Case Study: Addressing the Gender Gap in Computer Science
2013 - 2021

School of Computer Science @ Technological University Dublin

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Ireland’s 2nd largest third level Educational institution

29,000 students
School of Computer Science @ TU Dublin

- 1000 undergraduate students
- 300 postgraduate students
- 60 PhD students
- 44 academic staff
- 20+% UG female students
2 Areas of gender balance focus

**Runner-Up**
Minerva Equality Award

“Encouraging female students to enrol in Computer Science programmes and retaining them”

**Winner**
Minerva Equality Award

“Developing the careers of female faculty”

**Students**

**Staff**
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Part 1 - Student Initiatives
Comp Sci gender balance – Ireland 2013

Over 40% of computing programmes in Ireland had < 10% female new entrants year (2014-15)
2013 – our School of Computer Science

First year intake of females @ 10% in our Comp Sci undergrads

Typical of national picture

A determination to change

2013

10%
by 2021 – our School of Computer Science

Big increase in uptake of Comp Sci
(including a new programme @ 42%)

A change in ethos

CS Gender balance awareness

2013

10%

2021

22 – 42%
Our approach

Undertook initiatives in:

- Communication
- New Programmes
- National co-operation
- Mentoring

2013: 10%

2021: 22 – 42%
Step 1 – Talked to our current students

Pizza lunch with our female students

Why did you pick Comp sci?

How is it going?

How do we get more females in?
How’s it going?

“It was one of my first labs. I stood at the door. There was already a big group of lads in there - making a lot of noise – generally rowdy – no other girl around. The lab assistant was sitting in the corner not paying any attention. I really wanted to turn around and run. I nearly did. But I went in and just sat quietly – too mortified to ask anyone how to get started.”
A variety of experiences

“How’s it going?”

“It was one of my first labs. I stood at the door. There was already a big group of lads in there - making a lot of noise – generally rowdy – no other girl around. The lab assistant was sitting in the corner not paying any attention. I really wanted to turn around and run. I nearly did. But I went in and just sat quietly – too mortified to ask anyone how to get started.”

“I have no-one to be friendly with in my class anyway!”

“I can sum it up in one word why girls don’t pick Comp Sci: Maths. Everyone thinks it’s all about maths”.

“I really want other females to know that they are able to do the course because it teaches you how to think and be inventive. I hope other young girls won’t have to go through the same thing that happened to me” (She studied dental nursing first)

“I love it. It’s so creative”
Immediate Actions

- Every lab group with female students in it must have at least two females (easy!)
- Regular meet ups for students (easy-ish)
- Examine what CS programmes ARE popular with females
Next Step: What CS programmes are attracting the most females?

- We examined intakes into first year on all computer courses in Ireland for 2014, 2015 (& 2020)
- Data from the national education authority (no longer available GDPR)
- Data via our Ingenic network (more later)
CS programmes attracting the most females across Ireland

<table>
<thead>
<tr>
<th>Programme</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>BA Psychology &amp; Computing</td>
<td>53%</td>
</tr>
<tr>
<td>BSc Comp Sci international (language) *</td>
<td>42%</td>
</tr>
<tr>
<td>BSc Creative Media and Interactive Design</td>
<td>35%</td>
</tr>
<tr>
<td>BA Digital Humanities &amp; IT</td>
<td>35%</td>
</tr>
<tr>
<td>BSc in Computing &amp; Digital Media</td>
<td>33%</td>
</tr>
<tr>
<td>BSc Management Science &amp; Information Systems</td>
<td>32%</td>
</tr>
<tr>
<td>BA Digital skills</td>
<td>&quot;High&quot; - no figures</td>
</tr>
</tbody>
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Patterns?
Word cloud of computing programme titles (levels 8) that have > 20% female uptake

Not a lot of Computer Science!
Next Step: What CS programmes are attracting the most females?

