

Removing Gender Barriers in Physics

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Plan

- **The UK education system**
- **Project Juno**
- **Athena SWAN**
- **Drivers of change and reflections**
- **Gender stereotyping in schools**

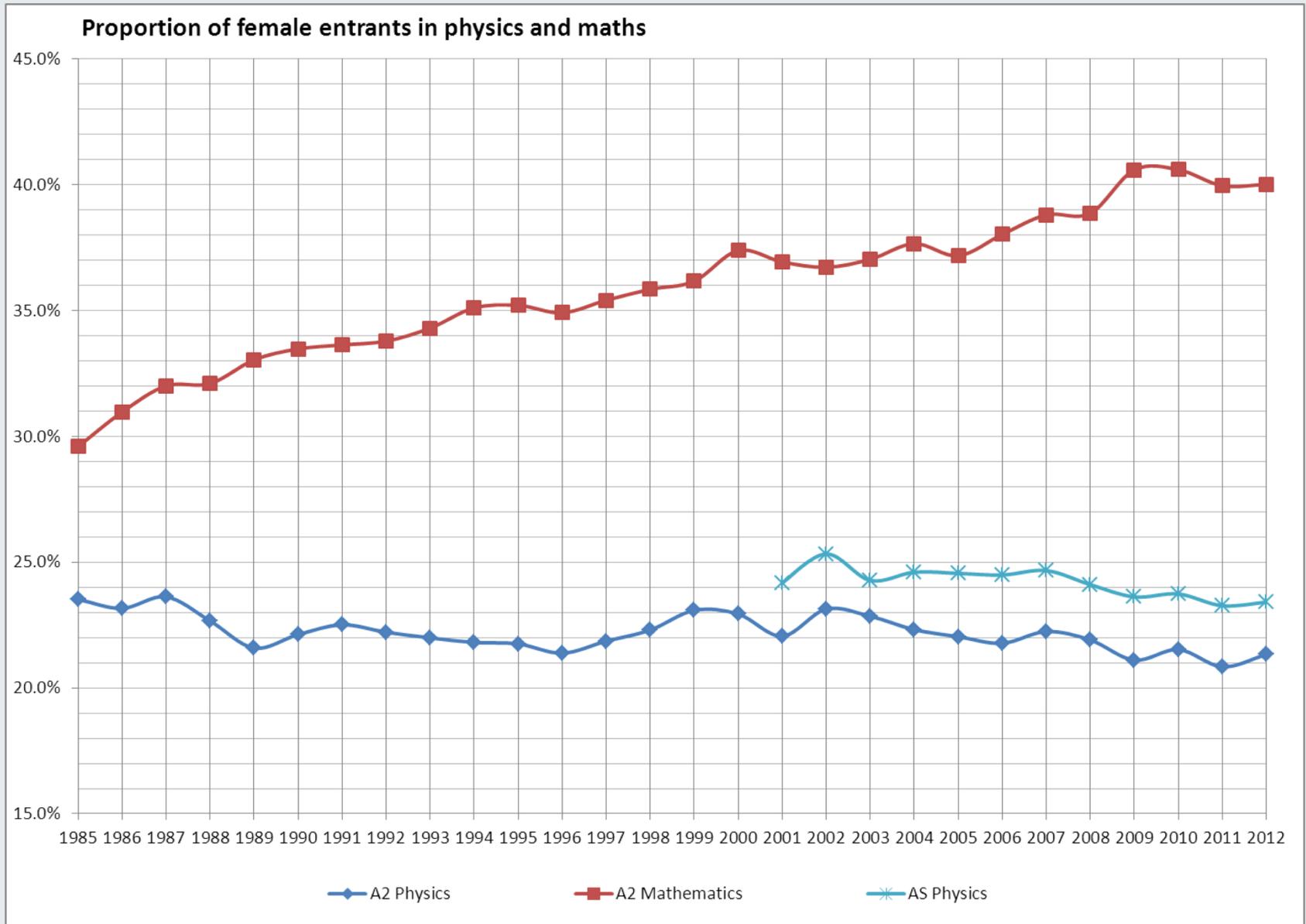
The UK Education structure...

