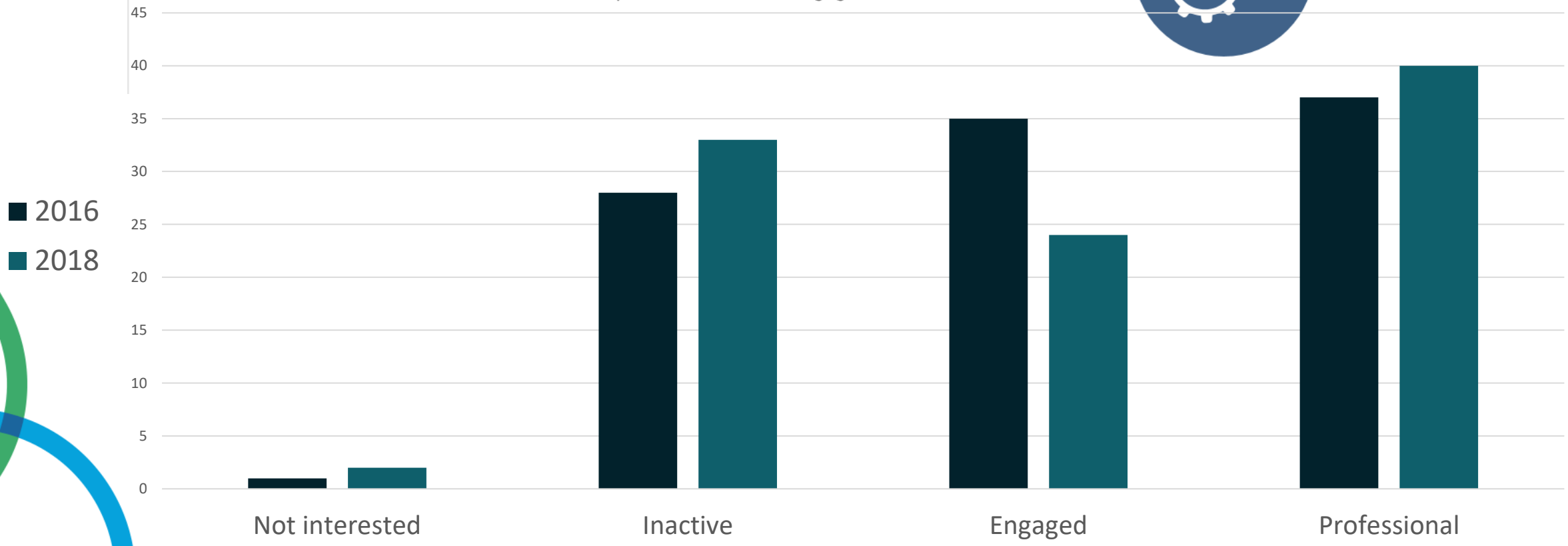
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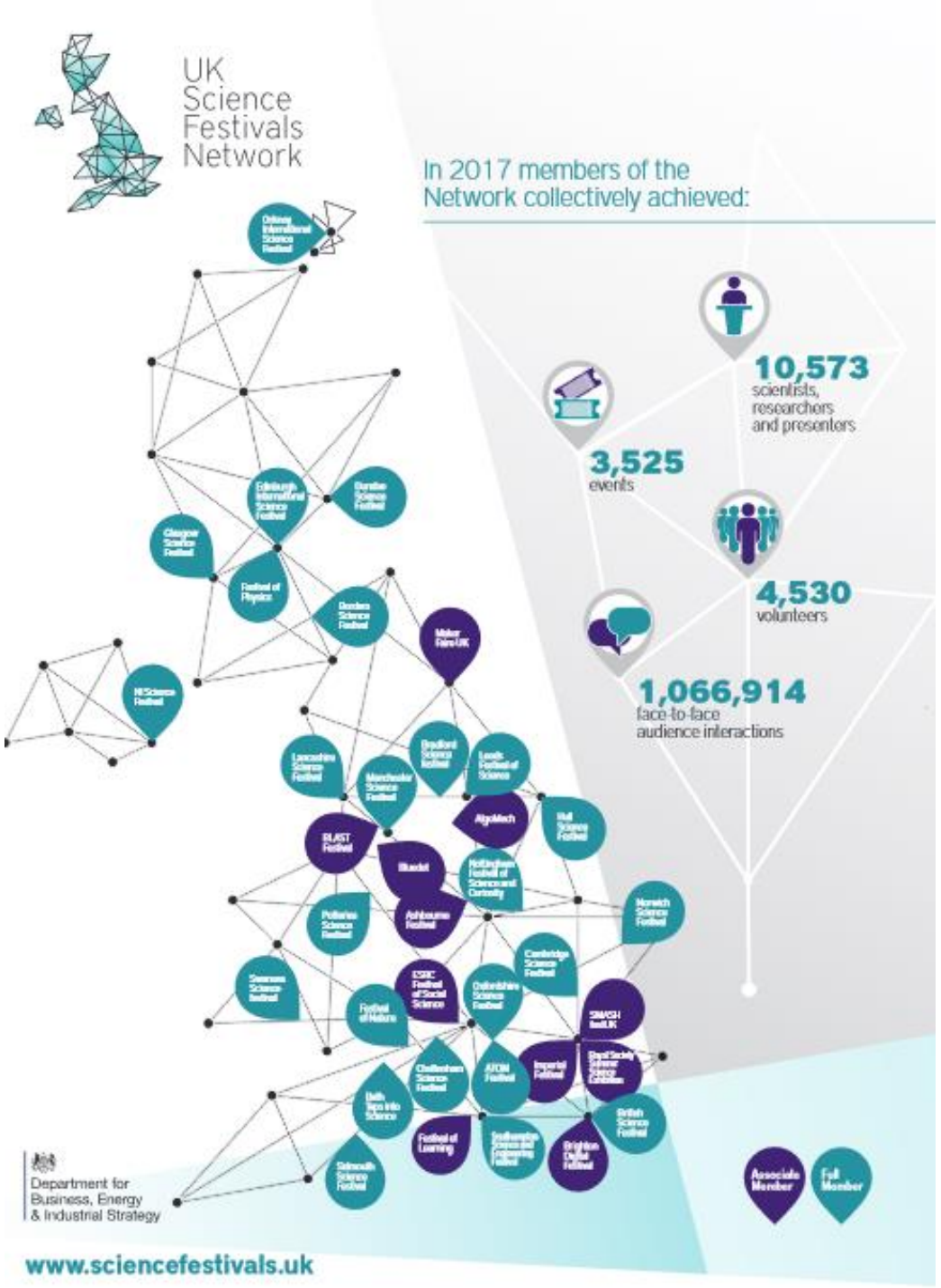
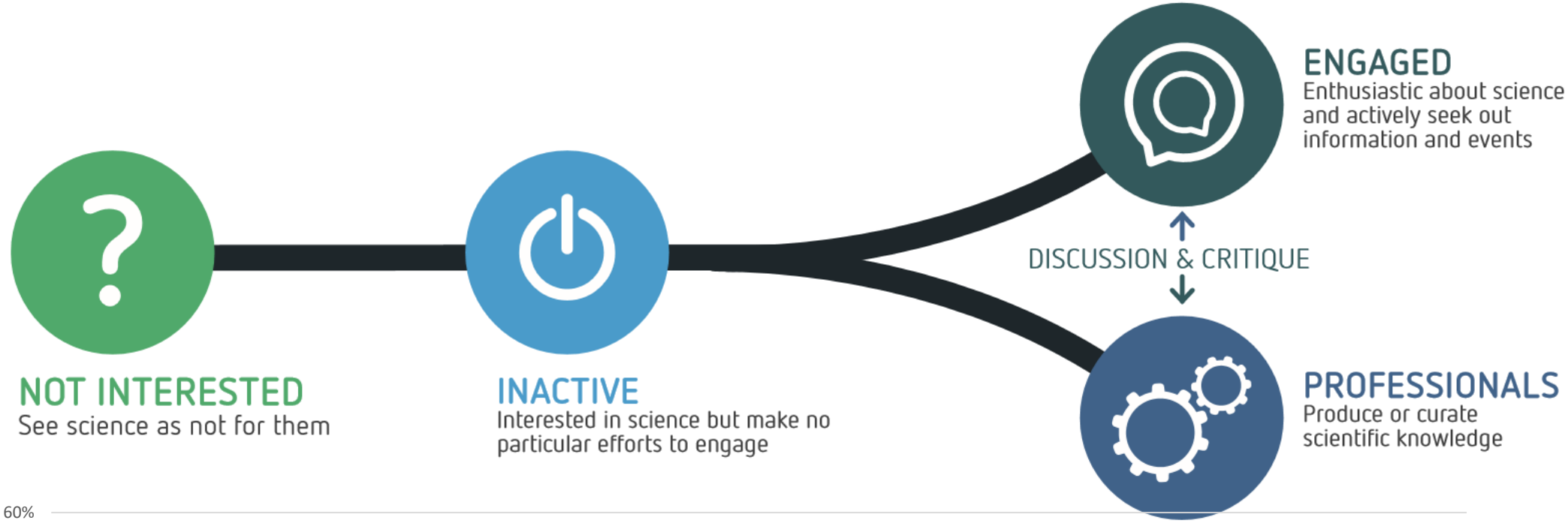

UK Science Festivals Network
In 2017 members of the Network collectively achieved:
10,573
scientists, researchers and presenters
