



# NETWORK SHAPES DESIGN ACTIVITIES. ICT SUPPORTING OPEN AND SHARED DESIGN PROCESSES.

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## ABSTRACT:

The network paradigm refers to individuals as being continually involved in processes of sharing and being able to organize into creative communities of practice and knowledge.

Some of these communities are developing and act creatively in the digital spaces of the net. They explore and push forward the ICT technology boundaries: everyday we observe on the Internet flourishing sources and authorities, new ways to organize information and public heritage worked out by different people and organizations that show much more richness everyday and become more and more interesting. Current researches on “creativity support tools” investigate the creative process as situated cognition activity in physical and technological spaces made up of tools such as creativity labs for innovation and frameworks for knowledge intensive activities. (E.g. L3D lab in Chicago, Fraunhofer Institutes in Germany). Research is revealing that creativity spaces should be differently designed for each creative action, which manages a particular kind of knowledge and needs to be supported by specific tools.

Design activity is linked to the design space in which it occurs. It is a knowledge transfer process based on tools, from pencil to cognitive maps: knowledge comes steadily into shape until it becomes a designed artefact. It is a creative and cooperative action itself, presenting the same attributes as network communities. The ongoing research is hosted at Politeca, a Design Knowledge Centre at Politecnico di Milano focusing on network tools placed into design spaces, exploring which kind of support they can provide in design processes. The aim of research is to verify the need and test the use of tools in design contexts by two different design communities: the design student community (in faculty labs and courses) and the practitioner community (knowledge at work in different design teams). The paper describes the first phase of experiments.

We study design activities "in situ" through participant observation methods derived from ethno methodology; we are creating a sort of "designers' observatory" from which we will be able to explore design processes from the point of view of both designers and researchers. In order to turn research findings into actions, forthcoming phases will verify emerging needs of knowledge by allowing designers to try out their work directly with a series of ICT design tools, and then providing for them a custom framework of tools to use.

Network tools are technology to act on and experience knowledge, consistently with our ideas that sharing heightens knowledge and that design activity involves sharing expertise. Proceeding from this, we aim to shape toolkits for design activities in order to enhance creative sharing and to contribute to the development of a knowledge base for design made up of a dialogue between resources and experiences.

**Keyword: digital community, ICT tools, design knowledge sharing**

## INTRODUCTION

The paper is structured in two parts. In the first part, we suggest a definition of digital communities that underlines the role of cooperation and network tools in the knowledge generation and sharing processes on the Net. Experience of communities in sharing practice is discussed and related with sharing expertise latent in design activities. Then we frame the concept of “design community”.

Starting from this analogy, the second part of the paper explains the research hypothesis: to verify the possible effectiveness with which we can transfer network technologies from digital communities to design contexts, aiming to enhance the exchange and share of knowledge between users of “design resource systems”.

The hypothesis is under review through experimentation within the “design students' community” at the Design Faculty of the Politecnico di Milano; paper describes the first phase of the experiment; in the future experiments will be eventually widened to include some professional local design contexts.

## PART I. LITERATURE FINDINGS AND KEY-CONCEPTS

### I. SHARING KNOWLEDGE: ICT TO AGGREGATE COMMUNITY

Originally, digital communities come out of the free software experience. With free software the source code is public and handed out freely. Free software developers form communities of individuals (both technical and user sides) that cooperate in the practice of writing, documenting and maintaining software. The sharing activity among developers breeds new knowledge and the tools that are the products of this cooperation are spread by public access and various sharing models. The social impact of the free software experience is primarily a contribution to a shared perspective on the production and use of technologies.

The ongoing ferment within networks has brought communities to move beyond the production of knowledge objects as final artefacts: nowadays communities join together in the production of knowledge itself and in the sharing of public activities. The strength of the network tools that mediate our everyday information and knowledge activities serve to the quick and viral participation of new users in generating content, and to the capacity of the tools to enable new relations and dealing. Effective use of the Internet has been achieved through its use as a means of communication, as a medium for the transfer and sharing of information and as a prime mechanism for interactions between individuals.

Experiences, learning and content production by many are the main processes that currently lead to innovation; these processes have been fully explored in organizational studies and we mainly refer to the “Creative Support Tools Report” (2006) for a synthesis of these concepts from a practitioners mindset. Richard Florida theories that mean creativity as a key value in economic growth are widely known and further concern on creativity as a process with social nature and significance. Fischer yet itemized that this creative process emerges from activities and contexts in which knowledge interactions and artefacts definitely contribute to the process itself (Fischer 2004). Furthermore Benkler made a breakthrough in socio-economical analysis of the community organizational model: it is primarily the sharing expertise fed by the Net and practiced by communities that makes possible the expression of creativity and the related innovation. Participation and cooperation are the major trends in social innovation (Benkler 2006). For this reason they are worth framing in different disciplines.

