School of Biomedical Sciences &
Leeds Institute of Teaching Excellence

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Final Year Undergraduate research project OR a "Capstone Experience"

Do we need to re-think?

Dave Lewis

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Thank you

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Higher Education Academy

LEEDS INSTITUTE *for* TEACHING EXCELLENCE

ELON UNIVERSITY

Biosciences: J Allen (Salford); S Bailey (Bath); R Bevan (Newcastle); D Bevitt (Newcastle); C Chalmers (Napier); A Coney (Bham); G Lace-Costigan (Salford); N Freestone (Kingston); M Hardy (Bradford); M Hejmadi(Bath); J Horrocks (Abertay); D Johnson (USW); I Kay (MMU); L Kindred (Leeds); L Lione (Herts); J Lodge (Bham); S McClean (Ulster); R McCaw (Leeds); A Muellar (UEA); E Muir (Leeds); C Palfrey (Leeds); S O'Hara (Salford); R Shiner (Wolv); D Skingsley (Staffs); R Stubbington (NTU); I Turner (Derby); K Yeoman (UEA).

Leeds: H Atherton (FMH); K Bacon (Geog); A Bruning-Richardson (Med); M Cordingley (FBS); A Cuncliffe (FBS); S Gorman (MAPS), B Henson (Eng); S Hodkinson (Geog); V Honeyman (ESSL); N Jackson (LUBS); V Manville (Env); J McKinnon (PCI); J Mellor (Med); C Morley (FBS); C Pask (MAPS); J Peacock (Geog); S Petzold (SMLC); J Robinson (LUBS); N Vasudev (Med); E Venn (Music); K Watkins (FAHC); C Watkins (Design); K Wilcockson (FBS).

Elon Univ. (USA): J Bean (Akron); C Beaudoin (Grand Valley State); C Van Zile-Tamsen (Buffalo); T von der Heidt (Southern Cross, Aust.).

Why offer research projects?

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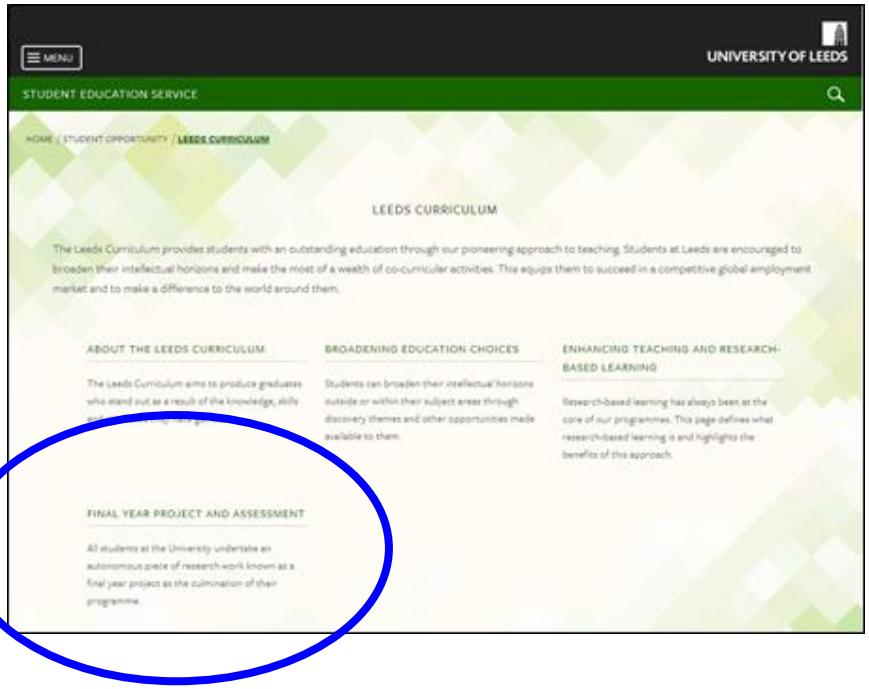
- QAA
- Accrediting Bodies
- Institutional



What is their educational purpose?

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Staff *(437)*:

Research Intensive

- Gain research experience
- Provide an insight into career in research
- Develop an understanding of the research process
- Inform career choices

Research & Teaching

- Undertake research in area of interest
- Gain new knowledge & understanding
- Opportunity for independent learning
- Critical thinking
- Develop ethical awareness & responsibility

Students have different expectations!

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2nd Yr Bioscience *(989)*:

Level 2

- Gain new knowledge & understanding (3>4>2)
- Research into an area of interest
- Develop employability skills
- Enhance employability
- Gain relevant real-life work experience
- Inform career choices

Level 3

- Build on previous knowledge, understanding & skills (3>4>2)
- Gain research experience
- Develop expt. & technical skills
- Publication

Discipline specificity?

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2nd Yr Bioscience *(1516)*:

2nd Yr Media & Communications:

Traditional research projects @Leeds

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- Individual lab-based
- Critical reviews

- Team-based laboratory
- Bioinformatics/Big data
- Computational & computer modelling

“Dreading my final year project since I started university, thought of having to do a "traditional" lab project terrified me.”