...a simplified version

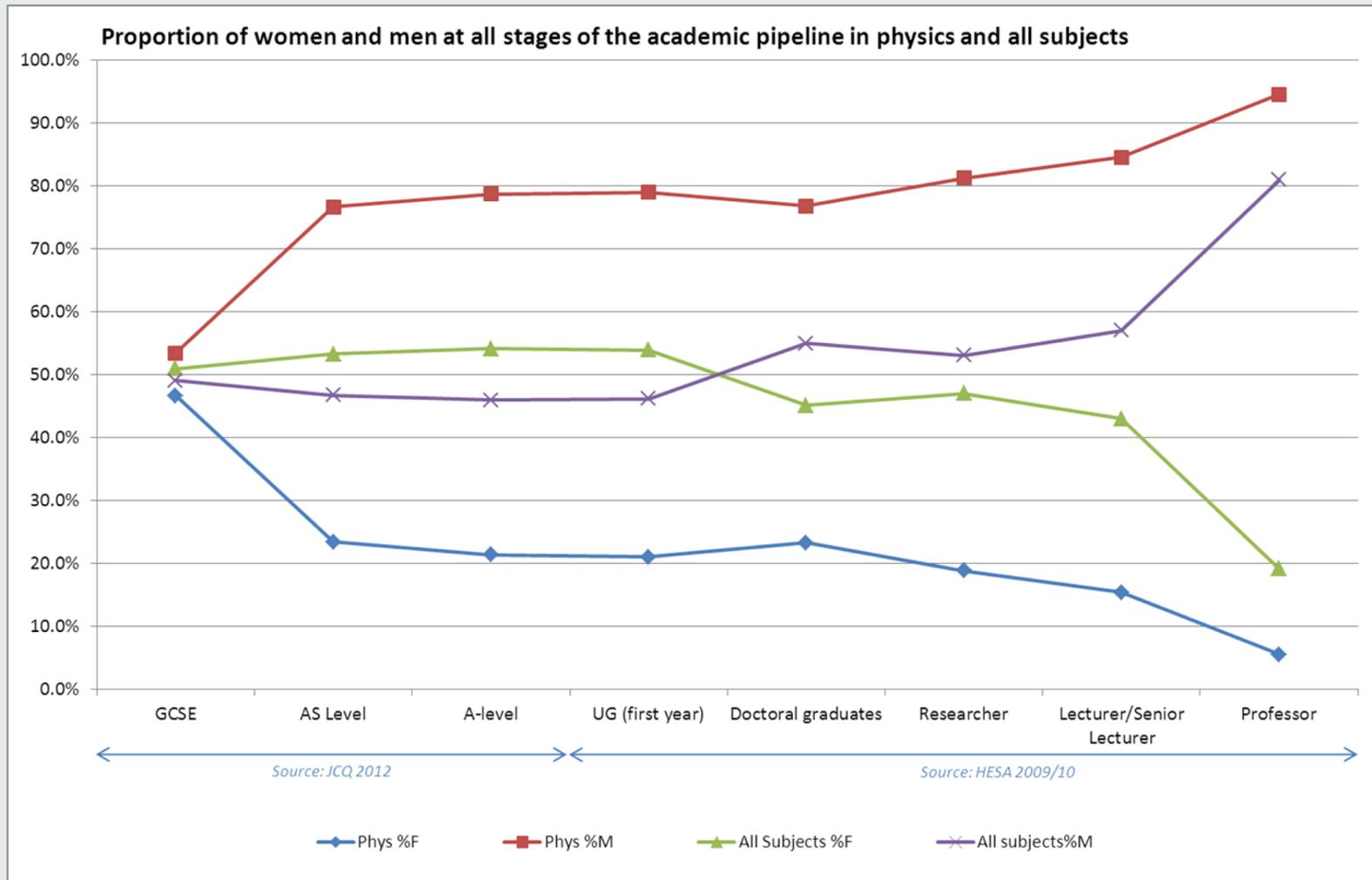
The Physics route

- **Everyone does Physics, usually as part of Science, until age 16**
- **Most students choose 3 A-levels from 16-18 in preparation for university entrance**
- **For Physics degrees these must include Physics and Mathematics**
- **First degree is either 3-year BSc or 4-year MPhys (or MSci)**
- **3 or 4 year PhD**
- **Then postdocs etc. as everywhere else**

