Interdisciplinary Learning and Teaching:
Frameworks and Practice Conference

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The Open University

# Supporting inter- and multi-disciplinary teaching and learning at taught postgraduate level

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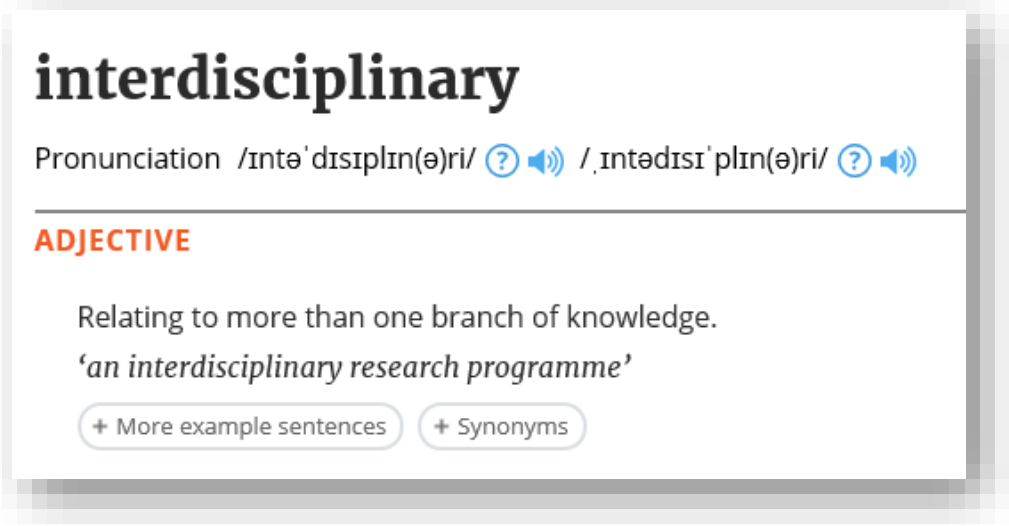
"We will begin by providing **an overview of our experience of interdisciplinary and multidisciplinary frameworks associated with Science Taught Postgraduate curriculum**, which has supported students on our MSc in Science programme at the Open University for nearly two decades".

"The talk will explore **what has worked well**, some of the **challenges associated with these types of curriculum**, and **discusses how such frameworks can be expanded to curriculum in other areas**, ensuring that we put students first by helping them to personalise their learning".

# Oxford English Dictionary (online), Oxford University Press, 2017



## interdisciplinary

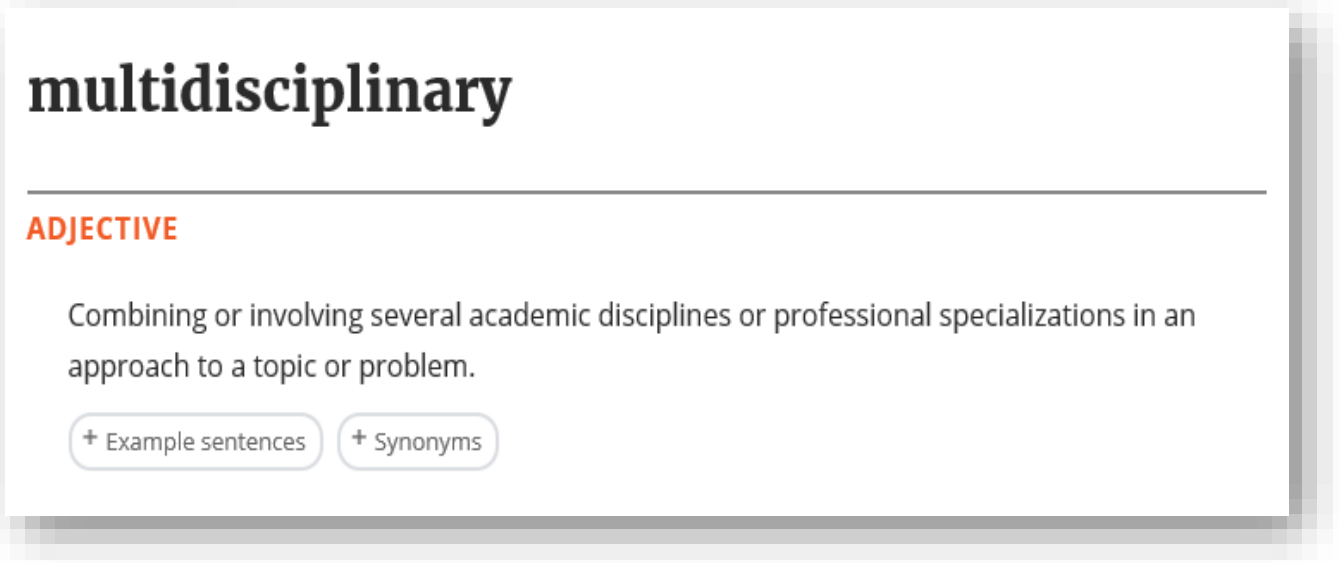
Pronunciation /ɪntəˈdɪsɪplɪn(ə)ri/ /ˌɪntədɪsɪˈplɪn(ə)ri/

**ADJECTIVE**

Relating to more than one branch of knowledge.

