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London
Dec 2005

Slide 1

Staying in-between “Music Technology” in Higher Education

(Post-modern) Challenges and Opportunities for Music Technology Education

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Intro - The Questions

Music Technology Education – how do we create a

- supporting and educationally valuable environment for students and staff
- in an area which
 - reaches not only over different scientific domains,
 - but also over different working and investigatory methodologies,
 - different approaches for presentation and practice,
 - different underlying - but implicit - justificational hypotheses,
 - different vocabularies and terminologies
 - as well as different conceptual frameworks
 - - not even to mention often different budgets and administrative units.



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Intro – The Project “Betweening”

- There is substantial complexity involved in providing genuinely interdisciplinary degrees
- ? how do existing educational frameworks allow interdisciplinary degrees, such as “music technology”, to be taught
- in general degree curricula of multidisciplinary nature tend to be given as if they fit seamlessly into our traditional, mono-discipline-based academic structure
- ? How can we face the interdisciplinary challenge of “betweening”, existing on all levels of academic endeavour: from teaching and learning to administration and research
- a case study – “Music Technology”
- Ca 40 visits to institutions in 2006 and a questionnaire using cognitive interviewing techniques



At the beginning..... There was data

- Meanwhile, back at the there is UCAS data [1]
- UCAS data can tell use quantitatively (not qualitatively)
 - how many degrees are out there (in Britain)
 - how wide the perception of the subject area is, looking at degree names
 - what types of degrees are available and in which ratio
- Using UCAS 2006 data
 - How many BSc's, BA's, BEng's, MEng's, etc are there?
 - Which terms are being used to define these degrees?
 - How many joint, how many honours degrees?
 - Any trends or tendencies or patterns?
- But before we turn to UCAS, some views on what the discipline of “Music Technology” encompasses
- ... and also: what's with all these (post-modern) quotes around “Music Technology”?

[1] UCAS Directory 2005 <http://www.ucas.com/search/index.html>



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The (post-modern) quotes around “Music Technology”

- **Music Technology :** increasingly reduced to mean sound engineering (or sometimes even EComp), but still used in GB as the widest of terms
- **Electro-acoustic Music :** generally including only composition
- **Computers and Music :** generally perceived as a wide area of knowledge, but excluding sound engineering
- **Computer Music :** used more in the USA
- **Sonic Arts :** used more in GB, implying creative compositional approaches
- **Sound Technology / Recording Technology / Sound Engineering**
- **Electronic-, Computer-, Digital Music**
- **Electro-acoustic music**
- **Computational musicology / Systematic Musicology (used more in Germany)**
- **Acoustics**



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A bit of Interdisciplinarity: Computer Music, a full taxonomy ? (Pope 1993)

1. Music theory, composition, and performance

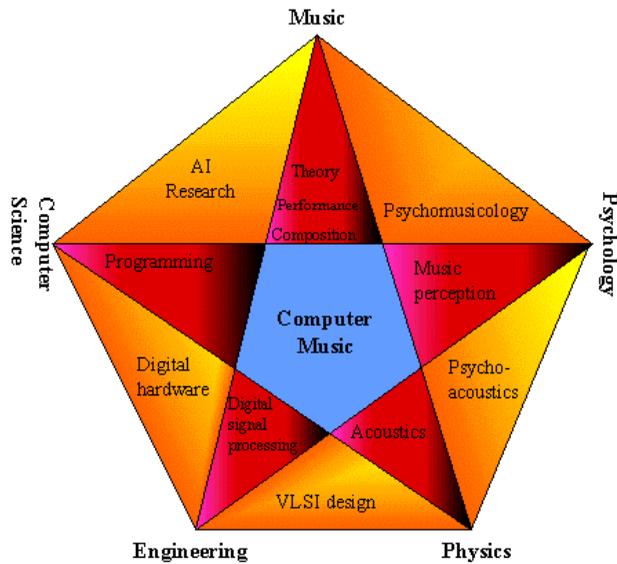
- 1.1. Music theory, sociology, and aesthetics
 - 1.1.1. Music theory and analysis
 - 1.1.2. Temperament and tuning systems
 - 1.1.3. New musical aesthetics and sociologies
- 1.2. Composition of electroacoustic music**
 - 1.2.1. Sound and composition models and notations
 - 1.2.2. Models of the composition and performance processes
 - 1.2.3. Sound design and processing
 - 1.2.4. Realization and production techniques
 - 1.2.5. "Aural rendering" or 'sonification" of scientific data
- 1.3. Algorithmic and computer -aided composition**
 - 1.3.1. Compositional algorithms and languages
 - 1.3.2. Composition systems for score or sound synthesis
 - 1.3.3. Artificial Intelligence and composition
- 1.4. Performance situations and interfaces**
 - 1.4.1. Performing and conducting
 - 1.4.2. Gesture recognition and interfaces
 - 1.4.3. Score following in performance
 - 1.4.4. Expression representation and analysis

