Opening doors: ensuring equality of access to all subjects for boys and girls

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Opening Doors - an Institute of Physics and Government Equalities Office project

- investigating and addressing gender stereotyping in secondary schools.
- Resulted in a good practice guide, highlighting issues that many schools deal with on a daily basis.
- Presents suggestions for schools facing similar barriers, including nine essential features of a school that is actively addressing gender equity.
Summary of presentation

- Background to the project from the IOP perspective
- Details of the project
- Next steps and discussion
Background – A level entries

A level entries for Girls in STEM subjects 1985-2013 - source JCQ

- physics
- maths and further maths
- chemistry
- biology

number

year

IOP Institute of Physics
### A-level subjects for female students 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Subject</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>English</td>
<td>63838</td>
</tr>
<tr>
<td>2</td>
<td>Psychology</td>
<td>41308</td>
</tr>
<tr>
<td>3</td>
<td>Biology</td>
<td>35664</td>
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<tr>
<td>4</td>
<td>Art and Design subjects</td>
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<tr>
<td>5</td>
<td><strong>Mathematics</strong></td>
<td><strong>34301</strong></td>
</tr>
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<td>6</td>
<td>History</td>
<td>26491</td>
</tr>
<tr>
<td>7</td>
<td>Sociology</td>
<td>23514</td>
</tr>
<tr>
<td>8</td>
<td>Chemistry</td>
<td>23260</td>
</tr>
<tr>
<td>15</td>
<td>French</td>
<td>8593</td>
</tr>
<tr>
<td>16</td>
<td>Economics</td>
<td>8037</td>
</tr>
<tr>
<td>17</td>
<td>Law</td>
<td>7994</td>
</tr>
<tr>
<td>18</td>
<td><strong>Physics</strong></td>
<td><strong>7361</strong></td>
</tr>
<tr>
<td>19</td>
<td>Design and Technology</td>
<td>7298</td>
</tr>
<tr>
<td>20</td>
<td>Political Studies</td>
<td>6591</td>
</tr>
<tr>
<td>24</td>
<td>Spanish</td>
<td>4871</td>
</tr>
<tr>
<td>25</td>
<td>ICT</td>
<td>4284</td>
</tr>
<tr>
<td>26</td>
<td><strong>Mathematics Further</strong></td>
<td><strong>3972</strong></td>
</tr>
<tr>
<td>27</td>
<td>Music</td>
<td>3790</td>
</tr>
<tr>
<td>36</td>
<td>Irish</td>
<td>203</td>
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</table>

### A-level subjects for male students 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Subject</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Mathematics</strong></td>
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<td>2</td>
<td>Biology</td>
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<td>3</td>
<td><strong>Physics</strong></td>
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<tr>
<td>4</td>
<td>Chemistry</td>
<td>25974</td>
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<tr>
<td>5</td>
<td>English</td>
<td>25800</td>
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<td>6</td>
<td>History</td>
<td>25161</td>
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<td>14</td>
<td>Physical Education</td>
<td>11030</td>
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<td>15</td>
<td>Design and Technology</td>
<td>9807</td>
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<td><strong>Mathematics Further</strong></td>
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<td>17</td>
<td>Political Studies</td>
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<td>18</td>
<td>Sociology</td>
<td>7843</td>
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<td>19</td>
<td>Religious Studies</td>
<td>7298</td>
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<td>20</td>
<td>ICT</td>
<td>6804</td>
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<td>24</td>
<td>Drama</td>
<td>4763</td>
</tr>
<tr>
<td>25</td>
<td>Other modern languages</td>
<td>4020</td>
</tr>
<tr>
<td>26</td>
<td>French</td>
<td>3918</td>
</tr>
<tr>
<td>27</td>
<td>Computing</td>
<td>3512</td>
</tr>
<tr>
<td>36</td>
<td>Irish</td>
<td>101</td>
</tr>
</tbody>
</table>
Degree course destinations for accepted applicants with physics and mathematics A-level in 2011

