Co-designing a Vision for Educating Human-Centered Creative Technology

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ABSTRACT
In this paper we discuss the re-design of the educational vision for Media Technology curriculum. Because of the introduction of ubiquitous computing and the internet of things a new approach to education is required. The educational vision is redesigned from three sources: first, the traditional approach of competences and requirements, secondly, an example course which addresses the ongoing developments in the research area, and, thirdly, a World Café session to generate ideas about the characteristics of Media Technology people and their work in a relatively distant future. As such, the future vision is redesigned by treating it as a media product and applying the creative methods and tools from its own professional practice.

Keywords
Envisioning the future; media technology; HCI; education; curriculum development; world café.

INTRODUCTION
This paper describes the project to analyze and renew the vision of the Media Technology (MT) curriculum at Rotterdam University of Applied Sciences. We understood a vision as an inspiring portrait of the future describing the direction in which an organization wishes to develop:

- The vision should look forward for about 5 years.
- The vision should motive both lecturers and students.
- The vision should be sufficiently practical for translation into actual education.

In this case, we applied the very same methods and tools to redesign the curriculum that we teach to our students to design Media Technology products. In the project, a human-centred co-creation and co-design process was followed to end up with a shared result.

Furthermore, the same tools and representation methods were applied to educational design as would normally be used for product design, such as scenarios, personas as well as textual and pictorial sketches.

Finally, within a formal stepwise setup, the same creative approach was followed that the team attempts to pass on to our students, including co-creation, brainstorming and incremental idea generation by means of a World Café participation method. (Slocum, 2005).

Since MT is a curriculum for professional training, the redesign of the curriculum should focus on the identity of the Media Technologist as a professional and on his or her professional activities in the everyday working environment. We decided to employ user scenarios and personas, where the user scenarios could capture the most relevant aspects of the profession activities, and the personas could be used as a tool to identify the personal characteristics of MT professionals.

Three personas were created from the available documentation about professional competences and from the developments in the field of study. In addition, user scenarios were created to present the most important aspects from the working day of each of the personas that seemed relevant to the educational programme.

The vision-project itself had started from the idea to develop a new educational course for the major curriculum in which the scientific developments in subject matter of Media Technology were translated into the educational practice with the DevThis course as a result (see: de Haan, 2011). In the initial design of the course, the general developments into the direction of ubiquitous computing and the internet of things (read: intelligent, context-sensitive, mobile, etc.) have been translated into an educational practice but a description of the vision behind the developments and the developments themselves were only documented later on (de Haan, 2012, 2013).

MEDIA TECHNOLOGY DEVELOPMENTS
The developments around the arrival of ubiquitous computing and the internet of things proceed rather rapidly. Concerning Media Technology or more in general Human-Computer Interaction (HCI) or even ICT the main developments may be summarised as follows:

- ICT has moved from a managed and centralised data-processing of ‘external’ data (entered by ‘data entry typists’) along information management to a rapid prototyping practice of creating lightweight mash-ups on the basis of sensory and contextual data.
- The meaning of software has moved from the role of a tool within the working environment to (mobile) apps and social media which intrude into the essence of one’s personal, social and private life to the extent as to define one’s identity.
As a consequence of these changes in the design practice and in the changes in the meaning and value of software, design methods for software products need to be adapted more and more to the human ‘end-user’ (the consumer or ‘prosumer’) and to the specific context of use or ecology:

- The dominant methods for application-development are no longer top-down, system-centric with specification in advance, but it has developed alongside scenario-based design, design iteration and rapid prototyping to agile development, co-design and co-creation.
- Concerning the end-user, the developments started from software-ergonomic principles to user-centred design and the usability lab and from there to emergent design, co-creation and co-design and the sensor- and living-lab.

Education will have to pay attention to a number of new developments such as: ubiquitous computing, sensory applications, location-based services, RFID and the internet of things, semantic web techniques and becoming familiar with scientific research. De Haan (2013) analysed the main developments in the research field and proposed that the main developments in the subject-matter may be described by six factors: tangible interaction, networked applications, intelligent interfaces, sensitive interfaces, social applications, and connected data services. In addition, there are three developments in design methodology: co-creation, programming frameworks, and agile design approaches. Furthermore, students will have to learn, particularly by teaching each other, teach back and learning-by-doing how to use research to develop solutions to ‘real-life’ problems and how to present the solutions to customers in the form of demonstrators or prototypes (de Haan, 2011, 2012).

PERSONAS

From the existing occupational profiles, three personas were derived:

- a freelance technical innovator, Jasper Brand
- a user experience developer, Maaike van Opland
- an HCI consultant, Simon Versendaal

These are three personas or stereotypical descriptions of fictitious persons like they could be active after being graduated in Media Technology in a professional occupation. Each persona is provided with some distinctive characteristics associated with creative occupations, such as motivation to learn, daring, discipline, creativity, etc. Finally, each persona was further worked-out with fictitious descriptions of their names, marital status, occupation and contract form, in combination with what there people might provide as answers to Who-am-I and What-does-my-working-day-look-like questions in their ‘own’ words.