Bioscience graduate career destinations

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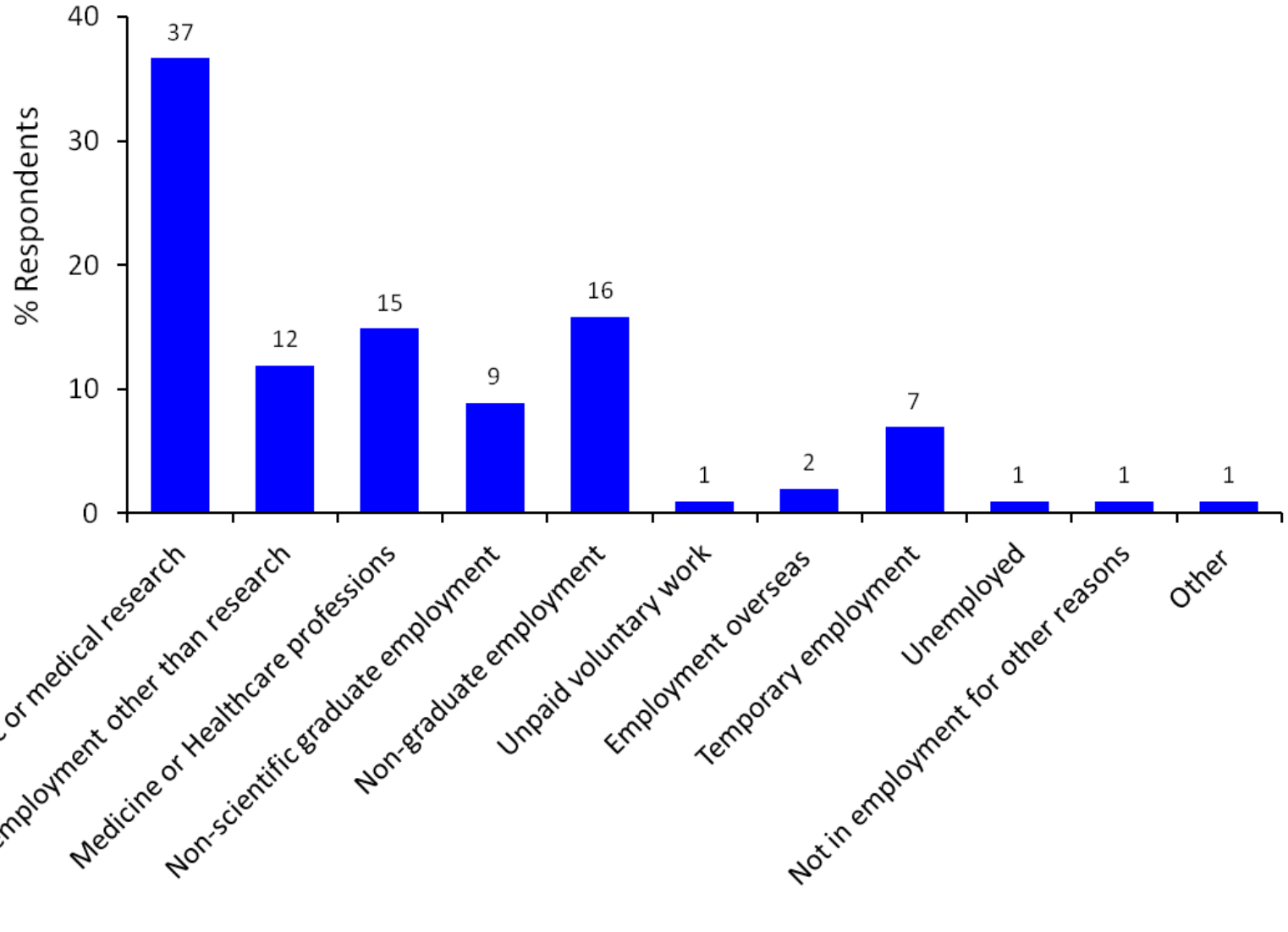

Research project or Capstone Experience?

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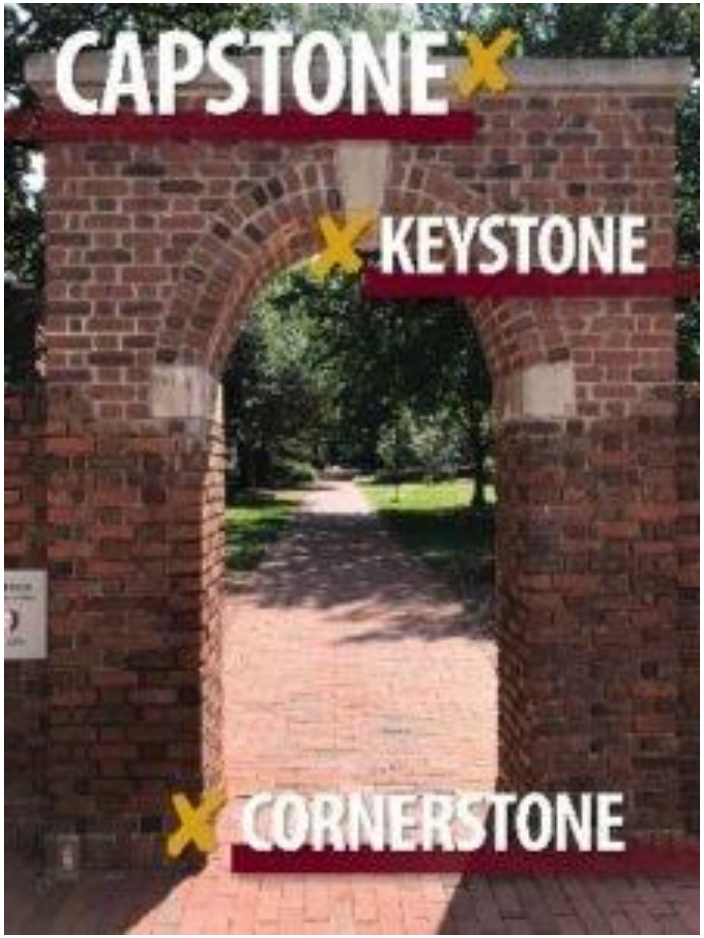
"Culminating experience(s) in which students are expected to integrate, extend, critique and apply knowledge, skills and understanding gained in earlier years to a problem"

