Designing an International Curriculum Guideline for Game Audio: Problems and Solutions

By Ufuk Onen, Richard Stevens and Karen Collins. In this paper, we present an overview of some of the issues and questions encountered in developing an international game audio curriculum, and outline some of our solutions. In doing so, we discuss the interdisciplinary needs of video game instruction, the industry’s desire for key soft skills in addition to technical skills (based on our informal and formal querying), and the constraints faced in terms of institutional and international differences in curricular structure. While our curriculum is specifically concerned with game audio, our solutions and approach can be adapted across other disciplines facing similar difficulties.

1. INTRODUCTION: WHY A CURRICULUM GUIDELINE FOR GAME AUDIO?
A common question faced by both industry and academic practitioners and theorists of games is ‘how can I get a job in the video game industry?’ While video games have, in the past decade, been making in-roads into training programs in both private and public sector post-secondary education, there are still significant gaps in the overall curriculum, especially when it comes to audio. Some degrees in video game design or development may offer a few hours of instruction on audio, and some degrees in sound design or composition may offer a few hours of instruction on games, but there are very few options for students who want a dedicated knowledge of game audio that will meet the needs of the game industry. Brian Schmidt, an industry veteran who has recently created a workshop dedicated to helping train game audio specialists, describes, ‘Although many schools teach music composition and sound design, few if any teach the additional skills needed to create music and sounds for interactive games. . . There are numerous issues that traditional composers or sound designers ignore when faced with working on their first game. For example, what is a ‘parameterized’ sound effect, how do I create interactive music? What is XMA compression? Why can’t I just use Pro Tools to create game audio? These issues are second nature to top game audio professionals, but they overlooked in traditional music or sound design courses. In fact, the need for better game audio education was one of the reasons for the formation of the Game Audio Network Guild, a non-profit group aimed at organizing and educating creators and audience, and remains an ongoing mandate of the Interactive Audio Special Interest Group, an organization primarily aimed at developing tools and standards for the audio industry.

Although there are conferences and workshops with ‘boot camp’ style introductions to game audio, the need for a more comprehensive education is certainly seen as critical by those active in the video game industry. Working in conjunction with the Interactive Audio Special Interest Group (IAsig) and liaising with members of the Audio Engineering Society (AES) and the Game Audio Network Guild (GANG), several academics and industry partners have been collaborating to create an international Curriculum Guideline for teaching game audio at the post-secondary level. The Guideline began from this basic industry need for better trained employees in game audio (music, sound design, dialogue, audio implementation, production, direction and audio programming). The IAsig felt that a Guideline coming from a conglomeration of academic and industry personnel was the best way to ensure that an appropriate curriculum is created that
meets the needs of industry as well as the rigors of post-secondary education, and therefore was the ideal organization to spear-head the development. The aim of the Guideline is to provide information, assistance and suggested teaching topics to institutions wishing to implement more game audio into their curriculum, whether as an entirely new program, or just as one or more additional courses added to an existing program. While the focus is on audio for video games – at this time the largest market for interactive audio – it is assumed that interactive audio for other media (educational products, interface sounds, etc.) will be a growing area, and skills are aimed at students learning the most important aspects of interactive audio that can be applied to a number of industries. The experience of designing an international Curriculum Guideline raised interesting questions and problems in regards to how to develop a curriculum that can be implemented in a variety of different educational structures, while at the same time ensuring that the guidelines will be adopted, as well as meet the needs of both industry and education in vocational-based and more traditional post-secondary institutions. In this paper, we describe some of the difficulties that we have encountered, and illustrate our approaches to solving these difficulties, with the aim of providing readers the opportunity to adopt ideas as they seek to develop their own programs or curricula. We divide the paper into three significant areas of difficulty, with each section describing solutions, although there is considerable overlap in both the difficulties and our solutions in each section. Finally, we summarize what we have learned from the process, and outline areas for future development.

