Cumulus Rovaniemi Conference Design to Care: Education Experiences to design local healthcare services

Angela Giambattista, Mariia Zolotova

Sapienza University of Rome, Rome, Italy

angela.giambattista@uniroma1.it

mariia.zolotova@uniroma1.it

Abstract

This paper shares the educational experience at a Product Design Studio of the International Master of Science in Product Design at Sapienza University of Rome. The course was organized as research work in the field of Design for Healthcare applied to education, using the Design Studio as a case-study. In particular, the research has evidenced the potential of design to bring improvements to the sector thanks to its creative and divergent thinking. Thus, the aim of the course was to transmit to the students the skills useful for achieving a Service and Social Innovation in the field of Healthcare. Specifically, the students were asked to develop a Design Proposal of a product/service that would provide a new User Experience for the local healthcare services (a Pediatric Emergency Room) by taking into consideration its social, economic and technological long-term sustainability. In order to reach that goal, the didactic activities were organized as a three-step process: 'to Research', 'to Design', and 'to Develop'. Each step had its own tools and deliverables, such as the Conceptual Maps, the User Experience tools, the Systemic Innovation Diagram, and the Business Model Canvas, and the s Technique that was applied for the first time at this course as a design method. These tools and techniques supported students in learning, thinking, analyzing, understanding, and evaluating their works. The course finalized at a set of Design Proposals demonstrating the improvement of the Healthcare services and the possible new behaviors of its users.

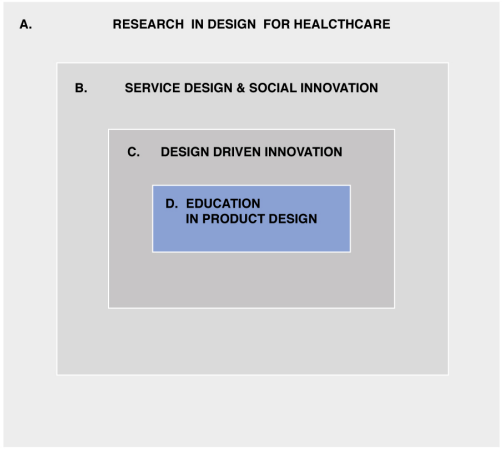
Author keywords

Design for Healthcare; Service Innovation; Social Innovation; User Experience; Design Teaching Methods

Introduction (1)

The specific theme of Healthcare arises from the consideration that the sector has been evolved over time due to many socio-cultural changes, such as the population becoming more and more old, the rising of the healthcare costs, the increase in the complexity of health technologies, the active role of patients in the healthcare process, healthcare system was increasingly stressed resulting in decentralization of care from the hospitals to the patient' houses. To address these challenges, the Healthcare system has been recently accelerating in terms of Design both methodologically and technologically, changing its habits, structures and the way users and designers look at medical products (Chamberlain 2015). Designers need to look at a holistic approach to tackle the design problem as a whole considering different conflicting requirements: the age, mental and physical conditions of the patients, the high tech of the medical products in comparison to the family atmosphere of the homes. Tackling the design problem with a set of straight conditions and a focused design strategy may open an opportunity of clearing the way for a better end-product both functional and pleasant (Foque&Lammineur 1995). The field of medicine has typically taken a very quantitative approach to healthcare, focusing on the immediate needs of treatment versus experience. The medical devices and technologies used to provide the most accurate and up to date diagnostics and treatments often unintentionally relegate the care and experience of the patient as non-essential consideration. However, in recent years, going beyond the functional aspect and according to a perspective in which patients increasingly stay at the center of the project, the Design Discipline turned to more intrinsic aspects with the aim to activate innovative processes in which needs of people, new technologies and products/services/environments can generate effective 'health experience'. Innovation in Healthcare is seen as the introduction of new concepts, processes, products etc., that bring an improvement to the current treatment, prevention, research improving quality, safety, efficiency, costs in a long term (Omachonu&Einspruch 2010). Aesthetic aspects require a new approach that would incorporate not only the functionality of products but also the dynamics of behavior (Ross&Wensveen 2010).

In the light of these considerations (fig. 1) this paper shares the educational experience held at design-studio lessons within the International Master of Science in Product Design at Sapienza University of Rome, the classic and new approaches and techniques applied, the results of the didactic activities as well as some difficulties encountered during the learning process by the students.