Who am I? according to Jasper Brand, freelance developer and partner of Suzanne (32 years of age and fulltime communication manager) and father of Kees and Babs (respectively 1 and 3 years):

“"I am a passionate DIY enthusiast and experimenter and always investigating new design techniques. It is especially fun to have lots of variety in my work and to participate in common hacking and tinkering projects. Accordingly, my motto is that anything can be learned. For whatever I cannot figure out, directly and by myself, there’s always someone else to be found who knows how to find a solution.” (excerpt).

My working day according to Maaike van Opland who works as a User Experience developer @ Cyberdam and studies Cyber Anthropology at the University of Leyden: "At half eight I start classes at the Uni. I do this at the office at home which is possible because all the materials are available online. My classes are for the greater part paid by the company, as it is customary these days. From about 11.00 o’clock I will visit two large projects to test a codec to detect emotional strain in meetings. We have a wide pallet of facial expressions and we will evaluate how the codec supports the testing persons in assessing the stress levels in others.” (excerpt).

WORLD CAFÉ

An important step towards the new vision is developing a set of user scenarios to describe relevant aspects of the working day of Media Technology professionals in the future. The future user scenarios are determined on the basis of the personas and the user scenario characteristics of a fictitious working day of each persona. This step was implemented by means of a so-called World Café session (Slocum, 2005) with participation from the Media Technology educational-team and a number of students in their last year and some post-graduates. Beforehand, all participants were provided with a number of short descriptions of the formal documents, a description of the main developments in the application-area, and descriptions of the personas and their working days.

The World Café session took place in one of the classrooms in an informal setting with food and drinks. The session started with an enthusiastic visual presentation about the developments in the subject-area with lots of funny examples and real products. The presentation rounded-off with a brief explanation of how a World Café session works a presentation of the personas, and the objectives the session:

- What do we do as Media Technologists in 2020?

The World Café is a creative development technique in which medium size groups generate ideas to solve a problem; usually around social issues in particular community, such as area development policies, etc. (Slocum, 2005). According to the setup of the World Café, participants distribute themselves over a number of tables in a Café-like setting in which each table has a member of the vision-team as a facilitator and one of the personas as the topic of the discussion. The participants brainstorm about issues such as the work, the work assignments and activities, the work-organization, the tools and techniques, etc. each according to the expectations of the participants regarding the characteristics of the persona at stake.
Participants were stimulated to generate as many as possible ideas without assessing these in terms of feasibility (brainstorm!) and to share the ideas with their table-partners and write them down on a large sheet of table-clothing with any associated notes. Around the time that idea-generation began to slow down, the participants move on to structure the notes into main and side-issues and to detect any common themes. After about 15 minutes the participants move to the other tables with fresh facilitators and personas.

After the World Café sessions, the results of each round were processed and the main ideas and discussion-items were noted down in sketches and lists by the vision-team. As an example, the second World Café session about the future of freelance developer Jasper Brand in 2050 generated ideas like: one browser fits all, programming behaviour not instructions, relaxation on the shop floor, and social coding as the standard, etc.

With a summary of the discussion:

In this round we focussed particularly on what would happen when programming apps is no longer required in the way we do it now. Everything will eventually become much simpler and as such we expect anyone to be able to program apps like developing websites is no longer work for specialists. We think that the next step will consist of managing the design environments that others may use to create mash-ups by linking pre-arranged components. We will presumably be much more involved in hardware then we do now. But also programming hardware (behaviour) will become much more accessible for MT students. (excerpt).

A PROPOSAL FOR A NEW VISION

After the World Café sessions, the vision-team summarised the results in a document with a proposal for a new vision for Media Technology in 2020 in which the discussions about the personas and their professional work were summarised in the form of future work-scenarios to describe a new educational profile and elaborate the available vision elements in one coherent picture. For each of the personas, the three sessions that discussed their future in 2020 and twice in 2050 were taken together in a single narrative about the persona after 2020 with a characteristic professional motto. For the Human-Computer Interaction consultant Simon Versendaal, this is what he does after 2020:

"It's a long time ago that I was occupied with usability-testing of product design; each self-respecting development environment nowadays has a build-in recommender system which analyses the actual user and usage data much more accurate than I would ever be able to do. Consequently, I am mostly occupied with the complete life-work environment and the interoperability of behaviour: how to seamlessly connect the various media, information channels and life-modi with each other. Generally, this works well but when breakdowns occur of the gesture-probes or the act-bots, the automatic adaptation of the systems to each other and to the behaviour of the users doesn't work flawlessly any more and that leads to some hassle and even claims for damages." (excerpt).

HUMAN CENTRED CREATIVE TECHNOLOGY

The results of the project have been presented in a discussion document, entitled: “.2020 Visie Mediatechnologie” (Zelle, de Haan en Slootweg, 2012) aimed at co-creating a new vision. An introduction describes the background of the developments in HCI that Media Technology is critically and creatively concerned with creative technology to design interactive media and products utilizing a co-creation and co-design development process requiring the competencies such as portrayed by the personas. A discussion describes several of the opportunities for further development of the vision along with some background literature. The document was subsequently used for two immediate purposes: first, to update the educational profile (Slootweg, 2012). Secondly, the document was used by the educational team to create a presentation to present the team's shared and common view on the MT curriculum, entitled (in English): "Media Technology: Human Centred Creative Technology" (Media technology, 2012) in which human-centred design, creativity and technique know-how are the three pillars of the curriculum.