% girls taking A levels in Maths and Physics



The subsequent fall off is relatively low



Project Juno

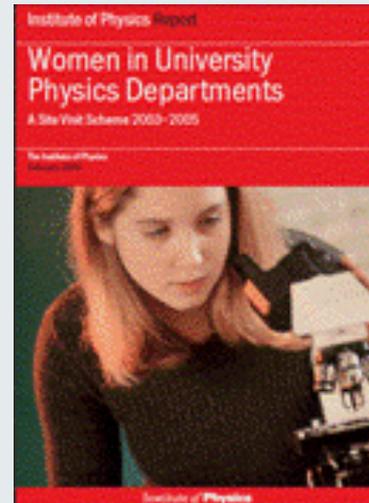
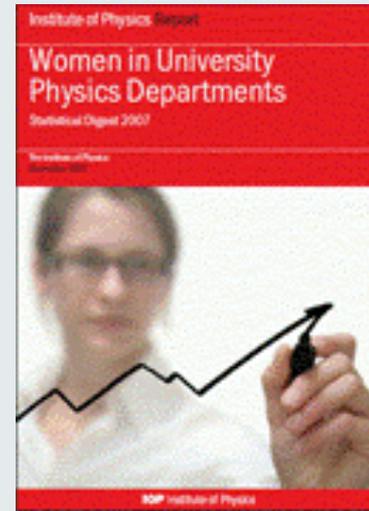
...a history

Development

- **2003-2005: Institute of Physics launched a scheme of Site Visits based on a similar scheme by the American Physical Society**
- **2006: Produced a report (see later) highlighting issues and suggestions for good practice**
- **2009: Led to the development of a set of Juno Principles**
- **2009-2019: Now an accreditation scheme to which Physics Departments can apply**
- **Unique to Physics**

Site Visit Scheme: Women in University Physics Departments

- **Panel ~ 6 physicists visited 17 depts. (including me for about 10 of the visits and always an early career person)**
- **Met management, senior and junior women staff, postdocs, PGs and UGs**
- **Tour of laboratories**
- **At the end gave oral feedback to Head of Dept**
- **Produced a confidential report after each visit**
- **Produced full report with suggestions for good practice**
- **For the first time, departmental staff meetings discussed these issues...**



Site Visit Scheme: Issues encountered 1

- **No one looking at the data – lots of anecdote and prejudice**
- **Women often isolated in tutorial groups or research groups**
- **Masculine culture around social events**
- **Some departments had very few women students (with no idea why)**
- **Several cases of sexual harassment, many of which were unknown to the department**
- **Lack of procedures to address harassment**

Site Visit Scheme: Issues encountered 2

- **Informal and biased recruitment structures at all levels – e.g. very macho recruitment documentation**
- **Inadequate (or non-existent) appraisal structures, particularly for post-docs**
- **Many young women did not feel an academic career was compatible with raising a family**
- **Male-dominated management structures**
- **No transparency in workload allocation**

Site Visit Scheme: Issues encountered 3

- **Promotion schemes rewarding those who push themselves forward**
- **Career breaks (e.g. maternity cover):**
 - **Not taken into account for recruitment, promotion etc.**
 - **No formal reduction of workload on return**
 - **No formal procedures while on break**
- **Poor childcare support**
- **Men not taking advantage of paternity leave etc.**
- **Long hours culture prevalent**



**“My boss says I can start working from home
two days a week...Saturday and Sunday.”**

Site Visit Scheme: Issues encountered 4

- **Isolated women struggle even in “friendly” departments**
- **Almost no training on gender issues for teachers, demonstrators, tutors...**
- **Published material full of gender stereotypes**
- **Post-docs were usually totally neglected in terms of support and career development and were often expected to work unreasonable hours**
- **Flexible working offered as a favour with no formal procedures**

Project Juno 2009 - originally 5 Principles, now 6

- 1. A robust organisational framework to deliver equality of opportunity and reward**
- 2. Appointment and selection processes and procedures that encourage men and women to apply for academic posts at all levels**
- 3. Departmental structures and systems which support and encourage the career progression and promotion of all staff and enable men and women to progress and continue in their careers**
- 4. Departmental organisation, structure, management arrangements and culture that are open, inclusive and transparent and encourage the participation of all staff**
- 5. Flexible approaches and provisions that enable individuals, at all career and life stages, to optimise their contribution to their department, institution and to SET**
- 6. An environment where professional conduct is embedded into departmental culture and behaviour.**