Creativity and innovation concern the design practice; so the reflection and the research on these social processes are increasingly urgent for design practitioners. Through the power to join people, the network paradigm refers mainly to sharing relationships and cooperation practices; from this paradigm comes the interest for digital communities that are strictly connected with the tools for managing knowledge. The evolution of these communities (and their social impact) is tied up to the quick expansion of ICT, which is used for the public management of resources and data, to foster cooperative work and to nourish the emergence of a public heritage composed of individuals, unstructured groups and organizations. User-generated-content processes and social software push forward the technological boundaries such that informal taxonomies, new semantic filing and systems for the information representation can emerge. The public domain is enriched thanks to ICT's capacity to enable new models of knowledge production. Sharing is a new way of knowledge production which creative expertise grooves on. This happens in the wider creative community of the Net; the research argues this may happen in the specific communities of designers.

## 2. COMMUNITY & DESIGN, DESIGN AS A COMMUNITY PROCESS

From the point of view of designers, therefore digital communities have two main characteristics. First, they choose to engage in relations of cooperation and participation; *network dynamics turn the production of knowledge into plural processes*. Networking shapes knowledge into a collective undertaking made possible by phases of social relations. In the organizational model of community relationships are necessary for knowledge creation and sharing. Second, they manage knowledge as a process, and act in combined ways on tacit and explicit layers of that knowledge. This accords to Fischer's definition of creativity in social processes, which explicitly refers to a hybrid crossover between tacit and codified phases (Fischer 2005). Such are the ways that these communities move beyond the definitions that separate tacit knowledge

from codified knowledge and they use as knowledge what comes out of the interactions of the networks in the use of tools. This kind of knowledge is a hybrid, and we call it *working knowledge*.

These implied sides of the digital communities are key-factors also in design processes. In a concerted way design the activity has been defined as a knowledge transfer process, which starts from concept generation and gradually takes shape until it results in designed artefact<sup>1</sup>. There are different phases in the design process: within it, we can pick out midway outputs, different representations, and modelling tools, and exchange between tacit knowledge and codified knowledge (both resource assets for design thinking and the experience accumulated in designing are equally useful in the design process). Furthermore, design activity grows with cooperation. Design is not the lonely creative generation of ideas in a single mind. It is structured around more or less explicit *cooperative* dynamics: designers work in teams, in both their professional activity and their education. Even when they are not working in a team, they still make use of resources and experiences from the outside world, from different design contexts and from the stakeholders of the system in which they are involved. As Fischer finally notes, “the complexity of design problems requires communities rather than individuals to address, frame, and solve them” (Fischer 2004).

### 3. SUPPORT DESIGN CREATIVITY AS NETWORK CREATIVITY

It seems that cooperation and working knowledge equate design with design communities, even if there is any neither former nor formal definition about this in the literature. Design can be read as a community process if we think of team-works, groups of designers and the design context in which they act: like communities they engage in common activities, they share resources, exchange knowledge, and work strictly towards one aim. Like digital communities, they find technologies useful for aggregation and for facilitating knowledge sharing. Our research hypothesis asserts that it is possible to move network tools and technologies with some effectiveness from digital communities to other physically located communities, as in the case of the designer's community. The working hypothesis wishes for the emergence of new different forms of digital knowledge belonging and connected to sharing activities in design. This can add to the implicit cooperation between individuals an explicit layer of knowledge that comes directly from cooperation. More expressly: a) which kinds of tools for sharing can be effective to further design creativity and b) in which way can we include them in a design context? Considering design creativity as a special kind of network creativity allows us to gather new knowledge emerging from the use (experience) of information, documents, resources, and to integrate it into design knowledge as a new form of practical knowledge. Plainly there are several and various tools that we can borrow from digital communities; the transfer of them into new contexts requires choice, adaptation and interpretation. We

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<sup>1</sup> Outcome of design process is not univocal, and cannot be considered just as material items. With the word artifacts, we consider products, services, communications, interfaces, tools, methodologies etc.

provide a key example: the Net is composed of communities without physical links that act exclusively in digital space, social software is a product of cyberspace and the actors that live there, digital communities are global. On the other hand, design contexts are physical and they have connections with local territories. Digital space is merely used to access resources or as a medium for communication. An essential gap within the communities we are analyzing is the concept of space. Research would be able to introduce the idea of digital systems within physical contexts, in order to go beyond the distinction between digital and physical spaces. Networks fit in to physical space. Indeed, one of the bases of research is to create for the designers' community a hybrid context made up of tools. It is required to break the spatial, temporal and technological barriers to creativity that Fischer lays before in its "collaborative design strategies" (Fischer 2004). Indeed the shifting of tools from global communities to local and professional contexts of cooperation will require settlements, transfers and design practices to adequately highlight tools most useful for each context. Fitting tools to different design activities and places would be necessary in the same way that digital communities use specific tools depending on their activity.

