Service Design – a Structure for Learning before Teaching

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Abstract. Service Design is a new learning domain where su9table teaching material is not (yet) available. Open Learning Resources, however, can readily been found. Triggered by the need for a course we developed a structure where students are guided through discovery learning and mutual teaching. We will show how we started from the students' authentic goals and how we supported them by a simple structure of pacing the discovery process and merging theoretical understanding with practice in real life. For the second lifecycle of the course we developed and applied an open source interactive learning environment.

Keywords: Service design; Open learning resources; Open source learning and teaching environment; Guided discovery; Moodle platform.

1 Introduction

When invited to teach a course on Service Design, we discovered that in higher education this topic was brand new, as it seemed to be in design practice. Possibly related to political context, only in some countries Service Design is recognized by governmental institutions, e.g., [1]. In 1991 Service design was introduced as a design discipline [2] by Prof.dr. Michael Erlhoff at Köln International School of Design. Related to developments at KISD an international Service Design Network [3] has been established. One of its offsprings is the collection of Service Design Tools [4] (in English), based on a thesis by Tassi [5] (in Italian).

2 Setting Goals for a Service Design Course

The course is taught in the spring semester students at the faculty of Architecture, University of Sassari, Italy, in the bachelor curriculum "Design". The course counts for 10 ECs, which is considered 250 hours of student time. One of the authors is responsible for the course and considered the teacher. The teacher, who cannot speak Italian, is available at the lecture hall for 2 days (12 hours) every fortnight. During this period, and during a comparable period the other week, an Italian tutor is

available, first of all to help students understand the teacher's English presentations and materials and vice versa, secondly to support the students in contacting the clients of design, which are managers or owners of real local institutes and business (mostly with an international clientele), and finally to help developing their products as far as these have to be in English (presentations, progress documents, some non-Italian communications that are part of the final design. For the rest of the time computer labs and (physical) design labs are available for the students to work either individually or in teams, and students are also supposed to regularly meet their design client.

2.1 Theory based Application of Techniques

In teaching design we aim at integrating the use of techniques with the understanding of relevant theoretical concepts. These concepts may well be derived from multiple disciplines. We support a pragmatic approach towards theory: one should understand why a technique or tool is developed (and, consequently, on what conceptual framework is based) in order to use it if it is considered relevant in the context of use. At the same time this domain features multiple disciplines, so the concepts we apply may well be based on unrelated or contradictory theories.

2.2 Service Design should involve multiple Types of Stakeholders

We advocate the involvement of all categories of users and stakeholders of the artifact to be designed: the client of design (often a service provider); suppliers to the service provider; staff categories of the service provider; related governmental institutes; and related other services. We suggest our designers to collaborate with all these different stakeholder groups during the whole design process, which requires, both, representation techniques that support understanding and communication between strongly varying types of professionals and user groups, and insight in the diverse professional and social cultures of these groups.

2.3 Depending on the Design Context, relevant Techniques need to be found

We never preach a single design method to be the best for the case. We stimulate (and award) choice and even "discovery" of, both, design method and approach. The same applies to the techniques and tools applied in the design process. The main condition is that students should argue for why they choose their method and use their techniques in favor of alternatives.

2.4 Learning Goals for the Course

The course is taught in the spring semester students at the faculty of Architecture, University of Sassari, Italy, in the bachelor curriculum "Design". The course counts for 10 ECs, which is considered 250 hours of student time.

Our past experience with developing and teaching design courses (Visual Design, Task Design, User Interface Design) to student groups in various countries, both for "traditional" classroom based learning and for distance learning, helped us develop the learning goals for the current course. After this course students should:

- Understand the concept of Services in a networked society;

- Understand the user-, and stakeholder-centered issues of Service design;

- Be able to find and to read relevant new literature;

- Understand the issues of cultural differences between users and other stakeholders of services;

- Understand the relation between culture and the use of services;

- Know a relevant design approach and the relevant techniques and tools;

- Have experienced a service design process in a design team.

3 Learning in Academia

Our view on learning might be characterized as socio-cultural constructivism. Vygotsky [6] shows that human learning is of a social nature, and Bruner [7] highlights the role of culture as a core element in learning, and, hence, in didactics. For us, the core of didactics is not the teacher's activity but the process of the student's discovery, elaboration and integration of information and experiences by confrontation and collaboration with peers and expert resources (among whom teachers as well as interactive learning environments).

In line with Novak [8], who states "meaningful learning underlies the constructive integration of thinking. Feeling and acting that occurs in human learning and in new knowledge constructing", we aim at challenging our students to be autonomous in their learning. We do not prescribe a single method but illustrate alternative approaches, point to multiple techniques and tools and suggest them to explore other ones, underscoring the importance of context of design and context of use for the success of the design as well as of the client's business. Moreover, we stress the value of creativity in the process and in the resulting service for, both, the client who often values unique of the business, and the users and other stakeholders who often choose their services based on their valuation being treated special. In order to create a realistic learning experience, we have our students design for real clients, mostly local businesses.