2. Musical acoustics, psychoacoustics, perception, and cognition

- 2.1. Musical acoustics and psychoacoustics**
 - 2.1.1. Acoustics of musical instruments and voice
 - 2.1.2. Psychoacoustics
 - 2.1.3. Room and spatial acoustics
- 2.2. Music perception**
 - 2.2.1. Physiology of hearing
 - 2.2.2. Pitch identification
 - 2.2.3. Rhythm identification
 - 2.2.4. Timbre perception
- 2.3. Music understanding and cognition**
 - 2.3.1. Rhythm understanding
 - 2.3.2. Key and scale recognition
 - 2.3.3. Higher-level structures



A bit of Interdisciplinarity: Computer Music Engineering (Cammuri/dePoli/Dannenberg)



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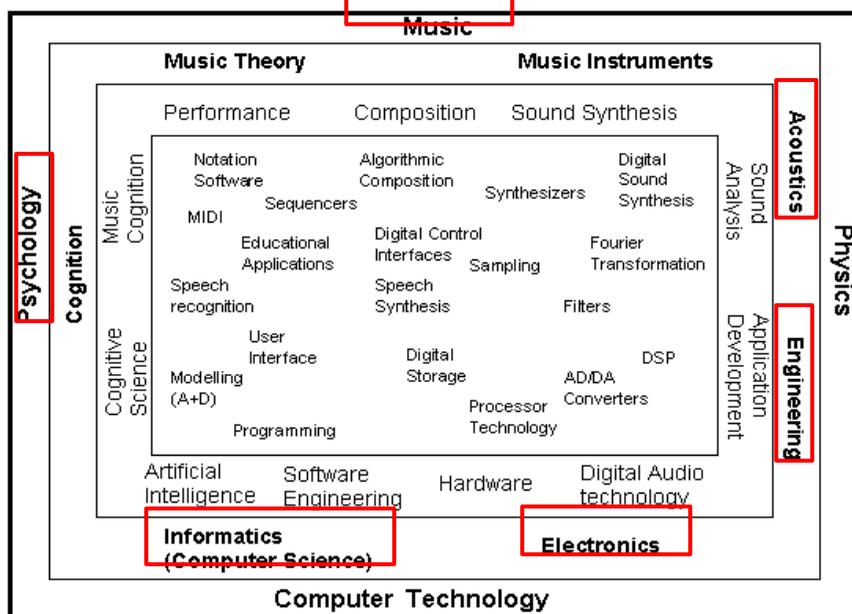
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[1] Cammuri, Dannenberg, De Poli, "Instruction of Computer Music for Computer Engineering Students and Professionals," in *Proceedings of the 1994 ICMC, ICMA*, (1994), p. 487.



A bit of Interdisciplinarity: Computer and Music



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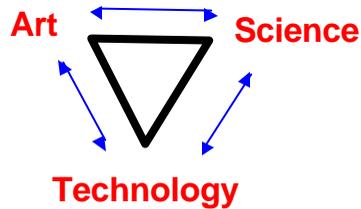
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Philipp Ackermann, *Computer und Musik*, Springer Verlag, New York, Wien 1991

A bit of Interdisciplinarity: Elements of Computer Music

Moore (1990)



A bit of Interdisciplinarity: Music Technology

- No taxonomy? Possibly too broad an area?
- Or encompassing parts too vocational for HE (i.e. sound engineering)? Mark Thorley (Coventry) has pointed out the oddity :

“the degrees around music technology are seen as being highly vocational, although there is no such job as a ‘music technologist’” [1]

- I, personally, perceive a widening gap between the scientific/engineering and the artistic aspects of this area (thru RAE and HE politics or cultural tendencies) ?