One of the most important aspects of the new vision was that Media Technology should not merely produce the technical know-how to design media applications but that the main objective of the curriculum is train creative design of human-centred products and services as such.

VISION IMPLEMENTATION: EXAMPLE PROJECTS

With laying down a vision document and a public-relations presentation to show the newly redesigned vision, the developments are not finished. In this section we briefly discuss three projects build upon the new vision and which exemplify aspects of Human-Centred Creative Technology. These projects derive directly or indirectly from the DevThis course, which was designed to implement a number of ideas concerning education, research and development in Media Technology. DevThis attempts to put teaching, designing a product and doing research together in one course (see: de Haan; 2011, 2012).

The ambient and pervasive design course is a second-year course which exemplifies how a course like DevThis may be used to design other, less advanced courses. In this course, students use the Arduino (Banzi, 2012; see: http://arduino.cc) toolkit to experiment with the use of sensors and effectors in computers applications, either on the connected pc or as stand-alone applications on the Arduino board.

In the ambient and pervasive design course, we skipped everything related to research, research methodology and research papers, taking students step by step along all the essential techniques to build a basic IoT application. As an example, one lesson demonstrated how to instruct Arduino to blink a led-light and which students had to reproduce as alternating lights. The next lesson demonstrated how to
extract the status of a light from the board to the pc and students were asked to build an application to extract the status of a sensor from the board and use that to program the alternation speed of the led-lights. At the end of the course, students were able to demonstrate all the different aspects of basic Arduino programming and they build a simple but complete prototype such as an app which twitters the status of a movement-sensor on the Arduino board or an app which shows the amount of traffic on a twitter account by means in the blinking rate of a light on the Arduino board.

The IoT network project (de Haan, et al.; 2013) exemplifies how the combination of research and education might be extended beyond a single course to tackle research questions which surpass beyond single courses, curricula and universities. The idea is to share a set of central curricula, each with its research methods and tools, among a number of different contexts, each with a particular perspective on the question such a media-communication perspective or an information technology perspective, etc., and among a number of different universities with different industrial partners, locations, user populations, etc. The IoT network project shows - at least in principle and intention - how different universities and research institutes and businesses may cooperate on shared project objectives by addressing those subgoals that best fit their own specialisations.

The UCD Toolbox project (UCD is: User Centred Design) exemplifies sharing research and development questions between curricula and universities on a smaller scale. At Delft University, a tool was developed to support user interface designers in selecting usability tools for answer design questions in the context of a particular design phase, a particular user population and with design resources (Weevers, 2012; see: http://ucdtoolbox.com). At Media Technology we were trying to find professional tools to teach first-year students how to select the right tools for answering particular usability questions. Putting two and two together would provide Delft with an evaluation of the usability tool and Rotterdam with a professional tool to teach students about usability method selection.

DISCUSSION

This paper discussed a new educational vision for the Media Technology curriculum in relation to the changes in the research by the paradigm-changing introduction of ubiquitous computing and the associated developments. Redesigning the educational vision was regarded as a regular Media Technology design project using user scenarios for both analysis and design, and personas to model stereotypical MT graduates in their professional activities. In combination with an analysis of the ongoing developments in the research field, represented by an advanced example course, and World Café sessions to generate ideas about the future Media Technology professionals and their working activities, resulted in a new educational profile and a presentation which defines Media Technology as a Human-Centred Creative Technology curriculum.

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REFERENCES


2. de Haan, G. (2011). DevThis: HCI Education beyond

3. de Haan, G. (2012) DevThis - Education in the age of
   the Internet of Things. Presented at EADiM2012, 22-24 November 2012, University of Graz, Graz, Austria.

   Technology Design Education - design and education
   from HCI to UbiComp. Proceedings of the Computer
   Science Education Research Conference - CSERC 2013,
   4-5 april 2013, Arnheim, pp. 66-72.

5. de Haan, G., Smit, W.A., Schagen, J.D., Bargh, M.S.,
   Internet of Things: netwerk voor kennis, onderzoek,
   onderwijs en ontwikkeling (in Dutch). National ICT
   Education Conference - NIOC 2013, 4 - 5 april 2013,
   Arnhem/Nijmegen, the Netherlands.

   Centred Creative Technology. Presentatie MT team
   Scholingsdag CMI, Hogeschool Rotterdam, december
   2012.

   Café". A joint publication of the King Baudouin
   Foundation and the Flemish Institute for Science and
   Technology Assessment (viWTA).

8. Slootweg, R. (2012). Opleidingsprofiel Media-
   technologie 2012-2016. Versie 0.1, 27 december 2012.

   (Ed.) Design for Usability. Methods & Tools - A

    Visie Mediatechnologie. 29 Augustus 2012. Available
    from: http://members.upc.nl/g.haan24/articles/

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