The previous research on creativity support issues find out that ICT tools really enhance creativity: current research investigates the creative process as situated cognition activities in a physical and technological space, such as creativity labs for innovation and frameworks for knowledge intensive activities (examples of this kinds of research are developed at the Colorado Boulder Lab, into Fraunhofer Institutes, at the Lifelong Kindergarten at MIT, at the University of Maryland etc). Its subject of research covers both professional creativity and creative communities, that we relate to the concept of metadesign: "*metadesign* is an emerging conceptual framework aimed at defining and creating social and technical infrastructures in which new forms of *collaborative design* can take place" (Giaccardi 2005). The goal of constructing information technologies that support creative activities has been attained by building on an adequate understanding of creative processes (Creativity Support Tools Workshop Report 2006). What the communities have in common is that creativity does not happen inside people's heads, but in the interaction between a person's thoughts and a social cultural context. It has been described as an evolutionary process (because of the breakthrough of creativity belonging to art and inspiration) in which different phases of codified and tacit thinking alternate and which is most likely to be helped by software (Schneiderman 2000). Researches have found that each kind of creative action requires a specific space that should be differently designed. Design action in these spaces can affect both the physical layer (distances, positioning, interiors, etc) and the technological layer (devices, platforms, resources, interfaces) in order to pick out specific tools for each knowledge need. The importance in design strategies to built new space for design activities (called also concept space) was underline also by Hori in its summarization about earlier researches on "creativity support tools": new space can mainly emerge through the introduction of new knowledge and this allows practitioners to rise to what Gero defined "creative design" (that one that occurs when new variables are introduced to the design system and an unusual novelty is shown) (Hori 1997).

There are two main approaches to creativity studies, the first focused on creativity itself, the second concerned to how system can support creativity: the nature of creativity is investigated through interaction and activity observation. Both creativity support tools issues and the ongoing research do not concern the idea of creativity itself, rather they are interested in understanding in which way technology affects these kind of processes. Both mainly refer to those tools that improve collaboration among teams. However Creativity Support Tools research stresses the effectiveness of diversified tools to support creativity; the ongoing research indeed mainly considers the tools for knowledge sharing and aim to try out the value of sharing in creative practices and thereby the role of tools supporting it. Sharing directly derived by social creativity models. IT could be the “unusual novelty” of creative design reframed by the network experience.

Summarizing, two main topics emerge from previous research: a) cooperation and participation are the keys of value in the processes of knowledge creation, b) strong and mutual influence between creative actions and the contexts in which they display (where context includes places and tools). It has been expressed orientation towards sharing experiences. With these findings we aim to develop ICT solutions that support sharing activities in specific design contexts.

## PART II. RESEARCH ACTIVITY AND METHODOLOGY

The wider research we are pursuing is mainly supported into a PhD program at the INDACO Department, Politecnico di Milano. We are at our early stage of the operative research; this paper would first present a former case in which we try out cooperative design that aims to introduce network tools in design activities, and then introduce and discuss our methodological approach. Consistently with the concept of spatial creativity described before, we identified interesting context in which implement action research.

### 4. TOOL TESTING

#### 4.1 CONTEXT

Our main context of inquiry is Politeca, a Design Knowledge Centre hosted at the Design Faculty<sup>2</sup>, available for students, teachers, researchers technical staff and professionals; it is a concrete outcome of previous researches in the field of Design Knowledge. The project has defined an on-line system for the cataloguing, retrieval and visualization of information and heterogeneous document, according to recognized standards. It is an integrated and interoperable system: from one side should enable the access, visualization and manipulation of information and knowledge and their "creative recombination"; from the other should allow to share and access to different repositories, both online, local or remote (Ciuccarelli, Innocenti 2002, 2004; Ciuccarelli, Innocenti, Vidari, Boghetich 2002). Politeca provides documentation, materials, catalogues, samples and magazines (what you do not expect to find in libraries) that are useful in design activities, from the early phases of concept generation to the final phases of prototyping, execute engineering and production. Within Politeca (as largely happens in the faculty labs) there is a latent design community composed by students that access the service<sup>3</sup> on a daily basis. Interaction between the users and the system is confined to resources search, reference service and advisory service on design activities. Access to resources is facilitated with catalogues<sup>4</sup> and consultation in person. There is a sparse awareness that space is a place for community, and that the knowledge available includes the knowledge provided by the community itself that we before described as working knowledge. Referring to Lave & Wenger's

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<sup>2</sup> Located at URI [www.politeca.polimi.it](http://www.politeca.polimi.it). The lab is built up by interaction and cooperation between two different department: Design Department INDACO and Chemistry & Materials Department "Giulio Natta"

<sup>3</sup> Users of Politeca are also external students and practitioners, but the research narrows to the inner students target.