To promote the collaboration with the peers, the students of the Service Design course are asked to group themselves in teams. Valorizing the different skills, background, attitude and upbringing of the various team members the students combine existing resources and tools to find out new solutions. Teams are invited to analyze and explain how they interpret their design project and their purpose for the artifacts to be used by multiple categories of people.

Summarizing: the learning environment should give to students a framework stimulating an active approach to the elicitation and integration of experience and

knowledge. The students are asked to be creative, to be analytic and to make explicit decisions.

4   Developing an open Learning Environment

Technology provides a good help in order to accomplish the goals of a social constructivist context both for teachers and for learners.

Facilities like e-mail, wiki and discussion forums are becoming available in university learning management systems. Students are finding ways to add what is available and useful for their learning. In the public space of Internet blogs, tweets and feeds expert professionals and scientists, often related to scientific institutes or universities, publish knowledge resources via creative commons and other emerging services to complement or even supersede the traditional "closed" educational facilities that are offered for a fee. In essence students and teachers can choose among a big variety of services to communicate, collaborate and publish freely.
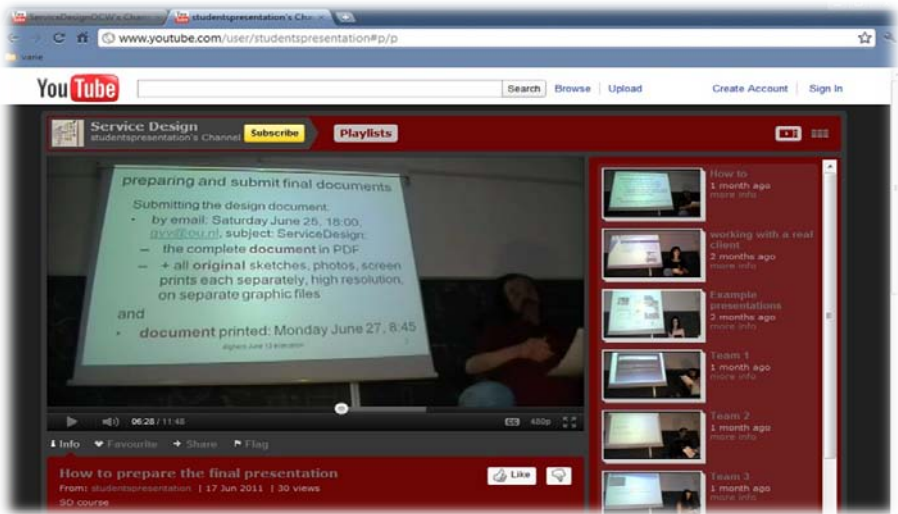
Fig. 1. YouTube channel with mini lectures captured from actual teaching during the course.

In our case we decided to develop our open learning environment based on the technology of the standard Moodle system that has been enhanced with improvements aiming at self-assessment and metacognition. The learning environment was structured based on the lesson plan that was used in the previous year for a fully classroom based learning process. This was expanded with additional opportunities for exploration, communication within teams and between multiple teams and teachers and tutor. We provided additional resources like online exercises, multiple different modalities of presentation of knowledge like mini lessons in both: (a) full

text with pictorial illustrations; (b) video recordings of actual teaching (Fig. 1); and (c) slide shows with voice-over.

The alternating classroom meetings, team meetings, and the use of the learning environment supported integration with online learning activities, resulting in opportunities for a blended learning process. The Moodle Learning Management System was configured to accommodate the resulting online components of the course. It includes facilities like messages, assignments, wiki, and forums to support online collaboration in addition to classroom based activities.
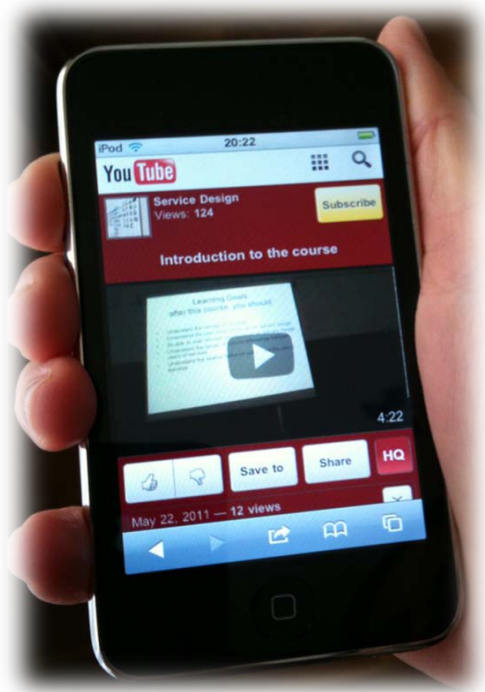
Fig. 2. Mini lecture as displayed on smart phone.