Each Principle has guidelines

1. A robust organisational framework to deliver equality of opportunity and reward:

1.1. Establish organisational framework

1.1.1. Evidence of senior management commitment

1.1.2. Effective consultation, communication, monitoring, evaluation and reporting mechanisms

1.1.3. Clear accountability for implementation and resources allocated (time and money)

1.2. Monitoring and evidence base

1.2.1. Monitor over time, quantitative data by gender:

All student admissions and performance

All staff applications, shortlists, appointment and promotion, looking at the proportion of women at each stage

1.2.2. Obtain qualitative data from staff

1.2.3. Identify any discrepancies in gender representation and/or progression and identify factors that might be causing them

How it works

- **Three levels of award (4th being added)**
 - **Supporter**

You start your Juno journey by endorsing the five principles and making a commitment to work towards Practitioner and then Champion.
 - **Practitioner**

You demonstrate that your Juno journey is well underway. Qualitative and quantitative evidence is gathered and its initial action plan demonstrates how you aim to achieve Champion status.
 - **Champion**

You demonstrate that the six principles are embedded throughout. Further evidence is gathered and its action plan demonstrates how you will continue to further good practice.

How it works 2

- **Paperwork includes:**
 - **Letter of support from Head of Department**
 - **Data on students, staff, recruitment, promotion, attainment etc**
 - **Narrative analysing data and describing initiatives**
 - **Action Plan**
- **Assessment is made by a panel of volunteers drawn from a number of Physics departments.**
- **Panel visits departments, not directly as part of the assessment but in an advisory capacity.**
- **Currently:**
 - **21 UK Juno Champions**
 - **14 UK Juno Practitioners + 3 Irish + National Physical Laboratory**
 - **9 UK Juno Supporters + 5 Irish.**
- **Evaluation:**



Athena SWAN Charter

<https://www.ecu.ac.uk/equality-charters/athena-swan/>

History

- **Driven by the awful situation with women in science, engineering and mathematics departments**
- **Started as a collaboration between:**
 - **The Scientific Women's Academic Network** led by social scientists at London Metropolitan University and
 - **The Athena Network** led by the Royal Society
 - **The UK Research Funding Councils** who provided funds to establish the scheme
 - **Organisation eventually picked up by Equality Challenge Unit**
- **Athena SWAN Charter** was launched in 2005 (by coincidence at the Institute of Physics) and the first awards were made in 2006.
- **Originally, only STEM departments could apply but in 2015 the Charter was expanded to include all subjects + research institutes.**
- **163** Institutions hold awards and **646** departments

Athena SWAN Charter

- **Institution must have an award before Department can apply**
- **Entirely paper based exercise – no visits or contact at all**
- **Structure of application is more rigidly defined than for JUNO**
- **Application developed by Self-assessment team**
- **Judgement by panels drawn by cognate disciplines**

Athena SWAN: award levels



Bronze

- 🏠 self-assessment and analysis
- 🏠 identify issues and challenges
- 🏠 plan activities on a solid foundation



Silver (equivalent to Juno Champion)

- 🏠 additional to Bronze
- 🏠 evidence of progress and achievement

Gold

- 🏠 significant record of activity and impact
- 🏠 beacons for gender equality and good practice

Advancing equality and diversity in universities and colleges

The framework

1. Letter of endorsement
2. Description of the department
3. Self-assessment process
4. Picture of the department
5. Supporting and advancing careers
 - Key career transition points
 - Career development
 - Flexibility and managing career breaks
 - Organisation and culture
6. Case studies
7. Action plan



Equality Challenge Unit



Advancing equality and diversity in universities and colleges

Drivers and Reflections

Drivers of Change

- **Research funders expect departments to be considering diversity issues**
- **In 2011, the UK Chief Medical Officer announced that certain funding for medical departments depended on them having a Silver Athena SWAN award**
- **The Research Excellence Framework, which measures the research quality in every university in every subject (and is very important) more or less requires Athena SWAN or Juno recognition.**

Athena SWAN vs Project Juno

- **Athena SWAN has more formalized paperwork and is common to all subjects...**
- **...but AS is top down and there is evidence that applications are being led centrally, whereas...**
- **...Juno operates at the department level and is definitely bottom up**
- **Juno has visits**
- **Juno is owned and judged by the Physics community**
- **The Institute of Physics brings together the Juno Community and acts as a driver for good practice**
- **The two schemes have led to dramatic change in many ways – major change is that these issues are discussed openly**