<sup>4</sup> Now there is a local catalogue. An ongoing project of digital catalogue can be found at <http://designet.polimi.it/>.



theories, Politeca expresses Community of Practice characteristics, as it tends to show Community of Interests properties<sup>5</sup>. Starting from the CoP/Col table in which Fischer differentiates the two types of community (Fischer 2004, p.6), we summarize peculiarities of Politeca community in the following Table 01.

Variables	Community of Practice	Community of Interest
NATURE OF PROBLEMS	DIFFERENT TASK IN THE SAME DOMAIN/PROBLEMS	COMMON TASK ACROSS MULTIPLE DOMAINS/PROBLEMS
KNOWLEDGE DEVELOPMENT	refinement of one knowledge system; NEW IDEAS COMING FROM WITHIN THE PRACTICE	synthesis and mutual learning through the integration of multiple knowledge systems; NEW KNOWLEDGE SYSTEMS
MAJOR OBJECTIVES	codified knowledge, DOMAIN COVERAGE	shared understanding, making all voices heard
WEAKNESS	GROUP-THINK, TEAM-WORKS SKILLS	lack of a shared understanding
STRENGTHS	shared ontologies / SHARED DOMAIN	SOCIAL CREATIVITY; DIVERSITY

Table. 01 – The table summarizes the peculiarities of Politeca community

Students are often involved in homogeneous research activities, related to the faculty calendar, classes and common needs; they run through well-known paths in the field of design. In other cases, they look for something specific and particular, and through their own researches they shape new research paths in the field. The community shifts over time from domain-orientation problems (they move into Politeca knowledge space) to common-concern problems (they start from Politeca knowledge space and expand from it). In the first case they use to undertake similar works, in the second case they need to manage different roles and multiple centres of knowledge. In all these cases activities of the previous users, especially the knowledge and the resources that arise from these activities could be useful and rich, if we could acknowledge and exploit them as own resources.

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<sup>5</sup> The concept of a community of practice refers to the process of social learning that occurs when people who have a common interest in some subject or problem collaborate over an extended period to share ideas, find solutions, and build innovations. In 1991, Lave and Wenger first used the term referring it to situated learning. The community of interests bring together stakeholders from different domain and have multiple centres of knowledge.

