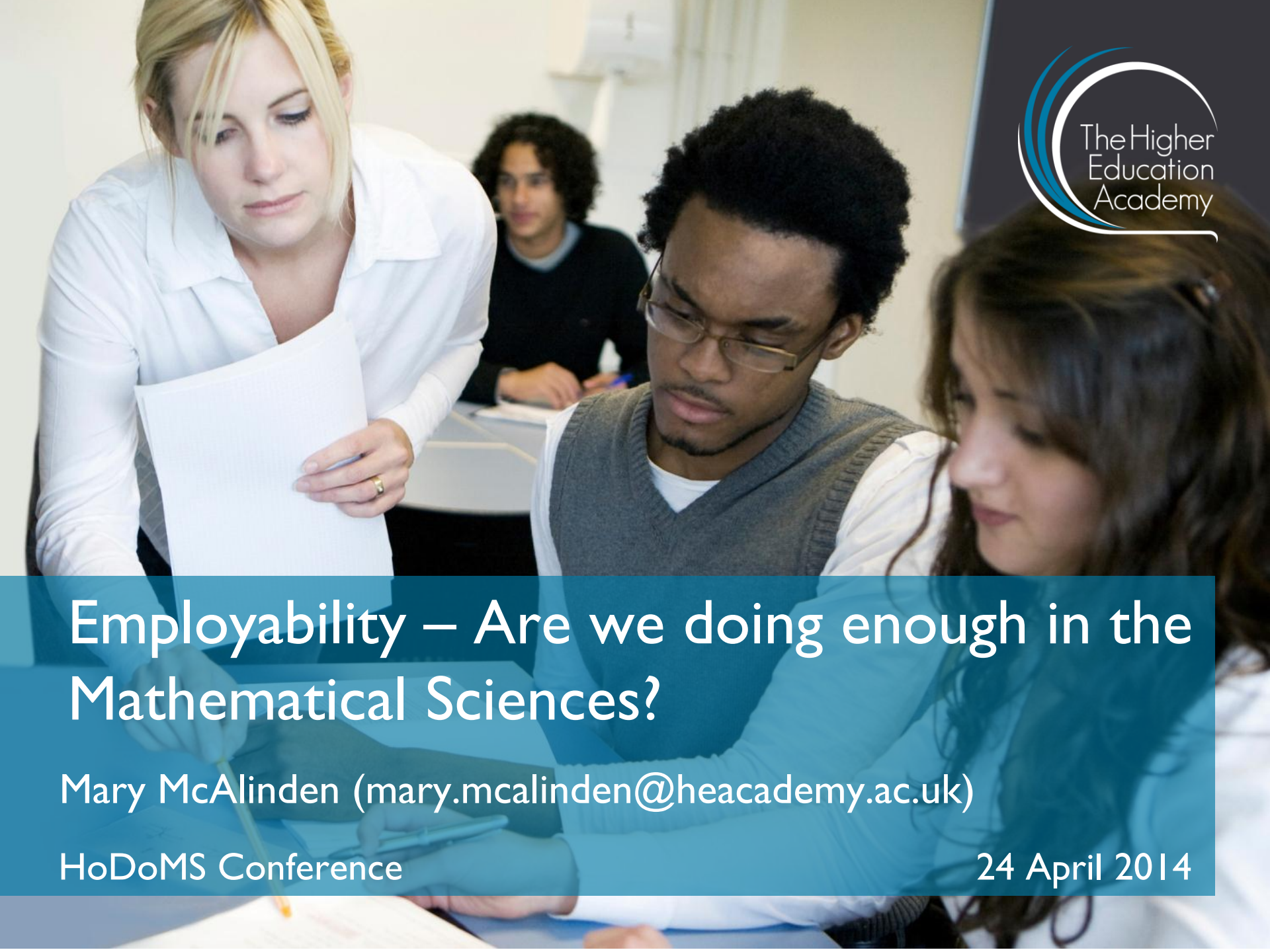

Employability – Are we doing enough in the Mathematical Sciences?