3,525
events
4,530
volunteers
1,066,914
face-to-face audience interactions
Department for Business, Energy & Industrial Strategy
www.sciencefestivals.uk

British Science Week 2019

8-17 March

Thanks for taking part in British Science Week 2019. Join us again in 2020 between 6-15 March!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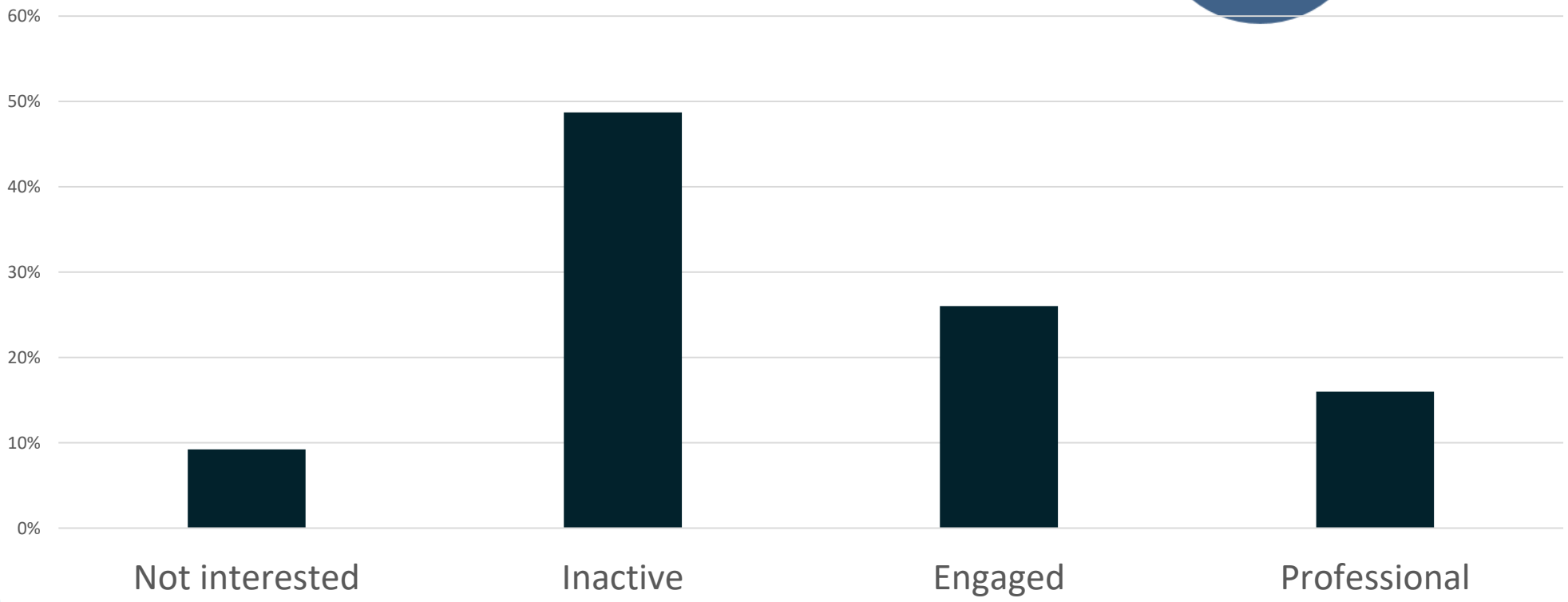
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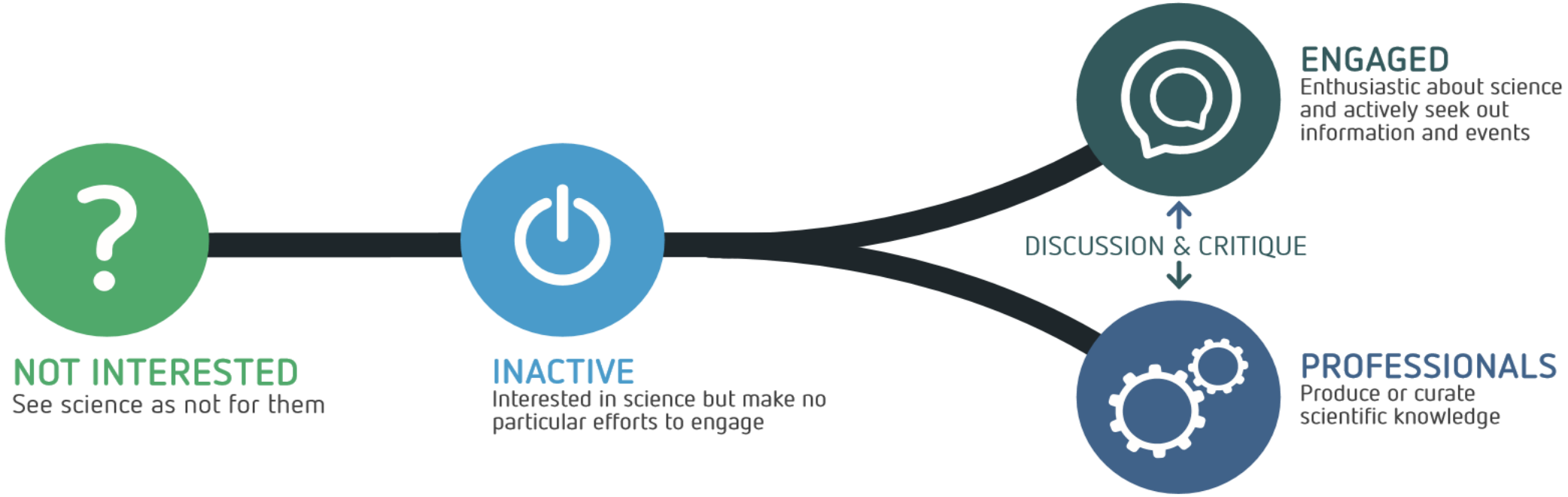
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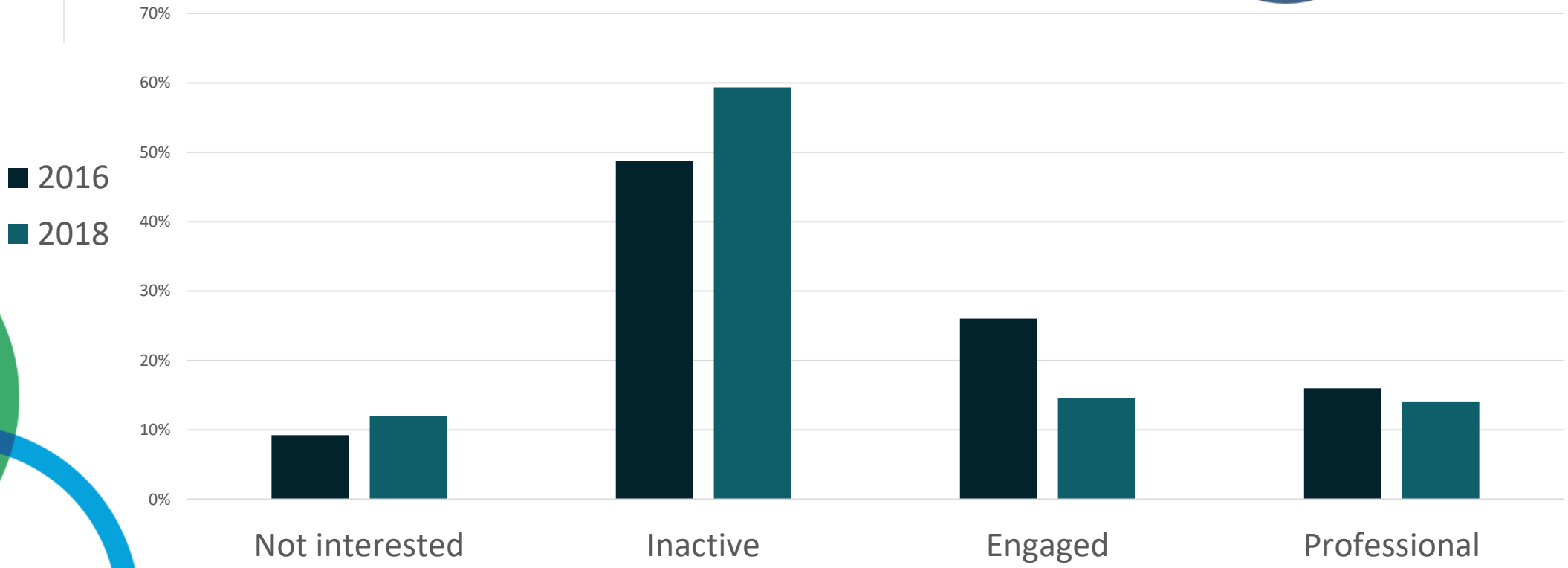
70%
60%
50%
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30%