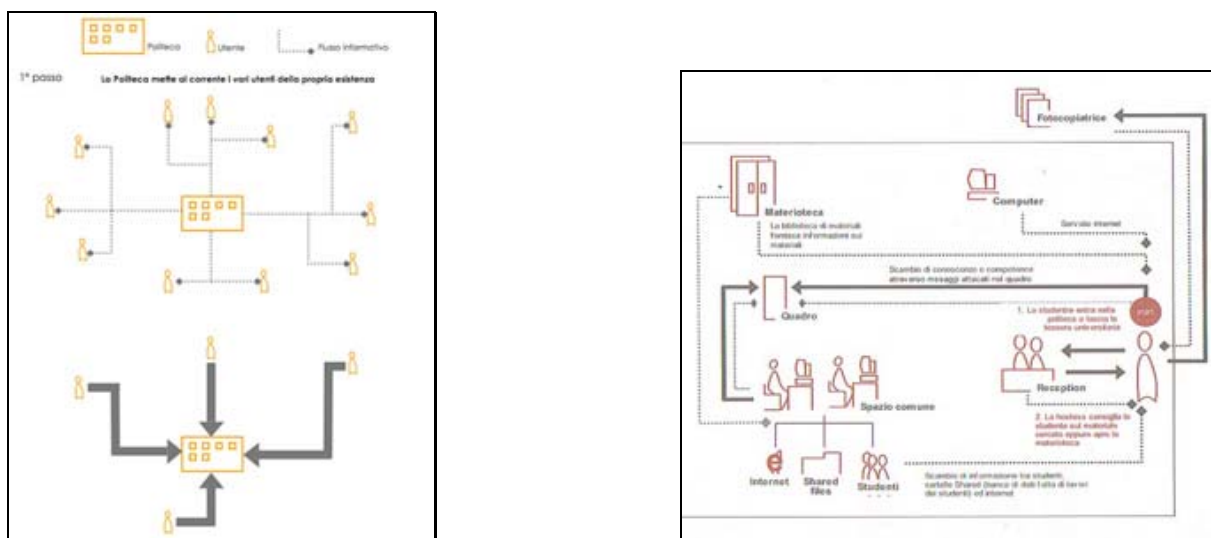
## 4.2 MAPS & ANALYSIS

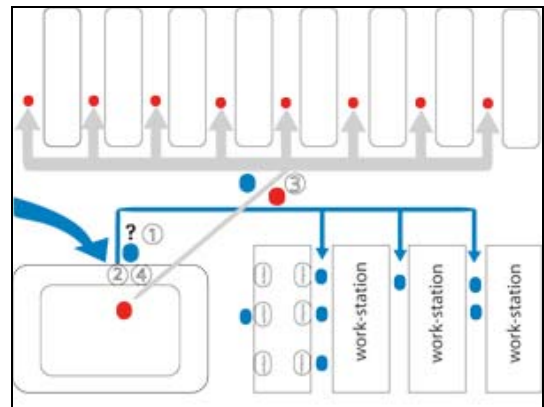
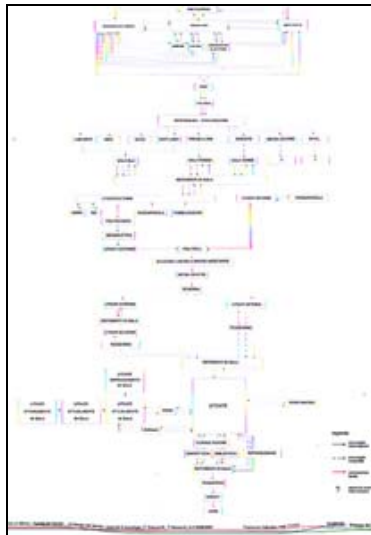
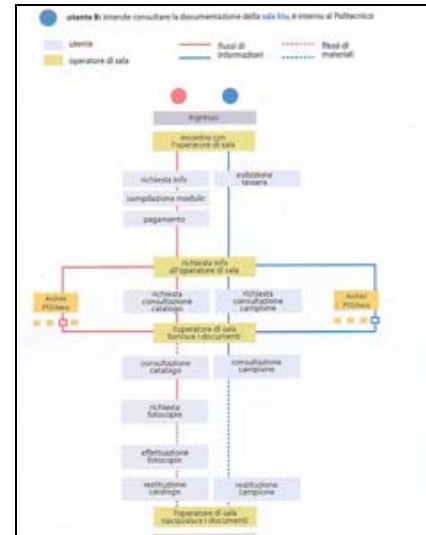
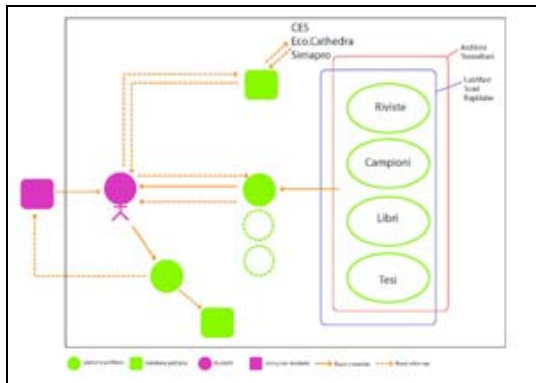


Fig. 01 – Research workflow during experiments

The research activity has been composed by linear steps and concerning outcomes. First, we drew maps to represent the current flows of information and knowledge within the space (representations comprise players, ways and times of interaction, communication artefacts, interactions paths etc.). Such representation has been useful to identify where potentially rich flows are latent or thriving interactions have been missed. Second, we discussed compared and interpreted the maps. The analysis has displayed multiples knowledge and information streams, we focused our interest in knowledge flows strictly connected to resources provided by the systems. Then we picked out three different layers in which deepening research to enhance and try out knowledge sharing; we labelled these layers as a) access, b) community of practice and c) working knowledge.

Fig 02-03-04-05-06-07 - Some examples of flow maps to describe information and knowledge flows in Politeca.