During the course the lectures of the teacher were recorded on video and published in the learning environment in addition to the presentation slides, to complement the notes that the students make during the lectures. This was especially important in this course because the lectures and class discussions were in English while the native language of the students was either Italian or Spanish. The recordings were published as well on a YouTube dedicated channel to make them available on new (for the students considered fashionable) devices like smart phones (Fig. 2). To this end we paid special attention on the way to structure the slides, the readability of text, and the visibility of face and gestures of the teacher.

5   Choice of Learning Resources

The previously mentioned open source website on Service Design Tools [4] was the original base for our techniques and tools, and our own DUTCH design approach [9] was the foundation of the type of methods we proposed. Major starting points to collect additional knowledge were the literature sources related to the UK, e.g., [10], [11], [12], [13], and [14]. We added pointers to additional design techniques that seem potentially relevant for the case of service design, e.g., decision support techniques like Design Space Analysis [15], [16], and [17]. In addition, based on our literature survey (e.g., [18], [19], [20], and [21]) we added pointers to public domain resources on cultural differences: the Cultural Survival Kit [22] with a discussion on aspects of national cultures and communications, and Hofstede's website [23] with a measurement technique for five scales of cultural dimensions and scores for many countries worldwide.

6   Structure of the Course

At a high level, our course was structured along generally accepted approaches of user centered learning, adapted to the domain of Service Design, where collaboration with different types of stakeholders with varying goals, cultures, and professional visions is a main challenge.

   At all stages of the course, and all phases of the design process, we asked the student to consider and elaborate 3 aspects: (1) analyze the context of your current activity, describe all relevant issues related to stakeholders; (2) consider the design space with any question to be answered, all possible options, and all relevant criteria; and (3) be creative in considering ideas as well as combinations of ideas from all stakeholders concerned.

6.1   Design Cycle and Phases

The topics of the bi-weekly meetings with the teacher reflect the design method structure that we suggest:

1. Introduction to services and service design; tools for design;

2. Culture: esthetics; language (including visual language, gestures, symbols and dress codes); values (referring to Hofstede [23] and to geographical culture differences [22]; For example, Figs. 3 and 4 show government sponsored websites for comparable audiences (students in the Netherlands, resp. Italy, with the same content: "excellent students", where cultural value differences along the dimensions of masculinity and power distanced result in strongly different experiences that match dominant local cultural values.

3. Analysis of the client, the different types of customers or audiences of the client, and other stakeholders; cultural differences between these groups;

Fig. 3. Dutch government sponsored website promoting student quality.

Fig. 4. Italian government sponsored website promoting student quality.

4. Co-designing with all stakeholders concerned, identification of issues, design space analysis;

5. Co-design continued – envisioning and detail design;
6. Visual design (including the use of visual design patterns for websites) and prototyping (including storyboarding, scenario development);
7. Assessment of design;
8. Presentation to the client.

During the analysis, as well as during the co-design phases the design teams are structurally working with their client and adjusting their understanding as well as their envisioning based on suggestions and feedback they continuously solicit.