<table>
<thead>
<tr>
<th>place</th>
<th>males course destination</th>
<th>%</th>
<th>females course destination</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mechanical engineering</td>
<td>13.7</td>
<td>physics</td>
<td>9.2</td>
</tr>
<tr>
<td>2</td>
<td>physics</td>
<td>11.0</td>
<td>pre-clinical medicine</td>
<td>7.0</td>
</tr>
<tr>
<td>3</td>
<td>civil engineering</td>
<td>7.5</td>
<td>mathematics</td>
<td>5.3</td>
</tr>
<tr>
<td>4</td>
<td>electronic &amp; electrical engineering</td>
<td>5.7</td>
<td>chemistry</td>
<td>5.1</td>
</tr>
<tr>
<td>5</td>
<td>aerospace engineering</td>
<td>5.2</td>
<td>civil engineering</td>
<td>4.8</td>
</tr>
<tr>
<td>6</td>
<td>computer science</td>
<td>4.9</td>
<td>architecture</td>
<td>4.8</td>
</tr>
</tbody>
</table>
Girls in Physics – under-representation post-16

To support teachers, IOP have:

- Developed resources (2006)
  - Girls in the physics classroom – research review
  - Girls in the physics classroom – teachers’ guide
- Run action research project for DCSF with Science Learning Centres
- Worked on improving physics pedagogy with schools, via the Stimulating Physics Network
The key influences on students’ attitudes to physics were identified as:

- **Self-concept** – that is, students’ sense of themselves in relation to the subject; the value they place on the subject and their willingness to engage with it;

- **Views of physics** – that is, how students experience physics at school;

- **Teacher-student relationships** – that is, how personally supportive students find their physics teacher.
It’s Different for Girls  (October 2012)
An exploration of data from the National Pupil Data-base

- Looking at progression to A-level physics from different types of school
- Assumed that pupils’ experience of teaching at KS4 will be a critical factor in choice of A levels.
- Are there patterns in the type of school where pupils’ sat their GCSEs and progression on to A-level physics?

Almost half (49%) of state-funded, co-ed schools sent no girls to study A-level Physics in 2011.
Figure 2: Percentages of girls and boys who went on to take physics A-level in 2011 by type of school

<table>
<thead>
<tr>
<th>Type of School</th>
<th>Number of Schools</th>
<th>Percentage Girls</th>
<th>Percentage Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-Ed Independent Schools</td>
<td>423</td>
<td>4.9%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Single-Sex Independent Schools</td>
<td>257</td>
<td>7.2%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Co-Ed Maintained Schools</td>
<td>2605</td>
<td>1.8%</td>
<td>10%</td>
</tr>
<tr>
<td>Single-Sex Maintained Schools</td>
<td>218</td>
<td>4.3%</td>
<td>14.9%</td>
</tr>
</tbody>
</table>
Main findings

- 49% of state-funded co-ed schools sent no girls on to take A-level physics in 2011. The figure for all secondary schools in England is 46%, compared to only 14% for boys.

- Girls were almost two and a half times more likely to go on to do A-level physics if they came from a girls school, rather than a co-ed school (for state-funded co-ed schools in England).
Observations

- The school environment can have a large effect on whether girls choose physics
- Part of that will be due to better teachers…
- …but some of it will be due to the culture of the school
- Next project was to look across a range of subjects
Closing Doors: exploring gender and subject choice in schools

- published December 2013
- built on the findings of the previous report which showed that progression of girls to physics depended strongly on the type of school they attended
- decided to look at progression to other gendered subjects and see if there was the same pattern as for physics

% Female entry to A-level subjects in 2013

- Physics: 39%
- Mathematics: 33%
- Economics: 33%
- Further Studies: 29%
- Business Studies: 29%
- Computing: 29%
- Design and Technology: 35%
- ICT: 38%
- Political Studies: 42%
- Chemistry: 42%
- Music: 48%
- Geography: 49%
- Irish: 64%
- Critical Thinking: 59%
- Welsh: 55%
- Classical subjects: 60%
- German: 55%
- History: 52%
- Spanish: 82%
- General Studies: 67%
- Media Studies: 61%
- French: 55%
- Drama: 55%
- Biology: 69%
- Sociology: 69%
- Psychology: 69%
- Religious Studies: 75%
- Art and Design: 75%
- English: 74%
- All Subjects: 72%
Observations

- About half the subjects show significant gender bias

- Boys are more likely to choose “facilitating subjects” (with the exception of languages)

- Gender influence on choice of subjects is not necessarily correlated with ability or performance
National ratios of male and female entries to the six selected A-level subjects averaged over the years 2010 to 2012 in England (JCQ)

- Physics A-level (n = 25,063)
- Economics A-level (n = 17,667)
- Mathematics A-level (n = 60,419)
- Biology A-level (n = 47,601)
- English A-level (n = 40,310)
- Psychology A-level (n = 46,859)