### 4.3 DESCRIPTION OF EMERGED LAYERS

The first layer, access, is about new ways to access and manage both digital and physical resources, ways that go beyond the idea that information can just be pinpointed by archives. At the moment, the Politeca service does not offer a unique access to all resources, and it does not have a digital library. The most clear sign of the lack of digital space for research is that it is not possible to retrace, keep and reuse users' search paths; yet keeping this data could be useful both for personal management of searches and for sharing them with others. Each student could benefit with personal search histories that keep knowledge from single points of activity and at the same time allow continuous knowledge flows and connections through activity points of time. Besides this, a full digital access could improve types and quality of documentation, even more useful than physical availability. By the way we underline that issue of physical

and/or digital access is such important and relevant for design inquiries because it adverts physical, tangible, ergonomic and material properties of artefacts that need to be continually explored by the research on digital systems. Knowledge traceability advantages the community as well, allowing connections between different points of view on resources without temporal or spatial barriers. The main result of these kinds of interactions and links that belong to digital space is the chance to build and explore new resources consistent with the wider trend of bottom-up and grassroots knowledge sources.

The second layer starts from the idea that the users of Politeca form an actual community of practice, or rather as previously clarified, a community where tacit and explicit knowledge can be helpful to members. Searches by users, online routes, and feedback on resources are just some examples of experienced knowledge that is possible to catch and share. By enhancing the knowledge that comes from sharing, it is possible to increase the information flows that currently exist in latent ways. A quick example to clarify: a student needs to search about polymers for schoolwork. He probably will start in an established way, as many students before him already started, maybe asking the same keyword to the same resources systems along similar research paths. He could instead light upon documents with comments, references, notes and in-depth examinations; useful columns in magazines can be pointed out, good images in publications useful to archive or visual works are signed, bookmarks for that specific issue are pinpointed. In the space of community, documents collect links and online searches proceeded by previous students; docs available in the space become just starting points towards a wider range of resources and access paths to them. The more important of these belong to users experience.

The third layer aims to enhance a more latent layer of knowledge within the community, such as the working knowledge that fills the space during activities. Politeca users whether regular or occasional sometimes cooperate in small and isolated groups, but currently there are not any links between these diffused activities and people most of the time work without confronting each other. The working knowledge rather could spread and perfuse into space supported by devices (screens i.e.) or architectural elements (walls, table, etc.). Students could know which research topics are active in some moment and which are the hot keywords; they can connect to active topics and put forward new ones. Boards and showcases (physical or digital, on walls, tables or screens) can advise spot of knowledge that create connections between activities in the space and the others space of students activities. Working knowledge mainly aims to set off on-the-spot knowledge and unpredicted links.

#### 4.4 EXPERIMENTS & CO-DESIGN

Starting from these topics, we are conducting early experiments that aim to verify the effectiveness of network tools in managing the new layers of knowledge we have described. Some of the experiments ground on existing DesignNet framework, others are new tools directly borrowed from the Net. These

experiments are mainly part of a PhD research program, but it has been temporarily assigned the design expertise of a small community of students. We posted “knowledge spaces for faculty” as the main project theme within the course “Technologies and Materials, ICT for design” at Laurea Specialistica in Service Design. The course focuses on the drift of the design and production processes effected by the new information and communication technologies; students were eventually expected to develop a concept-project about a new service for knowledge sharing in the faculty resource systems. We shared with students the research process in Figure 01. We first built maps, then analysed them and finally we explored the emerged layers of knowledge trying to develop them in new services for Politeca. This phase of co-design tided over a couple of months before summer. Students organized in small groups, they set up experiments, supervised and evaluated set-up process. Experiments will conclude in autumn, when we would to evaluate them also with the staff of Politeca. The way to preserve the new services, analysis and report of the whole process, deeper survey about the experiments, will compete to the PhD program and will be took in account in future works. Thus far this phase of cooperation has been very important because it allowed to authors and to the involved students a reflective analysis on the skills, expertise and knowledge of the field by using the own resources as the subject of analysis.

#### 4.5 DISCUSSION OF EXPERIMENTS

Experiments have been performing on digital and physical (paper) prototypes. Through these simulations and beta testing actions, we expect to fully develop some tool proposals and so we will afford to verify them for long-term services and use them as case studies. The groups developed service-concepts for each layers of the prior analysis; concepts targeted to new knowledge services for the students’ community. Chart that follows summarizes currently active experiments<sup>6</sup>.

