
MEDIA ART SCOPING STUDY SYMPOSIUM PROCEEDINGS
MEDIA ARTS SCOPING STUDY
NATIONAL ORGANISATION OF MEDIA ARTS DATABASE

Media Art Scoping Study Symposium

Media Art Scoping Symposium
Vital Signs: Revisited

Media art education at the intersection of science, technology and culture
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Musical Technology / Technological Music:

Teaching Electronic Music in the Academy

ABSTRACT

In 2007 WAAPA began a new music course that tied a thorough traditional music training with computer programming and new media arts. The Music Technology Major in the three year Bachelor of Music aims to produce students who can not only program interactive or compositional projects but also have a full capability in a more traditional musical background of aural training, harmony, theory, history and performance. After initial learning in composition, acousmatics, spatial music, recording, mixing and mastering music, students are introduced to programming through composition projects using MaxMSP and Jitter, moving on to Csound and the programming of Arduino's, as well as real time internet performances. The project based teaching and assessment structure encourages collaboration and performance in the public arena, creating a foundation for a performance/research ethic beginning at undergraduate level. This course is developing exciting outcomes that may finally solve the sound art versus music debate while developing learning strategies that combine musical and scientific approaches for a range of artworks with sound as a foundation. The paper discusses the design of the course and how it differs from others, and provides detail on the way programming is taught within a music framework and some of the outcomes to date.

KEYWORDS

Australian electronic music technology composition

"I don't think composition should be taught…. my attitude is: keep everything as human as possible, create a sense of proportion, good atmosphere to work, quietude, fantastic people there to help when they need them, and let them quietly get discouraged and get out of this tentative commitment they made; rather than creating some kind of Utopia."

(Morton Feldman, Music Times, August 1972).

Background

In 2007 the West Australian Academy of Performing Arts (WAAPA) at Edith Cowan University (ECU) introduced a new suite of Bachelor of Music (BMus) courses. The Music Department had previously been part of the WA Conservatorium course structure within a Bachelor of Performing Arts (BPA) when it merged with ECU. What was a complex map of units with a performance focus and very different structure to other courses at the university was now required to conform thus providing a rather unique opportunity for a complete overhaul of the existing BMus and its majors.

Early 2005 in preparation for this merger Cat Hope and Malcolm Riddoch began researching the structure for a Composition and Music Technology major within the proposed new Bachelor of Music degree. A number of composition students had already graduated through the BPA, enrolling in one on one 'instrumental lesson units', and this stream was formalized as a Composition major. A Bachelor of Music Technology had already been developed in 2001 with Robert Sazdov appointed as co-coordinator. However, despite an exciting start the degree collapsed in 2005, Robert Sazdov left WAAPA and the remaining students were then transferred to the ECU School of Communications and Multimedia and its Bachelor of Communications degree as a Music Technology major. This stream still exists as a Creative Music Technologies major within the Bachelor of Creative Industries at the now School of Communications and Arts (SCA). There is no music taught in this major.

The practical keys for the success of the proposed new Composition and Music Technology majors, within a university wide restructuring, were financial viability and clear differentiation from the creative technology major at the SCA. Consultations began with various other Australian universities and their academics[xlvi], in particular Julian Knowles who was then at the University of Wollongong. After also consulting practicing composers it was decided that the new majors should prepare music students for the rapidly evolving opportunities available in 21st century technologically driven music creation. Factors such as the explosive impact of the internet on traditional music industry business models, independent artists, music distribution and the public's listening habits - the growth in the film industry - the lack of music producers in the music industry - and the ever increasing hybridity of the contemporary arts - were all pointing to a need for trained musicians with broad based skills and musical tastes capable of working collaboratively across multiple genres and creative industry sectors. They needed to know about technology, without needing to know how to use every program that was current at the time the course was written.

In researching the various Music Technology courses on offer in Australia and internationally it became evident that many institutions tended to emphasize the technological aspects - sound engineering, mixing/mastering, computer skills and so on - with outcomes directed more towards production expertise than musicianship. These are not of course mutually exclusive outcomes as musical skills are also an important part of any Music Technology course and certainly for any successful career in sound engineering and production. Nonetheless, there did seem to be more of an emphasis on developing skills in musical

technology rather than technological music for many of the courses we looked at in the research phase. One notable exception that provided some inspiration for developing the new major was the New York University Music Technology program at the Steinhardt School[xlvii]. In this sense therefore, we saw a niche and a need for a course structure that emphasized the teaching of technologically oriented music skills, from composition to performance and production, within the context of an understanding of the historical development of, and contemporary skills in the use of musical technology. From the outset, the fundamental goal guiding the Music Technology course and degree structure at WAAPA was the emphasis on producing electronic musicians rather than technicians.