6.2 Techniques to Choose depending on Context

We pointed our students to multiple sources for tools and techniques, including all techniques dealt with in [4], [15], [16], and [17]. We challenged our students to each study some techniques and teach them to the whole group, which we recorded and put on a YouTube channel for the students to consider as a source throughout the course. Techniques and tools that turned out to be considered relevant and used by our student included: moodboard, mock-up, affinity diagrams, service image, mind map, group sketching, story board (Fig. 5), prototype (Fig. 6), role playing, scenario, persona, storytelling, poster design, tomorrow headlines, heuristic evaluation, cognitive walkthrough, design space analysis.
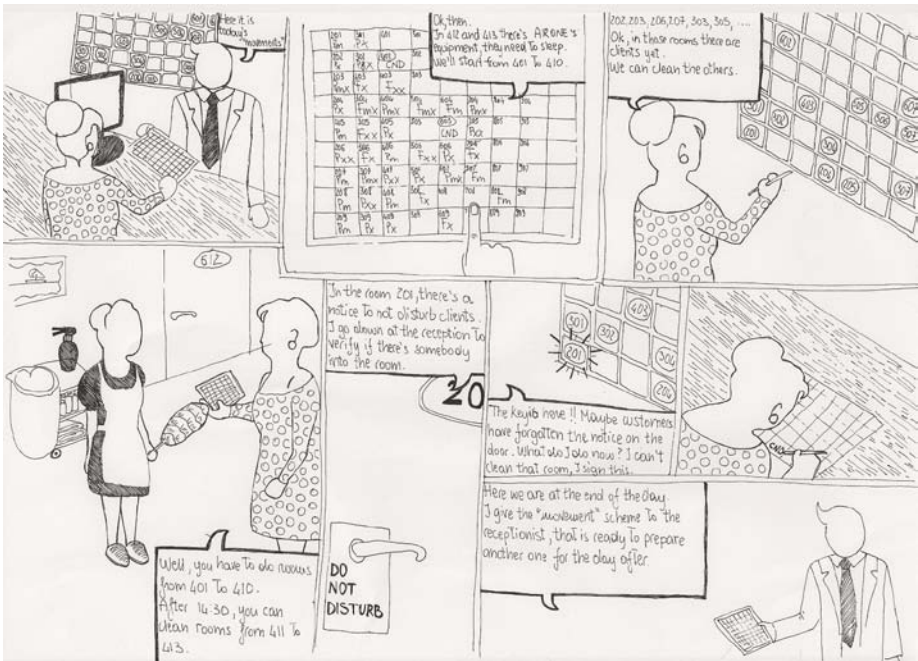
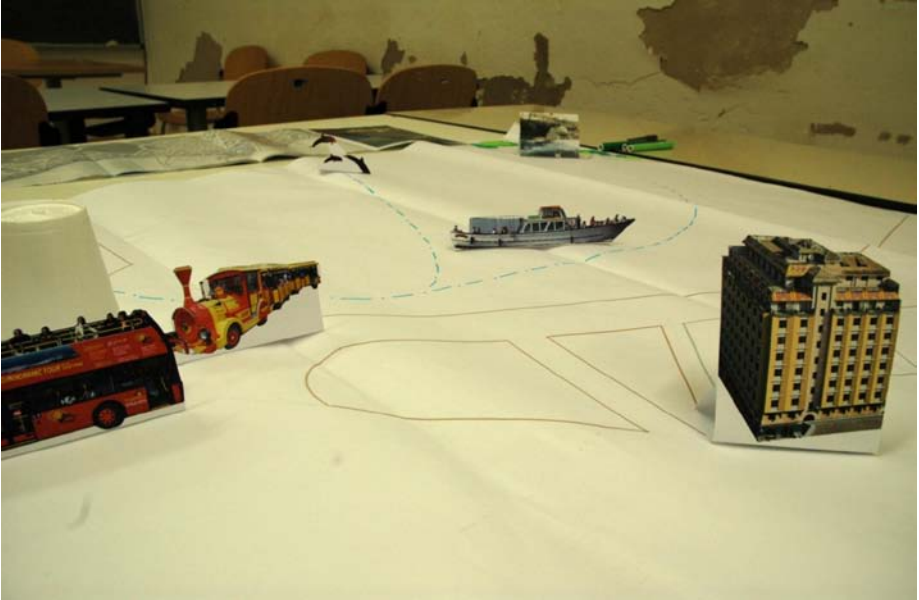**Fig. 5.** Student generated storyboard on hotel services.

Fig. 6. Student generated rough prototype on touristic services.

We found the students were creative in applying these techniques, often with well founded reasons, in phases of design where these are not considered standard techniques by current literature.

6.3 Lectures, Student Presentations, Mini Courses, Interactive Tools

During the course the students gradually took over the presentation time, showing newly discovered tools or new variants of techniques, providing reasons for why to use them in their context of design, and how to adjust them in relation to their design project and the state of their collaboration with stakeholders. Their presentations were kept and added to the learning resources in the interactive workspace, and sometimes discussed and applied by their peers.

During the course, sometimes a need arose for additional knowledge of concepts, examples of techniques, and explanation of how to use tools. In that case the teacher developed mini courses (presentations of between 5 and 10 minutes) that were added to the repository.

Some of the additions provided when a need arose during the course were in fact interactive tools for individual learners to explore the design space and potential solutions for needs, e.g. a wizard to explore the potential benefit of applying visual design patterns for the design of graphic aspects related to the services, e.g., stationary, advertisement, web site design, etc.

6.4 Assessment and Exam

Each student is expected to receive a personal score assessing the competence gained at the course. In this the students were aware from the start that this score is a function of: the student's individual performance in certain assignments for finding and teaching about several tools and techniques; the team's performance during the design project; the team's design document (which was actually build during the project); and the team's presentation to the client at the end of the course.

Individual students as well as each team received feed-back from the teacher and tutor continuously during the course on regarding the status of their project, the quality of the work so far, aspects that needed attention, and suggestions on where to invest extra effort.