"Opportunity to showcase knowledge, skills and understanding"



What constitutes a Capstone Experience?

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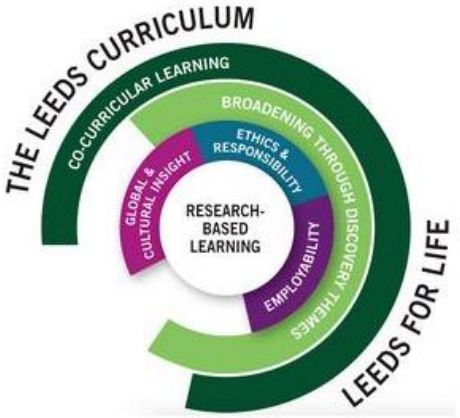

Workplace Co-operative

Prototype

Oral Histories

Enterprise

Portfolio

Student challenge

Students in Schools

Translation

Media Product

Reflective Case studies

Students as Partners

QAA Biosciences Benchmark

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All honours degree students are expected to have some personal experience of the approach to, practice and evaluation of scientific research, such as a project/research based assignment……. Such work is likely to include data collection and analysis from, for example, laboratory, field or literature work……It may sometimes be appropriate for students to work outside the laboratory or field environment, for example, in education or in the public understanding of science. However the research project is delivered, it is expected to include an element of novelty satisfied by work that is hypothesis-driven or which leads to formation of an hypothesis.

Criteria for accreditation

To achieve accreditation for a programme, HEIs will need to provide robust evidence in support of their application, which will be judged by peer review against the standard metrics listed below. The evidence should show how the intended learning outcomes are being achieved by all graduates through appropriate assessment strategies.

1. **A graduating level capstone experience which includes analysis, synthesis and critical evaluation, resulting in a defined output**

i. The capstone experience will integrate and develop the skills and knowledge gained in earlier years; bring reflection and focus to the whole of the degree experience; and provide students with the opportunity to demonstrate and apply the understanding and skills that they have developed.

ii. The capstone experience will be:

   a. An extended piece of enquiry-based work, relevant to the degree, with a justified approach that effectively communicates its outcomes

   b. Underpinned by a range of relevant sources, and will show recognition of health, safety, environmental and ethical considerations

   c. Contextualised, and show recognition of the provisional nature of knowledge, building to an appropriate conclusion

   d. Based on the processes of critical thinking, synthesis, reflection and evaluation.

Non-traditional Bioscience Capstones

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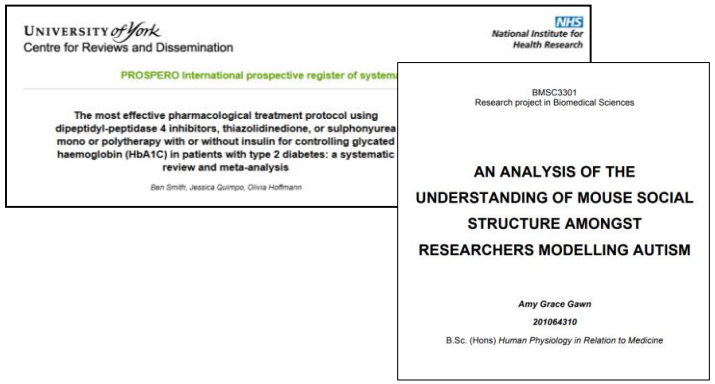
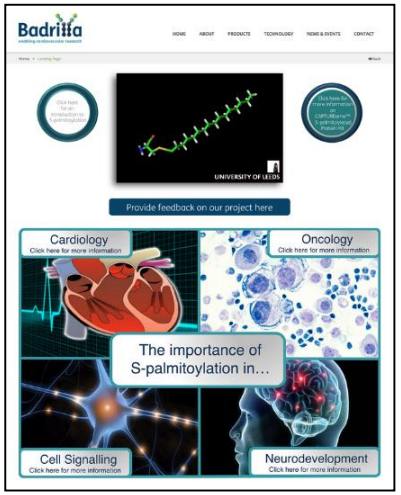
Systematic Reviews