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HoDoMS Conference

24 April 2014

Presentation outline

- Employability and employment
- Employment data
- Skills, knowledge and attributes
- Mathematical Sciences departments and employability
- Pedagogy and practice
- Views of alumni in Mathematics
- UK wide educational skills survey
- Interventions and resources

Employability not employment

Definition of Employability

- "**Employability** is a set of achievements, skills, understandings and personal attributes that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits the workforce, the community and the economy."

  Enhancing Student Employability Co-ordination Team (ESECT)

- **Employment** is a measurable graduate outcome.

Employability not employment

Alternative definition of employability

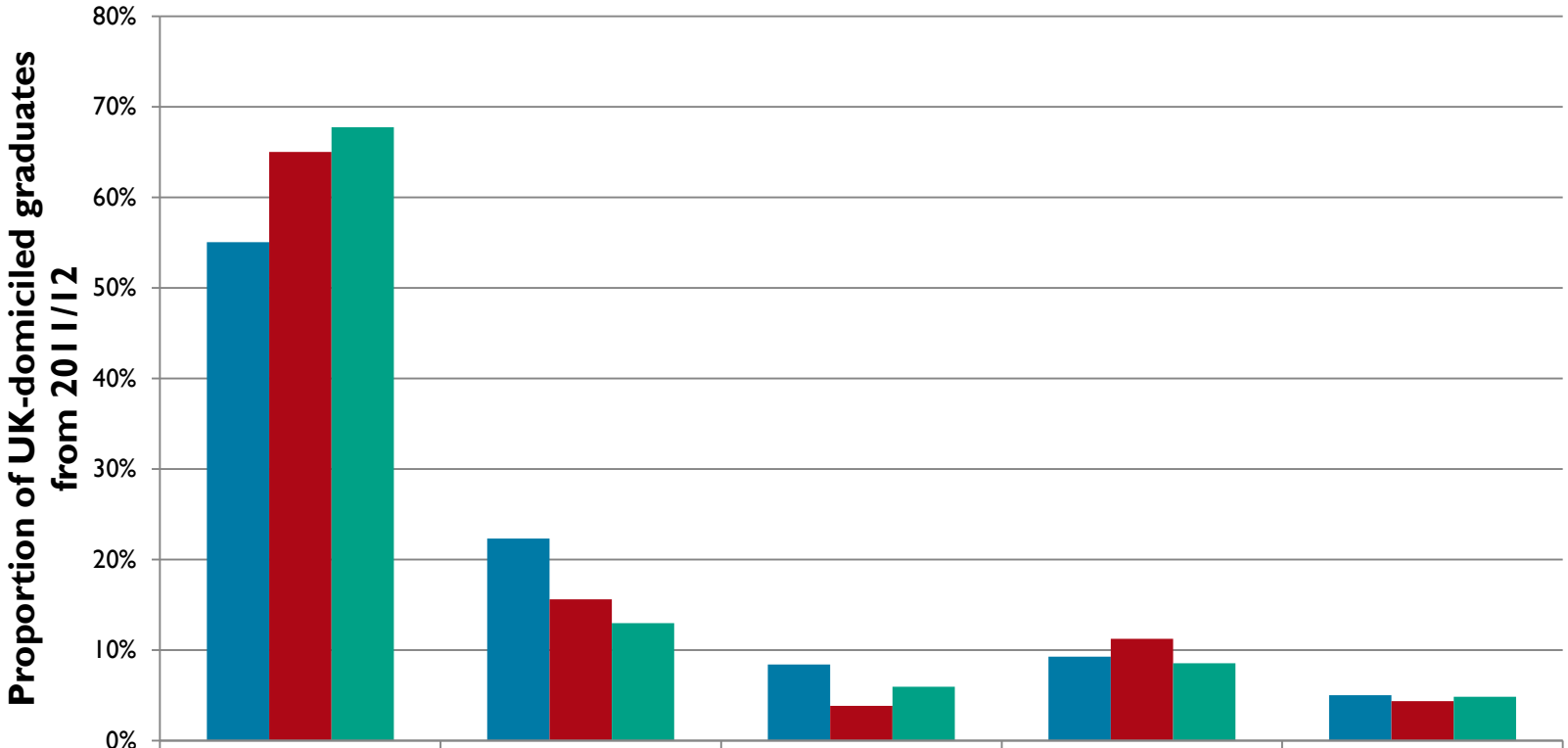
- "Employability is more than about developing attributes, techniques or experience just to enable a student to get a job, or to progress within a current career. **It is about learning** and the emphasis is less on 'employ' and more on 'ability'. In essence, the emphasis is on developing critical, reflective abilities, with a view to empowering and enhancing the learner."