With this musical distinction in mind, a course structure was developed leveraging the excellent resources available within the WAAPA Music Department at ECU. The Classical stream within which both Composition and Music Technology reside thus provides prospective Music Technology students with a strong grounding in traditional music theory, notation, harmony, orchestration, aural training and history. Utilizing the production expertise available within the Contemporary Music stream likewise provides a solid basis in mixing, recording and mastering techniques. Integrating the Composition and Music Technology streams provides a practical and historical perspective on composition techniques with an emphasis on electronic composition, leaving Music Technology to focus on the history of electronic music and technology, acoustic and acousmatic approaches to the theory of organized sound, multi-channel spatial music, programming, synthesis, internet technologies and electronic performance.

Furthermore, an emphasis was placed on critical thinking, writing and research skills from first year onwards looking towards not just the development of an active postgraduate research program but also to provide the industry skills required for project management, grant applications and critical reviews/publications, both via online and print media. Lastly, provisions were made to develop cross-disciplinary collaborations with other student musicians (performers, technicians etc.) and students in the various arts (film, dance, theatre, visual, gaming, TV and radio) available within the Faculty of Education and Arts at ECU.

This basic structure came together in first semester 2007 as the Bachelor of Music majoring in Music Technology at WAAPA and is now (2009) into its third year.

Bachelor of Music Course Structure

The course structure as it now stands has four streams all of which are integrated to varying degrees with the Classical, Jazz and Contemporary music majors.

Music Techniques - covers aural, theory, harmony and arranging. Students may choose classical or jazz specialties. Here, students learn techniques to discuss and identify intervals, melodies and chords. It enables composers and electronic musicians to communicate with

performers, hearing the music they write on the page, and facilitates the discussion and understanding of a wide range of music, even if it is not their preferred style.

Music History And Culture - in first year Music Technology Overview covers the history of electronic music and technology from Humboldt and Busoni through the tape music revolution and on to the present laptop computing era. A film music history overview is offered in third year. From second year the students can also choose to do classical overview, baroque, classical, jazz overview, jazz and contemporary overview . All music students do 20th century overview in first year which covers music from Debussy onwards.

Ensembles And Extension Studies - here students choose any other music unit within the BMus as an extension to their principal study. Ensembles include ECUatorial[xlviii], for all three years, starting with works by composers such as Alvin Lucier, John Cage, Tom Johnston, Laurie Anderson and Pauline Oliveros with an emphasis on improvisation and learning how to listen. Second year ensemble includes performing original student works composed in MaxMSP while the third year Aletheia ensemble collaborates with other institutions, such as Griffith University in Queensland, in the performance of electronic improvisations via audio streaming over the internet[xlix].

Principal Study - this is where students specialize, with first year Music Technology and Composition students sharing the same stream. From second year onwards they diverge to specialize in either Composition or Music Technology. Those interested in the composition and performance of electronic music major in Music Technology, those interested in writing for acoustic instruments take Composition. All continue to take part in the composers' workshop and Music Technology students have a production (mixing/recording/mastering) module each semester until the end of second year.

The mix of units across the different majors and the ability to pick and choose extensions from other areas such as modules from Classical principal studies and so on makes for a very broad based degree structure. However, this freedom of choice is somewhat complicated by the unit structure and complex timetabling and this is especially the case when offering music units to other students outside of WAAPA Music. This issue is currently being addressed in order to encourage cross-disciplinary collaboration.

The Music Technology principal studies include both composition and electronic streams throughout the degree. In the composition stream students take Introduction to Composition, Applied Music, Sound Art, and MaxMSP composition. The electronics stream covers Acousmatics, Spatial Music, MaxMSP, Jitter, Csound and Internet music. Assessments are in part theory based (essay and online writing as well as exams) although the emphasis is on practical outcomes such as sound installation, electronic performance, soundtrack production, CD album releases and compositions.