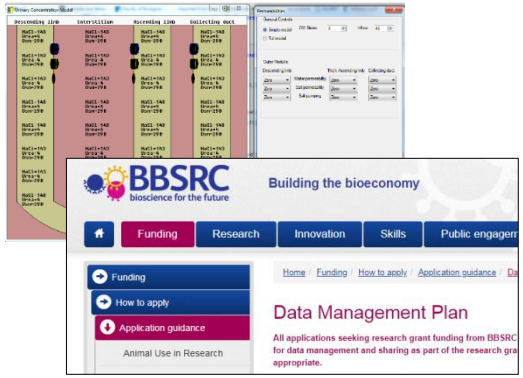


Surveys

Scientific Writing



Educational Development



Science in Schools

Public Engagement

Demand for non-traditional Capstones

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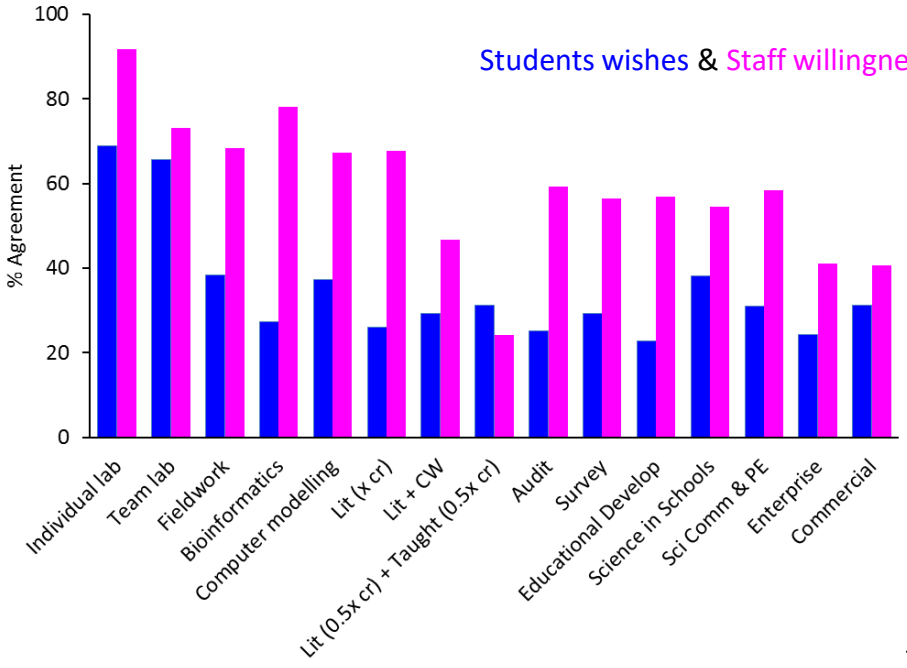
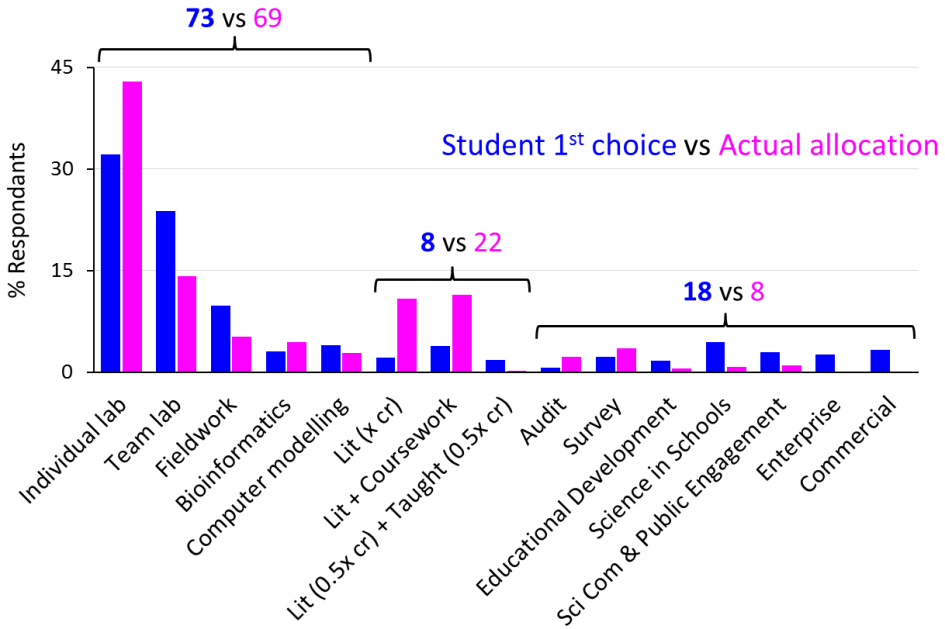
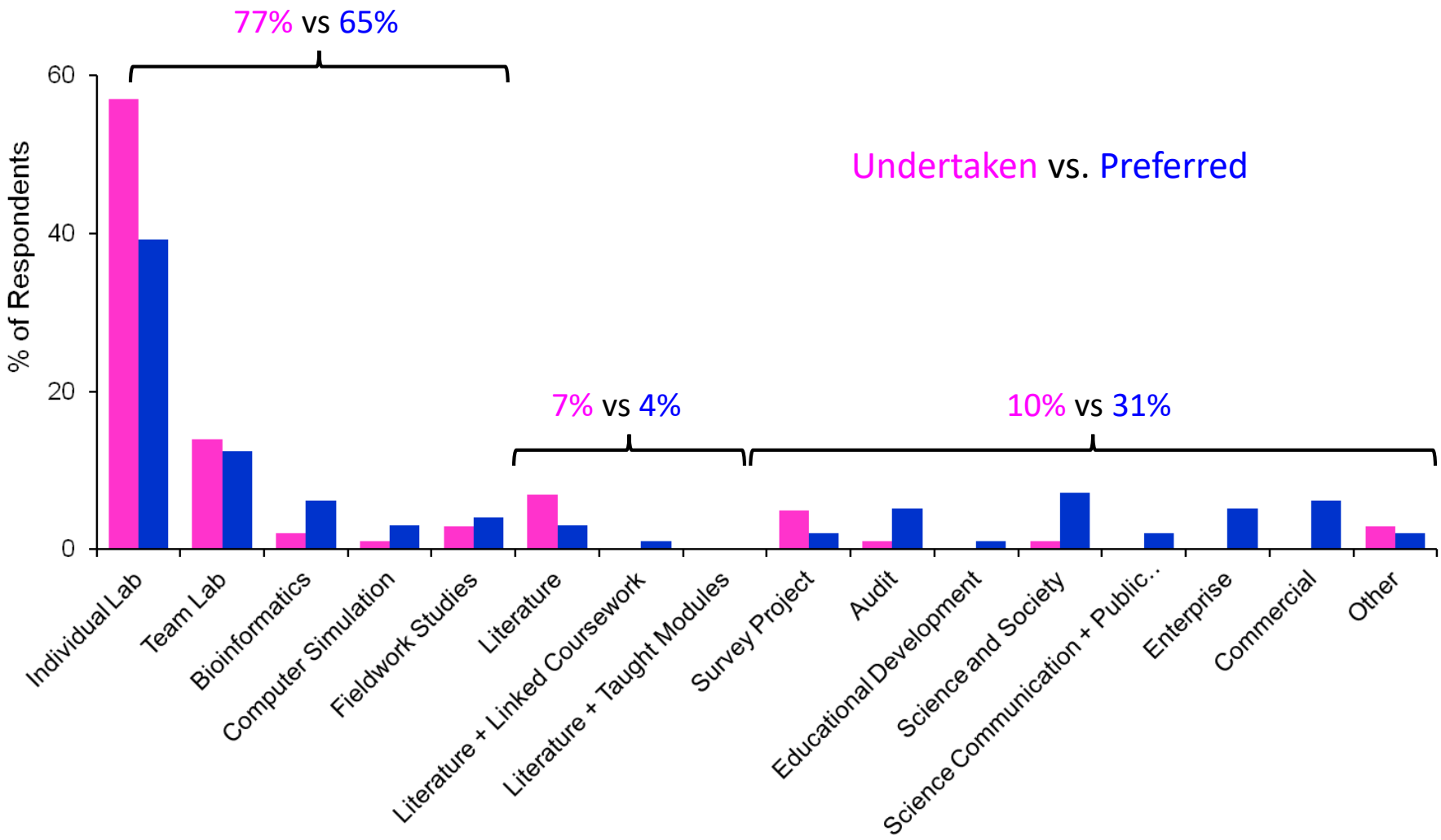