(Harvey 2003, Available at: http://bit.ly/oeCgqW)

Note

- The idea of sustainability is important.

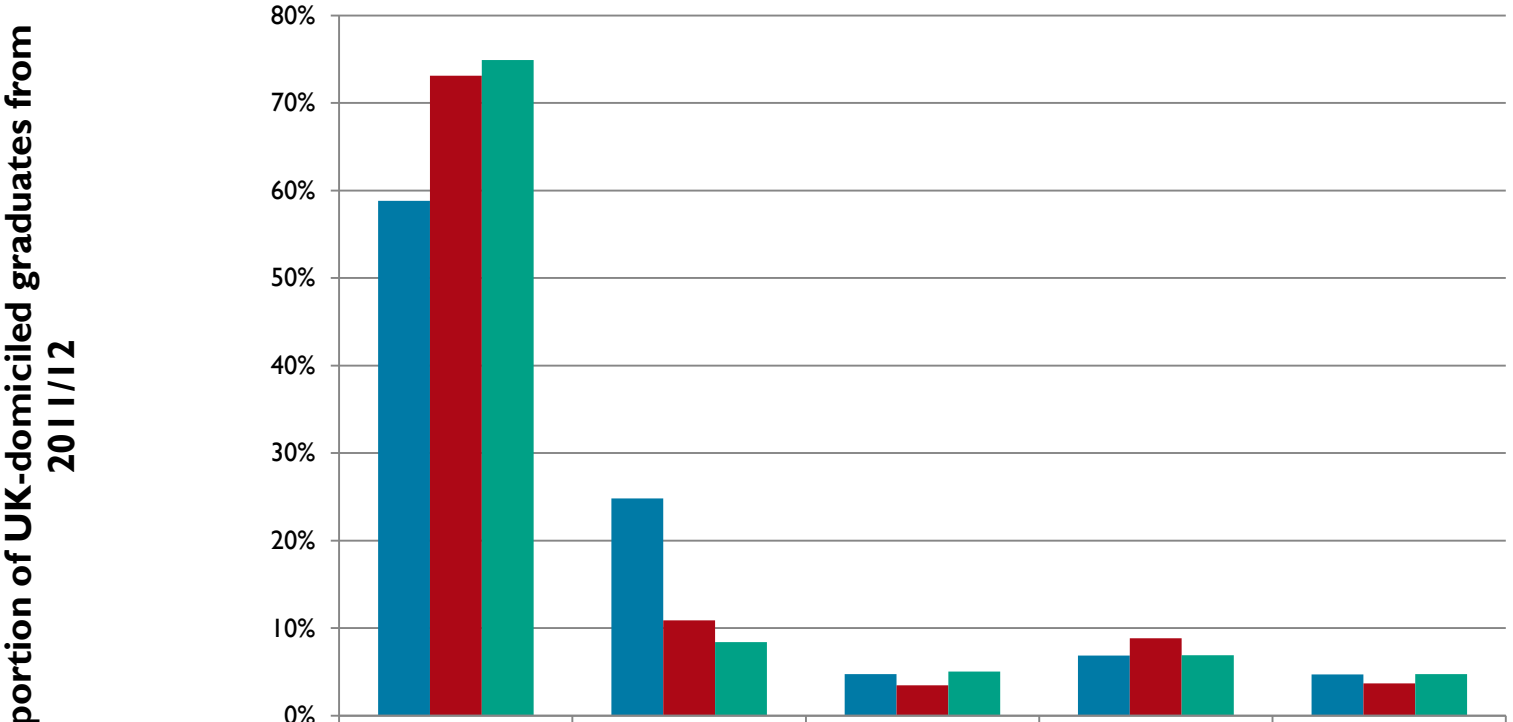
Outcomes for graduates after six months – First degree



