Designing an intensive programme based on Service Design and Design for Sustainability

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ABSTRACT

This paper presents the design and experience of Intensive Programme (IP).The main motivation behind the programme was the desire to explore the common cognitive ground for design for sustainability and service design. The objective was a "design synthesis" of both areas not only on a theoretical but also on a practical level. These emergent areas in design are the future. By initiating a dialogue grounded in a pedagogical exercise, between design thinking, design for sustainability and service design, each can be enriched through the diffusion of information generated. In order to provide the framework for this synthesis, material from philosophy of design and systems science were included in the IP.

The programme was very favorably evaluated by participating staff and students, while it was rated by external evaluators as the most successful of the IPs run in previous academic years. It represents an ongoing collaboration between European Union's ERASMUS Life Long Learning Programme (LLP) and five European Schools of Design.

KEYWORDS

Service Design, Design for Sustainability, Intensive programme, Design Synthesis

1. Introduction

This paper presents the design and experience of the now successfully evaluated Intensive Programme (IP), on "Emerging theories, methodologies and applications in the area of design: Sustainability and Service Design" was designed. The programme is a collaboration between Erasmus LLP, the University of the Aegean, TU Delft, ImaginationLancaster and the Köln International School of Design. Further, this paper discusses how new knowledge on design pedagogy that emerged will be taken forward towards the design of a prospective course, possibly an interdisciplinary master's programme.

The main motivation behind the IP was the perceived need of those involved to create a common cognitive ground for design for sustainability and service design. In this fashion, the "design synthesis" (Kolko 2010) of both areas was the objective not only on theoretical level but also on a practical level as 'service design for sustainability' well. The choice of these two emerging approaches of design is based on the evidence that they will play a major role in shaping the discipline of design in the future. The economy has shifted towards a service based model (Iversen & Wren 1998). At the same time, environmental and social pressures create the need for new ways of interacting with the environment and among people. Design offers an integrative and applicable theory and methodology; and also a human-centered approach. Its body of knowledge enables designers and practitioners to robustly contribute towards the creation of meaningful, productive services for sustainability that accommodate useful, accessible daily user experiences. By initiating a dialogue between design thinking, design for sustainability and service thinking, each can be enriched with new information and ultimately a holistic integration in Design. In order to provide the framework for this synthesis, approaches from philosophy of design and systems science were used to help students ground their work and integrate it into their world-view.

The Intensive Programme was run over two weeks and, in order for the participants to both understand and synthesize the new knowledge taught, a project was undertaken during the second week, following theoretical lectures given in the first week. The project brief was based on real life scenarios and was

centered around designing conceptual services for sustainability in the region where the IP took place. The "learning-by-doing" (Yuichiro, Simon, 1979) approach of the programme was designed to enable participants to quickly grasp the teaching material, to synthesize the two approaches within a real life scenario and finally to reflect on the material they have assimilated by evaluating the outcome of their projects through application.

This paper is organized as follows: the next section gives the background of the general pedagogical aims and objectives of the European funded Erasmus Intensive Programme scheme, and how our particular IP is aligned with this. This section also gives a brief overview of Service Design and Design for Sustainability, the two topics that we felt would benefit from a more synthetic, if not transdisciplinary, approach (Klein, 2008). Following this, in section 3, we discuss efforts at synthesis, both in general and according to the two topics. Section 4 narrates the setup and organization of the IP and especially emphasizes the project work that was carried out by students to aid the synthesizing process. Finally, we conclude (section 5) with the discussion of the important takeaways of the process and, in the light of our experience, the reformulation of the goals of the IP.

2. Background

2.1. The intensive programme (IP)

Our IP was organized according to the scheme set out by the EU sponsored Erasmus LLP. An IP is a short programme of study that aims to bring together students and teaching staff from higher education institutions of at least three countries. It can last from 10 continuous full days to 6 weeks of subject-related work. An IP can be a one-off activity or repeated over a limited number of years. The broad goals of the IP scheme emphasize the multinational as well the collaborative aspects of knowledge-sharing, especially of specialist groups that may not exist in other countries and institutions.

More specifically they aim at:
• Encouraging efficient and multinational teaching of specialist topics which might otherwise not be taught at all, or only in a very restricted number of higher education institutions;
• Enabling students and teachers to work together in multinational groups and so benefit from special learning and teaching conditions not available in a single institution, and to gain new perspectives on the topic being studied;

• Allowing members of the teaching staff to exchange views on teaching content and new curricula approaches and to test teaching methods in an international classroom environment. (European Commission 2010)

The benefits of such programmes have been classified by researchers into four main categories: internationalization; evolution of the curriculum; providing practical learning; and promoting multidisciplinarity (Martin & Mäntylä, 2012). Each of these four are explained below and aligned with the experience of our IP.