Opinions same one year post-graduation



Capstone Experiences across the World

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Enterprise

Students in Schools

Citizenship

Civic

Public engagement

Internship

Oral histories

Reflective Portfolio

Community

Systematic Reviews

Translation

Prototype

Performance

Overseas Internship

Grand Challenges

Client partnership

Engineers without Borders

Practice as Research

Student Challenge

Consultancy

Community partnership

Students as Partners

Next steps @Leeds

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- Large, team-based multi-laboratory
- More non-traditional
- Time “unlimited”
- Team-based systematic rather than individual critical reviews
- Grant proposals
- Commercial/Technical reports
- Rethinking assessments

- Interdisciplinary

My "*ideal*" Capstone

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- Student centred
- High impact educational practice
- Transformational and transitional
- Build-on, showcase & apply knowledge, skills & understanding
- (Co-)Create new knowledge & understanding
- Develop new skills
- Inform career choices
- Work experience & employability

Increased focus on personal & professional development

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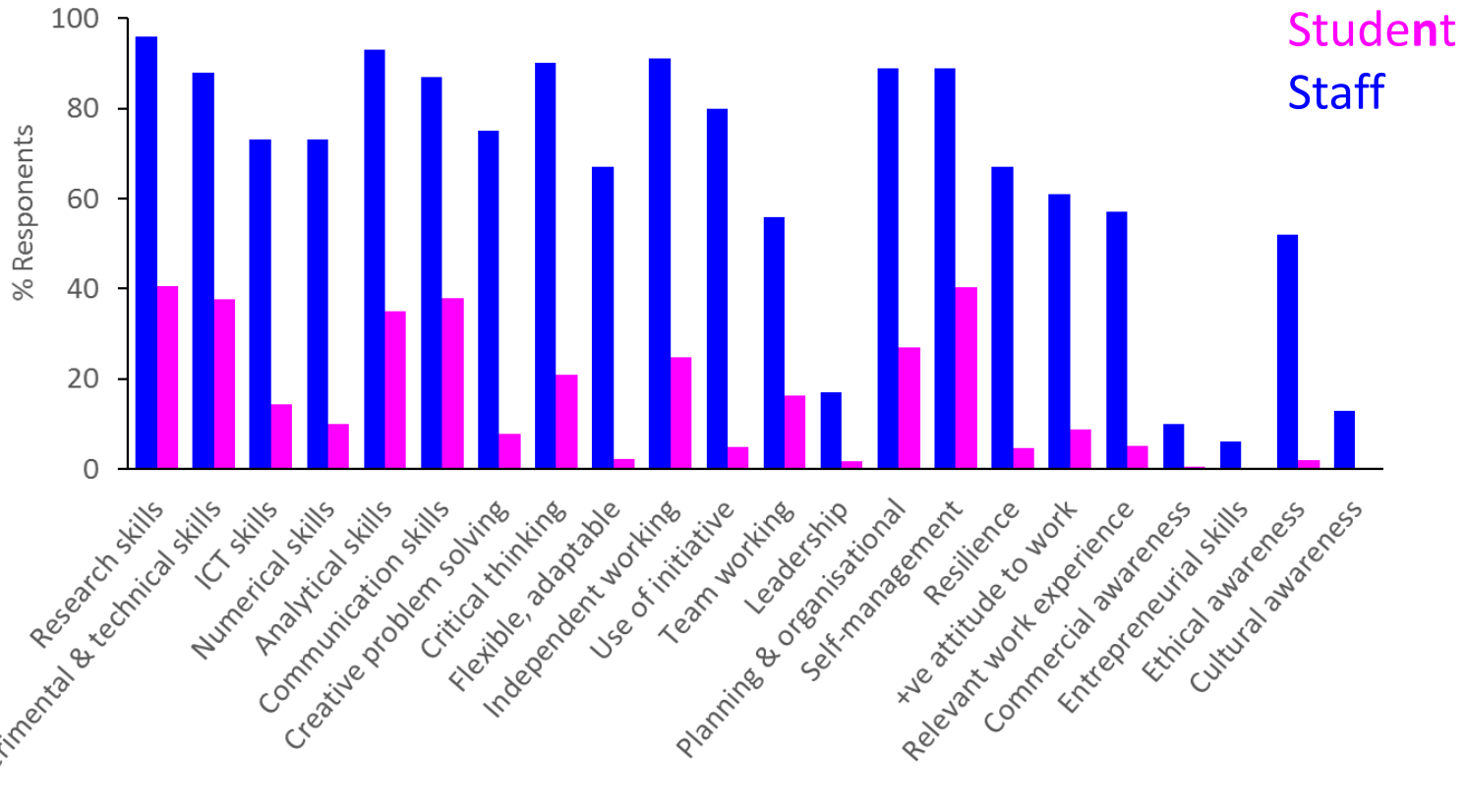

Females: Independent working; Team working; Self management; Use of Initiative; Professionalism

Males: Experimental & Technical skills

Employability skills:
Capstone vs Employment

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Re-think Learning Outcomes

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Learning Outcomes

Employability skills

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Suggested Learning Outcomes

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- Apply knowledge, understanding and skills gained in earlier years to a problem
- Gather or generate information: critically analyse this information to address the problem
- Gain new knowledge, understanding and skills in creating a solution to, or output for, this problem

~~Research~~ Enquiry-based Learning

Re-thinking Assessments

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- Valid- of learning
- Relevant and applicable