CONCEPT	DESCRIPTION	TOOL/PROTOTYPE
ACCESS		
MyPoliteca	Space to archive personal searches within Politeca archives and catalogues. The interface stores search paths and allows to bookmark searched documents, to save notes, to relate docs and keywords, etc. Users can share data with other students.	Personal desktop & search history prototyped on paper
DigiTeca	Users that access to scan service and get pictures from docs contribute to build the digital library of Politeca heritage.	Flickr <a href="http://www.flickr.com">http://www.flickr.com</a>

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<sup>6</sup> Documentation, descriptions, images and feedback of experiments are accessible at <http://politecalab.org>

COMMUNITY OF PRACTICE		
Digital Knowledge <sup>7</sup>	Open source software that allows online management of internet bookmarks. It is used to share searches that grow out of local resources. Useful to archive personal links starting from local resources	Scuttle <a href="http://sourceforge.net/projects/scuttle/">http://sourceforge.net/projects/scuttle/</a> <sup>8</sup>
Share searches and keywords	The system archives photos of resources consulted at Politeca. It allows tagging photos with keyword about research topics.	Flickr <a href="http://www.flickr.com">http://www.flickr.com</a>
Search & comment	Experimental use of post-it to leave comments and reference on consulted resources	Post-it <a href="http://www.3m.com/us/office/post-it/">http://www.3m.com/us/office/post-it/</a> <a href="http://download.html.it/software/vedi/2074/postit-software-notes-lite/">http://download.html.it/software/vedi/2074/postit-software-notes-lite/</a>
Public Domain	A new shelf: users can store artefacts, projects, essays and reports they produce for courses, exams and class-works. The documents are available to others students through a mechanism based on "sharing tokens". The system allows categorization by tags and the Politeca thesauri.	Databases / interfaces. The new shelf integrates previous local knowledge bases
WORKING KNOWLEDGE		
Working activities	System allows students to know which research topics are active in place in real time.	Screen / active desktop prototyped by papers and spatial labels

Table 02 - Current experiments.

As previously underlined, the development of each concept has required different design strategies and displayed specific limits and opportunities. The main difference we faced toward has been the set-up requirements of each tool. Some tools are software that needs to be installed on digital systems; they lean on pre-existing working platforms. Some others had been prototyped, and they comprise the toughness of use derived from a certain approximation within the prototype itself. We have to stress the biggest limit in this kind of experiments (and in the co-design action linked to them): time of action and research relies on didactics schedule, it has been strongly affected by deadline of exams, lessons timetable and the common activities of the class. According to these time barriers, we accounted of a shorter time allowed to testing out and implementation phases for those tools that mainly have required a full set-up phase (i.e.

<sup>7</sup> Another example of digital knowledge of design based on a network tool is the Design Knowledge Sourcebook you can find at <http://urijoe.org/sourcebook>

<sup>8</sup> The first service of sharing bookmark brought out from <http://del.icio.us> website, which belongs to Yahoo. Free software communities developed a lot of tools for sharing bookmark which are freely licensed, as Scuttle is.

the digital knowledge topic: a relevant lapse has gone by facing technical issues using the open-source platform that we chose). Prototyping instead granted us to directly focus on design process much more than on the working platform: continuous feedback and interactions with users facilitated refinements and benefited the prototypes by a more effectiveness. We noticed that students found the hardest toughness with experiments based on “close tools”, for example Flickr because of it is an online platform that does not allow any tweak in the system; it has been convenient to set-up and to quickly store images but does not integrate with previous local resources. Tools that do not require some redesign or arrangement are usually broad and students are not helped along the personalization of tools in context. Even users are affected by the lack in specific settings: these tools explicitly refer to the widespread community of the Net, and this makes hard to pinpoint the specific asset useful to the creative context in which they have been moving. Students instead highlighted strong benefits from tools that allow them to directly manage resources and to easily access to new knowledge space such as in the experiment of Digital Knowledge that already aroused the interest of Politeca staff too. These considerations turn out the effectiveness of delving design research into knowledge base issues. Therefore, we look upon some technical aspects of the experiments. All of them have been bounded to pre-existing tech environment, desktop computers and connected devices provided. We are aware that by extending experiments to other devices (such as screens) we will enrich our research scenario towards a more clear influence between the hybrid space and the conceptual exploration in it. We finally achieve a last-but-not-least precept that we equate to “wide threshold theories” referred in CST Report (2006): whatever kind of experiments needs to avoid time-consuming technologies. New tools should be transparent to users, and the new activities that they grant need to be encompassed as much as possible into ordinary workflow. This is a key factor in sharing processes, in which the balance between assets and efforts is mostly unvoiced to users.

These remarks sound in the local context of Politeca; but outside this specific case, flows analysis and the experimental model we have provided (referring to Figure 01) can be useful in wider contexts of research on knowledge topics.