- One definition of "Music Technology": [2]

“technology involved with the musical arts...”[3]

- Or defined through numerous diverse HE curricula? It is the most used term in UCAS after all?

- ?

“Music Technology” Curricula in Higher Education

Andrew Bates (Leeds 2003) looked at

“*Developing and implementing an HE Music Technology Curriculum*”:

*“Place all the ingredients in a large bowl,
stir vigorously until everything is thoroughly mixed together
and serve immediately” [1]*

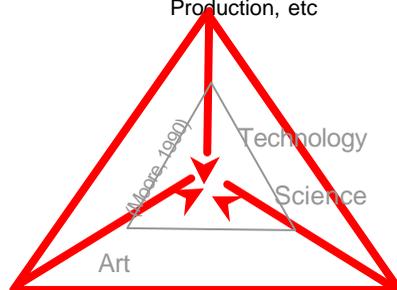
- Different Ingredients, different flavours, different meals

[1] Andrew Bates, Paper presented at the Leeds Music Technology Education Conference, Leeds, November 2003

Different Ingredients, different flavours, different meals

“**Music Technology**” [1]

As in Sound Recording, Tonmeister, Record
Production, etc



“**Music Technology**”

As in Creative Music
Technology, Sonic Arts,
Electro-acoustic Composition,
Sound Design, Electronic Music

“**Music Technology**”

As in Computational Musicology,
Electronic, Audio and Music
Technology Engineering, Music
Informatics, Music Technology
Soft/Hardware Development,
Digital Music

.... so let's turn to number-crunching & UCAS

[1] Notice: I am still hanging on to the term “Music Technology” and its **post-modern** quotes

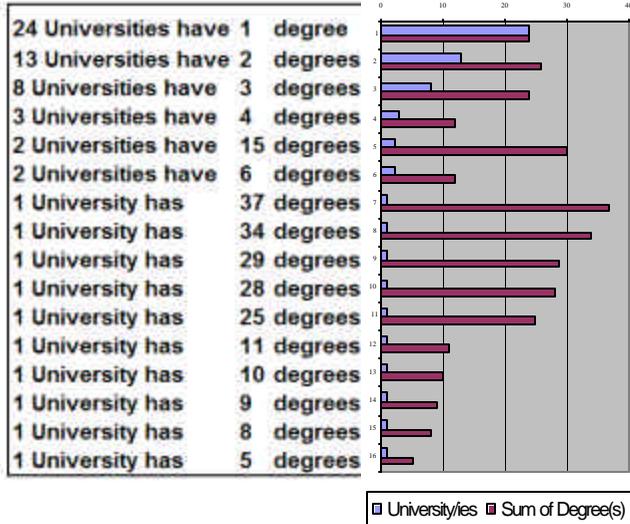


UCAS and Music Technology

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Using all degrees when selecting their category "Music Technology"

- 62 different Institutions
- 351 different degrees
- 63 different names (drawing already small differences together (ex: Music Technology/ies))
- 131 "Music Technology"
- 1 " Digital Music"



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Average = 5.1 deg

Without "matrix degrees":

Av. = 3.8 degrees

59% of universities have 1 or 2 degrees

University of Hertfordshire (H36)	37 degrees
Staffordshire University (S72)	34 degrees
Keele University (K12)	29 degrees
Thames Valley University (T40)	28 degrees
The Manchester Metropolitan University (M40)	25 degrees
Anglia Polytechnic University (A60)	15 degrees
Kingston University (K84)	15 degrees
London Metropolitan University (L68)	11 degrees
The University of Hull (H72)	10 degrees
The University of Huddersfield (H60)	9 degrees
University of Glamorgan (G14)	8 degrees
University of Chester (C55)	6 degrees
University of York (Y50)	6 degrees
Doncaster College (D52)	5 degrees
The University of Bradford (B56)	4 degrees
University of Central Lancashire (C30)	4 degrees
Northbrook College Sussex (N41)	4 degrees
Canterbury Christ Church University (C10)	3 degrees
University of Central England in Birmingham (U)	3 degrees
De Montfort University (D26)	3 degrees
University of Glasgow (G28)	3 degrees
Leeds Metropolitan University (L27)	3 degrees
The University of Salford (S03)	3 degrees
Southampton Institute (S30) Southampton Soli	3 degrees
University of Westminster (W50)	3 degrees
All other Universities (37)	2 or 1 degrees