Finding

- Programmes with higher female intakes are not “Computer Science” on its own

- Popular computing programmes have applied or complementary skills (e.g. Computer Science with a language, business computing, IT management, Green IT, digital media*)

- We term these hybrid programmes
Action: New Programme

- We established our own hybrid programme: Computer Science (International) - 2017

- Includes learning a foreign language

- Consistently higher proportion of females (2021 reached 42% female (double our other Comp Sci))

- High impact strategy
Action: New Programme 2

We launched FREE coding courses for non tech female students in our institute (2016)

Linked to not for profit CodeFirstGirls
https://codefirstgirls.com/courses/

Minimal effort, zero cost, volunteers staff

> 250 girls so far
Next: What are other CS Schools doing?

- Every School of Computing in Ireland working on the female pipeline problem

- Why not share ideas?

- *In 2017, we contacted all 18 universities in Ireland*

- Now: A network of every School of Comp Science in Ireland
Irish Network For Gender Equality In Computing

http://ingenic.ie/

Ingenic enables:

Share best practices

Vehicle for FUNDING

Large pool for data/ surveys

Fantastic networking
Example of funded project via INGENIC

**TECHMATE**

Best Practice Toolkit for Gender Equality in Computer Science Education

Comprehensive review of literature for initiatives with impact
https://arxiv.org/pdf/2206.06113

Development of an online toolkit to encourage use of these initiatives

Project funded by Irish government & Huawei
Mentoring – ESTeEM Initiative*

• Female students across Comp Sci and Engineering offered an industry mentor
• Monthly lunches @ TU Dublin with industry/ alumni/ mentors
• Support, advice, networking, confidence
• Vision, motivation, execution: Leslie Shoemaker

* Esteem was set up by Leslie Shoemaker
Others smaller initiatives

- Week long CS summer school (gender balanced)

- Senior school (ages 15-16) workshops @ TU Dublin (female)

- School visits
Management support & Culture

- Constant support from Management

- Gender issue in our School’s strategic priorities

- A female head of school for 10+ years!

- A national policy of change: e.g. Research funding gender rules

- An environment genuinely interested in change
Part 2 - Staff Initiatives

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Staff
Pre 2012 STAFF profile in our School

Academic Staff

Senior Academic Leadership Team

30 Full time Equivalents

20% female

100% male

School Executive Team

100% male

Head of School
Up to 2012 - what we found

- Academic posts - lack of female applicants
- Lack of progression of females to management or professor grades (0-25%)
- Heavy loads of administration & management-style roles taken on by females
- Difficulty in returning after maternity leave: teaching loads and gaps in research output;
- Legacy networks and culture of academic institutions created and populated by males
Our 4 aspects to staff gender balance

- Source
- Career
- Environment
- Support
**SUCCESS - SOURCE**

- Simple focus - gender balance in our recruitment

- **When a job vacancy arose**, informally identified female candidates external to our university/School and encourage them to join our team, using our networks to attract and target suitable female staff.
SUCCESS - CAREER

Boost skills, career strategy, ambition and confidence

• Aurora leadership programme for female staff

• Annual performance review for all staff

• Research supports (and min % of females as national funding rule)

• Mentoring scheme (both across uni, and within School)
SUCCESS - ENVIRONMENT

Gender Equality has been a genuine heartfelt aim:

- In our university – WLHE (Women Leaders in Higher Education)
- **Athena Swan** - national badge scheme for gender balance (funding condition!)
- In our sector – We set up national network of Computer Science nationally - **Ingenics** (as mentioned already)
SUCCESS - SUPPORT

It’s the simple things to make life easier for staff with personal commitments

- “Minding the modules” while on leave
- Flexible work allocation
- Considerate timetabling
By 2019 School staff - gender profile

Academic Staff
- 55 Full time Equivalents (36%)

Senior Academic Leadership Team
- 10 staff (50%)

School Executive Team
- 4 staff (75%)

Head of School (up to 2021)
- 100%
Take home points I want to highlight

- Hybrid programmes are high impact for student numbers
- A sense of belonging for students is key
- Simple supports for female staff really help
- We can’t be complacent! Constant change
- So much time is voluntary in this – Put money behind it!
- Gender balance drive must come from the top – and really felt
Thank you