With regard to **internationalization**, the researchers noted a number of positive impacts. These include: working in a multinational team, networking, understanding the differences and similarities of different curricula and an increase in long-term mobility. In our case, we made the team-working aspect central to our IP. Our multinational teams were deliberately constituted to contain participants from each participating institution. The result was that people of many different nationalities were put together for a short intensive period. This design proved to be very effective at breaking through the barriers erected by diversity in culture, language and education. At the same time, the social events planned in the scope of the programme fostered informal relations between the participant and the creation of personal and professional networking

In terms of **curriculum**, the researchers noted that IPs are of benefit to a wider audience than the participating students and academics. They can be a very useful tool for experimentation and can support the evolution of the curriculum. IPs can offer interaction and dialogue about the pedagogical approaches to a topic and the materials used and content taught in the different participating institutions. This cross-fertilization between different institutions provides insights on how others utilize teaching materials and methods and can offer new academic direction to teachers. At the same time, due to the ephemeral nature of the programme, it can act as an experiment for new ways of teaching ultimately leading to the creation of new courses or master's programmes. In our case, one of the participating institutions began the process of reorienting its curriculum to reflect the importance of Service Design for Sustainability using the positive experiences and good practices of the IP as its basis.

The **multidisciplinary** aspect of the typical IP refers to the new material produced from a variety of different fields. Given that Design is a multidisciplinary area, our intention was rather to

promote synthesis. Design traditionally draws upon engineering and social sciences to produce designs that if and when implemented will reformulate the problem space. Bringing together a variety of work from different disciplines and engaging in a synthetic process is part of the evolution of both the theory and practice of design. In our case, combining service design (Mager, 2005; Meroni & Sangiorgi 2010), design for sustainability (Walker, 2011; Bofylatos et al. 2012), philosophical theory regarding the nature of socio-technical artefacts (Kroes, 2012) and systems thinking in the context of services (Darzentas 2014),, helped the stakeholders involved (staff and students) to structure their personal "service design for sustainability methodology" while grounding it in the scientific theories behind each of the disciplines adopted.

Finally, in as far as **practical learning** is concerned, Learning-by-doing has long been recognized as important in the field of design pedagogy (Simon, 1981; Anzai, 1979; Cross, 2006). Practically applying theoretical knowledge makes it easier for the students to understand, use and evaluate the materials taught during the IP. Given the intense but short time span of the IP, staying on the level of the theoretical would lessen the quality of understanding and assimilation of the material as information overload would make the whole process less successful. In our IP design, we adopted the "learning-by-doing" and "hands-on projects" model. More specifically, for our Erasmus IP our main objectives at the outset were to provide training to design and design engineering students in Design for Sustainability and Service Design, by promoting student awareness about emerging approaches to design and designing, using systems theory and philosophy of socio-technical systems as framing tools. This meant addressing both the theory and practice of these approaches and providing the students the opportunity to shape a critical perspective on design and emerging approaches and themes.

These goals are purposefully left nebulous as the nature of the undertaking was such that uncertainty was high and thus we wanted to leave room for co-designing and implementing on the fly during the course of the programme. The subsequent interaction between teaching staff, participants and other stakeholders helped us make the goals more concrete and these are discussed in the last section of this paper.

In order to fully convey the scope of our IP endeavor, it is useful to elaborate on the different design approaches adopted as modules of the IP but also the interaction between those

parts. We first briefly outline the main characteristics of Service Design and of Sustainability as they are presently taught.

2.2 Service Design

Services are becoming a significant part of all modern economies and the pillars of their social systems. Services now represent between sixty and seventy percent of the gross domestic product of developed nations (Miettinen &, Koivisto, 2009). Coupled with the emergence of ubiquitous computing and ambient intelligence the service economy is emerging as the most dynamic social, cultural and economic vehicle for creativity and innovation. "*Service designers visualize, formulate, and choreograph solutions to problems that do not necessarily exist today; they observe and interpret requirements and behavioral patterns and transform them into possible future services.*"(Mager, 2008).