Reflections

- **A formal charter scheme gives a focus to efforts to improve gender equality**
- **External drivers, particularly when funding is involved, can have a massive effect**
- **It is better if a scheme can be owned by the subject community**
- **The IOP is stretched to run Juno just for the UK and Ireland but could we imagine either a Europe-wide scheme or a franchised Project Juno?**

Advice on what is important

- **Senior management commitment is essential**
- **Evidence from numerical data, forums and questionnaires**
- **Data:**
 - **Recruitment (applications, shortlisted, appointed)**
 - **Committee membership**
 - **Invited speakers**
 - **Student recruitment, progression, attainment**
 - **Promotion applications and success**
 - **Pay gaps Etc**
- **Questionnaires – look for difference in views by gender**

Advice on what is important 2

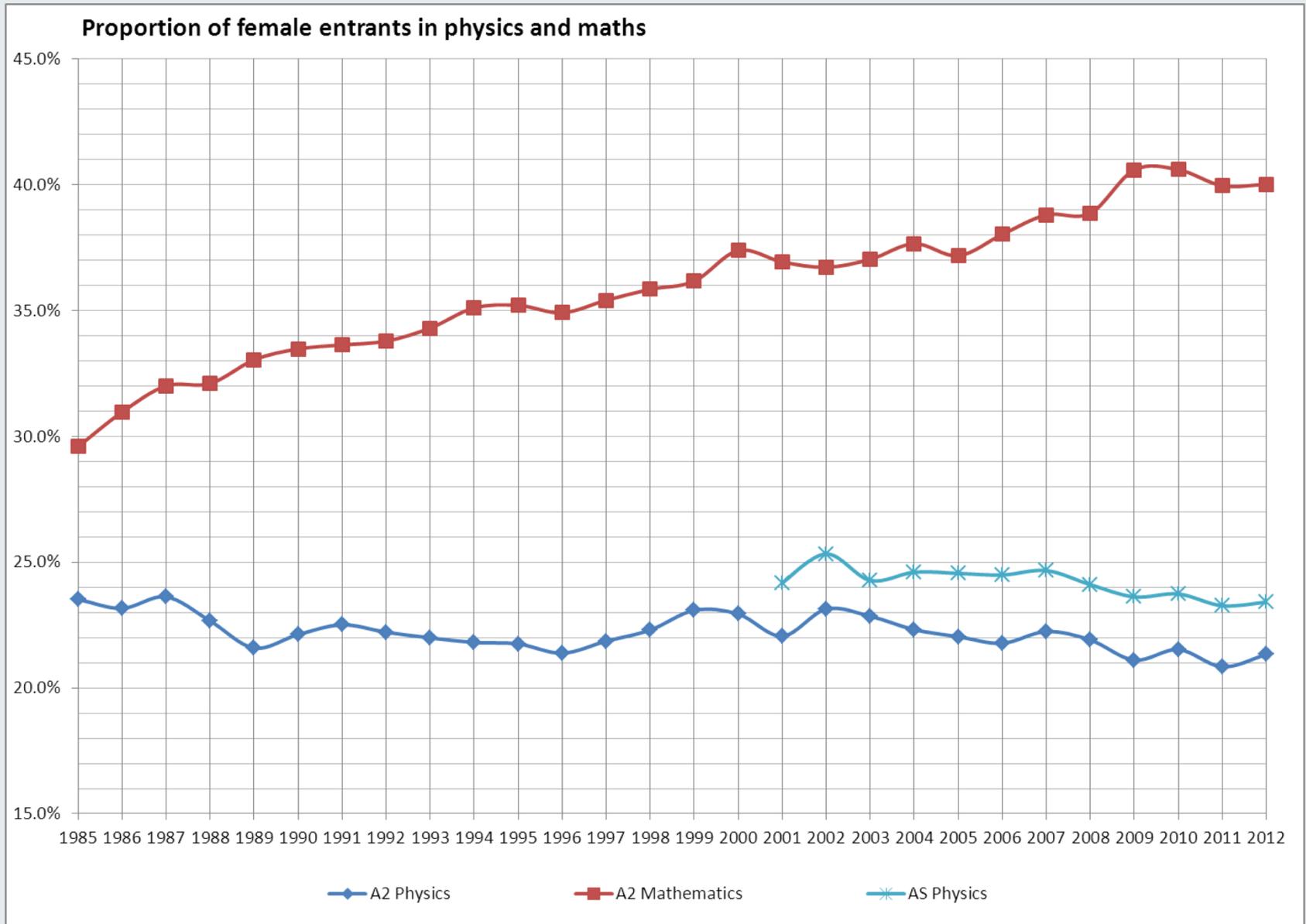
- **Formal procedures dealing with career breaks, flexible working etc**
- **Inclusive culture – men take advantage of diversity schemes**
- **Transparent processes**
 - **Appointment procedures**
 - **Promotion criteria and feedback**
 - **Workload allocation etc.**
- **Include everyone and all committees in process – diversity should be embedded in everything you do**
- **Develop an Action Plan**