QUESTION:	RESPONSE:
A. Which are the issues around the Healthcare (HC) sector?	**A.** Rising costs of HC, patients old & informed, complex technologies, decentralization of HC, conceptual change, holistic approach to design
B. What are the issues and methods of Service Design? How can SI be reached?	**B.** Research-Design-Develop, User Experience, Field Research, User Research
C. What are the benefits of DDI?	**C.** Providing advantages to the business by delivering meaningful products to the users
D. How the issues **A.-B.-C**. can be explored within an Educaion process?	**D.** A set of didactic activities that allow acquiring skills and knowledge useful to achieve an Innovation in the HC sector

Img. 1. The scheme of thee research in the field of Healthcare applied to the educational process

Starting with the general introduction to the course and its didactic aims, it then introduces the design problems faced by the students, and proceeds with the methods of Service Design (Stickdorn et al. 2011) chosen in order to respond to the problem and to acquire necessary skills. In particular, the course invited students to design the User Experience (Norman 2004) local Healthcare scenario, analyzing the sector by visiting a Pediatric Emergency Room in the local Hospital 'Policlinico Umberto I'. Choosing the Emergency Room as a case study provided an opportunity for the students to face the real societal, economic, and technological challenges, and for the educators to transfer a range of skills useful for the designers nowadays such as multidisciplinary approach and research skills, critical analysis of the current social, economic, cultural and technological contexts, empathy to the user, and the UX design tools, the Business Model Canvas (Osterwalder 2011) as well as some other techniques like the 'Stop Motion' that supported students in developing their design proposal. The design proposal had to respond to the local Healthcare scenario by creating a Service and Social Innovation (Manzini 2015) through designing products/services that would bring improvement to the current User Experience. Therefore, the process included the Desk Research on the themes of Service Innovation, Social Innovation and

Healthcare Design, the User Research (Field), the data analysis and the ideation process finalized with a Design proposal of a New User Experience which then was evaluated from the point of view of economic and technological sustainability and was identified its level of innovation. The paper concludes by sharing the results both from the didactic and practical points of view by mentioning the results of the didactic activities in terms of projects and feedback received from the students regarding the educational process. The educational process was also supported by the Paediatric Emergencies Unit of Policlinico Umberto I Hospital, particularly, by Prof. Fabio Midulla of Pediatric Emergencies and Intensive Care Unit-Department of Pediatrics, Sapienza University of Rome, who has welcomed the students during the field research, and, by Prof. Corrado Moretti, Emeritus Chief of Pediatrics of Policlinico Umberto I, University of Rome, who has visited and provided the evaluations to the Final Works.

The course: Design to Care (1)

The International Master of Science in Product Design includes students with different cultural and academic backgrounds and thus represents a pool for interdisciplinary interaction. The course was organized as a team-based studio focused on the investigation of the contemporary changes in the structure of markets, as well as, of the emerging forms of production-distribution which require different design approaches and more sustainable design activities.

In the last few years, there has been increasing interest in the potential of design methodologies and approaches to improve Healthcare thanks to the ability of Design discipline to draw on a tradition of creative and divergent thinking able to face the fundamental socio-cultural challenges (Chamberlain, 2015). The didactic aim of the Course was to provide specific knowledge in the areas of Service and Social Innovation (Manzini 2015) specifically in the context of Healthcare by developing new models, products and services in order to improve human wellbeing and activate sustainable innovation considering, at the same time, the environmental context, the productive possibilities, the economic system and the social aspects. The skills and knowledge required are transversal and heterogeneous and are finding their point of synthesis in the field of Service and Social Innovation in the context of Healthcare. The purpose was to transfer to the students the critical-analytical and synthetic-design tools in order to investigate the broad topic of Design-Driven Innovation (Verganti 2009) and to develop a product/service proposal considering the degree of sustainability in the long term as a determining factor.

In view of these considerations, the Design Work was aimed at developing a new product/service in the specific context of Pediatric Emergency that usually takes place in hospital emergency rooms and involves the children care (0-14 years) with different degrees of illnesses or injuries that require immediate medical attention and/or intervention. Therefore, each team had to develop a product/service which would take into account users' experiences in an emergency context and considering behaviors, needs and actions of all the actors involved in the context (children, parents, medical staff, hospital

management, etc.) before, during and after entry to the Emergency Room (ER).

In order to involve the students in an effective design process, they were asked to pay attention to the following aspects:

- from the social point of view, the phenomenon of patient-centered-care and the methods of user/human-cantered-design (Brown 2011);
- from the economic point of view, the issue of economic sustainability, that is use, safeguard and sustain resources (human and material) to create long-term sustainable values;
- from the technological point of view, the phenomenon of new Information and Communication Technologies (ICT).