1.1. A NOTE ON TERMINOLOGY
Although there was involvement from people in several countries and areas of the world (with the majority of representation from North America, Australia and Europe), the largest proportion of the IAsig Educational Workgroup was U.S. American, and the USA remains one of the major centers in video game development, and so we have chosen to use American terminology with regards to the curriculum. A semester refers to a 16-week block of classes (what in many Commonwealth countries is referred to as a ‘term’). Typically about 4 weeks of the semester is reserved for exams. It is assumed that a student will take four or five courses per semester. We define a course as a one-semester block of classes that works towards building a qualification (in the UK, this is referred to as a ‘module’). We assumed that courses would meet for at least three hours in-class per week. A degree program (major) is the collection of courses that makes up the complete qualifications, and a stream is a specialization within that program. In fact, this confusion over terminology was one of the first and easiest problems to overcome. Discussing typical in-class time and program structures amongst our countries and systems and agreeing on terminology to describe the structure was one of our very first steps.

2. THE INTERDISCIPLINARY NATURE OF GAME AUDIO
Game audio is highly interdisciplinairy in nature. We define interdisciplinarity as any work involving more than one discipline, and the integration of these disciplines into a distinct, new area of inquiry. [25] The interdisciplinarity of game audio is both a result of the structure of the game industry, and its needs, as well as institutional divides that tend to segregate the Arts and Humanities from the Sciences.

2.1. JACK-OF-ALL-TRADES ROLES WITH- IN THE INDUSTRY
Game audio practitioners often find themselves having to wear many hats. While in big-budget game productions and in large production companies the job descriptions for employees are
often clear, in mid and low-budget productions and in smaller companies the border-lines between work descriptions of composers, sound designers, audio engineers, programmers and the like often tend to blur. Today, a large section of the industry (not only those that develop games but also the others that provide applications and content for websites, customer service systems, mobile phones and such) still has the ‘one-person’ audio department and that one person must work across all audio disciplines, in other words s/he has to be a ‘jack-of-all-trades’ that composes, manages sound design and implementation. This blurring of the boundaries of job descriptions is also true (though to a lesser extent) for video, television and the film industries as well. However, the implementation of sound into a game is a far more complicated process than is usual in the film or television market. It is often impossible, in other words, to implement audio into a game without some form of programming knowledge, and even composition must often be thought of in terms of programming-like logic.

The blurring of boundaries described above calls for professionals who are not only competent in one area (e.g., expressly in music composing, or in audio recording), but in other areas of audio as well. For example, a composer working on a low or mid-budget game, besides composing, recording and mixing music, usually ends up recording and editing sound effects, designing sound, and even recording and editing dialog and voice-overs. Moreover, the skills required are the same as those for traditional linear media (e.g. film, video), with an additional skill-set related to the requirements of the interactive, non-linear, programming-based media (responding to in-game parameters, creating dynamic, interactive compositions, and so on). Any curriculum for game audio should include these additional needs of interactive media while at the same time providing enough of a grounding in traditional, linear, non-interactive methods that the student will be competent entering either field.

2.2. THE NEED FOR AN INSTITUTIONALLY INTERDISCIPLINARY APPROACH
Not only must the students be able to demonstrate broad skills in both creation and implementation, and cover skills from more than one form of audiovisual media, in most schools game audio creators fall into a disciplinary valley surrounded by the Arts and Humanities (music and sound programs) on one side, and Computer Science (programming) on another. Game audio undoubtedly encompasses music and sound or recording departments, but also requires an understanding of programming in order to understand implementation or audio engine programming (the domain of Computer Science departments), acoustics (often falling under Physics or Engineering departments), real-time sound generation (requiring a foundation in Mathematics and Physics), voice talent directing and managing (the domain of Drama and Communication departments), and a general foundation in game/film/media studies to provide theoretical, analytical and critical contexts (which can be in a variety of Media Studies, Fine Arts, Film Studies, English departments, and so on). It was necessary to develop a curriculum that could draw from this interdisciplinary and cross faculty nature and ensure that, for example, even students with a concentration in music composition would have an understanding of the work that is undertaken to turn their compositions into actual music productions into a game, in order to foster communication between disciplines.