7 Examples of Student Learning

Fig. 7. Issue cards.

In order to illustrate the students' work, their feed-back, their way of interpreting the method, tools, and techniques, and the often surprising ways they applied their newly developed insights, we show some examples of the types of techniques they discovered to be suitable to their context of design and to the cultural issues of meetings between different professional cultures.

Working with users of currently available services, Issue cards are a quick and easy to generate and understand way of identifying and analyzing problems (Fig. 7). In the same way Personas help identify, understand, and reason about, sub-groups in the multidimensional domain of intended users (Fig.8).

Users → tools (character profile)
Name: Axel e Liesbeth
age: 65 and 60
They come from in Munich.
They are a couple that would pass the pension traveling around
Europe, so they often entrust themselves to a travel agency of
their city.
They have a big passion for the beer.

Name: Riccardo and Ginevra
age: 52 and 29
They come from Milan.
Riccardo is a small businessman with a passion for sports car.
Ginevra studies statesmanships. She loves fashion.

Name: Giulia, Giorgio and Marco
Age: 7 – 9
They are three friends that go to elementary school attending
to the evening course of Smuovi. Marco loves soccer, while
Giulia and Giorgia swim.

Name: Pablo e Juan
Age: 22
They're from Valencia.
They study veterinary. They go at all concerts of their favourite
artists and they play in a rock band.

Fig. 8. Personas for different tourist categories.

A Task analysis grid (Fig. 9) for each different user group (persona) and stake holder allows designers to tell the story of tasks in relation to context and experiences.

Fig. 9. Task analysis grid.

A Motivation matrix (Fig.10) helps analyze the structure and connections between various stakeholders and the values of their interactions.

Connections	Client Business	Client Leisure	Staff Barman	Staff Colf	Economist	Web Master	Translator	Forniture	Financer
Client Business			Use bar Service	Call them if they have requests		Use web site	need it to have informations		
Client Leisure		Communicate, send feedbacks	Use bar Service						
Staff Barman	Serve for users	Serve for users	Work together		He's been paid by him				Can be paid by him in particular occasions
Staff Colf	Clean theyr room and spaces	Clean theyr room and spaces			She's been paid by him				
Economist	Study	Study	Pay him	Pay her		Pay him	Pay him	Take ordinations for service	for particular requests can call him
Web Master	Gives the informations in the website	Gives the informations in the website			He's been paid by him		Asks him for the language in the website		
Translator					He's been paid by him	Helps for the website			
Forniture	undirectly furnishes stuffs	undirectly furnishes stuffs			He's been paid by him				
Financer			for particular requests can call him		talks for the materials		for particular requests can call him		

Fig. 10. Motivation matrix.

An Offerings map (Fig. 11) shows the intended architecture of the services, and a System map indicates the relations between the service providers and between these and the users (Fig. 12).
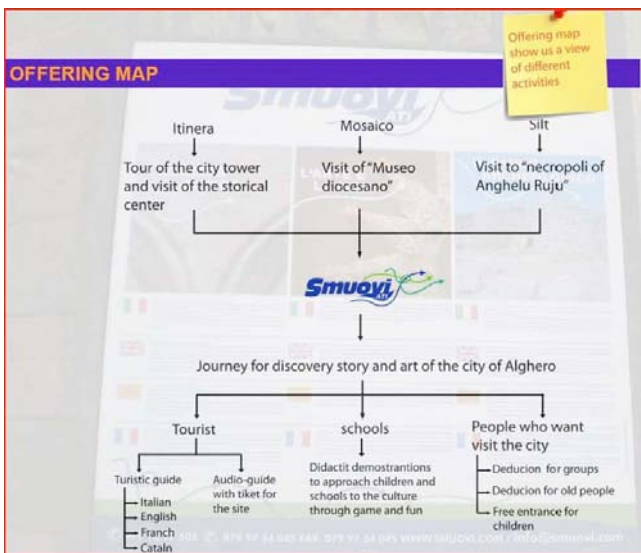

Fig. 11. Offerings map for tourist services.

Fig. 12. System map for tourist services.