Principal Study - Electronic Composition

While Composition majors focus on notated acoustic music after first year (taught in one-on-one lessons), Music Technology students focus on electronic music, sometimes notated, as their practice/expression in classes. Apart from this distinction the two streams are the same,

engaging with ensembles, performers, music history, aural training, arranging and so on with Music Technology retaining an emphasis on electronic composition throughout.

The first semester first year Introduction to Composition discusses current day composers both international and Australian as well as important events in composition and performance over the last fifty years. Topics include genre, style, analysis, a study of music broken down into its components, as well as the relation between improvisation, composition and sound art. A collaborative project with a non-music student is also required and this is repeated every semester through to third year[l].

The second semester Applied Composition introduces approaches to music for film, theatre, dance, TV, sound art installation, music video and gaming as well as contracts and copyright issues including the Creative Commons and APRA. Again, an emphasis is placed on collaborative processes across multiple disciplines and demonstrated practically with another collaborative project.

In second and third year there are group composition classes for Music Technology majors covering composition skills as they relate to MaxMSP and sound installation. These classes complement the MaxMSP programming units that start in second year and focus on the electronic composition from a music perspective and how to score electronic music. The fourth semester composition unit on sound art looks at interactive theory, sound sculpture and the internet. A sound art exhibition project is also undertaken using MaxMSP. In third year the composition class analyses the students' own works looking towards the final semester graduation project.

A weekly Composers Workshop gathers all the composition and music technology students from first to third year together - often with honours students, postgraduates, the composer in residence and visiting artists - to debate, comment and share ideas about composition. Every student is required to organize one 15 minute performance per semester including, if necessary, finding performers and setting up rehearsals.

Throughout their composition studies the students are also required to write reviews for the online Earwax Magazine[li] and maintain their own composers page on the WAAPA Musicians Blog[lii]. Provisions have also been made for a Composer in Residence, a position awarded yearly to established, upcoming or recently graduated composers, offering staff benefits such as access to computer labs, audio equipment and rehearsal rooms, teaching experience and a performance of their works in the WAAPA concert program. Students are encouraged to interact with the Composer in Residence and are required to attend their concerts and presentations, offering an engagement with the new music community outside WAAPA.

Principal Study – Electronic Music

The core studies for Music Technology reside in this stream and begin in first semester with Acousmatics. While classical notions concerning tonal music, traditional notation and aural training are reinforced in the Music Techniques stream this unit attempts to deconstruct the student's classical conditioning and come to an understanding of the electronic concept of music as 'organized sound'[liii] via both theory and praxis. The physical concept of sound in terms of the science of acoustics, psycho-acoustics and neural processes associated with auditory perception is first outlined in the context of the question: What is sound? Following this bracketing of the scientific concept the students are introduced to Pierre Schaeffer's phenomenological concept of sound as a sonorous object of perception[liv], or to 'the sounds themselves'[lv].

Concurrent aural training is undertaken via weekly field reports[lvi] describing environmental sounds without recourse to their source. By mid semester, due to the retuning effects of repetitive listening, students' auditory perception usually becomes sensitized to the musicality of environmental noise and they begin composing an acousmatic electroacoustic work using field recordings in a multi-track digital audio editor. All students must have some previous experience with a multi-track environment to gain admission to the course. The students are then organized in a team project using their compositions for an end of semester public sound installation, the 'Acousmatic Listening Lounge' at ECU's off campus white box gallery, the SpECtrUm Project Space[lvii]. This sort of practical, project based learning is an important aspect of every semester from first year onwards. Outcomes include increasingly sophisticated sound art installations as well as electronic performance with students involved in the event planning, marketing and management.

The second semester Spatial Music unit investigates the spatiality of organized sound utilizing 5.1 surround sound production facilities to produce five channel spatial compositions with each student constructing a 5.1 DVD of the semester's works. Spatial music by composers such as Iannis Xenakis and Karlheinz Stockhausen is analyzed and students are required to produce a graphic score as well as organize and install an end of semester multi-channel public performance of their spatial compositions.

The technical production requirements of these core units are bolstered by dedicated production units with one semester each of recording, mixing, mastering and CD/DVD production through to the end of second year.