Design to Care: Teaching Methods (2)

The didactic phases and the related technical/experimental contributions were aimed at the acquisition of specific skills related to:

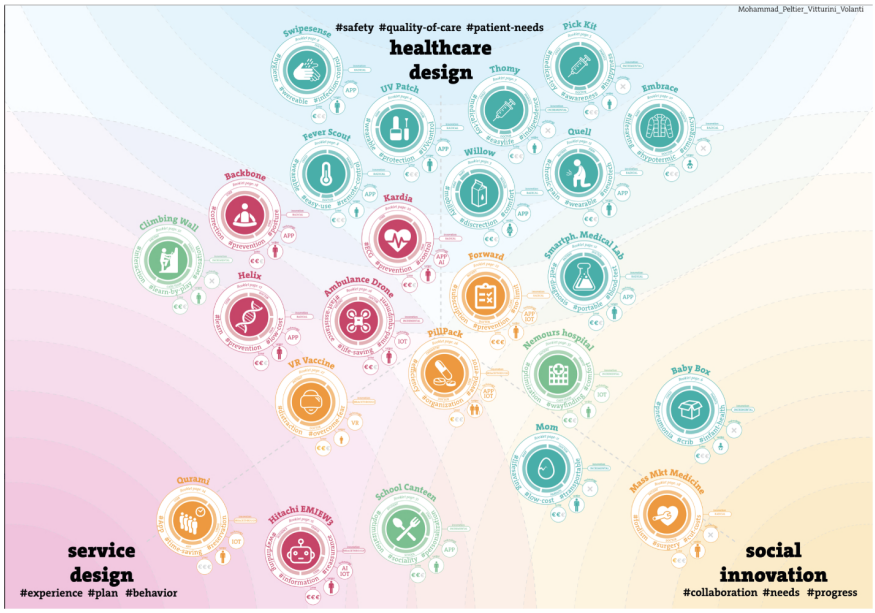
- Research Skills: the students had to acquire an interdisciplinary approach for the analysis of healthcare scenario; to develop methods for research and observe the technological production as well as the socioeconomic aspects.
- Inquiry Capability: the students had to understand the connection between technology, innovation, and design analyzing potentials and limits of existing processes; to develop a hypothesis of sustainable innovation able to cause reflections on existing values, morals, and practices specifically in the field of Healthcare;
- Design Skills: the students had to develop a design proposal through the correct organization of the productive and economic aspects; to build a consumption scenario around the cultural and social behaviors; to develop and apply a correct and suitable technological solution to solve specific design aspects.

To Research

The first step of the didactic process, the Research, was focused on the analysis of Service and Social Innovation (Manzini 2015) scenario in the context of Healthcare. Each team had to search and analyze products, projects, processes, scientific research, design proposals that could be considered 'good practices' in terms of Design in the field of Healthcare and Pediatric Emergency. The examples include those of the Human/User-Centered-Design approach (3), User Experience tools (4), Environmental, Economic and Social Sustainability concepts (Brundtland 1987), Smart Technologies and Smart Ambient (Aarts&Encarnação 2006), etc. The selected projects had to demonstrate the improvement of a certain people's behavior or the solution for an economic, social or environmental problem. The deliverable of this step was a conceptual map (img. 2) where these experiences were put

in relation in a way to find inputs and evaluate potentials and restrictions of the phenomenon of the 'Service and Social Innovation' in the context of Healthcare. In order to create these maps, to represent visually the information and to communicate the findings, students had to explore the Infographics (4) as a tool. Difficulties were met by those students who didn't have a design background. These situations required additional attention from educators.

In between the steps of the learning process, a series of lectures were organized in order to introduce necessary concepts and approaches, such as lectures on Service and Social Innovation, Design-Driven Innovation and Innovation in Healthcare, a lesson on the User Experience tools, as well as a thesis work presentation of a newly graduate who had worked on a product for Emergency Room. Having lectures is not only a traditional way of transmitting information, but also a way of verification of the vision is shared in the same way by everyone as it allows a direct dialogue. It is both difficult and important in an international and multidisciplinary environment because many of the concepts are often either not known or are known in different manners.



Img.2. 'Research' step's delivery: Concept Map of Service, Social and Healthcare Design Innovation (NURSE Team: Mohammad S., Peltier T., Vitturini L., Volanti V.).

To Design

Starting from the results of the previous, the next part of the educational process, the Design process, was focused on the understanding of what