	Working	Studying	Working and studying	Unemployed	Other
Maths	55.0%	22.3%	8.4%	9.3%	5.0%
STEM (exc. Maths)	65.0%	15.6%	3.8%	11.2%	4.3%
First degree	67.7%	13.0%	5.9%	8.5%	4.9%

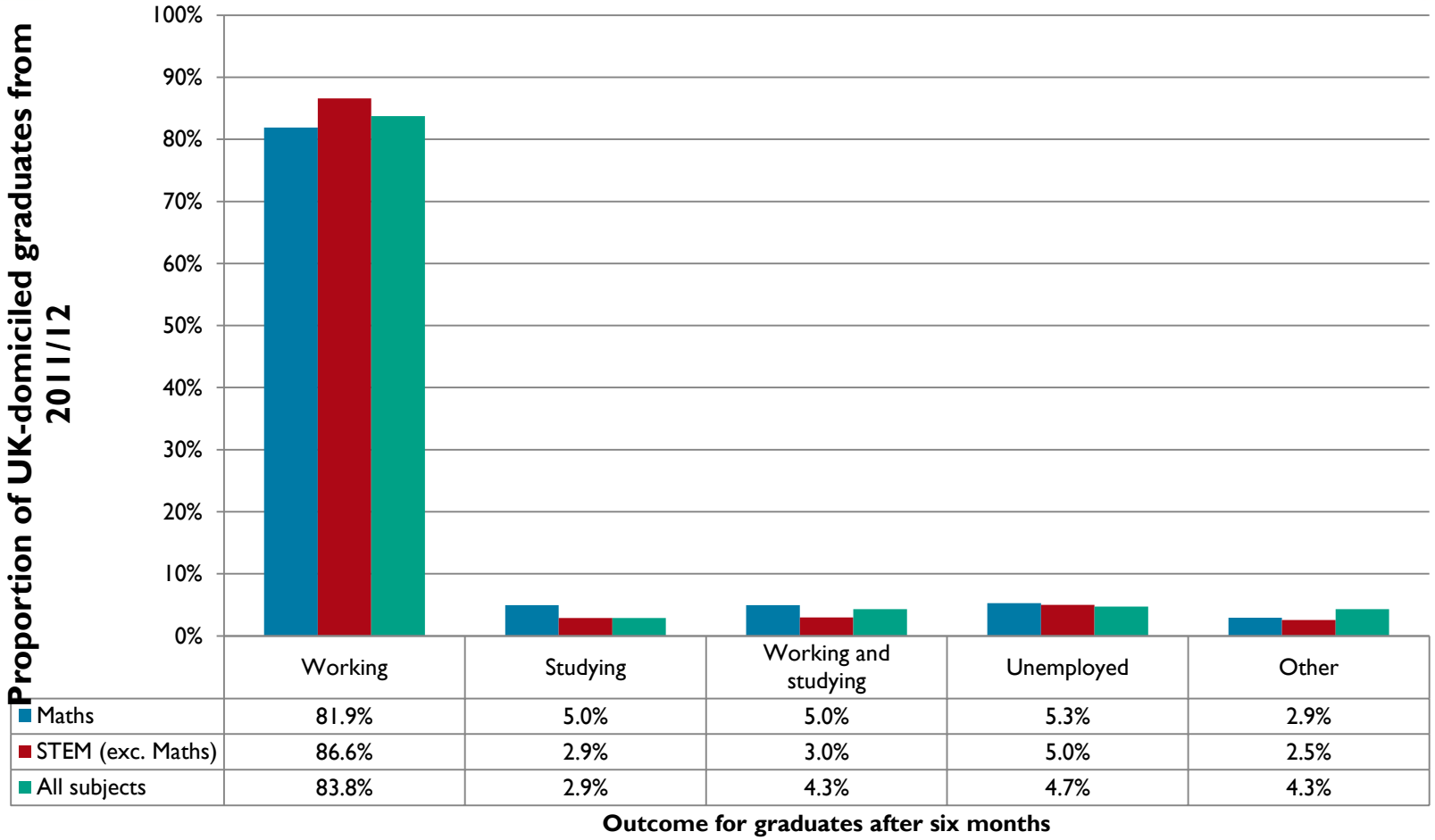
Data comes from HESA Destination of Leavers of Education survey 2011/12 provided by HECSU