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The “Matrix Degrees” [1]

American Studies and Music Technology (TWR3)	3FT Hon BA
Astrophysics and Music Technology (FWM3)	3FT Hon BSc
Biology and Music Technology (CW13)	3FT Hon BSc
Business Administration and Music Technology (WW23)	3FT Hon BA
Chemistry and Music Technology (PW1J)	3FT Hon BSc
Computer Science and Music Technology (QWK3)	3FT Hon BSc
Economics and Music Technology (LWC3)	3FT Hon BA
Educational Studies and Music Technology (VW3A)	3FT Hon BA
Finance and Music Technology (MW3J)	3FT Hon BA/BSc
Forensic Science and Music Technology (FW3J)	3FT Hon BA/BSc
French and Music Technology (RW3J)	3FT Hon BA/BSc
Geography and Music Technology (WX3J)	3FT Hon BA/BSc
History and Music Technology (WV3J)	3FT Hon BA/BSc
Human Geography and Music Technology (WV3J)	3FT Hon BA/BSc
Information Systems and Music Technology (WV3J)	3FT Hon BA/BSc
Information Systems and Music Technology (WV3J)	3FT Hon BA/BSc
International Relations and Music Technology (WV3J)	3FT Hon BA/BSc
Law and Music Technology (MW3J)	3FT Hon BA/BSc
Management Science and Music Technology (WV3J)	3FT Hon BA/BSc
Marketing and Music Technology (WV3J)	3FT Hon BA/BSc
Media, Communications & Culture and Music Technology (WV3J)	3FT Hon BA/BSc
Medicinal Chemistry and Music Technology (WV3J)	3FT Hon BA/BSc
Music Technology and Neuroscience (BW13)	3FT Hon BSc
Music Technology and Philosophy (WV35)	3FT Hon BA
Music Technology and Physical Geography (WF3B)	3FT Hon BSc
American Studies/Sonic Arts (TW7J)	3FT Hon BA/BSc
Applied Social Studies/Sonic Arts (LWJ2)	3FT Hon BA/BSc
Business/Sonic Arts (NWC3)	3FT Hon BA/BSc
Childhood & Youth Studies/Sonic Arts (WXJ3)	3FT Hon BA/BSc
Crime Studies/Sonic Arts (MW2J)	3FT Hon BA/BSc
Cultural Studies/Sonic Arts (LWJH)	3FT Hon BA/BSc
Dance/Sonic Arts (WW3N)	3FT Hon BA/BSc
Drama/Sonic Arts (WWJ4)	3FT Hon BA/BSc
Educational Studies/Sonic Arts (WX3C)	3FT Hon BA/BSc
English/Sonic Arts (QWH3)	3FT Hon BA/BSc
Film & TV Studies/Sonic Arts (WWB3)	3FT Hon BA/BSc
Geography/Sonic Arts (LWR3)	3FT Hon BA/BSc
Health Studies/Sonic Arts (BW33)	3FT Hon BA/BSc
Human Resource Management/Sonic Arts (NWP3)	3FT Hon BA/BSc

Term coined by M.Thorley
(Coventry/Staffordshire)



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The Degrees: what's in a name

- Arts and Media Informatics/Music
- Audio and Music Technology
- Audio and Video Engineering
- Audio Electronics
- Audio Engineering
- Audio Technology
- Computational Musicology
- Computer Science with Music (popular, digital, etc)
- Computer systems and music technology
- Computing and Music
- Computing with Music
- Creative Music Technology
- Creative Music Technology and Sound Recording
- Digital Music
- Electronic and Audio Engineering
- Electronic music
- Electronics with Music
- Information systems/music
- Information technology and multimedia
- Music Composition and Technology
- Music Informatics
- Music Multimedia and Electronics
- Music Technology and Innovation
- Music Technology and/or with Audio Systems design
- Music Technology
- Music Technology Software Development
- Music Technology with Popular Music
- Music with Computing
- Sonic Arts
- Sound Design Technology
- Sound Engineering
- Tonmeister
- etc

[1] UCAS Directory 2006 <http://www.ucas.com/search/index.html>.