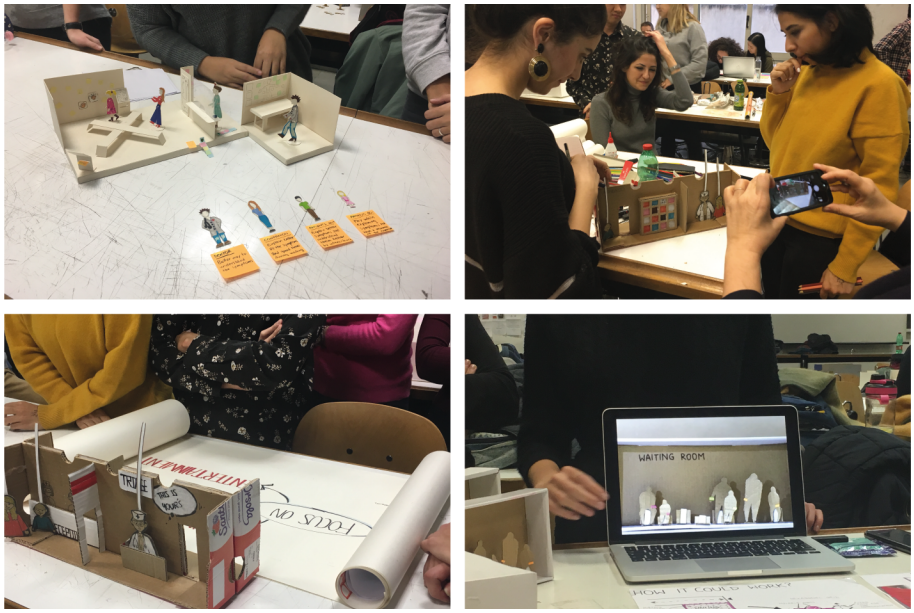
happens before, during and after the entry to the Emergency Room (ER) in terms of products, people and environment. The process was divided into 3 steps: the User Research (5), analysis and ideation, designing a proposal.

The User Research was set up as a 3-steps work: planning the user research, collecting empirical data, and data analysis. The planning supposed setting the design objectives and identifying the target audience; the collection of empirical data was realized through the interviews, observations and surveys; the data analysis was performed using some User Experience (UX) Design tools that will be explained later (3, 4).

The first step was prepared in-class, including the research logistics: the activities to do with the participants, the time, the location, the tools. The data collection has started with the immersion into the local context as a series of visits to the Emergency Room. The visits were officially arranged and the Hospital provided access for the students for them to perform the research activities. The observation was accomplished through shadowing the daily activities, taking field notes, making sketches. The surveys involved a personal network of the students as well as open resources like Facebook and Google

Img. 3. The surveys' results (CEWEK team: Ayala Ramirez M.J., Natasha E., Talone G., Telesca E.).

surveys. The surveys' results were systemized later in a table demonstrating visually the percentages and the ratio of the collected data through pie charts (img. 3). The interviews allowed going into the core of the experience though they were more useful for the students who could talk fluently in Italian, as



Img. 4. Students presenting the new User Experience through Stop Motion technique: telling a story with the cardboard mockups of the Emergency Room and its users' characters.

perceiving spontaneous expressions and emotions requires good communicative skills. However, these studies have been insightful both for the local and the foreign students, as they could discuss the distinctions in the Healthcare systems as well as in the idea of providing care in different countries and cultures. The final step of the data analysis was performed by using the UX tools like Personas (Lidwell et al. 2010)(3, 4), Empathy Map (Gray 2010) (3, 4) and Customer Journey Map (Brown 2011)(3, 4). The analysis was finalized in describing the archetypes, their social and demographic characteristics, needs, habits, motivations, taking in consideration their emotional, behavioral, and rational dimensions in respect to the current User Experience, in identifying steps of interaction with the current products/services and the touchpoints.

The second step of the Design process was organized as a 3-days Workshop, where students were given time with the aim to focus on their findings, analyze them and eventually come up with a proposal of a product/service that would create a new User Experience for the Emergency Room. The three days didactic activities were structured as the following steps: 'Before-Idea-After', and each day was dedicated to one step. The step 'Before' was dedicated to analyzing the Personas and their current Customer Journeys with an objective to extract the 'User Needs' of each Persona and to select which of these to design a proposal for. During the process, it was noticed that the students met difficulties in making the difference between what means a 'problem' and the 'User Needs'. For example, many of them have stopped with

an idea of the time-related issues in the Emergency Room, because the waiting time there was indeed long. However, this understanding has led to difficulties in the following 'ideation' step.

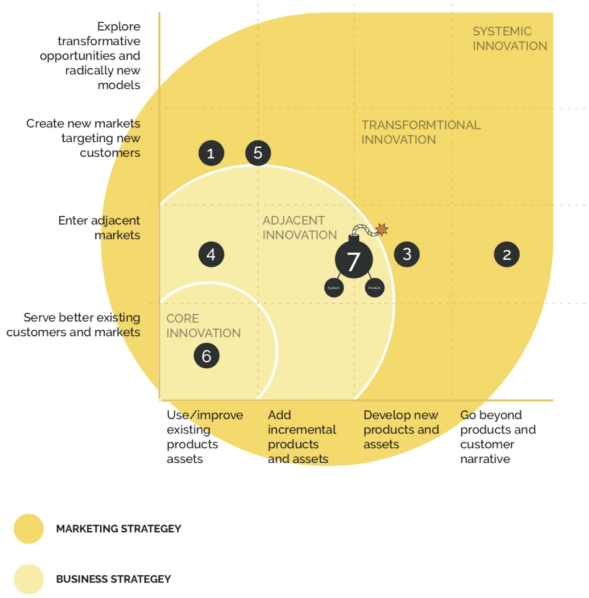
The next day of the Workshop the students were asked to enter into the ideation process and to propose their idea according to the User Needs extracted at the previous step. The proposal had to be presented describing its three main aspects: functionality, usability, morphology. The proposal could be an improvement of the existing product or an alternative solution, or a completely new system and service. As it was mentioned above, the confusion in understanding the 'problem' and the 'user needs' has led to restrictions in the ideation process, as for many students seemed that there was only one problem that had only one solution. Shifting their attention back to the User Needs has opened a range of new design opportunities, as in the Emergency Room there are several Personas, each of them having different needs even related to the same problem of timing. For instance, doctors, nurses, patients that are different in their age and their physical condition, and the people who accompany them, all of them had their needs different one from another while the same time was passing for them.