Affinity diagrams (Fig. 13) allow analysis of the positive and negative aspects of the intended services in actual context.
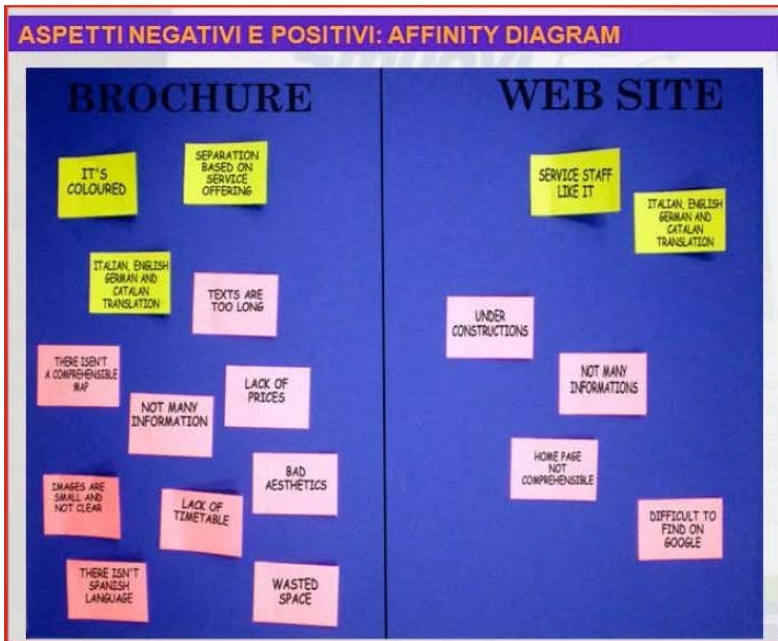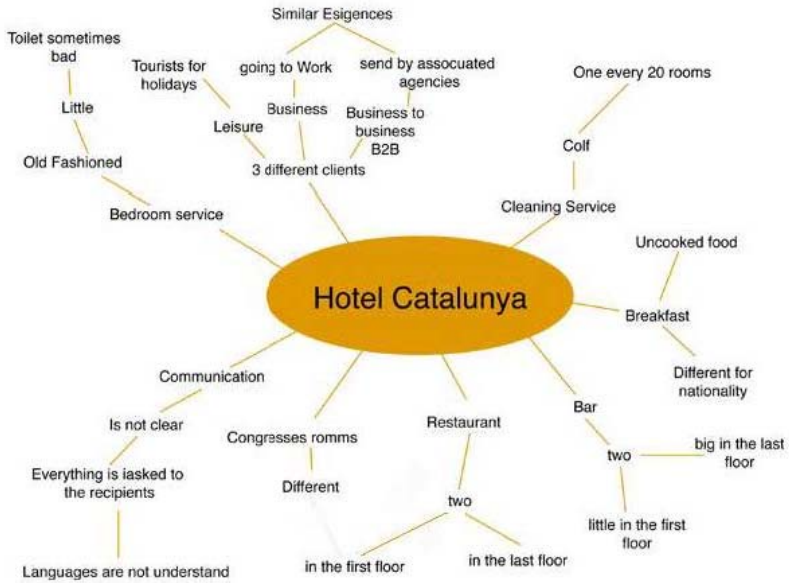

Fig. 13. Affinity diagram.

Fig. 14. Mind map of hotel cervices.

Mind maps allow generating, analyzing, and re-structuring complex relations in service design (Fig. 14). In general these tools enable the design teams to collaborate with various types of stakeholders, often in multi-stakeholder sessions (Fig. 15).

Fig. 15. Design team (students) collaborating with various stakeholders.