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The Degrees: what's in a name

UCAS Subject Categories for Music Technology (1) with number of degree names using this term

- Music Technology 131
- Electronic Music 31
- Creative Music Technology 20
- Music Production 5
- Commercial Music 1
- Digital Music 1
- Audio Music Technology 0
- Music Acoustics 0
- Music Recording 0
- Music Systems Engineering 0
- Music Technology Systems 0

Top 6 Categories from degree names (2)

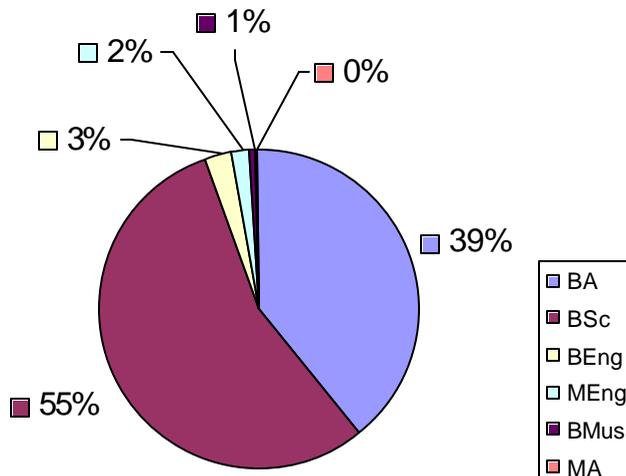
Degree Name Occurrence		
Music Technology	131	41.9%
Media Technology	36	11.5%
Electronic Music	31	9.9%
Sonic Arts	22	7.0%
Creative Music Technology	20	6.4%
Audio Technology	10	3.2%
Music Production	5	1.6%
Recording	4	1.3%
Sound Engineering	3	1.0%
Rest	51	16.3%

Degree Qualification

- Majority of qualifications are BSc

Total: 351

BSc (195)
BA (137)
BEng (10)
MEng (6)
BMus (2)
MA (1)



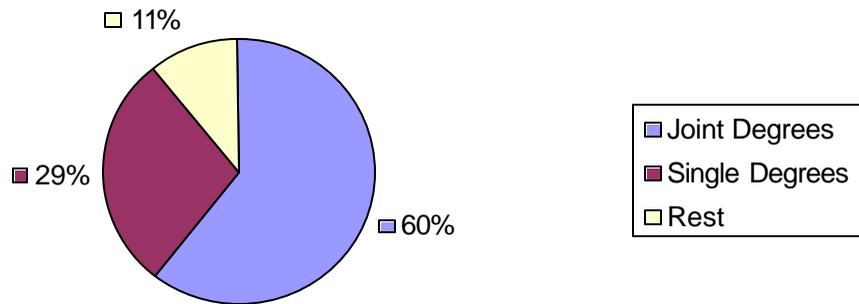
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Degree Qualification: Joint vs Single

- Majority of degrees around Music Technology are joint degrees



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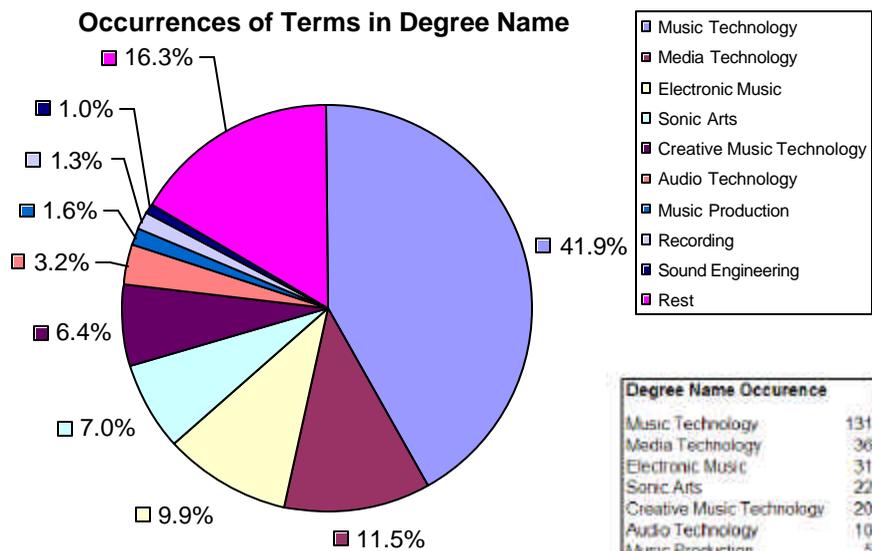
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Degree Names