Moreover, having a basic understanding of these areas at an early stage in their learning cycle would allow students to explore possibilities beyond their immediate perceived interests into other areas. The integration of audio into a game requires many considerations and choices that
should be made between the composer(s), sound designer(s), implementation person(s) as well as audio programmer(s). Decisions regarding real-time mixing for instance, and the various needs for audio compression as well as other technical limitations often need to be made as a group to prioritize needs at each point in the game. Clearly, then, understanding the tasks of others in the group and the technical needs of the game are a vital part of the job.

2.3. ADDITIONAL CAREER-BASED REQUIREMENTS
Besides these specific interdisciplinary skill needs, considering that many of the available jobs are freelance contracts for both music and sound design, students also require a demonstrated understanding of marketing and business, especially the video game and music industry, budgeting, and copyright law. When working as freelance, contract (which can be per game or per a specific time period), or on an in-house basis, apart from their particular audio specialty, students also need to wear other hats such as salesperson, accountant, self-promotion and marketing expert, and the like. Trying to squash too many needed skills into a program is a common problem faced by many disciplines, of course, and so the difficulties we faced here were not necessarily new, but were compounded by the institutional divisions that would often mean that these skills are taught in a variety of faculties. In addition to our solutions described below, we strongly suggest that students work, where possible, in some form of internship as part of their program. These internships, of course, not only help the student to develop career skills and networking, but also help to bring fresh ideas and the latest trends back into the classroom.

2.4. OUR SOLUTION: A PRIORITIZED COMMON FIRST YEAR
Taking into consideration the specific skill needs of game audio professionals, we set about prioritizing the skills that were most important to each of the typical jobs available. This involved several stages. First, we collected a range of job advertisements that listed skill requirements and collated the information. We then surveyed members of the game audio community to come up with lists of skills that they undertake in their own jobs. Together these lists formed a set of skills that became part of a shared Google Document. Members of the IAsig were invited to rank skills on an online survey according to their perceived value (critical skills, important skills, desirable skills, and unimportant skills) for each of the main streams of our focus (composers, sound designers, implementers and programmers). This ranked list became the foundation of a series of skill blocks that focused around related skill-sets. Due to the over-burdened nature of the curriculum, we eliminated those skills that were deemed unimportant, and in some cases, desirable skills that were not deemed critical or important.

For example, our skill-block of ‘Microphone and Recording Skills’ included the objectives to be able to direct a basic recording session using microphones, mixers and editing systems; to understand microphone choice and placement for various types of studio recording; to select, use, and appropriately place microphones in field recording; to understand static and live/motion capture dialogue recording; and to conduct an ADR (automatic dialogue replacement) recording session with an awareness of recording facial movements for post recording animation lip-sync.

A more theoretical selection included a ‘Game Music Analysis’ block. These skills included understanding the aesthetics and practices of interactive music; understanding how different musical styles can be used in game and media production; the ability to critique contemporary game scores; understand the evolution of game music and its relationship to technological
advances; and to understand the parallels between non-linearity in concert music and game music. The skills for recording were rated as high priority in each of the streams, whereas the music analysis skills were rated as lesser importance for sound designers and programmers than for composers.

From this list of skill blocks, then, a set of core blocks that were deemed critical or important to everyone were highlighted and were collected as belonging to a ‘core’ series of classes. Our final core set of skill blocks included an understanding of the game industry and various project and time management skills, understanding games and game design, studio and session management, recording skills, editing and mixing skills, acoustics skills, implementation skills, synthesis and sampling skills, programming skills and analysis skills. In other words, students would all begin with a broad base of common courses that they shared in order to foster teamwork and understanding on upper-year projects. Students in each of the streams would take courses that offered these skills in a common first year. That way, students may also adjust their expectations and have a greater understanding of related but different potential areas of study.

Taking this list of core blocks and more stream specific skill blocks, we then attempted to anticipate how many hours were required to learn each of the skills to a degree appropriate for a graduate. Based on these suggested hours, we created larger sections of core blocks into courses of about 30 hours instruction time. In this way, we could see how many courses would be required for each stream and if the plan was feasible.

