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SOUND AND MUSIC DESIGN FOR GAMES AND INTERACTIVE MEDIA

STUDIO REPORT

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ABSTRACT

This paper presents the sound and music specialty of the master at ENJMIN (Ecole Nationale des Jeux et Media Interactifs Numériques: Graduate School of Games and Interactive Media) (<http://www.enjmin.fr>). The sound specialty is opened to composers, musicians, sound engineers, sound designers. The main goals of the school are to teach the use of sound and music in interactive media in general and video games in particular and the ability to work in multidisciplinary teams. In the first section we present the whole master goal. The second section is devoted to the description of the sound programme. The third section presents other activities of the school (continuous, training, international partnership, research). The studio presentation will develop these topics through several students project's demo.

1. INTRODUCTION

The ENJMIN, graduate school of games and interactive media, was funded five years ago as a public school with the support of the French prime minister. It is a partnership between three universities (CNAM, universities of La Rochelle and Poitiers) and two non profit institutions (CNBDI, CNAM Poitou-Charentes). Its goal is to train creators, designers and researchers in the fields of video games and more generally digital entertainments.

Thus, the school offers a European master's degree open to students with a bachelor's degree in at least one of the following fields: audiovisuals, visual arts, sound and music design, computer science, and cognitive science. Students are selected for their background, their creativity, and their passion for video games. The structure of the education is inspired by film schools (FEMIS, INSAS, NYFA, Lodz Film School, etc.).

The curriculum is based on the following assumptions:

- A specific job in the game industry is a specialization of a comprehensive body of basic knowledge.

- The production process of games is closely related to the film production process, a cooperative work in multidisciplinary teams.

The two main goals of the curriculum are the following:

- To train people in multidisciplinary teamwork according to the processes and the technologies of the game industry.
- To enhance each student's technical knowledge in his/her original discipline (storytelling, audiovisuals, computer graphics, sound and music design, computer engineering) with the concepts, methods, and tools used in the design and implementation of computer games.

Students are accepted in one of six specialties: game design, project management, graphic design, sound design, programming, and man machine interface (ergonomics). The specialty must be chosen by a candidate according to his background and his domain of interest. Each year 45 students (5 in sound) are selected though a selective competitive examination. For example a sound candidate must have a bachelor degree in sound engineering or music. He has six weeks to create the pitch of a game on a proposed theme and to provide a sound chart and some samples of the sound used in this game. If he is selected at this first level, he must pass written exam in English, general knowledge and film or game analysis. At last, he has to go through and oral evaluation.

The master's curriculum is made up of courses, conferences (seminars), and projects that allow students to do the following.

- Discover the world of video games: history, vocabulary, economy, methods, and production processes.
- Know the basis of the profession of the other participating parties in the conception of a game to be able to work together. For example, we teach the basics of programming and computer graphics to a sound engineer.
- Learn, by domain of specialty, the methods and the technologies used today and those planned for tomorrow in the development of video games.
- Experience the multidisciplinary game-design process.

- Gain experience in his future profession in a four-to six-month internship in the industry.

The four semesters of the master are structured as follow: During the first semester students learn the basis of video games, cinema and television, analyze of games and film. They also learn the vocabulary and principles of the specialties out of their initial domain. For , a students learn the basics of programming, image synthesis, animation.... , to be able to work with other members of the multidisciplinary teams on the first project. The second semester is devoted to specialty courses. Sound and music design specialty courses are presented in more details in the next section. The second year is mainly devoted to the main projects, advanced courses for each specialty and internship.

2. SOUND CURSUS

2.1. Teaching principles

Games and interactive sound and music are directly related to the whole project goals. As in an audiovisual school, students must be trained to the participation of the whole project. The sound chart is the counterpart of the graphical chart, defined during the pre production phase. In the same way the technical feasibility of the project and the final perceptive environment must be taken into account into the early phases of the project. Sound designers and musicians must be able to work with game and graphic designers, and to express their needs and cooperates with programmers, taking into account constraints like sound compression levels or sound engine limited capabilities, and the predominant part of image synthesis. In counterpart a sound designer may be the core of the interactive design. So we also teach how sound can be a fundamental element of the game design, as both an core element of gameplay, interactive narration and immersion principles. As a consequence our pedagogy is focussed on the ability to create, design, produce an original collective multi-disciplinary work. In the sequel of this section we presents the courses related to sound and music design.

2.2 First semester: Technical basis of sound engineering and sound design

This module is meant to understand basic sound design concepts to students coming from other specialties (images, programming, game design...). The goal is to undergo the basic steps of the sound design in film, games and, more generally, interactive media. The first part is focussed on the nature of audition in linear and non linear media, psycho acoustic principles and broadcast constraints. Then, we give as short introduction to sound and digital audio, and the production and constraint of sound design in games. Students work in a short project where they must classify sound materials and specify and realize the soundtrack of an existing movie or a game.

2.3. Second semester: sound specialty

2.3.1 Principles

All the modules are intended to give to the sound specialty students the specific knowledge related to game and interactive media design. We assume that the students have some basic knowledge on sound and music and a elementary practice of digital audio tools

2.3.2 Music and sound design for linear and non linear media

Starting from classical analysis principles of film soundtracks, we define a model for interactive media and, in particular, games. Students apply and discussed these models on several examples. Sound designers and musicians present their own points of view and practices. As a conclusion, students must solve an issue related to the sound and image relationship.

2.3.3 Sound production

This module presents the sound design production in terms of technical process, human, economic management and legal issues. The ability to lead a project according to a sound chart is the main pedagogical goal, taking into account that the student may act as a composer, a sound designer or a sound engineer.