Occurrences of Terms in Degree Name



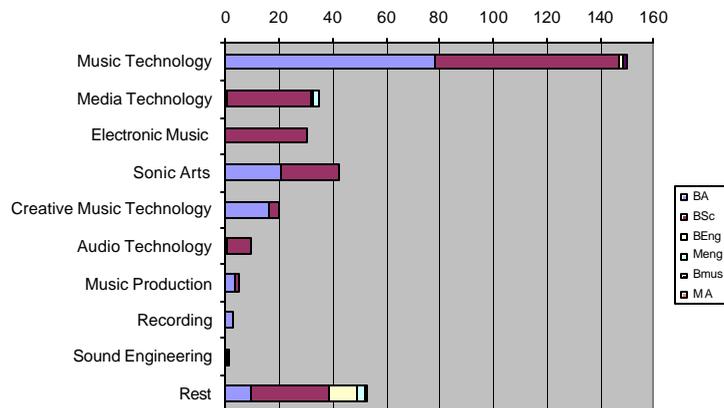
Degree Name Occurrence	
Music Technology	131
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Sonic Arts	22
Creative Music Technology	20
Audio Technology	10
Music Production	5
Recording	4
Sound Engineering	3
Rest	51

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Terms vs Degree Types



	BA	BSc	BEng	Meng	Bmus	MA	Total
Music Technology	78	69	2	0	1	0	150
Media Technology	1	31	1	2	0	0	35
Electronic Music	0	31	0	0	0	0	31
Sonic Arts	21	22	0	0	0	0	43
Creative Music Technol	17	3	0	0	0	0	20
Audio Technology	1	9	0	0	0	0	10
Music Production	4	1	0	0	0	0	5
Recording	3	0	0	0	0	0	3
Sound Engineering	0	1	0	1	0	0	2
Rest	10	29	10	3	0	1	53

Types of “subject accumulation” within a degree

- **A) Contributions from more than one department but with having “glue” courses dealing with both areas as one discipline**
 - Such as BEng over two departments
- **B) Contributions from more than one department, with students being left to accumulate their “interdisciplinarity”**
 - Such as usual Joint Honour degrees
- **C) Contributions from one department only, but which brings in staff expertise from relating disciplines**
 - Such as many Single Honours BSc Music technology degrees
- **D) Mixture of the above**
 - Or boundaries between the above are not discrete
- **E) Any of the above with exclusion of specific areas**
 - Such as Creative Music Technology generally not encompassing Computational Musicology and vice versa

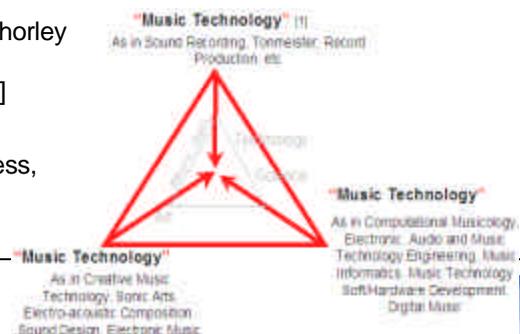
The student's perspective

- **John Gummery (Thames Valley) has been carrying out research into the perceptions and professional prospects of Music Technology students. (BA Music Technology).**
- **Important for evidence of changing attitudes and how students view the Music Technology degrees**
- **From his research I want to draw out some aspects relevant to this topic:**
 - ***"... there has been a steady fall in the number of those who want to work in music recording and production."* (63% in 2002 decreasing to 28% in 2004, other categories: composer, performer, self employment, film/tv/ratio/media work)**
 - Students seem to be increasingly becoming more open-minded to the wide range of diverse job prospects that a music technology degree can support.
 - OR: Are universities still riding the bubble of a past economically important music industry?
 - ***"All (...) graduates interviewed found the broad curriculum to be (Increasingly) relevant and beneficial in their employment. The high proportion using these skills in their current employment supported this view."***

[1] John Gummery, The perceptions of employability amongst music technology students, LIMTEC 2005

A somewhat lengthy conclusions about University and the Post-modern "Quotes"..... finally...