*'an interdisciplinary research programme'*

+ More example sentences + Synonyms



## multidisciplinary

**ADJECTIVE**

Combining or involving several academic disciplines or professional specializations in an approach to a topic or problem.

+ Example sentences + Synonyms

# Terminology - *Disciplines*

**C.P. Snow (1965) "the gulf of mutual incomprehension"**
between those who followed the sciences and those who saw the arts and humanities as their 'natural home'; the argument that 'disciples' are able to engage only with ideas from their own field of expertise; "the ontological and epistemological truths associated with their way of seeing and experiencing the world" (Marr, 2015)

**disciplines offering 'specialised education' in defined 'fields of study', following established rules and procedures….**
that "schools exist to guide students through the established hierarchy of education…." and that if left to their own devices "students would receive an incomplete or inconclusive education" (Misiewicz et al.)

**but…..real-world application crosses such boundaries**…..
requires cross-disciplinary communication and learning, recognising the interconnections between disciplines, with communities of scholars, educators and practitioners engaged in differing fields of study addressing contemporary issues in today's world. (Appleby, 2015)

# Terminology – *across, between and within*

**Holley (2009) "three variations of knowledge production that extend across disciplinary boundaries….cross-disciplinary, multi-disciplinary and transdisciplinary"**

- **Cross-disciplinary**: related disciplines come together to address a problem which evades study from a single epistemological standpoint
- **Multidisciplinary:** where two or more disciplines collaborate for a specific purpose (e.g. computer scientists, psychologists and sociologists collaborating in the design of human/computer interfaces)
- **Transdisciplinary:** encourages co-operative interaction between scholars and practitioners; linked to Gibbons' (1994) concept of 'Mode 2' knowledge.

(Marr, 2015)

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**SPECTRUM OF EXPERIENCE?**

**Variation in provision, ideology, frameworks and practices in Higher Education (e.g. in UK, US, Canada etc) - Liberal Arts; Joint Honours (major/minor); Combined Studies; Graduate Interdisciplinary Programs; Professional Master's etc.**

Traditionally across two (or more) 'discipline' areas: joint or combined degrees

- Discipline A *with* Discipline B
- Discipline A *and* Discipline B

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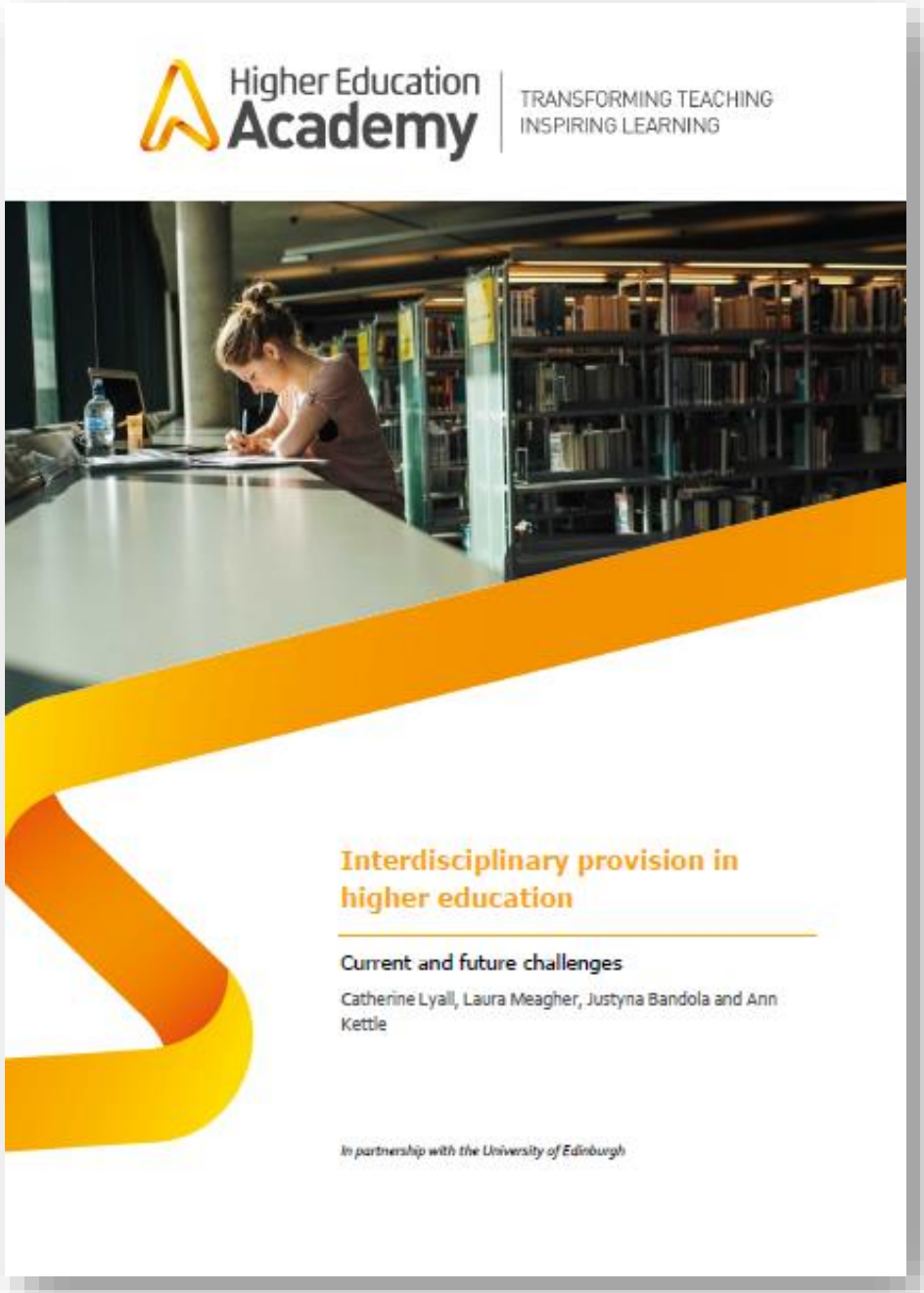