Action Plan

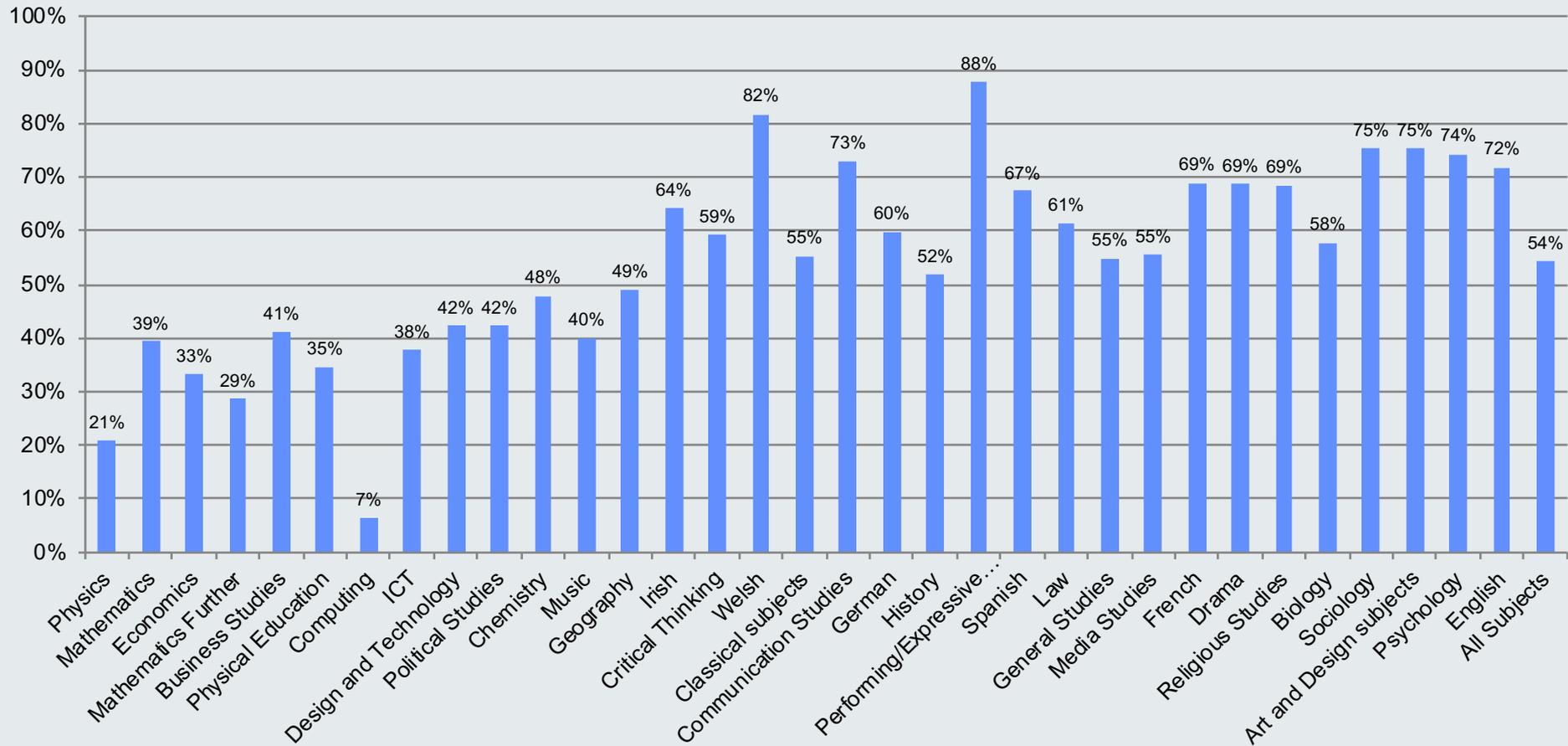
- **Must be evidence-based**
- **For each action**
 - **What problem are you trying to solve – from evidence?**
 - **What action are you proposing?**
 - **Why do you think that action will address that problem?**
 - **How will you know when you have been successful?**
 - **Who is responsible for the action?**
 - **What is the timescale?**
- **S**pecific: Refers to a particular issue identified in the analysis
- **M**easurable: Criteria for success can be measured
- **A**chievable: Do not promise things that are implausible
- **R**elevant: Should relate to specific issue.
- **T**ime-bound: Provide milestones/deadlines. Be realistic.