The third and the last day of the Workshop was dedicated to designing a Storyboard (4) using a 'Stop Motion' technique (6) in order to explain and test the new Experience the students want to propose for the ER. The 'Stop Motion' technique is generally applied to animated film-making, where the animation is composed of separate frames in which objects are fixed in small increments and when played back the sequence seems to be a smooth motion. The goal was to describe the 'User Need' that was solved by the product/service proposed highlighting the changes between the previous context and pointing out the new user behavior. The advantage of the 'Stop Motion' technique lays in the way it is performed. The students not only had to imagine the interaction between the user and their proposal but to actually build it and test it step by step, 'frame by frame'. The process of projects' evaluation through re-creating (learning through making) the interaction process between the final user and the proposal step by step has simplified the empathy to the user, and has evidenced immediately the problems of the interaction process, making it visible when some component was either missing or extra (img. 4). As the picture shows, the students were provided with the floor plan of the Emergency Room, so they had to build a model of that, to cut out the 'puppets' of their users and of their proposal. Then they had to make a series of pictures, each of them stating a moment of the interaction, of the users' behavior. Then this series of pictures was set together as a short video explaining the new Experience in the ER according to the 'User Needs' selected at the previous steps.

To Develop

The 3rd and the last step of the didactic activities was dedicated to developing the Social Innovation in the field of Health Care based on the approach of

Service Design (Stickdorn et al. 2011). According to Service Design approach, the step 'Develop' aims at evaluating the level of innovation and the validity of the proposal regarding the social request. The design tools used for this step were two: the Benchmarking (Boxwell 1994) and the Business Model Canvas (Osterwalder 2011). The final result of the Benchmarking was to evaluate the level of Innovation of the proposal. In order to do that, the diagram of the Systemic Innovation (7) was used, where the students could place their findings in relation to the two axes: the creation of new markets and the change of the use (img. 5).



Img. 5. The diagram of the Systemic Innovation and the Benchmarking Analysis (BOMB team: Allotta D., Asur P., Kumar S.R., Othman H.).

Business Model Canvas (img.6) describes and evaluates the supply-chain behind the design proposal, defining in detail:

1) what is the real value for the users;

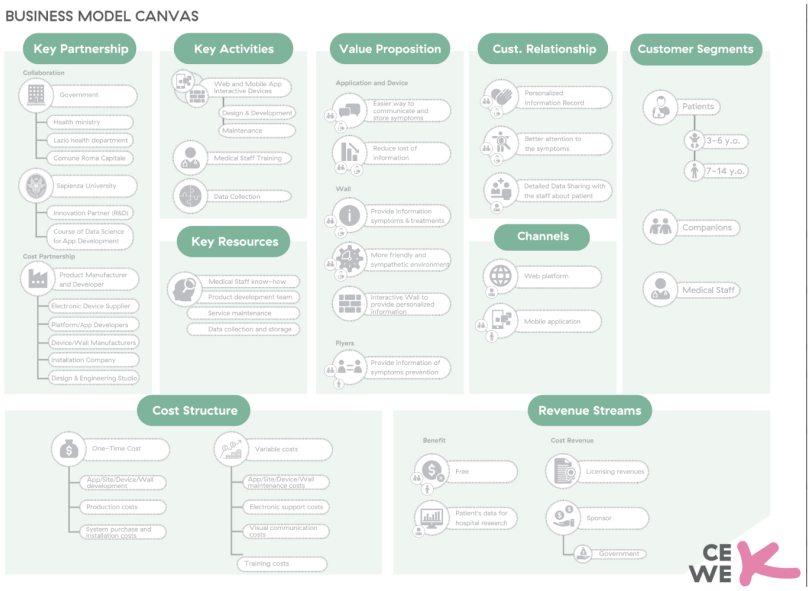
2) the identification of the target audience of the value proposed;

3) the stakeholders useful to realize the design proposal;

4) the economic impact of the business (in terms of quality).