We then created an example ‘blue sky’ curriculum based around these courses for a four-year US American degree program as a suggested example of how the program could be implemented. We called this a ‘blue sky’ curriculum because this would be an ideal implementation of the curriculum, integrating all of the skills deemed important for a professional. We also recognized, however, that due to many factors (see below), the implementation of such a curriculum for many institutions would be impractical, and so set about creating alternative ways to implement the highest priority skills into courses.

3. SKILLS-SPECIFIC LEARNING: SOFT SKILLS, OBSOLESCENCE AND AUTODIDACTICISM
One of the key findings of our discussions and surveying of industry professionals was the strong need for soft skills, particularly adaptability and the ability to independently upgrade skills. We have separated these needs here, although clearly there is some overlap.

3.1. THE IMPORTANCE OF SOFT SKILLS
Many of those involved in the industry stated that what they thought was more important than training technical skills was soft skills or emotional intelligence, and what might be referred to as self-management skills.[24] According to Paul Lipson, president the Game Audio Network Guild, candidates wishing to enter the field of game audio should be ‘flexible, personal, and professional’ and remember that ‘You work with and for a team.’ [1]. In the development of the curriculum within such a technologically driven discipline such as game audio the focus has inevitably been on technical skills and knowledge. However there is significant evidence that success in finding and keeping work in any industry (particularly technologically-based and keeping work in any industry (particularly technologically-based industries) is not simply
dependent upon technical ability but also on a student’s so called ‘emotional intelligence’ [8] ‘soft’, or ‘interpersonal’, skills [10]. These are sometimes assumed to be a part of the ‘hidden curriculum’, defined by Dutton as ‘those unstated values, attitudes, and norms which stem tacitly from the social relations of the school and classroom as well as the content of the course’ [6]. The annual report in 2008 from Project Bar-B-Q 2008, an interactive audio think-tank conference, rated interpersonal skills as being very important for every position [18]. Personal and interpersonal skills, referred to in the UK as ‘Employability’ skills [15], also feature strongly in our analysis of 40 recruitment advertisements for jobs in games audio. We found that interpersonal skills could be grouped into three main areas:

1. Interpersonal skills such as the ability to develop and sustain productive working relationships: ‘good interpersonal skills’; ‘able to support the development of relationships’; ‘Build lasting relationships.’

2. Teamwork skills: ‘Great teamwork skills’; ‘Be a Team player who is able to share his/her ideas with others’; ‘ability to work collaboratively with the other members of a team’; ‘Demonstrate the ability to work in a team environment’; ‘able to mentor and support team members’; ‘Is able to work well under guidance and direction’; ‘Knowing how to work under pressure, for long hours, as part of a close-knit team.’

3. Communication skills: ‘Great communication skills’; ‘excellent communicator (spoken and written)’; ‘pro-active communicator’; ‘able to share ideas and import new ideas and/or processes’. We also found a recurring theme in terms of the personal attributes of the students: ‘Proactive, self-motivated person who can multitask effectively’, ‘working without direct supervision’, ‘the ability to both take direction well and make strong, self-directed decisions’, ‘Demonstrated ability to be proactive and self-motivated’, ‘Well organized, rigorous and autonomous.’

Questions arose as to how to ensure that these necessary soft skills became incorporated into the IAsig’s Curriculum Guideline, to guarantee that students would not only develop these skills, but be able to demonstrate these skills to potential employers through their portfolios, through internships, and in job interviews. How to teach these skills, therefore, became a question related to the wider aims of education in general and the structuring of course content in higher education.