Research reviews in other design contexts. In a latter phase<sup>9</sup> experiments will be performed in some professional design contexts in Milano. Unlike the student community that is homogeneous, the professional community is varied and fragmented. Design studios, design firms and small and recently launched design projects have different characteristics; analysis and information flows drawing will provide heterogeneous maps. A quick taxonomy of different professional team-works has yet allowed us to build a matrix to select interesting contexts, where we can carry out action research. The experimental phase will not be instant and concrete as in the case of the student community and it mainly differs because it will not necessarily be a co-design action. We plan to conduct the first phase of inquiry by dialogues,

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<sup>9</sup> We got the first contacts with practitioners. We expect to start the experiments with them in September/October at hopefully gain the first results at the time of the conference.

interviews, storytelling and visual reports according to the evidence of need of a much more clear and deep ethnographical approach. This will hopefully accurately define the knowledge needs in each design team; later on it will be possible to structure direct experiments of tools to evaluate which ones are useful to satisfy the knowledge needs that have emerged.

## 5. METHODOLOGY: BUILDING “DESIGNERS’ OBSERVATORY”

Current debate on design methodology stresses the need to consider equally the research practice and the design practice in research. Creative and heuristic features of the design necessarily affect design research methods: “[...] the way fuzzy research problems are faced; the in-built flexibility of the research process; the use of design practice as an integral part of the methodology of research; the underlying adductive thinking [...] (we) are leading towards the definition of a distinct approach to design research, a kind of a “designerly” way of researching”<sup>10</sup>. Standing on these considerations, the research puts forward a methodological approach that mixes skills for theoretical inquiries with practical and creative expertise. It is inspired by ethno-methodology and participant observation methods<sup>11</sup> from qualitative research in social science, because they apply in research that practically develops within inquiry fields even if researchers unusually partake of the specific field. Therefore, the main aspect of participant observation in design research is that, while we observe “in situ” and cooperate into research contexts, we are the object and subject of our research hypothesis and questions. Research aims to solve problems in which we are directly concerned and somehow involved as well. We termed this kind of methodology “designers’ observatory”, which defines the perspective with which we can direct our research inquiry. We stand on designers’ observatory from the point of view of designers, but also as researchers; the concept of designers’ observatory takes cue from qualitative methods and constructivist approaches to science, but integrates them with remarks about practice-based research that aims to advance knowledge partly by means of practice. “[...] Practice-based research is research where some of the resulting knowledge is embodied in an artefact. Whilst the significance and context of that knowledge is described in words, a full understanding of it can only be obtained with reference to the artefact itself. Artefacts in practice-based research can range from paintings and buildings to software and poems”<sup>12</sup>. According to this, the idea of designers observatory ground on two main tendencies: a) trend to design activities (orientation to inner

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<sup>10</sup> Quoting: Silvia Pizzocaro, Learning design research: outlining a context Critical issues derived from the Politecnico di Milano Ph.D. research curricula in industrial design, <http://jdr.tudelft.nl/articles/issue2004.01/Art5.html>

<sup>11</sup> Participant observation is a set of research strategies which aim to gain a close and intimate familiarity with a given group of individuals and their practices through an intensive involvement with people in their natural environment, often though not always over an extended period of time.

<sup>12</sup> Practice-based research, University of Sidney, Creativity & Cognition Lab, <http://www.creativityandcognition.com/content/view/80/105/>



analysis, activities in situ, participation to activities, rich interactions in context), b) trend to pragmatic usefulness (testing of tools and practical review of them directly in context).

Summarizing, we are the audience of our own survey on network tools, and “the observatory” implies the idea of testing antidote on ourselves.

## 6. CONCLUSION & FORTHCOMING

Research starts from the assumption that knowledge comes from sharing. Into the current argument of knowledge management issues, this kind of research expressly aligns with the idea that the value of knowledge is not into the efforts to store it, but it's rooted into sharing processes; because of knowledge is key actor into innovation system, new knowledge that comes from sharing should actively bolster innovation.

A further basis is that design activities have a latent sharing expertise. The paper suggests some first steps to verify which is the contribution that sharing activities can give to creative practices and, connected to this, which tools can provide an effective contribution. The creative communities that act on the Net ground on network tools for knowledge sharing, and they can display useful models for other professional or codified creative practices. So the main contribution to the wider research on “creativity support” is the focus on tools that enable sharing processes and allow direct manipulation of knowledge sources.

In fact, network tools are technologies to act and experience knowledge. Moving them from cyber to physical spaces requires redesign to differently fit into each creative context. This should happen according to the specificity of design practice that requires theoretical analysis mixed to action-research. So we underlined by practice the importance of tool testing and experiments. We expect positive or negative feedback about the tools we are testing within the students' community. Feedbacks that we will collect from the ongoing experiments and from the latter ones will verify the effectiveness of tools in each single context. The final goal of research is provide a framework of network tools useful for design practices. Each design context will identify in it specific toolkit that should be able to support their own knowledge needs. This sort of results can positively contribute to tightening the link and to deepen the dialogue between (design) resources and (designers) experiences into practitioner's knowledge bases.

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