Group sketching can be used to involve various stakeholders at the same time early in the analysis of the design space Fig. 16). For discussion with users, a Service image (Fig. 17) or story board (Fig. 18) may be helpful as triggers for storytelling, and a mock-up (Fig. 19) does allow analysis of actual user behavior in an early stage.
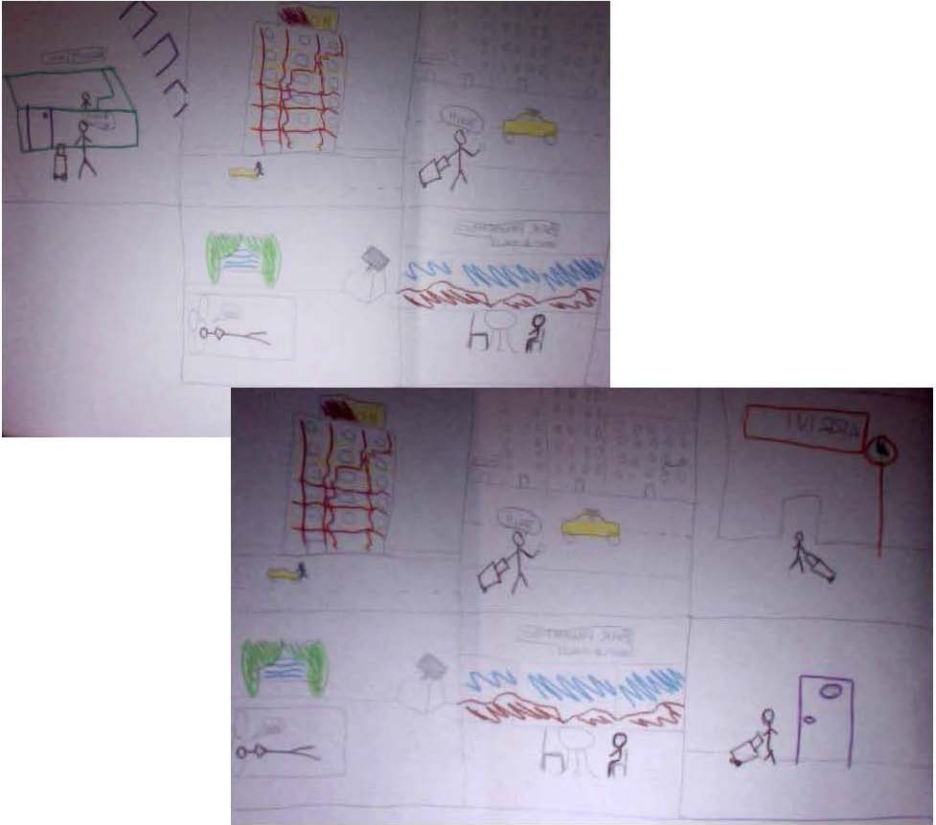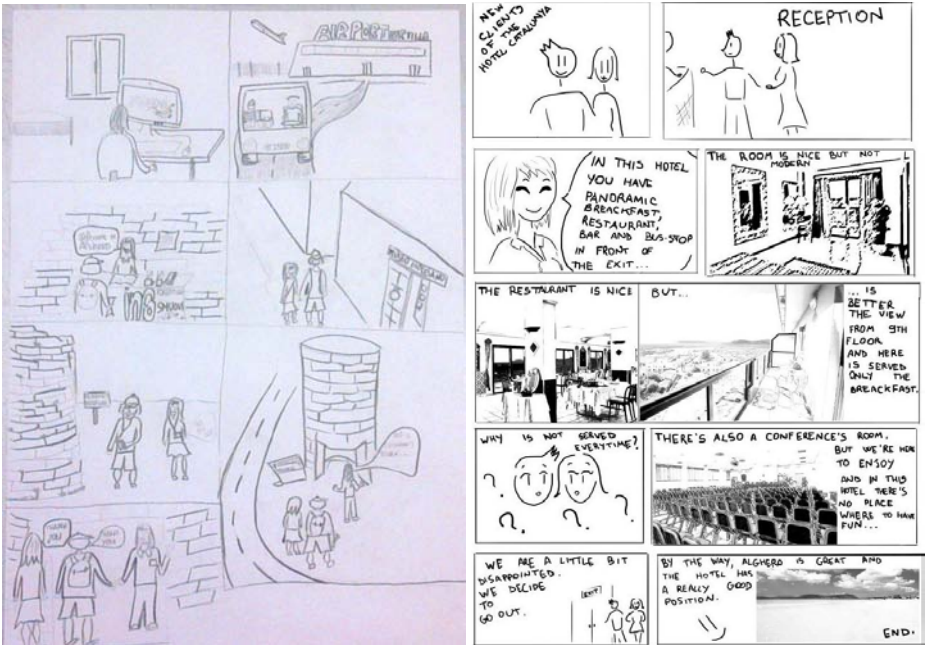

Fig. 16. Results of Group sketching.
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Fig. 17 and 18. Service image and story board intended for user feedback.
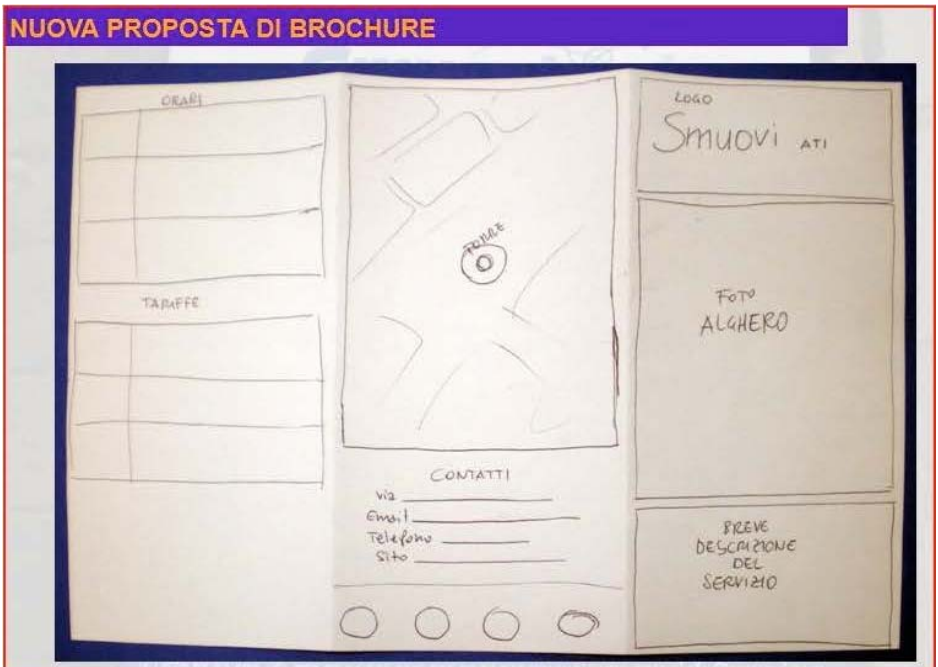

Fig. 19. Mock-up of an information brochure.