3.2. CHANGING INDUSTRY AND SKILL OBSOLESCENCE

Useful to our conception of a curriculum guideline was a summary by Hutchings and Saunders, who state ‘In the highly competitive environment all higher education institutions face, the ability to conceive, design, market, deliver and reengineer curricula that meet the diverse and rapidly changing vocational, disciplinary and artistic aspirations and expectations of their clients, is critically important’[12]. In other words, skill obsolescence can go beyond merely the tools of the trade [22], and it is necessary that an allowance for aesthetic, industrial and technological obsolescence is built into a curriculum. The nature of the game industry requires an ongoing, evolving approach to course design that can rapidly adapt to changing technology and tools. For universities, the bureaucratic structure of approving changes to courses can be difficult and very time consuming (often up to as much as two years). Therefore, the nature of course descriptions as well as the proposed content had to be vague enough to allow for what may be significant changes to occur.
Moreover, the epistemological divide that exists between traditional university and more vocational centric learning (what might be called the difference between education and training) means that those coming from the traditional university background and its emphasis on breadth and soft skills may be less qualified in terms of hard skills and specialization immediately required by the industry, but potentially better able to adapt to a changing industry as well as changing job positions later. There was a constant consideration, therefore, to find a balance between necessary training in hard technical skills as well as rounding out these skills with theoretical understanding and critical thinking [26].

3.3. AUTONOMOUS LEARNING
The need to develop autonomous learning is clear not only from our research into the job market discussed above but also from the fast moving nature of the game industry itself where the market is driven by technological development and innovation [21]. Within the proposed curriculum the emphasis is on teaching principles, not packages, as by the end of a four year program it is very likely that current software and even the fundamental technologies of the game consoles they are built on will have entered a new cycle. Professional schools and private colleges may be better able to adapt and provide specific programs, but as discussed, the students do not merely require technical skill-sets, but also the ability to adapt quickly, to contextualize their work, and to adjust their skills to changing aesthetics. The pedagogical model requires what Derry and Murphy define as an ‘embedded curriculum’, as opposed to a ‘detached curriculum’. They describe that a detached curriculum provides isolated instruction in a particular skill-set, like mathematics or music, whereas an embedded curriculum teaches students about learning-to-learn within their discipline. They describe, ‘If students are, right from the beginning, instructed not only about the subject but also about how to learn it, then they will, in the long run, acquire a considerable number of specific learning techniques. Equipping the students with a reservoir of subject-related efficient learning techniques is a main step in enabling them to acquire new knowledge independently.’ [13] Our courses, therefore, were organized around the concepts and principles behind the design and development of audio for games, rather than around any hardware or software specific skills [14], and would strongly encourage a constructivist approach [3] that may prove more effective in producing the kind of auto-didactic who can continue to refresh their skills on their own. As Mike Rawson describes, ‘learning to learn’ has become a critical part of the skills agenda, and is an essential ‘package of skills’ to ensure future employability [20].

3.4. OUR SOLUTION: PROBLEM BASED LEARNING WITH AN EXPERIENTIAL FOCUS
Criticism of the concept of learning outcomes has come with fears that complex learning cannot take place, and that attention would be focused on those things that can be described in terms of objectives and outcomes [16]. We recognized, therefore, that there had to be opportunities in the curriculum for exploration, for in-depth study and personal growth, and that the curriculum ‘should not be so crowded that “surface” learning is encouraged at the expense of understanding’ [16]. Describes Rawson, the learner needs to be ‘involved in a self-reflexive process of learning: a conscious examination of his or her learning processes’ [20]. Analysis, criticism, and self-reflexive thinking, journal and essay writing and discussion, along with self-directed but guided learning are seen as essential in fostering this learning to learn. Peter T.
Knight describes that time for strategic thinking, portfolio-making, along with ‘mindfulness’ and reflection on practice needs to be written into a program [16].

One way of promoting the development of such skills is simply to make students aware of the importance placed on these skills by potential employers such as the results of our job analysis survey. Although highlighted in the curriculum as specific learning outcomes, we feel that modules viewed as ‘generic’ are traditionally undervalued by students and that these should be embedded into the context of the students’ projects. Skills development most effectively takes place through a process of ‘active participation, feedback and reflection’ [19] and so we would recommend that these are developed within an experiential learning cycle [17] that involves simulation and role play within a team project. This is addressed particularly in the recommendation for an interdisciplinary final major project that should involve students in a five stage process of awareness, practice, feedback, reflection, and further practice post-feedback [11].