- Music Technology's last decades of economic success in one area of its knowledge/practical domain have sparked a steep increase in the HE degrees offered in Britain
- The degrees in their entirety reflect the diversity of its subject area(s)
- Universities have been very successful building on this demand and students tend to want to maintain the interdisciplinary character of this subject
- Do "Matrix degrees" show rather a demand and academic interest by students or desperation by Universities?
- Question remains, as Mark Thorley has asked "who is the client, the student or the industry" [1]
- And if there is a demand for interdisciplinarity and broadness, how can we accommodate this educationally



[1] Mark Thorley, Music Technology education – who is the customer, the student or the industry, LIMTEC 2005



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Music Technology and Interdisciplinarity

..... still concluding.....

- This area is still struggling to come to terms with the different methodologies of its own user community [1]
- The rapid increase of degrees in this area demonstrates how much is happening at the brinks of the traditional academic disciplines
- Even the label for this interdisciplinary subject indicates conflicts of interests for a number of different stakeholders.
- Interdisciplinary inquiries are (Mourad, 1997) “...efforts to pursue knowledge without being essentially constrained by the structure and content of a single discipline, including **subject matter, predominant theories, typical methods, or primary schools of thought.** They imply a general desire to conceive knowledge and theoretical practice in new ways.” [2] (... and **terminologies**)

[1] C Boehm, “Betweening: How to put the “and” between Music and Technology”, LIMTEC 2005 and Boehm, Music Technology in Higher Education, in: The Idea of Education, ed. by Tom Claes Inter-Disciplinary Press, Vol. 12. 2005. ISBN1-904710-11-5.

[2] Roger P. Mourad, Jr., Postmodern Interdisciplinarity, The Review of Higher Education 20.2 (1997) 113-140



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Some controversial post-modern views about Music Technology, Interdisciplinarity and HE

...and yet still trying to conclude...

- **Concept 1: The age of specialisms is new, do we really need deep specialisms without broad interdisciplinarity?**
 - “Early modern natural philosophers were more often than not *dilettantes in their experiments and humanists by education. It is unlikely that a new Leibniz should emerge today. But it is possible that, if he were alive now, he would still try to open gates.*” (Arikha, 2005) [1]
- **Concept 2: The project of modernity in University education may have failed**
 - “‘The project of modernity’ stems from the 18th century (age of enlightenment), aiming at developing objective science, universal morality and law, and autonomous art according to their inner logic.” (Habermans, 1983) [2]
- **Concept 3: “Current disciplinary system may be becoming brittle” [1] (Sperber)**
 - We need a post-modern acceptance of fragmented but self-organising areas of knowledge, in which “particular foundations would emerge in the course of the inquiry rather than be predetermined in the form of discipline-bound theories, methods, and schools of thought.” (Mourad, 1997) [3]

[1] Noga Arikha, History of disciplines and disciplines in history, in: (Sperber, 2005).

[2] Habermas, J. (1983). Modernity--An incomplete project. In H. Foster (Ed.), The anti-aesthetic: Essays on postmodern culture (pp. 3-15). Port Townsend, WA: Bay Press.

[3] Roger P. Mourad, Jr., Postmodern Interdisciplinarity, The Review of Higher Education 20.2 (1997) 113-140.



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Music Technology and Post-Modern Education

.....final page, really...

The three options for Educational Systems:

- **Are we in need of post-modern university frameworks? (Roger P. Mourad, Jr)**
 - Should we accommodate new concepts of fragmentational knowledge
 - And self-organising areas of interdisciplinary domains of knowledge
 - Creating foundations where needed in the inquiry rather than pre-ordained and culturally engrained
- **Or is there possibly more merit, certainly less resistance, of absorbing (exclusive) parts of an interdisciplinary domain within a traditional discipline**
 - Acceptance of EComp in HE Music Culture (e.g. RAE) can be seen as an example.
- **And as a third possibility, is there evidence of this interdisciplinary domain becoming its own separate discipline, with its own school of methodologies, approaches and practices.**
 - And is there a benefit in that?



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The End

.... finally!!

If you want to stay in touch with the project “Betweening” or contribute to our upcoming questionnaire send me an email or visit our website at

<http://www.music.gla.ac.uk/CMT/projects/betweening>

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Thank you