Starting in second year, programming is introduced via MaxMSP as both a composition and live electronic performance tool. Emphasis is placed on its use in ensemble works linking electronics with acoustic musicians as well as in the construction of interactive sound art installations. This programming stream is extended into third year with the introduction of CSound as well as Arduino microcontroller hardware for use in interactive MaxMSP sound art projects.

MaxMSP can be especially useful for introducing programming to musicians in ways that can be understood musically, particularly for those that might not have a strong background in computers and/or mathematics/programming. While traditional concepts of musical structure

(i.e. melody, rhythm, polyphony) can be quite difficult to translate there are other musical structures, particularly when using prerecorded samples and effects, where it is easier and more intuitive to create musical structure. One of the strongest aspects of MaxMSP as regards teaching the software effectively is its realtime prototyping environment. Students can build structures on the fly and see how they operate during the construction process. The architecture encourages students to explore their own creative potential as there is no barrier between the creative thought process and the ability to build/construct.

The third year Music Internet unit comprises an introduction to the WAAPA Music Label[lviii], the department's online audio publishing website. Fifth semester third year Students form the onsite staff and are introduced to the responsibilities and tasks of managing editorial copy, online store maintenance, order fulfillments, stock take, marketing and audio mastering for MP3 downloads, CD Audio and album cover artwork, PDF scores and so on. They learn the basics of music distribution as it is currently evolving on the internet and publish a downloadable MP3 of their concurrent Aletheia Streaming Ensemble performance. In the final semester the students publish selected works as approved by the editorial board consisting of WAAPA Music course coordinators.

Third year is also devoted to the ongoing development, realization and production of a major sound art installation or electronic performance to be showcased in the end of year WAAPA Music Technology Graduation Show. Throughout their undergraduate career and especially by third year all students are encouraged to expand their professional music practice beyond the academy, and the department has developed a relationship with Tura New Music[lix], the peak body for new music in Western Australia, to facilitate this. Tura provides performance opportunities at the monthly Club Zho performance nights as well as the annual Totally Huge New Music Festival and the aligned conference. The support includes infrastructure, liaison with local councils, national contacts, marketing and promotion. Several undergraduates have already successfully participated in commercial projects outside the academy, from MaxMSP interactive installations[lx] to film, radio and television. These external collaborations and industry partnerships are an important part of the curriculum in the widest sense and are intended to help ensure that graduation is merely a stepping stone for our professionally skilled electronic musicians.

Music Research Program

Postgraduate research pathways were also formalized in the Music Department restructuring. While there previously tended to be a distinction within the department between non-research oriented performance and music research as musicology, the new Excellence in Research for Australia (ERA) initiative has opened up the potential for an active postgraduate and academic music research program. ECU implemented the Creative and Performing Arts Activity Index (CPAI) for recognition of performance activity as research some time ago. Following this new research focus WAAPA Music is currently developing a research ethic at the department from the ground up - from a renewed focus on undergraduate research and writing skills to consolidating its postgraduate program through such initiatives as the postgraduate colloquium for all BMus Honors and Masters of Music (in Composition, Music Technology and Screen Composition). The newly accredited WAAPA Music Research

Centre brings together active music researchers in the department with online publishing[lxi] of ongoing research. It is affiliated with the faculty research group CREATEC[lxii] and together these form an integral part of the creative research initiative at ECU.

Although still in its formative stages this WAAPA Music research initiative and focus is the capstone of the Bachelor of Music at WAAPA and an important part of the ethos and structure of the Composition and Music Technology streams. To date there has already been one Music Technology Honours graduate, and one Master in Screen Composition will submit this year (2009) while the initial cohort of undergraduates is into the final third year of the BMus and working towards the inaugural WAAPA Music Technology Graduation Show.

In terms of the ongoing development of the course and research structure we are still learning as we go, constructing the intra and inter departmental and university relations that the WAAPA Music Technology degree is built upon. While communication across the music majors remains a problem due to the specialization of each discipline (classical, jazz and contemporary music), we find that music technology requires an inclusive and eclectic approach that weaves through the various degree course structures. This eclecticism is reflected in the relation between Composition and Music Technology, or more specifically the relation between traditional approaches to tonal music and notation, and the technological approach to music as organized sound. At WAAPA Music Technology these are complementary disciplines, and necessarily so given that the purpose of the degree is to produce an electronic musician as a technological classicist with well rounded, eclectic musical and production skills capable of working with technology across multiple genres - from sound installation to graphical scores, more conventional notation, the internet, film and interactive media.