This interdisciplinary project would also allow them to learn about, experience and reflect up on different team roles [2] and if we are going to prepare students to work in a globalized industry, students should also develop an understanding of cross-cultural capability [5]. Moreover, we would recommend on-going journal writing throughout the entire program in order for students to reflect on their own progress and learning. As part of a final-year thesis project, students are required to create a portfolio that not only demonstrates technical competence, but is also accompanied by written analyses of their own work that explains their thought processes, self-criticism, and research methods for the projects, design philosophy and approach taken. In this way, we are creating reflective practitioners that have the skills to analyze and discuss their work with others.

4. INSTITUTIONAL AND INTERNATIONAL BARRIERS

In addition to consideration of the difficulties described above, it was clear from the start that any curriculum guideline that would be truly useful would have to be extremely flexible and adaptable. The reasons for this became immediately apparent in our discussion of our own international and institutional differences. A summary of the difficulties in more detail will explain the challenges more clearly before we describe the approach we took to combat these difficulties.

4.1. INTERNATIONAL ISSUES

One of the initial difficulties encountered in discussions arose from the issue of internationalization and language. Wanting to create a curriculum guideline that can be used by a variety of undergraduate systems around the world meant dealing with different terminology even within the English language described in the Introduction. Confusion amongst the group was quickly sorted out by defining a set of terms at the outset that we could use for the duration of the project. Language was a fairly easy problem to tackle, therefore, but more difficult problems in terms of internationalizing the curriculum arose. A Bachelor of Arts degree commonly lasts three years in most of the European Union, whereas it lasts four years in most of North America, for instance. Many countries have different systems and structures of organization for undergraduate teaching. Even within some countries, such as the USA, there are differences in terms of in-class hours per semester, making the structuring of a curriculum
difficult. Tied in with this are the ranges of existing skills expected of students upon entering a degree program. In the UK, for instance, students have typically finished their general education program and have taken a two-year A Level (Sixth Form) series of specializations in their areas of interest. Planning for a degree program that can be implemented in many different countries, therefore, involves planning for a considerable degree of flexibility with regards to the amount of time that may be spent on a subject/topic area.

4.2. INSTITUTIONAL ISSUES

Not entirely divorced from the issue of internationalization are the many institutional differences, not only in terms of structure, but also in terms of requirements, cultures, and levels of bureaucracy that can make a full implementation of the guideline unrealistic. Many institutions have their own distinct degree requirements. At the University of Waterloo in Canada, for instance, BA students in all subjects must take a minimum of six courses from the Humanities (English, History, Languages, Philosophy, Fine Arts and Religious Studies) and four courses from the Social Sciences (anthropology, economics, geography, political science, psychology and sociology). Each major has an additional set of requirements that must be met. A 3-year BA degree consists of 30 total courses. A full year’s worth of courses, therefore (10 courses) is already taken up by meeting the compulsory general BA requirements, leaving only 2 years worth of courses for specialist training in the chosen major. A four-year Honours program requires an additional year with more individual research work, and a five-year Co-operative BA program requires work terms between study terms where students undergo paid internships. Pennsylvania State University’s Music program, on the other hand, requires a general composition course, 45 ‘general education credits’ in addition to its 79-88 credits for the major (where approximately three credits make up a course as we have defined it). Another significant related issue that arose from the planning stages is the political realities of higher education and how the curriculum can be implemented into a variety of different styles of program (fit around existing programs, become an entirely new program, etc.). An ongoing dichotomy throughout the development process meant the blue sky curriculum had to confront the reality of disciplinary boundaries, university administration, accreditation procedures and various associated bureaucratic barriers to quick adoption.

