The balance between generalists and specialists in the Medialogy education

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Abstract. In this paper we discuss the tradeoff between educating specialists and generalists in the Medialogy Master education at Aalborg University in Copenhagen. The Medialogy education was established in 2002 with the goal to combine technology and creativity in designing, implementing and evaluating media technology applications. The curriculum of the education has been through several revisions, the last of which, discussed in this paper, was performed during the Spring 2011.

Keywords: Medialogy, interdisciplinarity, media technology education.

1 Introduction

In recent years, a number of interdisciplinary educations in HCI and related fields have been developed worldwide. As an example, in [4] Pausch and Marinelli describe the ideas behind Carnegie Mellon's interactive entertainment center. In such center, an education in HCI and related technologies with a focus on entertainment is offered, where top students from different disciplines such as engineering, computer science, art and psychology work together to create novel possibilities for the entertainment industries. In the paper, Pausch and Marinelli state that in this Master education they started by teaching basic programming to artists, and humanistic subjects to computer scientists. However, as stated by the authors, this solution did not prove to be ideal. This was due to the fact that computer scientists had a hard time to catch up with humanistic subjects, and at the same time artists could not learn enough programming skills to become as fluent as computer scientists. Instead, they preferred to mix the different pro-files during project work. This means that the program focused more on

facilitating interdisciplinarity during teamwork rather than during classwork.

In [1], Adamczyk and Twidale elaborate on the challenges student teams face when integrating design practice from a wide variety of disciplines. They discuss the fact that HCI is still a broad interdisciplinary field integrating diverse theoretical backgrounds, practices of artifact production, and methods of evaluation. This creates challenges for students, especially concerning the methodologies they need to adapt during teamwork.

Figure 1: The modified Michelangelo hands represent the main concept of the Medialogy education: the balance between technology and human factors.

In [2], Giovannella reports on his experiences and challenges while initiating and teaching a course in interaction design as part of a Bachelor program in media science and communication. It is interesting to notice that Giovannella states in the paper that he took the challenge of designing the whole curriculum alone. As a matter of fact, many interdisciplinary educations related to HCI show merely a combined effort of different competences from several faculty members put together. This creates a problem in coherence, consistency and understanding of the overall goals of the education.

It is certainly still a challenge to design a coherent, comprehensive, and interdisciplinary curriculum in HCI. It is not only problematic to balance the tradeoff between educating generalists and specialists. It is also a challenge to find the core competences in a curriculum that is designed for students that can show interest towards different aspects of HCI such as the engineering side, the design, or human factors.

Moreover, the challenge of establishing a fruitful collaboration between different profiles is also still open [5], and applies to both students and faculty members. This is one of the reasons why ACM SIGCHI started a group whose goal is to map the different HCI-related educations worldwide, and to define the key competences that an HCI curriculum should have.

Terry Winograd, professor of HCI at Stanford University, claims that to get design into effective practice, one needs to train designers and also to teach the people they work with how to understand, incorporate and foster design. This philosophy is also at the heart of new programs around the world like the Stanford d.school, which talks about creating T-shaped people. Such people maintain the depth and focus of a single discipline while adding a crossbar of design thinking that drives the integration of multiple perspectives into solving real problems [6].

In this paper, we describe the challenges we encountered while designing and revising the Master education in Medialogy, a media technology education with a focus on human factor that runs at Aalborg University in Denmark.

2   The Medialogy education

In 2002 Aalborg University introduced the Medialogy education, which sought to train graduates with a firm understanding of developing media technology while maintaining focus on topics there are interconnected but often over- looked in traditional engineering educations, and with the goal of training problem solvers in a digital age independent of tasks. In Medialogy, students learn theories and applications of media technology, and develop both technical and creative skills in this field.

The Medialogy education follows the Bologna model of dividing the curriculum in 3 years of a Bachelor degree and 2 years of a Master degree. During the first year of the Bachelor degree, students are exposed to topics such as animation and graphic design, introduction to problem based learning, introduction to programming, interaction design and human computer interaction, mathematics. During the

second year of the Bachelor degree students are exposed to topics such as A/V production, human perception, computer vision, object oriented programming, sound and music computing and experiment design. During the third year students are exposed to topics such as computer graphics and screen media, interactive systems and media psychology and sociology. Each semester of the education is divided in three classes of 5 ECTS each and a project of 15 ECTS. The project usually is based on topics covered in the courses of the semester. It is completed in groups of 5 to 7 students, and is based on the problem-based learning approach (PBL) [3]. The core idea of the PBL approach in Medialogy is that students choose a problem to work with as a semester project, and design and implement an application that addresses that problem, as well as evaluate the application with users. Each project consists of a product that is designed, implemented, tested with users and documented via a report.

Project work is divided naturally among the students, in the sense that each student chooses to focus more on his strengths during project work. As an example, more humanistic oriented students choose to focus on report writing and literature search, while more technically oriented students choose to focus more on the implementation of the final product. However, during the examination every student is responsible for every part of the report and the connected product.