20%
10%
0%
2016
2018
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Inactive
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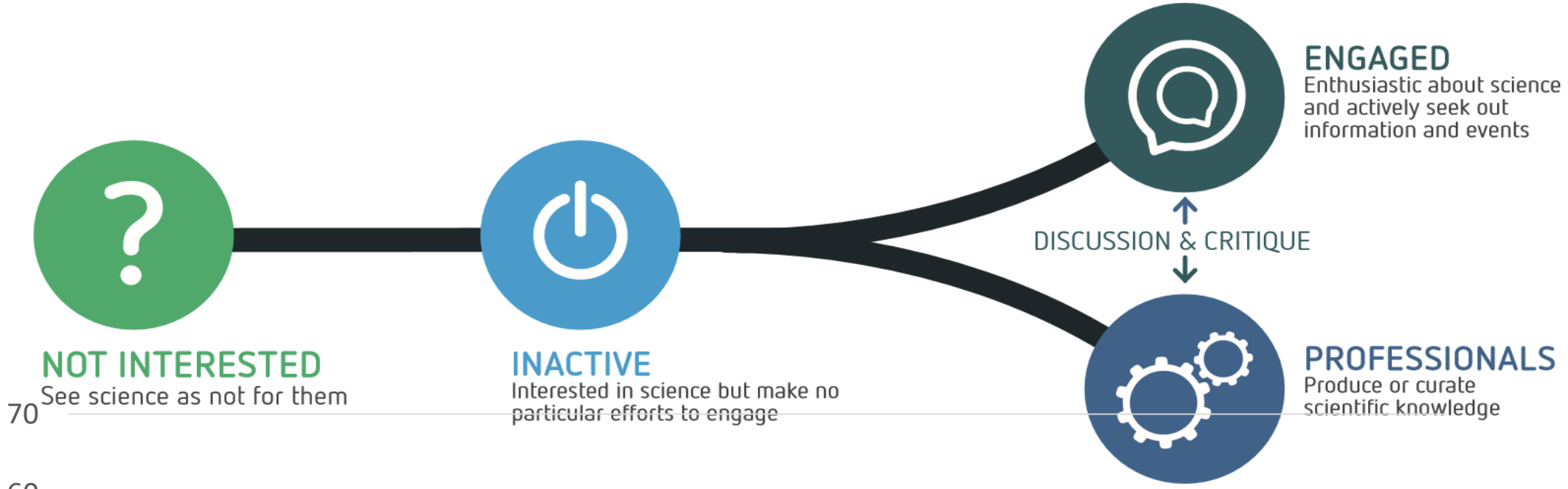
Professional

*“There’s a whole world to tap into to get that knowledge on so many levels so that