The history of electronic music in the academy is as old as the modern use of electricity, over a century now, and from the beginning it has been driven by this same dynamic interplay between classical composition and constantly evolving electronic technology - between classical composers and technologists. There is an innate freedom to this technological dynamic, and this is as true of our early 21st century electronic music as it was for the pioneering Italian composer and educator Feruccio Busoni (mentor to the electronic pioneers Edgard Varèse and Australia's own Percy Grainger). Creative and academic freedom underlies our technological approach to music, just as Busoni himself said, looking forward to our technological future: "music was born free; and to win freedom is its destiny."[lxiii]

REFERENCES

[i] The institutions and courses covered during the 2005 research phase included Adelaide University Bachelor of Music Studies in Music Technology, Griffith University Bachelor of Music Technology, Sydney University Bachelor of Music, University of Western Sydney Bachelor of Music, University of Edinburgh Degree of Bachelor of Music (Music Technology), McGill University's Schulich School of Music Bachelor of Music in Music Technology, Northwestern University Music Technology and New York University Steinhardt School Music Technology Program.

[ii] Music Technology, NYU Steinhardt, http://steinhardt.nyu.edu/music/technology/ (accessed June 18, 2009).

[iii] The ECUatorial ensemble is named after Varèse' famous work, completed in 1934, that contained parts for fingerboard theremin and cello.

[iv] For ongoing documentation of performances and streaming audio see the Aletheia Ensemble collaborative browser at http://aletheia.waapamusic.org (accessed June 18, 2009).

[v] In tandem with these film student collaborations, each year the students take part in the Revel8 competition, where they compose and synch music to super 8 film. The films are show at a major cinema and there are a variety of awards on offer. Revel8 | MySpace, http://www.myspace.com/revel8super8filmfest (accessed June 18, 2009).

[vi] Earwax magazine: Earplug, http://earwax.waapamusic.com (accessed June 18, 2009).

[vii] WAAPA Musicians Blog: Composers and their music at WAAPA, http://waapacomposers.com/composers/ (accessed June 18, 2009).

[viii] The term 'organized sound' following Edgard Varèse encompasses a technological approach to music and remains a focal point throughout the degree. For Varèse on organized sound see William W. Austin, *Music in the Twentieth Century* (New York: Allen and Bacon, 1969).

[ix] Pierre Schaeffer, (2005) "Acousmatics," in *Audio Culture – Readings in Modern Music*, ed. C. Cox and D. Warner (New York: Continuum, 2005), 76-81.

[x] Dr Malcolm Riddoch has a background in science and phenomenology which makes him a well suited lecturer for this module.

[xi] WAAPA Musicians Blog: Field Reports, http://waapacomposers.com/cat/music-technology/ (accessed June 18, 2009).

[xii] A number of Sound Spectrum projects can be found at Spectrum Archives, http://www.scca.ecu.edu.au/projects/spectrum/comingup.html (accessed June 25, 2009).

[xiii] WAAPA Music Label, http://label.waapamusic.com/ (accessed June 18, 2009).

[xiv] Tura New Music, http://www.tura.com.au/ (accessed June 18, 2009).

[xv] WAAPA student Brett Murray provided MaxMSP/Jitter programing for Silent Barrage in collaboration with Philip Gamblen, Guy Ben-Ary, Peter Gee, Dr. Nathan Scott and the Dr. Steve Potter Lab. The work toured New York in 2008 and won an honorary mention in the 2009 Ars Electronica.
http://www.aec.at/prix_history_en.php?year=2009 (accessed June 18, 2009).
http://www.symbiotica.uwa.edu.au/silentbarrage (accessed June 18, 2009).

[xvi] Music Research Group, http://research.waapamusic.org (accessed June 18, 2009).

[xvii] Centre for Research in Entertainment, Arts, Technology, Education & Communications, http://createc.ea.ecu.edu.au (accessed June 18, 2009).

[xviii] Feruccio Busoni, "Sketch of a New Esthetic of Music", in *Three Classics in the Aesthetic of Music* (New York: Dover, 1962).