Service design has been taught in a variety of schools and many of these programmes have been in large part shaped by the work done by the service design network (SDN). The SDN's manifesto (SDN, 2012) states that the crucial competencies of the service designer are rooted within design culture and that the three main competences needed to successfully engage in service design are visualization, observation and use of the language of experiences. These three competences contribute to a user-centric and co-creative way of designing. They aim to bring the designers closer to the stakeholders and include their wants and needs in the proposed service while proposing innovative solutions. The experiences of the service consumers are central, as services themselves are, unlike products, intangible, heterogeneous, inseparable and perishable (Meroni & Sangiorgi 2011). Due to these characteristics, all that remains of the service is the experience that the user takes back after his interaction with the service provider. A generally accepted way to designing services has been identified as an iterative three step process. The first step is the identification of the actors involved in the definition of the service, using appropriate analytical tools. This is followed by the definition of possible service scenarios, verifying use cases, sequences of actions and actors' role, in order to define the requirements for the service and its logical and organizational structure. And finally the service is represented using techniques that illustrate all the components of the service, including physical elements, interactions, logical links and temporal sequences. (Morelli 2006)

These descriptions paint the picture of a highly visual and practical way of designing with the end user in the center of the process. In contrast, design for sustainability is more about taking a step back and slowing down the design process in order to engage in critical reflection and contemplation on the nature of design. We discuss this next.

2.3 Design for Sustainability

Design for sustainability has been variously been defined as: a profound political & economic change (Wood, 2008); a significant structural change (Thackara, 2005); a social revolution (Edwards, 2005); radical social & technical change (Ryan, 2008); the possibility of all people flourishing forever (Ehrenfeld 2008). This variety does not allow people to fully grasp the notion of sustainability and think about what steps have to be undertaken in order to move towards a sustainable human society. It is precisely this future-oriented emergent nature of sustainability that makes it impossible to define in simple terms.

It is also important to differentiate between "Design for sustainability" and "Sustainable design". Design for sustainability is associated with post-modernity and moving towards a new socio-economic situation. Sustainable design, also referred to as "eco-modernist design" is associated with shaping modernity in a way that is less damaging for the environment (Walker 2009, Benson; Fine 2011).

The issue with Design for sustainability is the very nature of the problem designers are trying to tackle. Transforming society to be sustainable has been categorized as a 'wicked problem' or an emergent property of the social system. By definition, wicked problems cannot be defined; defining a wicked problem is in its own accord a wicked problem (Rittel 1972, Kolko, 2012). At the same time, it is impossible to clearly model an emergent situation that has yet to emerge. However this "fuzzy" nature of Design for sustainability coupled with the fact that at times it does not abide to the laws of the market make it excellent for a learning experience in a University environment, when aiming to trigger a critical stance towards design and create an environment that fosters creativity and experimentation, the driving forces behind true innovation.

3. Synthesis in the design process

Broadly speaking, the intersections between service design and design for sustainability have generated two main trends: that of design for social innovation, or social change, and that of

transmaterialization. These trends can overlap, as can be seen from the explanations below.

• **Design of services for social change** (Jegou & Manzini, 2008; Morelli 2007). Social innovation aims to co-create services in the context of local communities aiming to improve the quality of life of the people in the said communities. This marks a trend towards collaboration, self-organizing and collectivism. These communities challenge the dominant narrative or metanarrative (Lyotard, 1984) and aim to create autonomous, local narrative whilst participating in the grassroots counter-culture movement (Merroni & Balla, 2007). These counter-culture movements are broad and take on different forms depending on the means and the goals. These movements include hacking; heresy; fan fiction; small change; professional-amateurs (Busch, 2008) design activism; design for social change; slow design; meta-design; open design (Fuad-Luke, 2009). The common thread between all of these movements is a need to move away from the existing models of top-down driven service design towards a more open and participatory model, where the user can affect the outcome of the design process.

• **Transmaterialization** is concerned with minimizing the material aspect of a product and its transformation to a non-tangible service. This of course is close to imposible and the hidden material footprint of a transmaterialised service have to be taken into account. This can be achieved by transcending the product in a purely digital domain (from atoms to bits) or creating a system in which the desired function is part of a service system (i.e. leasing services, sharing economy).

Examining the intersections of social innovation and transmaterialization, it becomes evident that there are important cross-overs from one domain to the other, and that a more robust synthesis would be beneficial for all stakeholders, such as in the creation of 'Service Design for Sustainability'. A further hint that there is a need for a comprehensive view of such a field is the fact that both intersections are defined as radical, interdisciplinary and holistic.

Furthermore, based on a systems thinking view of the world (as opposed to a reductionist way of thinking), we believe that trying to merge these two areas would make a whole that is more than the sum of its two parts. Indeed, the two complement each other by adding 'variety' that does not exist when either approach is undertaken separately. This of course, is a synthetic process, the creation of a service design for sustainability approach as a part of the design process. This thesis is also supported by the emergent nature of sustainability which makes it explicit that the

tools used in this new era of human development are going to be radically innovative compared to what we have today.