Gender stereotyping in schools

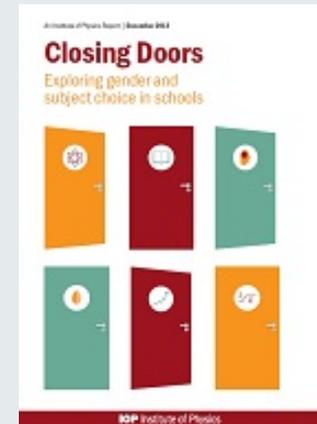
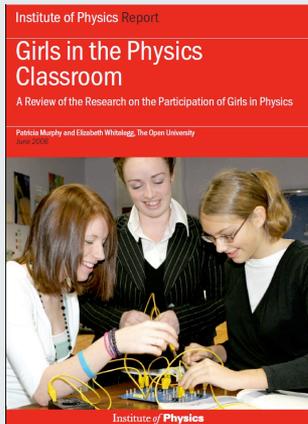
% girls taking A levels in Maths and Physics



Gender imbalance is a common phenomenon



Various IOP reports and longitudinal research



UPMAP: Understanding Participation in Maths and Physics (Institute of Education, UCL)

[http://research.ioe.ac.uk/portal/en/projects/understanding-participation-rates-in-post16-mathematics-and-physics-upmap\(45a02dd7-1141-4e70-a97b-bcb65adc79f4\).html](http://research.ioe.ac.uk/portal/en/projects/understanding-participation-rates-in-post16-mathematics-and-physics-upmap(45a02dd7-1141-4e70-a97b-bcb65adc79f4).html)