As we planned out our curriculum, we were quickly confronted by the inter-disciplinary needs of the curriculum described above. We are not just dealing with sub-divisions within a single faculty, but are crossing faculties in numerous cases between the Sciences and the Arts and Humanities. This raises the question of whether graduates should obtain a BA or BSc, for instance, which can require different processes for approval, assessment, and so on. It also means that co-operation must take place between faculties (which can be difficult when Universities fund faculties differently based on enrolment, etc.). Moreover, to have projects to work on (i.e. games), students must collaborate with departments who design and develop games—these, too are currently divided into very different disciplines, coming from both the Arts (game studies/digital media departments) and Sciences (computer science departments), which can have quite different faculty cultures [7]. These interactions can become significant challenges in terms of managing course credits, teaching, funding, and so on.

Many universities are, of course, recognizing the need for cross-faculty collaboration and programs that span both the Arts and Sciences. It has even been speculated that such
collaborations are now instrumental to institutional survival. Notes Garry Brewer, ‘Longer-term survival, though by no means guaranteed, will depend increasingly on the ability of such schools to tear down barriers limiting access to one another and between themselves and the real world where problems abound’ [4]. He suggests that until a significant restructuring of the entire system occurs, the most reasonable solution may be to ‘take root in the interstices between existing programs, without threatening the dominant paradigm’ [4]. This need for flexibility at the institutional level is further complicated by the fact that curriculum guidelines are more likely to be used if they allow for flexibility on behalf of not just institutional strengths and weaknesses, but also the strengths and weaknesses of the individual educators, who need the ability to bring their own skills, research, beliefs, frames of reference, methods and cultures of learning, theoretical preferences, operational objectives and training to their teaching [9].

4.3. OUR SOLUTION: CREATING AN ADAPTABLE, FLEXIBLE FRAMEWORK

With the difficulties discussed above, it was clear that the curriculum would need to be developed as small modular units that could be reconfigured into a variety of structures. Collaborative mind-mapping web software such as Thinkature was useful in our initial development and agreement on content and streams of specialization. A Scaled Curriculum Grid was developed that enabled a variety of programs to draw from: one semester technical programs, one or two-year college programs, four year university programs, and a six-year multi-track post-graduate program. The more traditional syllabi we developed for our blue sky curriculum and the Scaled Curriculum Grid was then adopted by international educators and ‘re-skinned’ into skills and learning outcome-based blocks that could be shuffled and adapted to fit around existing programs, to develop new programs, and to fit a variety of course time structures. These building blocks were prioritized based on the voting of the group members as to their importance described above, and so schools that were unable to implement all of the blocks could prioritize requirements.

5. CONCLUSIONS, SUGGESTIONS, AND NEXT STEPS

A summary of our process will be useful before we outline what we have learned from creating this Curriculum Guideline.

1. Agreed on terminology
2. Agreed on streams of learning based on typical division of labor in the workforce
3. Collected job ads, highlighting skills listed
4. Queried industry professionals about their job skills
5. Collated skills information and ranked according to priority for our streams
6. Chunked the skill-sets into skill-blocks that make sense to be taught together
7. Chunked skill-blocks into core blocks that were deemed critical or important for everyone and set these as a common first year requirement
8. Estimate hours to learn skills in-class
9. Created larger sections of blocks into courses of about 30 hours instruction time
10. Created a blue-sky model organization of courses as an example curriculum (USA structure)
11. Developed syllabi that describe learning outcomes
12. Returned to skill-blocks and reconfigure based on priority
13. Developed real world tasks and case studies that can be incorporated into syllabi
14. Created a list of resources educators can draw on to teach skills.
5.1. SUGGESTIONS
Based on our experience, we have created a list of suggestions for others faced with a similar task of creating an international curriculum guideline.