As can be seen from the overview of courses offered, the Medialogy Bachelor education includes several aspects of media technology, from topics in human-computer interaction, to math and programming, to courses related to sensation and perception, courses focused specifically in one sense (either vision or sound or touch), to courses focused on the design of interactive systems such as videogames.

At the end of the Bachelor education students are there- fore trained to handle several aspects of media technology, but they cannot be considered as specialists in any of them.

3 The Medialogy Master

The Medialogy Master is a two years education, where students follow

courses and work on small projects in the first three semesters, and in the last semester work on a Master thesis.

In its first iteration, the Medialogy Master was following the same interdisciplinary approach as the Bachelor education. This means that students were exposed to several aspects of media technology, but obviously at a higher level than the Bachelor.

This approach was not considered very satisfactory from the students' point of view: after being exposed to several areas of media technology, some students felt the need to specialize in one of them. As a consequence, many students were leaving our education after the Bachelor, choosing other universities were they felt that they could obtain a more specialized education, even if it was not necessarily the case. For this reason, we decided to revise the curriculum of the Master and offer four different specializations:

• Medialogy and interaction

• Medialogy and computer graphics

 • Medialogy and sound and music

• Medialogy and games

The first three specializations are merely related to human senses and related technologies (specifically touch, vision and audition). The fourth specialization is mostly connected to a whim of fashion, since it derives from the fact that there has been lots of interest in Scandinavia to train professionals in applications of media technology to games. In addition, we offer a generalist Medialogy line that can be chosen by those who do not necessarily feel the need to specialize. Figure 2 shows the structure of the four semester of the Master education. In each semester, courses, which belong to the same column, are electives. As an example, in the first semester of the Master education there are two mandatory courses, 3 electives (where students need to choose one among the three) and a project. During the Master education all students are exposed to some topics that we believe are important no matter the specialization chosen. Such topics are principles of human center design for multimodal interfaces, multimodal perception and

cognition, and advance statistical techniques for experiment design. Moreover, they are exposed to topics specific to their own chosen specialization, such as foundations in the chosen specialization, research topics in the chosen specialization and a Master thesis on the chosen specialization.
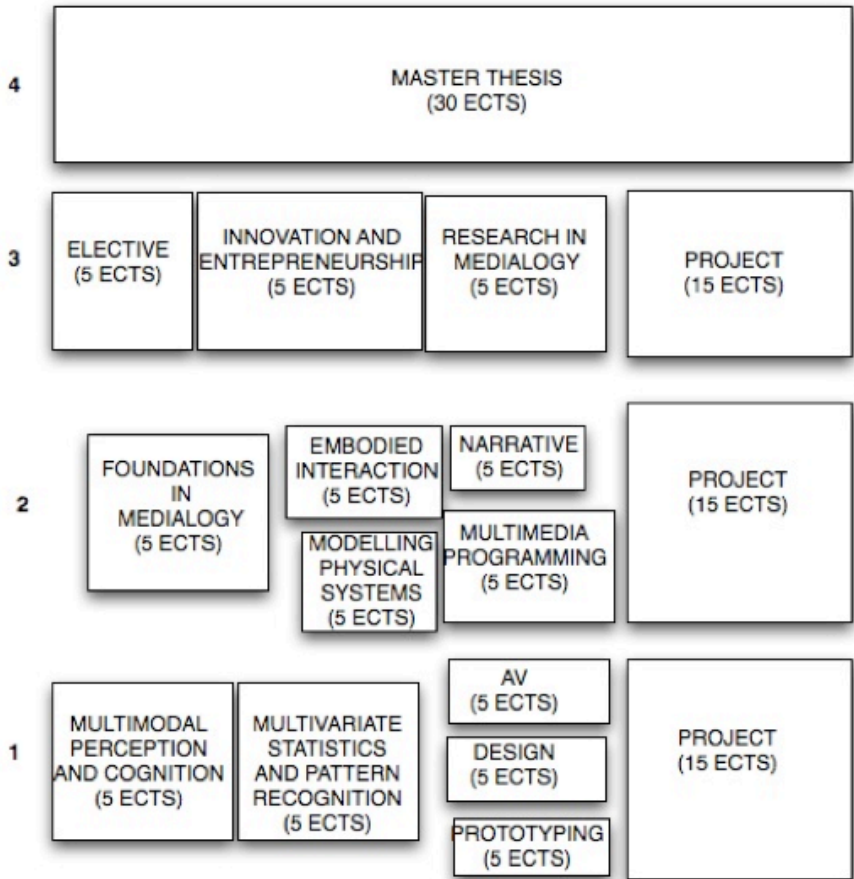

Figure 2: The structure of the Medialogy Master education showing courses and projectwork for each semester.

Specifically, during the first semester of the Master education students are exposed to topics such as advanced human-computer interaction, multimodal perception and cognition, prototyping techniques, and statistics and pat- tern recognition. These courses are offered to

students no matter what is their profile of choice. Students are then able to specialize during their project work and miniprojects associated to each class. During the second semester of the education students follow both courses related to their own specialization and interdisciplinary courses in media technology.