- Percentage of girls nationally progressing to A-levels (53%)
- Girls
- Boys
81% of state co-ed schools either maintain or make worse gender stereotyping

Despite statutory duty on schools to promote equality of opportunity
Main Findings

- 81% of state-funded, co-educational schools are either sustaining the (dismal) national ratios, or making them worse.
- The fact that so many co-ed schools are at or below “average” means that single-sex schools must be better at challenging gender stereotypes.
- Large regional differences: London and East Midlands “best” and South West “worst”.
- % FSMs has a major effect on overall numbers progressing to A levels but not on gender balance.
Opening Doors

- Joint funding by the IOP and Government Equality Office

- Aimed to identify barriers to, and good practice in, overcoming gender stereotypes

- 2 networks with 5 schools in each of them –
  a) in the SW around Bristol and Bath
  b) along the S coast between Portsmouth and Brighton
Opening Doors – how it worked

- Two to three network meetings to share good practice and raise awareness of the issues.
- Working with the two networks to set up site visits to each school to assess their “gender awareness” and commitment to equality of opportunity.
- A ‘good practice guide’ for schools to use at the end of the pilot.
- Analogous to Project Juno and Athena SWAN projects operating in universities.
Network meetings

- Reviewing results of initial survey to establish awareness of policies and practice in each school
- Sharing good practice
- Discussions on unconscious bias and gender stereotyping.
Site visits to each school

- Panel comprising teachers from other schools in the network, a gender “expert” and IOP staff

- After the visits, host schools received confidential reports on perceived issues, recommendations and good practice observed

*Good Practice Guide is based on these reports*
Site Visits

Meetings with:

- School leadership team
- Teachers with special responsibilities
- Careers advisor, pastoral support, PSHE etc.
- Departmental heads
- Classroom teachers
- Lunch with segregated male and female students from Y10 and above
- Brief feedback to SLT
Highlights of good practice
Management, structure and environment

- Member of SLT acts as gender champion
- Teachers of all subjects are aware of classroom management techniques
- The school environment is used to counter gender stereotyping
- Timetable blocking of subjects does not reinforce stereotypes
Policy and training

- All teachers are trained in diversity issues, including unconscious bias
- A clear policy on diversity and inclusion, which has been put together by staff and students and is widely known across the school
Language and Communications

- Sexist language is considered by staff and students as being as unacceptable as racist and homophobic language
- All school publications are gender neutral in their content and presentation
- Staff have been trained to be careful in their use of language, particularly in informal conversations
Monitoring and Support

- Disaggregated data on achievement and progression is collected, discussed and acted upon at a whole-school level, using benchmark data.
- Diversity is embedded in all school activities. The school applies a diversity impact analysis of any school activity.
- Pastoral support operates in tandem with a strong PSHE programme and is not seen exclusively as a way of dealing with personal issues.
- Girls develop their self-confidence and resilience and boys understand the link between hard work and high levels of achievement.
School Initiatives

- Initiatives are related to issues identified from data analysis and are developed on the basis of evidence.
- Initiatives form a coherent programme of activity across the whole school; they are evaluated and the outcomes shared across the school.
- Visiting role models and external visits are continuing, not one-off, projects.
Academic Matters

- School has a strict policy that all subjects should be presented equally to students in terms of their relative difficulty
  - In grade requirements for progression
  - Being careful in making informal comments
- Schools have a culture in which all subjects are potentially accessible to all students
- There is an emphasis on working hard to make the best of one’s ability rather than seeking subjects where one has innate talent.
Careers advice and parental engagement

- Careers advice starts early, is proactive and tailored to the individual, and focuses on the next educational phase and keeping options open.
- Teachers are aware of both academic and vocational routes.
- Student destinations are monitored and analysed in terms of data and national benchmarks.
- Parents are engaged at an early stage and stereotypical views challenged.
Student Experience

- Students are at the heart of the campaign to counter gender stereotyping.

- Students act as ambassadors, working with pupils lower down the school and with local primary schools to raise awareness of, and to counter, gender bias.
Next Steps

- Work with partners to establish an Opening Doors conference series

- With partners, consider the possibility of a national voluntary scheme, based on the guide, analogous to Athena SWAN/Project Juno in universities.
Thank you

Questions, comments....?


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