- Scientific paper
- E-portfolio

- Manage risk!
- Learn from others

Long term impact of Capstones

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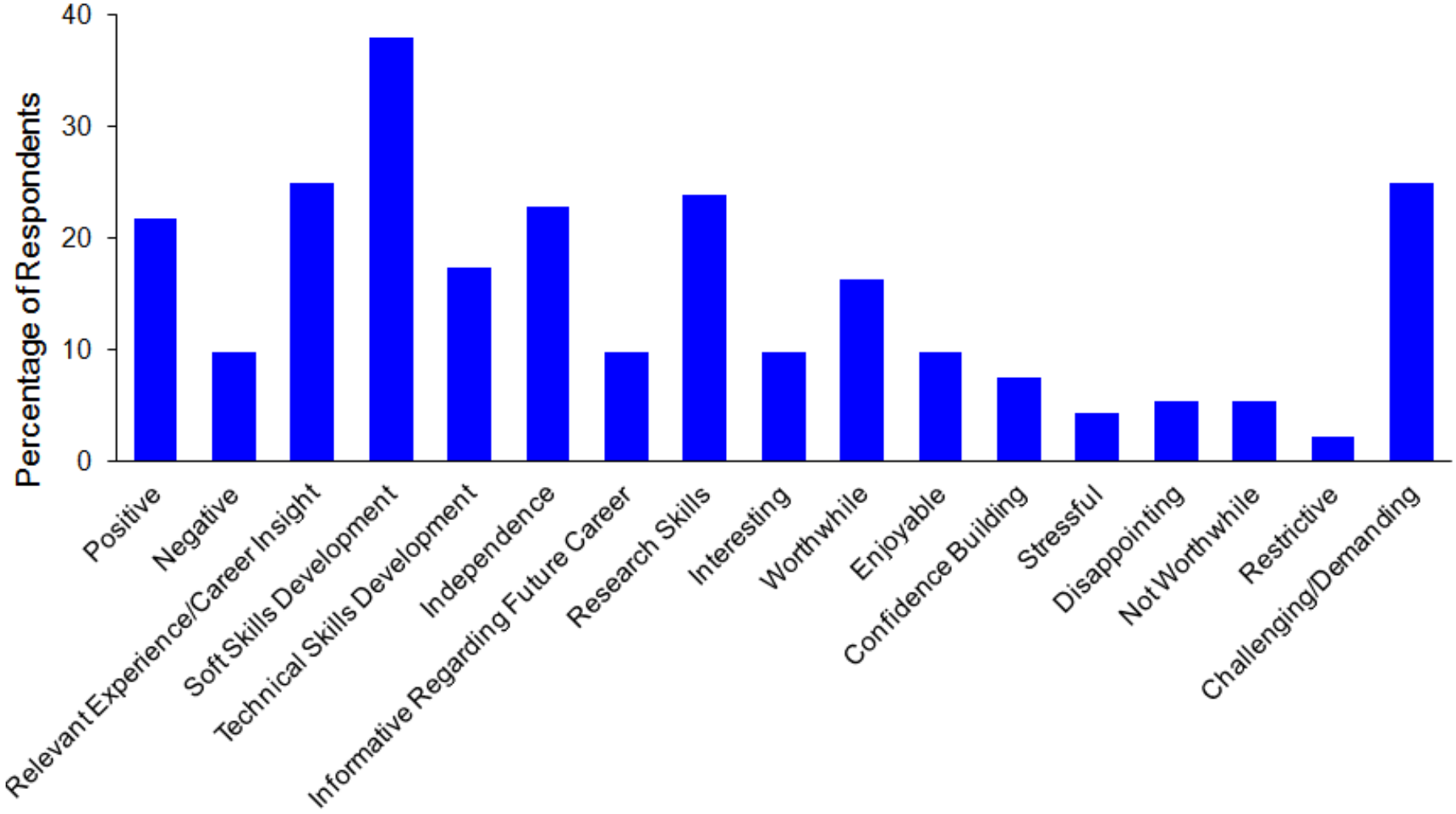

Impact of Capstones: Career Choices

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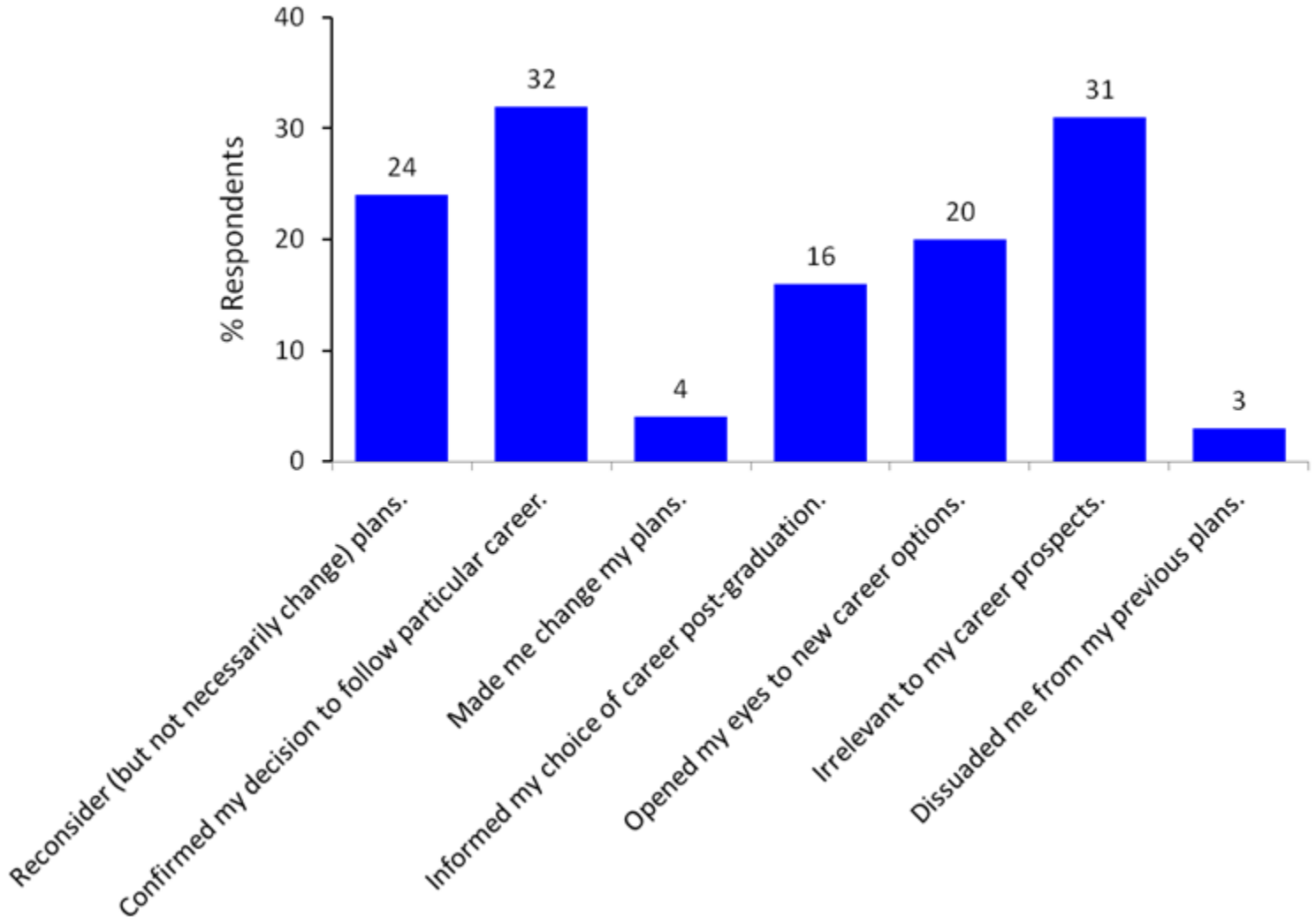