Once new services develop a final structure, several techniques help to represent this for stakeholders (implementation sketches, Fig. 20) and users (Sketch of website visual design, Fig. 21, and Moodboard for setting the tone to trigger intended user experiences, Fig. 22).
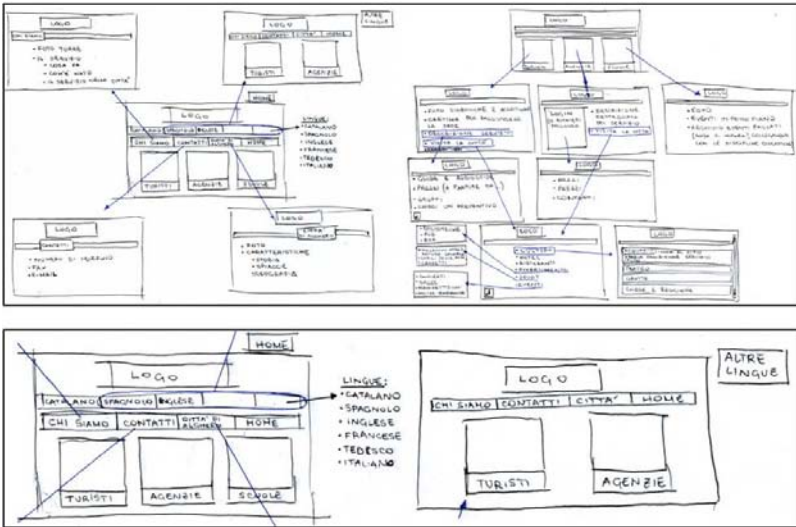

Fig. 20. Sketching the intended structure of navigation and content allows early assessment with professional stakeholders
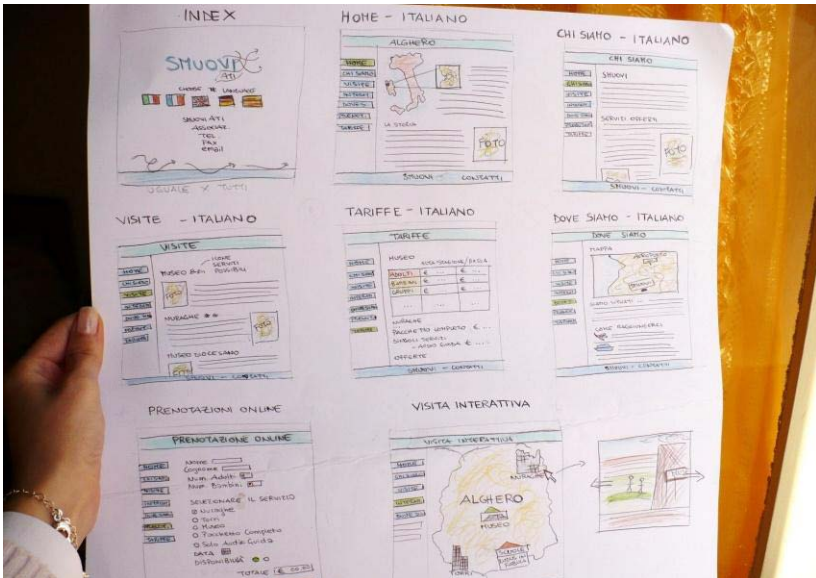

Fig 21. Sketch for visual design of website.

Fig. 22. Moodboard helps understand the experience of visual representation of services.

8 What We Learned

Working with an interactive electronic learning environment where the actual learning behavior is mainly defined by the students working in a real life context was new and exciting. We learned a teacher has to step back and adjust continuously to student development, to context of real design projects, as well as to the living learning environment that is being filled by all stakeholders of the learning process.

We learned the teacher has to structure the concepts to be discussed into atomic units, since the learning process continuously asks for the introduction of individual topics at unpredictable moments.

We learned the way to present, to discuss, and to prepare sources for the learning environment require special attention to the way these issues will have to be re-used later (life lectures turn out to survive as YouTube clips, short PDF files, voice-over presentations, etc.).

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