1. Agree on a set of terminology at the start: This sounds fairly self-evident, but in many cases we came across misunderstandings based on terminological differences.
2. Have an online collaborative space: We used Google Docs spreadsheets, Thinkature mind-mapping software, and SurveyMonkey to create surveys. This not only allowed us to see progress, but enabled us to understand other members’ thought processes, comment and adjust collaboratively without having to send around many versions of a document through email, which quickly became unmanageable with the many members of our group. We also had VOIP conference calls to discuss matters that became contentious.
3. Get industry involved early: While there are often differences of opinion and understanding with regards to the purpose of higher education, by bringing in industry professionals as members of the group, and using real-world job advertisements, we ensured that the skills we would be promoting were the skills that would enable students not just to obtain employment, but to maintain employment. Use combinations of qualitative and quantitative data analyzing industry needs.
4. Prioritize learning outcomes/skill-sets: Not all schools will be able to ‘drag and drop’ a curriculum guideline into a new program. Many schools will need to know what the most important skills are, as there may be limited time available to teach in the area.
5. Have a blue sky model: We created a four year curriculum plan fairly early in the process, and although this ended up being changed considerably by the end, it helped to have a full document to look at to see structure and direction.
6. Plan for change/flexibility: We recognized that even by the time the curriculum guideline was finished it would have been out of date if we included reference to specific software titles, and so on. By leaving open-ended descriptions that can adapt to changing technology, and focusing on skill-sets that are more time-resistant, we can leave time and space for specific tools be taught.

5.2. FUTURE PLANS
The implementation of the curriculum guidelines is an issue that we are faced with currently, due to the fact that there are few educators available in the area of game audio. It is our hopes that with growing interest in games in general, as well as with the increased opportunity to attend game audio ‘boot camps’ (at the Game Developers Conference and at GameSoundCon, for instance) as well as packages of teaching materials (see below), that this lack of available educators will change soon. Another barrier we face is the current lack of pedagogical materials available to instructors. The creation of these materials requires considerable input from those currently practicing in the games industry – an industry whose employees are often overworked already. When textbooks do get written by those in the industry, they are sometimes created without a complete understanding of the needs of the classroom.

Educators need to collaborate as much as possible, therefore, when and where possible, to ensure the timely creation of teaching materials. This need has been partly met via the IAsig online interactive audio WIKI, and the growing number of books available in the area of game development. However, specific materials are still required, and as the technology is rapidly changing, a system of constantly updated material needs to be created and shared. As such, a
wish-list of resources is being compiled with the aims of developing documentation and research in the areas that are still sparsely documented.

The success of an interdisciplinary program such as game audio requires a reconsideration of the ongoing separation on campuses of the Arts and Sciences faculties. Moreover, it is necessary that departments and faculties be open to cross-faculty collaboration and research, as well as practice-based research for the curriculum to be successful. Currently, in many universities it is still the case that faculty are assigned to a department, and that publication and/or teaching outside of one’s immediate discipline is at best misunderstood, at worst ignored and/or not given credit towards tenure, merit raises, and so on. Many new interdisciplinary areas such as game audio require faculty to maintain technological skills that change rapidly, in addition to disciplinary knowledge from a vast array of areas (for example, video game development and areas of computer science and programming, music technology, industry trends, sound design and film and game theory). A further consideration is to obtain ongoing feedback on the curriculum, in order to evaluate its success. This curriculum auditing is a necessary process of quality control. While the IAsig initially proposed the possibility of creating a certification system or having a standardized certified testing system to ensure that students were obtaining the skills that are required, ultimately we decided against these solutions because they would institute yet another barrier to rapid adoption, as well as inhibit the flexibility needed (as discussed above). Instead, we propose to evaluate curriculum through qualitative and quantitative research, including documents, interviews and/or surveys and observations and on-site visits, as well as statistical data regarding attrition and graduation rates, as well as post-graduation job placements.

ACKNOWLEDGMENTS
The authors would like to thank the Interactive Audio Special Interest Group (particularly the Education WorkGroup), as well as members of Project Bar-B-Q and the Audio Engineering Society for their input on the curriculum guideline and on this paper. A copy of the curriculum guideline will be made available through the Interactive Audio Special Interest Group (IAsig.org) in 2010.

This paper was written by the collaboration of Ufuk Onen of Bilkent University, Richard Stevens of the Centre for Creative Technology at Leeds Metropolitan University, and Karen Collins of the Canadian Centre of Arts and Technology at the University of Waterloo.

REFERENCES


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