

# Liz Thomas

## associates

Higher education research and consultancy



## Developing inclusive practices in professional development for STEM

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@ProfLizThomas

# Overview

- Protected characteristics, Equality Act 2010
- Context: Women in STEM and the leaky pipeline.
- The context of professional development in PGR and workplace.
- Research question and objectives
- Potential barriers
- Solutions
- Where are we now?
- Future practice

# 9 protected characteristics, Equality Act 2010

- Age;
- Disability;
- Gender reassignment;
- Marriage and civil partnership;
- Pregnancy and maternity;
- Race;
- Religion or belief;
- Sex;
- Sexual orientation.

We have chosen to focus on sex, and in particular women in STEM subjects. This thinking can be applied other protected characteristics and target groups, such as low socio-economic status, or even international students, and other disciplines.



# Women and STEM: The leaky pipeline

- Currently only 13 per cent of all STEM jobs in the UK are occupied by women.
- Only 17% of STEM professors are women.
- Women are less likely to study STEM subjects at school, progress to HE, undertake PGR and move into science careers, but the pipeline 'leaks' at different points for different disciplines.
- This has implications for the economy and science, as well as for women.
- Much of the focus has been on earlier stages of the pipeline.

# Professional development

- Professional development helps PGR students and employees develop additional skills to progress and succeed.
- At Imperial all PGR students must undertake at least 2 course, and there are many to choose from. Gender differences in course participation observed, women select assertiveness in large numbers, but few do leadership.
- In the class room men and women take gendered roles in active learning and group activities.
- This raised questions about wider patterns of participation and engagement in the classroom, and how these courses could become more inclusive.

# ECU Attracting Diversity model (adapted)

1. Develop collaboration: team and institutional buy-in.
2. Undertake quantitative analysis/review of data to assess under-representation.
3. Undertake qualitative research to develop understanding about under-representation.
4. Use evidence to develop access and success initiatives, being open to positive action.
5. Formative and impact evaluation.
6. Apply and share the learning.

# Our proposed study

- Title: Gender Biased Participation and Interaction in Professional Development by STEM PG Students
- Research question: To what extent is there gendered participation and interaction in professional development provision by STEM post-graduate students.

# Research objectives

1. Which professional development courses have gendered enrolment?
2. Why is enrolment gendered?
3. In what ways is in-class engagement and interaction gendered?
4. What are the implications of gendered participation and interaction for students, the STEM sector and learning and teaching of professional development courses?
5. What can be done to reduce any negative impact of gendered participation and engagement?



# Where are we now?

1. To what extent have is enrolment in professional development courses gendered? Which courses attract fewer or more men?
2. Why is enrolment gendered?
3. In what ways is in-class engagement and interaction gendered?

Reflection: have you noticed this previously? Have you done anything about it?

# Potential issues affecting participation and engagement

- Gendered perception of courses: course titles, marketing, images, peers and influencers.
- Practical issues around timing, location, mode of delivery.
- Don't feel comfortable engaging in the classroom.
- Course is irrelevant to them now, don't see themselves in these roles in the future.

# Gendered perceptions

- Changing course titles: water engineering – humanitarian engineering; port – fitness and health; computer games - management and the games industry.
- Marketing: materials and website include diverse and non-traditional images, case studies etc.
- Peers and influencers are very powerful: ambassadors, role models, buddying.

# Practical issues

- Day, e.g. when students are on campus anyway
- Time, e.g. during school hours
- Mode of delivery, e.g. on-line, blended
- Flexibility, e.g. different ways of engaging



# Pedagogy

- Assumptions about students past knowledge or educational experiences – learn from students.
- Unconscious bias – assuming some students (e.g. men) are better than women – training.
- Use multiple ways of engaging students.
- Be proactive – notice when students are not engaging and address it.
- Actively develop students confidence and capacity to engage.

# Curriculum

- Feasible and relevant opportunities for engagement – diverse examples, materials and opportunities, reduce assumptions about accessibility and interest, opportunity to draw on own experiences, relevant to future aspirations and goals. Real-world learning.
- Embed academic and professional skills development into the core curriculum to support engagement.
- *"...curriculum is what all students have in common, irrespective of their diversity, and is within our institutional control..."*. (Kift et al 2010, p14)

# Inclusive approach

An inclusive approach is student-centred and proactive. It: *... necessitates a shift away from supporting specific student groups through a discrete set of policies or time-bound interventions, towards equity considerations being embedded within all functions of the institution and treated as an ongoing process of quality enhancement. Making a shift of such magnitude requires cultural and systemic change at both the policy and practice levels. (May and Bridger, 2010, p.6)*

# Where are we now?

1. To what extent have is enrolment in professional development courses gendered? Which courses attract fewer or more men?
2. Why is enrolment gendered?
3. In what ways is in-class engagement and interaction gendered?

Reflection: have you noticed this previously? Have you done anything about it?



# Future development of practice

1. What are the implications of gendered participation and interaction for students, the STEM sector and learning and teaching of professional development courses?
2. What can be done to reduce any negative impact of gendered participation and engagement?

Reflection: What could you do differently as a result of attending today?

**Thank you**

## Contact details

- [liz@lizthomasassociates.co.uk](mailto:liz@lizthomasassociates.co.uk)
- [www.lizthomasassociates.co.uk](http://www.lizthomasassociates.co.uk)
- @ProfLizThomas