Outcomes for graduates after six months - Masters



Data comes from HESA Destination of Leavers of Education survey 2011/12 provided by HECSU

Outcomes for graduates after six months - Doctoral



	Working	Studying	Working and studying	Unemployed	Other
Maths	81.9%	5.0%	5.0%	5.3%	2.9%
STEM (exc. Maths)	86.6%	2.9%	3.0%	5.0%	2.5%
All subjects	83.8%	2.9%	4.3%	4.7%	4.3%

Data comes from HESA Destination of Leavers of Education survey 2011/12 provided by HECSU

Areas of employment 2011/12

Corresponding data for first degrees *

• Business, HR and finance professionals	39.6%
• Information technology professionals	10.2%
• Clerical, secretarial and numerical clerk occupations	9.9%
• Retail, catering, waiting and bar staff	9.3%
• Educational professionals	9.0%
• Others	21.7%

Available at:

http://www.hecsu.ac.uk/assets/assets/documents/WDGD_Sept_2013.pdf

* Figures are subject to small rounding errors.

Skills, knowledge and attributes

Skills and knowledge

(a) Career management skills

These incorporate the skills needed to obtain employment

e.g. CV writing, finding employment.

(b) Generic skills

These include e.g. time management, team working, problem solving, communication skills.

(c) Discipline knowledge

Skills, knowledge and attributes

Definition of Graduate Attributes

- "Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These **attributes include but go beyond the disciplinary expertise or technical knowledge** that has traditionally formed the core of most university courses. They are qualities that also prepare graduates as agents of social good in an unknown future."

  (Bowden, Hart, King, Trigwell and Watts 2000

  Source: http://www.employability.ed.ac.uk/GraduateAttributes.htm)

Potential pitfalls

Possible Scenario

- Graduate attributes are defined at institutional level.
- Departments undertake a programme level mapping.
- Graduate attributes are identified within module/unit/course descriptions.
- Embedding takes place, followed by subsequent assessment.

Question

- How well do students understand the process?
- Can they articulate the nature of their development?

Recording achievement

The HEAR

- "The Higher Education Achievement Report (HEAR) is an electronic document issued by higher education institutions to students on graduation. It provides a detailed record of a student's academic and extra-curricular achievements to supplement the traditional degree classification."

HEFCE 2012

Uptake

- "In 2013, 88,743 HEARs were issued to students (from across 27 institutions)".