When designing the IP we knew that we would have to engage participants into a synthetic process. Synthesis in design is defined as "an abductive sensemaking process". Abduction can be thought of as the "step of adopting a hypothesis as being suggested by the facts. A form of inference" (Peirce, 1998; Kolko, 2010). Synthesis is quintessential in any multidisciplinary process. During the design of the course and the selection of the materials taught there was a need to provide models that bridge service design and design for sustainability but not in an explicit way. We aimed to create an array of different approaches, tools and methodologies that would allow the participants to synthesize their own personal frame of what 'service design for sustainability' could look like.

4. Project Work

The goal of the IP was to see what a service design for sustainability approach would produce. This was done by asking the students participating in the programme to try to apply the knowledge they had absorbed in project work. In the paragraphs below we first situate the project in the whole of the programme.

The schedule of the programme was split in two parts. The first week the participants attended lectures and participated in resulting discussions about sustainability and service design. This was not restricted only to these two disciplines but also covered ethical issues; IT infrastructure for service design on the cloud; (Zissis &Lekkas, 2011); co-design in virtual worlds (Vosinakis & Koutsabasis, 2013); aesthetics (Xenakis & Arnellos, 2013); etc. These lectures aimed to cover the theoretical background of the different materials but, at the same time, add new cognitive modules that would lead to increased variety and overall higher integration of the materials taught in the student's worldview.

At the end of the first week of lectures, the participants were split into multinational groups of six and were given a brief about a design project. The briefs described a problem space, but were unclear and fuzzy. This was purposely engineered to allow a higher degree of freedom to the students so that they were able to reformulate the problem space according to their particular ways of working and the data available to build their propositional services. Propositional services are services that are created in order to better understand and evolve the theory following the work of Walker on propositional artifacts (Walker 2008) that are designed items whose purpose is to act as speculative devices

for theory of design for sustainability and tools for reflection on theory. The pedagogical aim of the project was not to create a finished product but to critically reflect on the materials taught during the first week of the programme, while engaged in a 'learning-by-doing' process.

The design studio is central to the pedagogy of design (Hokanson, 2012): it includes two main pillars, the public presentation of ideas to the teaching staff and the interaction between teachers and students. (Shaffer, 2007). In the studio no new knowledge is given but it is co-created by students and teachers through trial, reflection and dialogue. The goal is to let the students create their own worldview. The time constraint of the project constituted a major driving force and we had to negotiate between creative freedom and creating a presentable concept. To achieve this, "Constrained making" and "Guided reflection" (Kolko 2012) were adopted. During the phase of understanding and reformulating the design brief, desk research, mapping the stakeholders and gaining access to design insights all had to be compressed in a two/ three day time slot. In order to ease the process, we constrained the tools used and based this process on lo-fi prototyping. At the same time, in order to provide meaningful criticism and increase the amount of information diffused between isolated design teams, an expert panel was conducted every day. This helped the groups stay on course as well as do time management.

The main idea behind the whole process was that a 'deep dive' into the material would help the students overcome the different barriers described earlier and engage in a design process that would require them to reflect on all of the different materials taught. An important point that further strengthens the immersiveness of the programme was that the learning process was continuous not just while students are listening to lectures and participating in discussions, but also while eating and drinking together.

5. Conclusions and Discussion

Many interesting issues emerged while designing and then running the programme. Firstly the educational goals and methods that had been set up in the design phase had to be evaluated and their evolvement understood. The main reason behind this was the need to clarify between different approaches, tools and methods. In this fashion we reformulated and refined the original IP goals as follows.
The participants of the programme must be able to:

- Understand the difference between design for sustainability and sustainable design, Eco-modernist and radical approaches.
- Grasp the underlying causes behind today's unsustainable society, modernity, consumption and growth etc.
- Understand different tools of service design and, when in the design process, use service blueprint, customer journey etc.
- Frame and transverse the cognitive and action spaces where 'service design for sustainability' is needed.

As this is an ongoing process, the specifics of the programme are ever evolving but we feel those goals are constant descriptors that are capable of always describing the underlying notions behind the programme, but without reducing the possibilities. Some practical issues also came up and had to be re-evaluated for future iterations of the IP and for future courses. For instance, the time frame had to be re-assessed, the first weekend of the programme is not formally part of the teaching process, but by providing the design briefs and relevant data to the design teams, at that time, can help to accelerate the synthesis process. This was later made possible not by explicitly studying and working on the project, but by giving the participants more time to reflect on both.

Finally, it is true to say that we saw that the experience of bringing together experts from two separate fields, putting them with students, and attempting synthesis was exciting and even "life changing" in the words of more than one participant. While at the design stage, we could not be sure that we would reach such a level of success, the results appear to show that our design for the IP, which tried to give ground rules, but not restrict developmental possibilities, combined with the engagement strategies of getting all participants "not just to learn, but to do", as well as to "live and breathe" the project work, was instrumental in achieving these high results.

6. Acknowledgements

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