During the process, several problems in learning and comprehending have been noticed. Regarding the Systemic Innovation diagram, the students met difficulties in evaluating correctly the level of innovation, as for many of them it seemed that the higher is the position of the project in the diagram, the 'better' the design is. The achievement was to reach an understanding that the

Benchmarking and the diagram serve to correctly place the product in the market, rather than to force the project to the diagram's borders. Regarding the Business Model Canvas, the problems were related to identifying the owner of the business in the project, which has thus led to confusion in finding the stakeholders, the key resources and activities. The collective misunderstanding has brought to an idea that some issues require deeper explanation.



Img.6. Business Model Canvas (IC team: Belluzzi C., Duello P., Chakka S., Li S., Hamzeh langroodi N.).

Conclusion (1)

The didactic activities have been concluded with a series of projects responding to the User Needs at the Pediatric Emergency Room proposing a New User Experience. The proposals have taken into consideration the analysis of the state-of-the-art in Service and Social Innovation and Design for Healthcare, the students have conducted the User Research, have evaluated the level of Innovation, the technological feasibility and economic sustainability of their proposals. After, for the Final Works, the students have developed the mock-ups of their design proposals that would demonstrate the morphology and the usability of the product/service they designed. They also have prepared a model of the Emergency Room in order to visualize the Proposal in the environment as well as the people involved in the New Experience. The

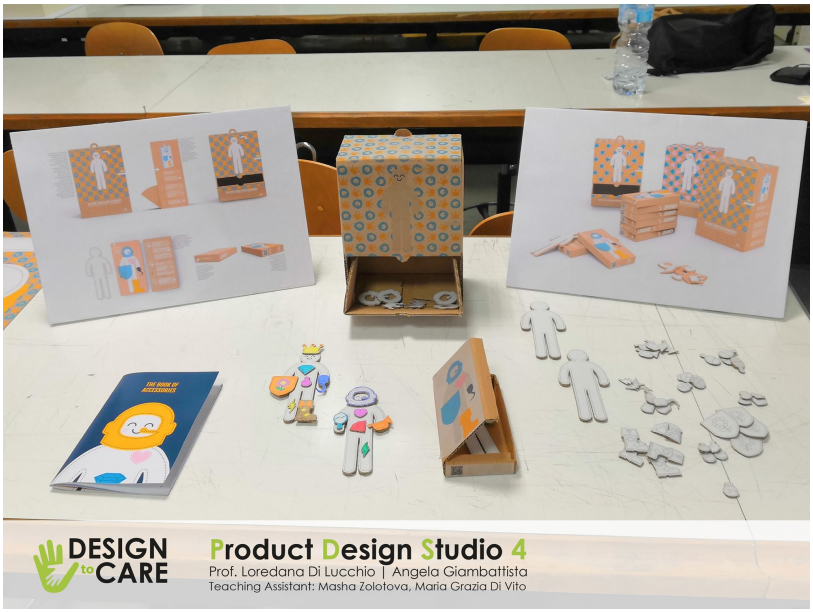
booklets were prepared in order to report all the three steps of the didactic activities: 'to Research', 'to Design' and 'to Develop'. The videos and the brochures were done in order to prepare the projects for the possible promotion, including the crowdfunding campaigns (img 7., 8).

Practically, the proposals mainly responded to the children's experience providing objects and services that would distract them from the negative experience, thus contributing to their better emotional and psychological condition during the time spent in the ER through a new behavior proposed. Some proposals though included also other organizations and institutions in their scenario, for example by including the schools or psychological research units.

Img. 7. The Final Works: Design Proposal mock-ups showing the morphology, functionality and usability of the proposal (IC Team: Belluzzi C., Duello P., Chakka S., Li S., Hamzeh langroodi N.).

Next, there are the 2 examples of the students' Final works that we consider the most complete from the design point of view since they have not only responded to the problems but also included other considerations, institutions, and disciplines in their projects:

1. NURSE Team: Mohammad S., Peltier T., Vitturini L., Volanti V. «ER campaign» (img. 9). The project aims at reassuring the young patients throughout the Emergency Room experience, and increase their awareness of issues relevant to their health and safety. It involves an awareness campaign that goes



Img. 8. The Final Works: Design Proposal mock-ups showing the morphology, functionality and usability of the proposal (NURSE Team: Mohammad S., Peltier T., Vitturini L., Volanti V.).