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**Lyall, C., Meagher L., Bandola, J., Kettle, A. (2015)**

'Interdisciplinary provision in higher education: current and future challenges', Higher Education Academy. https://www.heacademy.ac.uk/system/files/interdisciplinary_provision_in_he.pdf

**Gantogtokh & Quinlan (2017)**

'Challenges of designing interdisciplinary postgraduate curricula: case studies of interdisciplinary master's programmes at a research-intensive UK university', Teaching in Higher Education (online) http://dx.doi.org/10.1080/13562517.2016.1273211

# Our experience… Science perspective

MSc degrees in Science (F12), Earth Science (F53), Space Science (F77), Medicinal Chemistry (F62), and Mental Health Science (F78); previous offer has included Science and Society (F48), Medical Physics (F50) and Professional Science (F62)

- **MSc in Science programme has been running successfully since 1998**
- >2,000 graduates from the programme (up to 2016)
- Curriculum has continued to evolve - modules delivered entirely online since 2012
- ~600 student registrations across all science taught postgraduate modules
- 1/5 of all taught postgraduate science students link their studies to F12
- 2.5-7 years to complete – P/T distance learning (median completion is 3 years)
- All modules now have an EMA (no exams)
- Average completion and pass rates across all taught modules have been broadly comparable (2012-2016): 72% pass rates, 78% completion
- Broad curriculum choice of 60 credit 'core science' modules, plus 30-credit options
- Compulsory 60 credit capstone project (15,000 word dissertation)

# Our experience… Science perspective

**Interdisciplinary at individual module level:** e.g. ‘mental health science’ takes an interdisciplinary ‘biopsychosocial’ approach, combining biology, psychology and social sciences; ‘medicinal chemistry’ likewise integrates ‘organic chemistry’ (drug synthesis, design and modelling) and relates this to disease (from concept to clinic)…..

**and at programme level:** e.g. ‘space science’ programme integrates with ‘technology’, ‘computing’ and ‘engineering’ disciplines; ‘earth science’ integrates with ‘environmental sciences’; and formerly ‘science and society’ integrated ‘science communication’ and ‘science education’; and the ‘professional science’ masters programme integrated ‘business (MBA stage1)’ and ‘core science’.

**The capstone dissertation project offers the opportunity to relate disciplines and learning objectives from core science modules studied as part of individual programmes.**

# Our experience… Science perspective

**Student satisfaction** according to feedback from end-of-module surveys (SEaM) and PTES (sector-wide) feedback ratings have risen year on year and maintained for the past three years across constituent modules on the programme at 87-88%.