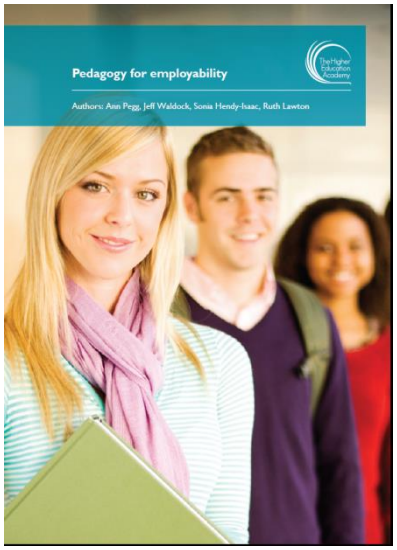
HEA 2013

The Mathematical Sciences

The Higher Education Academy STEM

How do departments respond to queries about employability?

Pedagogy and practice



- The authors argue that employability "is not about lists of skills or categories of skills" but is about "skilful practice in context".
- Work on employability has identified "the lack of evaluation of initiatives and approaches to teaching and learning employability skills."
- Available at: http://www.heacademy.ac.uk/employability

Graduates' Views

Graduates' Views on the Undergraduate Mathematics Curriculum (Inglis, Croft and Matthews, 2012).

- Over 400 Mathematics alumni responded 2.5 years after graduation.

Findings

- The **majority of students** believed they had successfully developed cognitive skills through their studies

  (e.g. logical reasoning, critical thinking, problem solving).

  These were identified as valuable in the work place.

Graduates' Views

Findings

- Fewer **students** believed they had developed non-cognitive skills (e.g. making presentations, oral, written communication, team working). Incoming undergraduates expected to develop these skills during their mathematical study.

- Graduates would have liked their degree programmes to provide more opportunities to develop skills in applying Mathematics to the real world.

  Available at

  http://www.mathcentre.ac.uk/resources/uploaded/gradviews.pdf

CBI/Pearson 2013 Survey Results

CBI Pearson Education and Skills Survey 2013

- Conducted in February and March 2013
- Responses were received from 294 employers (employing 1.24 million people).

Key finding

- "Businesses report too many STEM-qualified applicants don't arrive rounded, grounded and ready for work (45%) and lack general workplace experience (39%)."

CBI/Pearson 2013 Survey Results

CBI Pearson Education and Skills Survey 2013

- "Having the **right attitudes and aptitudes** is by far the most important consideration when businesses are recruiting graduates – nearly nine in ten employers (88%) **value these above other factors** such as degree subject (67%) and degree class (48%)."

CBI/Pearson 2013 Survey Results

CBI Pearson Education and Skills Survey 2013

- "While many graduates leave universities with the skills needed for success in work and life, businesses still find too many do not: 20% report **shortcomings** in graduate applicants' literacy/use of English, 27% in problem-solving and 32% in self-management".

Available at:

http://www.cbi.org.uk/media/2119176/education_and_skills_survey_2013.pdf

Future Fit (CBI/UUK, 2009)

Employability skills

- Self-management
- Team-working
- Business and customer awareness
- Problem solving
- Communication and literacy
- Application of numeracy
- Application of Information Technology

"Underpinning all these attributes, the key foundation must be a positive attitude: a **'can-do' approach**, a readiness to take part and contribute, openness to new ideas and a **drive to make things happen**.