was really, really exciting for me. And just being immersed in that community, having those conversations and seeing what the possibilities are, that was really, really exciting. And also the possibilities and opportunities I can create for the children, that was really exciting…**I wouldn’t say I see myself as a scientist but I do see myself as an enthusiast**….I’m very immersed.”*

Carmel, Community organiser, 2016

Future Debates

The British Science Association wants to empower many more people – not just scientists – to constructively engage in debates over science's role in their lives, their local economy, and the UK's future.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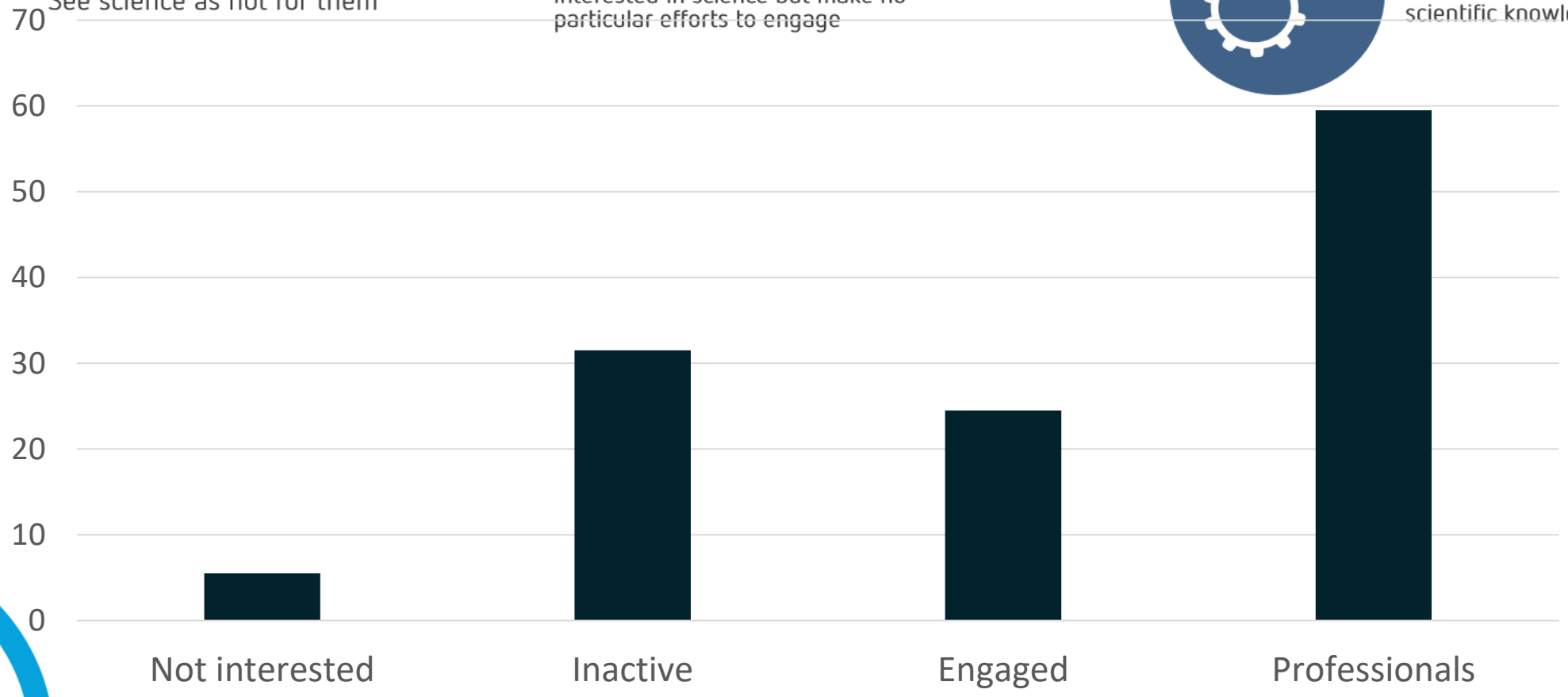
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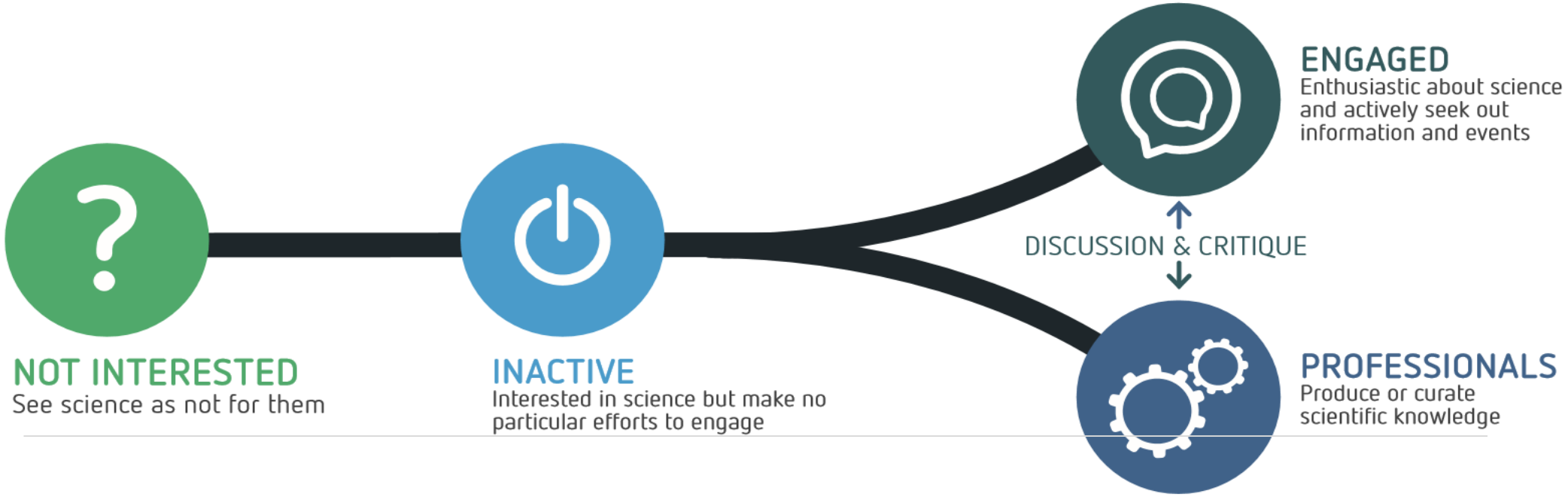
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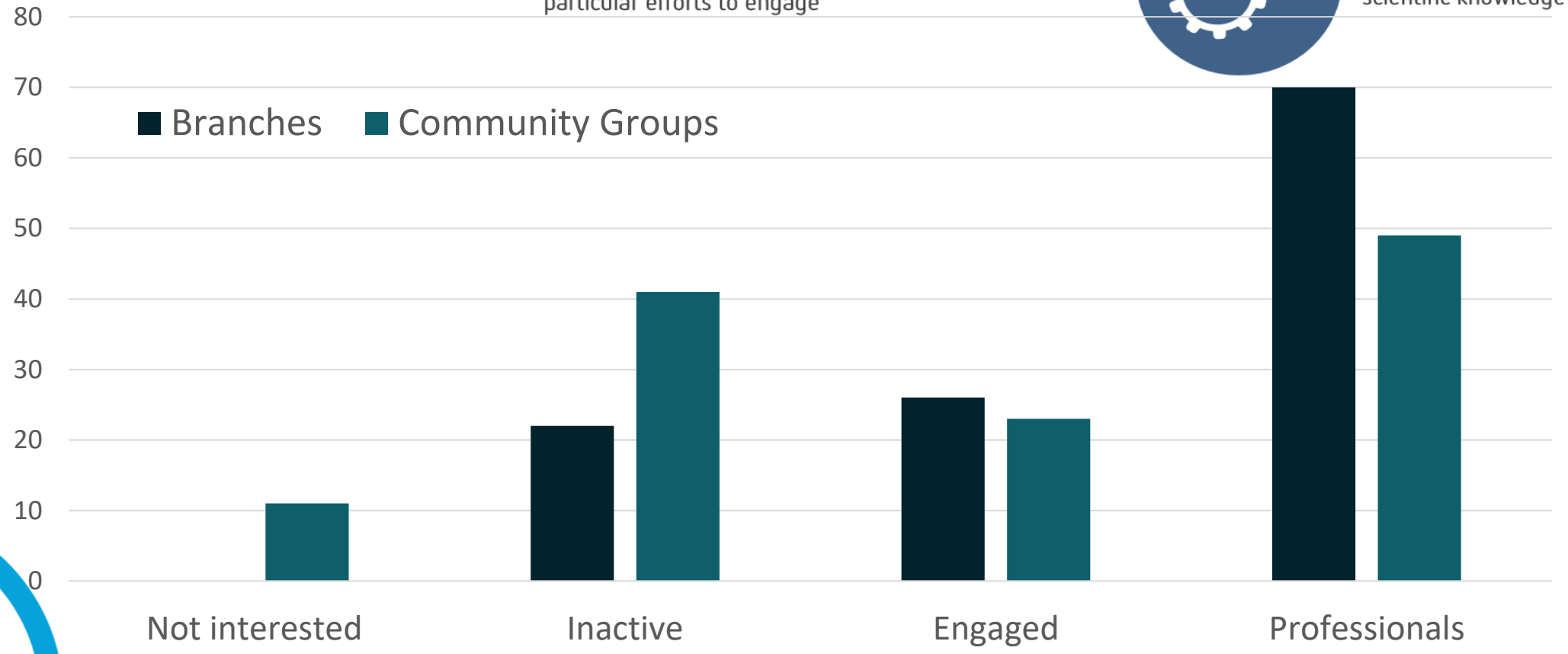
80
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Branches
Community Groups
Not interested
Inactive
Engaged
Professionals

BRITISH SCIENCE ASSOCIATION

Katherine Mathieson

Chief Executive

British Science Association

@Britsciassoc @kath_math

Katherine.Mathieson@britishscienceassociation.org