ASPIRES: King's College now IOE at UCL

<https://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf>

Summary of IOP work and other research

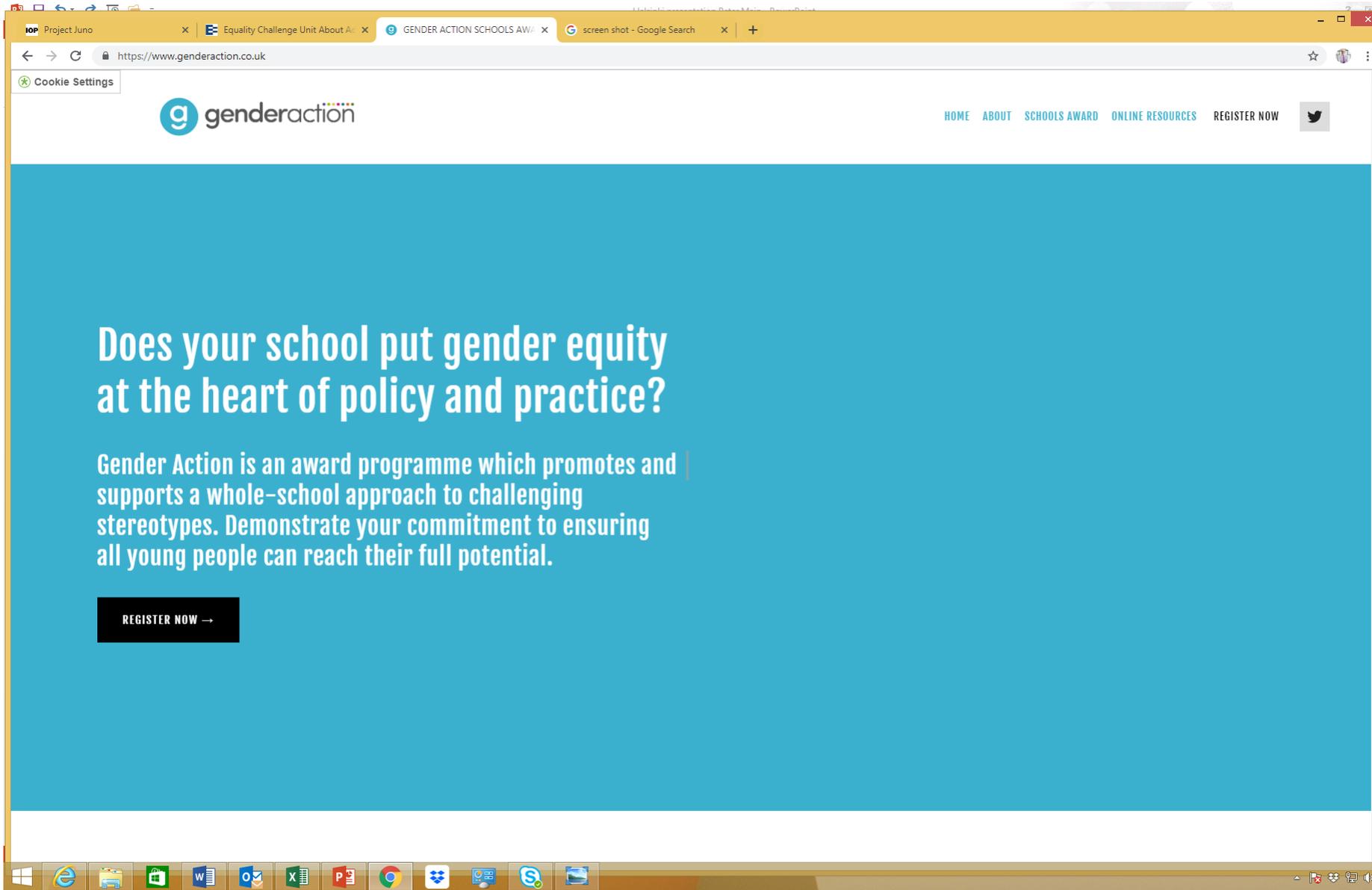
- 1. School culture can have a massive effect on whether girls progress to do Physics: girls more likely to do physics in all girls schools**
- 2. Family attitude to science is a very important factor in determining choice**
- 3. Female students unlikely to respond to conventional attempts to sell STEM careers; girls find it hard to see themselves in physics and engineering**
- 4. Perceived subject difficulty is a major barrier**
- 5. Traditional outreach **does not work** (high achieving women speakers, gee-whiz physics) and is likely to reinforce problems**
 - a) Only exceptional women can do physics
 - b) Perceptions of difficulty
- 6. To beat the gender stereotype in Physics you need to be beating gender stereotyping in all the other subjects too**

IGB Findings

- Blended approach improving teaching and attacking stereotyping - 6 pilot schools
- Spectacular effects

Schools	2015/2016 girls		2013/2014 girls	
	Number	%	Number	%
A	5	31	0	0
B	7	21	2	9
C	3	8	2	6
D	24	51	2	15
E	12	33	4	13
F	1	20	2	14
Total	52	27	16	10

Gender action: breaking down gender stereotyping in schools



The image shows a screenshot of a web browser displaying the homepage of the Gender Action Schools Award. The browser's address bar shows the URL <https://www.generation.co.uk>. The page features a blue header with the 'genderaction' logo on the left and navigation links for 'HOME', 'ABOUT', 'SCHOOLS AWARD', 'ONLINE RESOURCES', and 'REGISTER NOW' on the right. A large blue banner contains the main heading 'Does your school put gender equity at the heart of policy and practice?' and a sub-heading: 'Gender Action is an award programme which promotes and supports a whole-school approach to challenging stereotypes. Demonstrate your commitment to ensuring all young people can reach their full potential.' Below this text is a black button with the text 'REGISTER NOW →'. The Windows taskbar is visible at the bottom of the screen.

Project Juno | Equality Challenge Unit About A... | GENDER ACTION SCHOOLS AW# | screen shot - Google Search | +

Cookie Settings

genderaction

HOME ABOUT SCHOOLS AWARD ONLINE RESOURCES REGISTER NOW

Does your school put gender equity at the heart of policy and practice?

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REGISTER NOW →

Questions?

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"I don't have any answers. I'm a non-prophet."