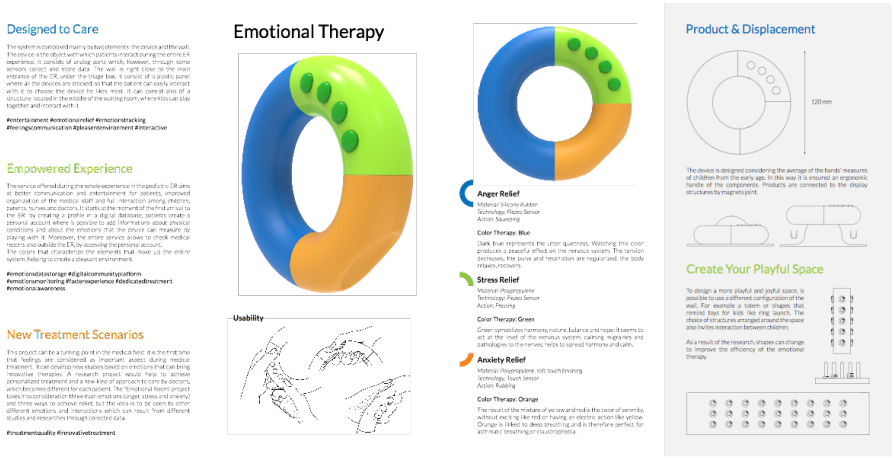
outside the ER, accompanying the child at home and at school. The campaign will start in the ER, when at the triage the patient receives a closed box containing a cardboard figure, some informations and a personal QR code. Through the code the patient can download the Friends In ER app and access a personal area, create an avatar and access a virtual room where there are avatars of children who, like him, in the past have been in the emergency room and they shared their experience. This makes the patient feel less alone. When the child is called to visit he will find, in the various departments, accessories distributors, different for each problem dealt with. The child will be able to collect these accessories thanks to the special slot, in his personal box. The patient, once back home, can then open the box and have fun coloring, customizing, gluing the pieces, creating an avatar that recounts his particular experience within the emergency room. Through the app, the child can finally share his/her experience, now completed, and be an example for other children who will be in the ER in the future, so that they can feel less alone. The campaign will also continue at school, where children will find informative posters, a book containing a story for each accessory and will participate in lessons on the subject prepared by the teachers, facilitating the sharing of experiences among peers.

2. IC Team: Belluzzi C., Duello P., Chakka S., Li S., Hamzeh langroodi N. «Emotional Room» (img. 10). Emotional Room is a project that aim to em-

Img. 9. Project «ER campaign» (NURSE Team: Mohammad S., Peltier T., Vitturini L., Volanti V.)

power existing treatments with the introduction of a therapy based on emotions relieving. The system is composed by two elements: the device and a display wall. Experiencing the device, children can get rid of bad feelings during their journey in the pediatric ER. The project, indeed, acts on three main emotions (anger, stress and anxiety), integrating into the design process colors therapy, tactile feedback studies and morphologies of childish products. The analog interaction is supported by a digital system of data collection, accessible by doctors and researchers, as well as parents. The service offered aims also at better communication and entertainment for patients, improved organization of the medical staff and full interaction among children, parents, nurses and doctors. This project can be a turning-point in the medical field: it is the first time that feelings are considered as important aspect during medical treatment. It can develop new studies based on emotions that can bring innovative therapies.

From the didactic point of view, the most difficult in comprehension part for the students was 'to Develop', since the activities and the instruments of this part (Business Model Canvas and Innovation level analysis) required the skills related typically to marketing/business activities. Some students though have appreciated the practical value of these instruments in real life, while it is commonly considered that nowadays university education stays too much far away from the job reality. This feedback then gave an idea of the possible missing bridge between the two worlds, which is the business analytic skills



Img. 10. «Emotional Room» (IC Team: Belluzzi C., Duello P., Chakka S., Li S., Hamzeh Iangroodi N.)

that allow bringing the ideas down to the earth and make them feasible and credible for the potential investors. The Workshop instead, with its spirit of a design studio and collective work, helped many of the students to focus and come up with ideas in a short time. In particular, the Stop Motion technique has contributed to fast analysis and verification of the Design Proposal by providing simple, hands-on tools for re-creating and 'experiencing' the User Experience around the new products and services. Later, some students have encountered difficulties in maintaining coherence in between their original idea and the final results, as while analyzing the ideas they were encountering some negative considerations which pushed some of them to deny their ideas and change them. For the final examination, an expert from the medical field has been invited to give a non-design point of view and to assess if the projects have a correct and comprehensible communication language, since the next step would be to present the projects to the Pediatric Emergency Room the students have been designing for in order to get a possibility to realize the project. Having said all this, we can conclude that the overall experience has demonstrated the validity of the teaching method, as the three parts: to Research, to Design, and to Develop, have allowed the students to structure their activities that resulted in innovative ideas of Services and in coherent storytelling of the projects. The Research part has brought them to un understanding of the importance of the emotional component of the User Experience, 'to Design' part has demonstrated the practical value of the UX tools, and 'to Develop' part provided some useful evaluation tools that allow the analysis of the project form technological (mock-up) and economic (Business Canvas) point of view. In particular, Prof. Corrado Moretti, Emeritus Chief of Pediatrics of Policlinico Umberto I, University of Rome, during his visit at the Final Works, has pointed out the actual value of the design proposals, and, thus, the work on the project continues with the aim to promote these

prototypes to the Policlinico Umberto I hospital for further possible development.