2.3.4 Digital audio

As students are coming from various backgrounds (music, musicology, sound engineering), this course has the goal to reach a common homogeneous level in digital audio. The target is to give them the ability to express and to discuss with the game programmers their needs in terms of sound functions and integration principles. The module covers fundamentals of digital audio (signal processing, filters...), classical sound transformations, spatialization and synthesis. It covers more than current practices in games and open to possible technical evolution like generative music and foley effects. Building blocks tools like Max MSP helps the understanding of these theoretical aspects, are, even if these tools are not used in the game industry.

2.3.5 Writing for interactive media

The main topics of this module is to give some principles about the sound interactive scenario which relates the gameplay features, the dramaturgy of the game to the continuity of sound, the partially controlled position of the player in the game space and its, supposed, emotional state. Principles presented starts with the control of sound loops, real time mixing and events managements. Advanced topics introduce the

design of a reactive and adjustable music. These principles are illustrated through exercises using simple game engines like Gamemaker or Virtools [3]. Students must devise an interactive scene, with or without graphics, in which the sound has a predominant role.

2.3.6 Sound tools and technical constraints in game audio design

The goal of this module is to explain how the sound design must be implemented as a part of the whole game programming system. We present the main tools used to integrate the sound in games (FMOD, ISACT, XSACT...), the basic sound API (directsound, OPENAL...) and specific tools like EAX and Eagle [1]. The constraint related to the architecture of game consoles and PC sound cards are detailed. The integration of the sound functions in general game engines like Criterion/Renderware or Unreal and its relation to other the other functions of the engine (Graphics, AI, physics, network) are presented.

2.4 Third semester: advanced courses and international seminars

On one side, advanced classes deal with particular subjects like generative music or advanced sound technology points like the last development of real time mixers. Students may ask for a dedicated presentation on topics that are important for their own project. It can concern sound students and programmers at the same time. International seminars allow students to reach and discuss with famous sound designer, composer through video conferences.

2.5. Students projects and internship

2.5.1 The first project

The first year project intends to train students to interactive design and a first experience of team works. A group composed of less than four students coming at least from two specialties has to design a simple interactive creation. The results have to be a simple and accomplished piece that can be experienced by a user in less than ten minutes. It can be any kind of entertainment or artistic systems including, among others, games. We discourage students to develop complex systems in terms of the technology used or the amount of manpower needed.

2.5.2 The second project

The second year project is the main work done by students during this six-month period of the master. The goal is to complete the preproduction of a game in an environment close as possible to the industry practices.

Each project teams includes nine students: one project manager, one sound designer, one ergonomist, two game designer, two graphic designers and two programmers. The group has to manage time, technical resources and a budget. The main result of the project is "the game bible" that contains the game design, the graphic and sound design, the interface, the software architecture, the validation plan, the planning, and an evaluation of the production costs for whole game. A prototype of the game is realized using industrial design tools. Innovative projects, according to industry standard, are encouraged. In particular the creation of new uses of sound in gameplay and the game ambiance is considered as an important feature. The projects end by a formal presentation to game publisher and game studio, with a call to funding for the whole game

2.5.3 Internship

The four to six months internship is generally served in game studio or audiovisual post production companies. For example sound students have been working in companies Ubisoft, Cyanide, Eden Studio, KBP, talk over. Some of the students practice in research laboratories like IRCAM, France Telecom Research and Development and the laboratories of the partnership universities (CEDRIC/CNAM, L3i/University of La Rochelle, LACO/University of Poitiers). This may lead the student to a PhD in the corresponding laboratory.

3. OTHER ACTIVITIES

3.1. Professional certification

Since three years we propose a two weeks professional certification on sound and music design for games and interactive media. This training is open to twelve young composer and sound professionals who are interested to practice in new media fields. In this context, as a partnership with SACEM (Society of Authors, Composers and Music Publishers) allows us to invite five young composers to follow this course. This year we open new professional certification related to interactive television and game on mobile phone. The sound aspects of these new platform will be developed in upcoming courses.

3.2. Partnership with e-magicians, European Encounters of Young Creators in Numeric Arts

ENJMIN also supervise and collaborate in different events in this festival in the field of sound and music creation for linear or non linear workshops with students and other events. In particular we are in charge of the sound aspects in the e-magicians student's contest

4. Conclusion

We do not have yet some data about student's evolution and employment as the first promotion of the Master is ending this year (2006). But the Master was lead up by a one year graduate training according to the previous university regulation (DESS: Diplome d'Etudes Supérieure de Spécialité). We have some global statistics covering three years group of students of the DESS. About 40 % of them are now working in game studio, 30% are working in companies related to digital entertainment (telecommunication operators, television or animation companies...), 7 % are involved in PhD research works.. 8% of the students have either chosen to work in other fields (in particular some of the programmers), started other training or are unemployed. The remaining did not answered to our inquiry.

The three following cases are typical example of the sound student's evolution.

Taking as an example of research, the computer science laboratory of the CNAM (CEDRIC) are associated with France Telecom to design an interactive sound engine. A student who finished the sound specialty of the DESS is now involved in this work in a PhD. Another student is working also at the CEDRIC with several companies and laboratories on the design of games for blind peoples.

One of the first promotion students was first enlisted as a musical assistant at IRCAM. He is now working in a sound production company in Sweden.

Several students have the chance to be sound designer in game studio (Eden game, Cyanide...) . One of them have is now the "lead" sound designer of the company.

Our point of view (see [3] for a detailed analysis), which is the main argument for the creation of the school, is that the convergence of technologies and media (iTV, multiplayer game on phones, Web TV games...) will lead to a important demand of high level specialists, designers and creators in the field of interactive media.

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