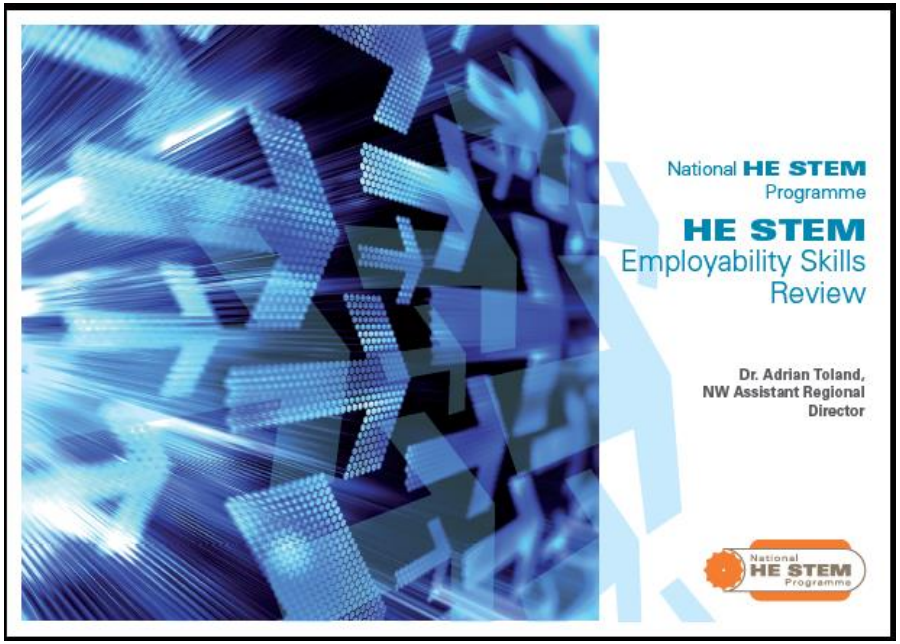
Frequently mentioned by both employers and universities is **entrepreneurship/enterprise** …."

Available at:

http://www.bisa.ac.uk/files/Permanent%20Files/cbi_uuk_future_fit.pdf

Analysis of Benchmark Statements

- The main skills given in *Future Fit* were mentioned in the QAA subject benchmark statement for MSOR
  - except for business and customer awareness.



Available at:

http://www.hestem.ac.uk/sites/default/files/employability_skills_review.pdf

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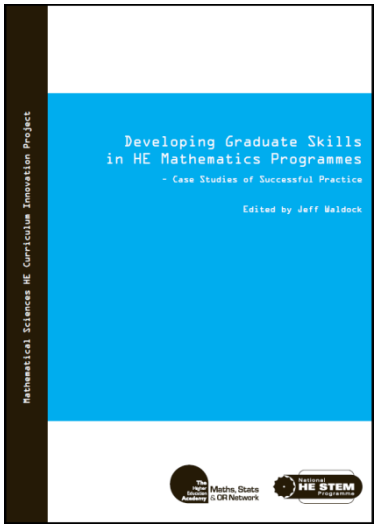
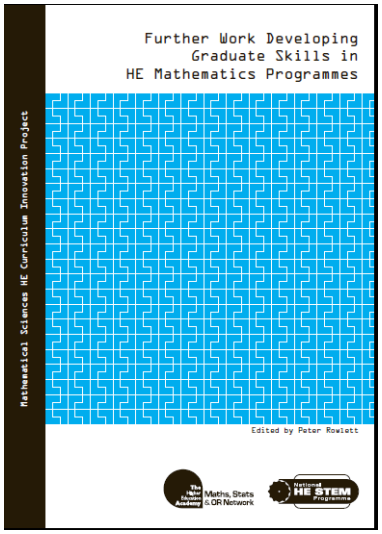
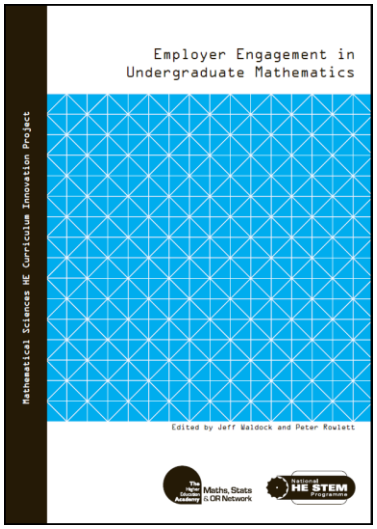
Constructive interventions







- All are available at www.mathscentre.ac.uk.

Careers information

- The four professional bodies (IMA, LMS, RSS, OR Society) all include sections on careers on their websites.

Maths Careers (http://www.mathscareers.org.uk)

This includes:

- many opportunities and employers;
- practical information about what employers want;
- general careers management advice;

and much more.

The Future

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