Impact of Capstones: Employability

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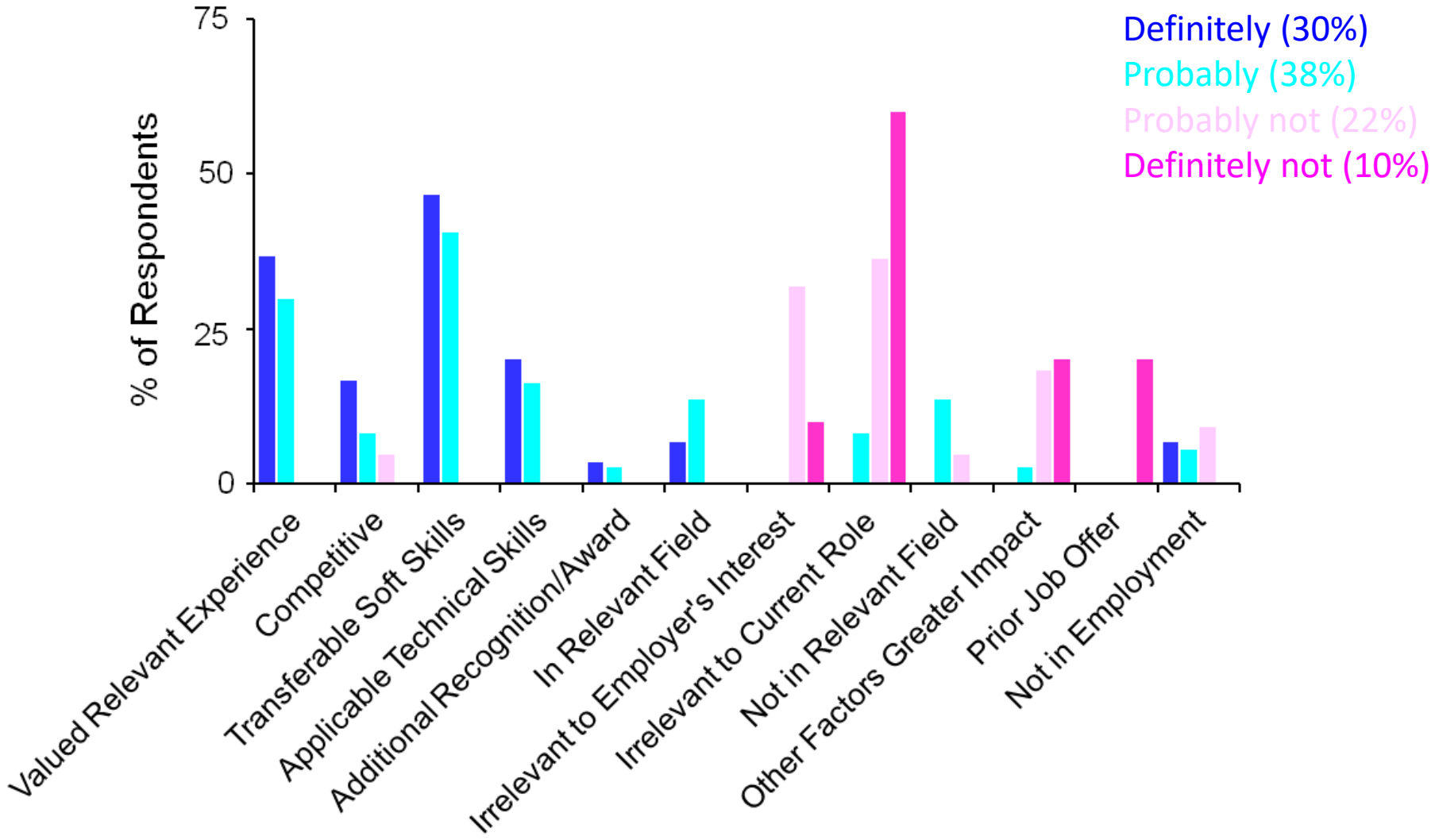

Summary

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- Rethink concept/scope- Capstone Experience
  - Intended Learning Outcomes
  - Assessments
  - Relationships
- Increased focus on skills development & application: A showcase
- Retain & expand range of provision
- Multi-disciplinary, open-ended

- Transformational and translational
- Enhance employability & inform career choices

My ultimate Goal!

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In terms of what I gained personally, the thing I will remember in 10 years time, is schoolchildren running across the playground towards me screaming Miss S, Miss S, are you coming back tomorrow to teach us!

So rewarding, the highlight of my four years in Medicine, indeed my whole education. I gained so much from it personally and professionally……

Questions, comments or more information?

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