- 2009-10 71%
- 2010-11 75%
- 2011-12 82%
- 2012-13 83%
- 2013-14 87%
- 2014-15 88%
- 2015-16 87%

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[SEaM feedback: satisfaction with overall quality across taught postgraduate modules]

F12 PTES satisfaction with overall quality was 91% in 2015-16
(sector-wide average 83% for TPG; 82,707 respondents, 31.2% response rate)

# Our experience… Science perspective

**Student satisfaction on F12 (2015-16)**

126 students surveyed, 44% response rate [IET-SSST qualification data]

91% for overall quality, study experience and delivery methods

95% with assessment and qualification aim

96% with tutors

- Pre-registration advice – ensuring students are clear on routes through the qualification (module choices) and are suitably prepared to undertake their studies; referred to undertake suitable additional study prior to registering on the programme, if necessary
- Qualification entry requirements and individual module-specific entry requirements
- Curriculum coherence - assessment strategy, clarity of learning outcomes, materials
- Flexibility of module choices
- Appropriate tutor support and university services (e.g. library and computing support)
- Dedicated postgraduate student support teams (since 2012)

# Our experience… Science perspective

- Programme design
- Educational aims and learning outcomes
- Curriculum/pedagogic principles
- Teaching, learning and assessment strategies
- Institutional (Faculty/University) support structures
- Pre-registration advice and guidance, setting expectations

**F12 Motivation to study (2016-17)**
41% said employment/career and personal development were equally important
19% mainly for personal development
11% mainly for employment/career
**F12 Career motivation (2016-17)**
30% developing or progressing in current career
15% changing to a new career
**F12 Employment status (2016-17)**
56% in full-time work; 22% part-time work
7% retired; 11% unemployed

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IET-SSST Qualification Data 2017

# An Interdisciplinary 'Open' Master's Programme….

# An appropriate pedagogic framework…

- Using lessons learned from the strong foundation of the Open Programme and the MSc in Science and interdisciplinary programmes provided elsewhere, we are putting '*Students First*' and helping them to '*personalise*' their learning.

- Our framework has a focused area of study within a set of cognate discipline areas (e.g. Arts and Humanities; STEM; Education, Psychology and Health) – this will provide the discipline-specific weighting.

- Students then select an area of further study that complements or contrasts with their cognate area, and professional development.

- The fusion of pathways, creates a personalised learning journey for the student.

# Why …are we taking this approach?

- The flexibility of choice offered by the framework and model we are exploring allows students to personalise their learning to suit both their individual interests and career aspirations.

- We want to facilitate the ability for a student to specialise within a cognate area and complement this study with further professional development options to increase their employment and career prospects.

- We feel this would provide students opportunities to strengthen existing careers, change the direction of their career, explore and develop an area (or areas) outside of their current professional path, or to move across a discipline or field.

# What challenges are being addressed…

- We are exploring ways in which we can ensure applicants and registered students are supported with their study pathways.
- And investigating ‘market value’ and links with employers to express the value of this type of curriculum and employability skills.
- Our working title is **Open Master’s**, but does that communicate with people clearly?

# The Open Master's working group

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# References….

**Appleby, M. (2015)** 'What are the benefits of interdisciplinary study?' OpenLearn http://www.open.edu/openlearn/education/what-are-the-benefits-interdisciplinary-study
**Holley, K. (2009)** 'Understanding interdisciplinary challenges and opportunities in higher education', San Francisco, Wiley Subscription Services.
**Gangtogtokh, O. and Quinlan, K.M. (2017)** 'Challenges of designing interdisciplinary postgraduate curricula: case studies of interdisciplinary master's programmes at a research-intensive UK university', Teaching in Higher Education (online) http://dx.doi.org/10.1080/13562517.2016.1273211
**Gibbons, M. (1994)** The new production of knowledge: the dynamics of science and research in contemporary societies, Thousand Oaks, CA, SAGE publishers.
**Jones, C (2009)** 'Interdisciplinary approach – advantages, disadvantages and the future benefits of interdisciplinary studies', ESSAI, volume 7, article 26, available at: http://dc.cod.edu/essai/vol7/iss1/26
**Lyall, C., Meagher L., Bandola, J., Kettle, A. (2015)** 'Interdisciplinary provision in higher education: current and future challenges', Higher Education Academy.
https://www.heacademy.ac.uk/system/files/interdisciplinary_provision_in_he.pdf
**Marr, L. (2015)** 'Interdisciplinary study: disciples of disciplines?' OpenLearn
http://www.open.edu/openlearn/education/interdisciplinary-study-disciples-disciplines
**Misiewicz, J. et al.** 'The benefits and challenges of interdisciplinarity', Chapter 12 in 'Interdisciplinary Studies: A Connected Learning Approach' edited by Robin DeRosa, PressBooks; Rebus Open Textbooks (Plymouth State University Interdisciplinary Studies Program)
https://press.rebus.community/idsconnect/chapter/the-benefits-and-challenges-of-interdisciplinarity/
**Snow, C.P. (1965)** 'The two cultures and a second look', Cambridge, Cambridge University Press.