Acknowledgments

First, we would like to express our gratitude to Prof. Loredana Di Lucchio, principal professor of Product Design Studio 4 and Coordinator of the International Master of Science in Product Design at Sapienza University of Rome. Also, we would like to acknowledge the Paediatric Emergencies Unit of Policlinico Umberto I Hospital for the total support in all the stage of the didactic process. In particular, we would like to thank Prof. Fabio Midulla of Pediatric Emergencies and Intensive Care Unit-Department of Pediatrics, Sapienza University of Rome, for having welcomed our students during the field research and Prof. Corrado Moretti, Emeritus Chief of Pediatrics of Policlinico Umberto I, University of Rome for his evaluations of the Final Works. A special thanks also to all the students that participated in this didactic experience for all their enthusiasm, motivation and dedication to our design proposals.

References

Aarts, E. H., & Encarnação, J. L. (Eds.). (2006). True visions: The emergence of ambient intelligence. Springer Science & Business Media.

Boxwell, J. & Robert, J. (1994). Benchmarking for competitive advantage. J. Boxwell.–London: McGraw-Hill Professional Publishing.

Brown, T., & Katz, B. (2011). Change by design. Journal of product innovation management, 28(3), 381-383.

Brundtland, G., Khalid, M., Agnelli, S., Al-Athel, S., Chidzero, B., Fadika, L., ... & Singh, M. (1987). Our common future (\'brundtland report\').

Chamberlain, P., Wolstenholme, D. & Dexter, M. (2015). The state of the art of design theory and practice in health: an expert-led review of the extent of the art and design theory and practice in health and social care, Project Report. Sheffield: Sheffield Hallam Univeristy.

Di Lucchio L., Giambattista A. (2017). DESIGN & CHALLENGES Riflessioni sulle sfide contemporanee del Design. p. 1-192, Trento:List Lab, ISBN: 9788899854577

Gray, D., Brown, S., & Macanufo, J. (2010). Gamestorming: A playbook for innovators, rulebreakers, and changemakers. O'Reilly Media, Inc.

Foque, R., & Lammineur, M. (1995). Designing for patients: a strategy for introducing human scale in hospital design. Design Studies, 16(1), 29-49.

Lidwell, W., Holden, K., & Butler, J. (2010). Universal principles of design, revised and updated: 125 ways to enhance usability, influence perception,

increase appeal, make better design decisions, and teach through design. Rockport Pub.

Manzini, E. (2015). Design, when everybody designs: An introduction to design for social innovation. MIT press.

Norman, D. A. (2004). Emotional design: Why we love (or hate) everyday things. Basic Civitas Books.

Omachonu, V. K., & Einspruch, N. G. (2010). Innovation in healthcare delivery systems: a conceptual framework. The Innovation Journal: The Public Sector Innovation Journal, 15(1), 1-20.

Osterwalder, A., Pigneur, Y., Oliveira, M. A. Y., & Ferreira, J. J. P. (2011). Business Model Generation: A handbook for visionaries, game changers and challengers. African journal of business management, 5(7), 22-30.

Ross, P. R., & Wensveen, S. A. (2010). Designing aesthetics of behavior in interaction: Using aesthetic experience as a mechanism for design. International Journal of Design, 4(2), 3-13.

Stickdorn, M., Schneider, J., Andrews, K., & Lawrence, A. (2011). This is service design thinking: Basics, tools, cases (Vol. 1). Hoboken, NJ: Wiley.

Verganti, R. (2009). Design driven innovation: changing the rules of competition by radically innovating what things mean. Harvard Business Press.

Notes

(1) The Introduction, 'The course', and 'Conclusions' are written by Giambattista A.

(2) 'The course: Teaching Methods' are written by Zolotova M.

(3)Tools for Design Thinking process: «What is Human Centered Design» www.designkit.org/human-centered-design Last access 01.02.2019

(4) Tools for Designing Services: «Service Design Tools» servicedesigntools.org Last access 15.02.2019

(5) User Research Basics. usability.gov/what-and-why/user-research.html Last access 12.02.2019

(6) An example of slow motion film: «First animated film». Guinness World Records. Last access 5 January 2019.

(7) Systemic Innovation Diagram: Hollins, P. (2017). RAGE Potential Business Models. RAGE EU 2020 Deliverable.