During the third semester students have the possibility to follow courses related to advanced research training in their own area of specialization and courses on entrepreneurship and innovation. As an alternative, they can spend a semester abroad in an university affiliated to Aalborg University Copenhagen, or work in an internship in a company. In the last semester of the education, students work on a Master thesis, either alone or in small groups.

During the Master education groupwork is organized differently than in the Bachelor education. As a matter of fact, students can work within or across specializations.

As an example, a student enrolled in the sound and music specialization can work with another student enrolled in the computer graphics specialization, and the final product of their project is represented by an application including both sound and vision. During the oral examination, students enrolled in the sound profile cannot be examined on the part of the curriculum specialized in computer graphics, and viceversa. This represents a significant difference from the bachelor education, where students are responsible for the whole curriculum. This also allows members of different groups to specialize in a selected area while working together with other competencies. We believe this is an important skill in a media technology education, which allows group work to resemble what happens in a real company, where people from different profiles work together towards a final application. However, this approach also obviously has some problems, which are discussed in the following.

4. Impact on students

The introduction of specializations in the Medialogy Master education was highly appreciated by the students. This is demonstrated not only by the significantly higher number of students which enrolled in the Master education after our revisions, but also by the comments

provided by the students themselves.

As a matter of fact, students expressed their appreciation for the offered possibility of choosing a particular area of media technology, while keeping the overall Medialogy mentality of combining technology and creativity. They especially liked the possibility to collaborate with students from different profiles, while keeping a focus on their chosen specialization. Some students expressed their concern of the fact that what we are offering are not real specializations, in the sense that the education is still Medialogy, i.e., media technology and human factors, which means that few courses are very specialized. The specializations are reached mostly during students' independent work and project work rather than via coursework. This works fine for students which are in-dependent and motivated, but can become problematic for students who need a regular schedule given for example by coursework and weekly assignment in order to progress with their skills.

Another expressed concern was the difference between choosing a specialization in Medialogy or a different education highly specialized. As an example, concerns were expressed on the difference between an education in acoustics and a specialization in Medialogy with a focus in sound and music computing. As a matter of fact, an education in acoustics would focus only on acoustics, and all fellow students in the education would work on acoustics. In an education in Medialogy with a specialization in sound and music computing, the focus is on human factors related to sound more than sound technology itself, and topics such as sonic interaction design and evaluation of products with a salient sonic behavior are covered. Moreover, students can work on the sonic component of a product together with other students taking care of the visual component. To summarize, students more engineering oriented would be probably more interested in an education in acoustics or signal processing, while students interested also in human factors would probably be interested in the Medialogy education.

The feedback gathered from students was collected by performing group interviews before, during and after they completed their education. Overall we did not notice any difference in the honestly of their replies when examining students before entering and after completing their education. Currently we do not have precise statistics

of the distribution of job types after graduation, but our overall shared impressions among staff members is that the majority of students succeed in finding a job which is close to their chosen profile.

5. Impact on the faculty

When designing and implementing a new education, there is often a tradeoff that needs to be taken into consideration between allowing faculty members to design the education and provide their influence, or having the education out- lined by an expert in interdisciplinarity and media technology. In the first case, it is very likely that faculty members will simply suggest courses related to their field of interest. This is especially problematic for faculty members highly specialized, since their suggestions would very likely appear quite unappealing to the students. Moreover, the education will very likely look more like a patchwork of different courses which are dependent on the faculty who suggested them. Since Medialogy is not an established discipline such as for example mathematics or physics, it is still a challenge to define what are its key competences, and therefore find a compromise between providing a coherent education while satisfying and keep motivated the faculty members.

In the revision of the Master education we tried to find a compromise between the two approaches: the authors of this paper, who have been involved in the Medialogy education from the beginning and believe to have achieved a good understanding of the core competencies needed for an interdisciplinary education in media technology, first proposed the different profiles, and some core competencies we believed students should have. Then we left some freedom to the different faculty members to suggest some courses and key topics, as well as possible project work, merely according to expertise in different profiles. In some cases faculties provided some suggestions that were both interesting for the specific profile and also as general topics for a coherent education in media technology with as focus on human factors. In other cases, faculty member just provided some suggestions connected to their very specialized field of interest, almost in the desire to recreate a copy of themselves. In such situations, longer discussions were necessary in order to reach a compromise that could be

satisfactory for everybody as well as coherent and realistic from an educational perspective. Obviously, the higher the number of faculty members involved in the preparation of a curriculum, and the more the education has an interdisciplinary nature with several topics which can be potentially important, the more there is a need for a compromise between faculties.

6. Conclusions

In this paper, we discussed several challenges encountered while designing and implementing the Medialogy Master education at Aalborg University in Copenhagen. The education was designed in such a way to find an ideal balance between interdisciplinarity and focus on specialized topics in HCI and media technology, together with the need of optimizing on resources in terms of number of courses, satisfying the desire of the faculty members present, as well as taking into account the feedback from the students as well as the needs of the market and society. Given the different elements that needed to be taken into account, we believe we achieved a satisfactory final result. However, the curriculum described in this document will start to run for the first time on September 2011, so it will be possible to perform a more formal evaluation of its success only during the Fall 2013.

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