Evolving Experiences of Participation: The e-ILAUD Tool

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Abstract—The role of participatory communities all over the world calls for new models and tools to support citizens in taking part in decisions about the design and planning of urban design. Information and Communication Technologies (ICT) can be the basis for effective ways of participation for citizens and for helping them achieve a more active role in society. This paper describes e-ILAUD, a tool inspired to the principles of the International Laboratory of Architecture and Urban Design (ILAUD), aiming at improving citizen participation and co-create solutions.

Index Terms—e-Democracy/e-Participation, E-government enterprise architectures, Government collaboration patterns, Urban planning, Neighbourhood community, Participatory platforms

I. INTRODUCTION

The scenario of more participatory communities in Europe and all over the world makes it necessary to explore new models and to elaborate a radical revision of the role of citizens in decisions taken in our society for the next decades. On the one hand, ICT tools could be the basis for higher and more effective ways of participation for citizens. On the other hand, too often technology remains difficult to use for large segments of the population who however are no longer willing to be excluded from decision making about their environment and form the digital society. However, Smart Cities [18], with various technologies, such as agile, Artificial Intelligence (AI)-related, Internet-of-Things (IoT)-related, mobile technologies, Geographical Information Systems (GIS) to mention a few, are becoming more and more prevalent, and we think they will help individuals to participate more actively in making decisions about their own homes, neighbourhood, and cities.

This paper proposes to build a framework, called e-ILAUD, based on the experience of participation of the ILAUD Italian free association (www.ilaud.org), the International Laboratory of Architecture and Urban Design founded in Italy in 1976 by Giancarlo De Carlo – among Universities, cultural institutions,

individual persons and scholars whose interests are focused on the problems of human habitat and environment.

ILAUD activities are carried on through laboratories based on studio works, seminars and lectures, and adopt the following inspiring principle:

- working in groups, with a close relationship between teachers and students;
- having direct knowledge of the places and situations;
- having a direct relationship with the local communities and their representatives;
- using the project (the "tentative" project) not only as an answer to a problem but also as a critical tool to explore and better understand each context.

In this paper we propose e-ILAUD, a conceptual and technological solution that makes it easier for ILAUD to interact with citizens and other stakeholders such as Public Administrations (PAs), enterprises, social organizations, and so on, interested in territory planning. It aims at promoting an active involvement of various actors in the participatory design of the neighbourhood, in particular in a local Community, thus promoting smart proactive services for urban planning. The aim is to provide, first of all, an educational tool, which help to establish connections, comprehension, and understanding of the treated matters. We propose to help early interventions, shared decisions, and follow-ups of the decisions taken, thanks to a better connection and service integration.

The paper is organized as follows. Section II reports examples of experiences of participation, while Section III describes the experience of ILAUD. Section IV illustrates the requirements of a digital platform for ILAUD. Section V presents the proposed architecture of the e-ILAUD tool supporting participatory design and planning. Finally, Section VI reports discussion and concluding remarks.

II. EXPERIENCES OF PARTICIPATION

Participation has often been adopted as a virtuous practise in different contexts around the globe. The modalities have

changed according to different cultures involved in the participation process. In Palestine, for example, in the participatory processes for the Masterplan for Jericho, interviews were allowed only to senior members of society [1].

The use of participation is a very Western approach, due to its intrinsic logic. The experience of Advocacy Planning in the US has been fundamental to participation: an "advocate" (not in the legal sense, usually a planner) gives ordinary citizens expert advice in planning matters, assisting and representing them before the matter is handled by official bodies at the municipal or state level. The aim is that "Advocacy planning should not lead to ordinary citizens being pushed into passive roles or treated like children; instead, it should help them to stand up for their own interests and should make it easier to compensate for possible discrimination" [13].

However, there are some interesting cases of participation far away from the West. In the state of Rio Grande do Sul, Brazil, they have tried to overcome the problem of how to spend public money by asking citizens directly through long series of assemblies, open to the entire population, treating priorities among needs, such as sewage before a road, the advice centre before the sports field, and so on [11].

The book [16] has highlighted a participatory movement in Japan with the Machizukuri Movement, a community-based comprehensive approach improving built environmental practices, both in theory and actual practise, looking at urban design and planning as deeply rooted in local potential and inherited cultural context.

Experiences of participation in decision-making processes in the field of design and urban planning [8] are generally characterised by three elements.

1) The first, which characterises the important experiences of North American Advocacy planning, is essentially conceived as a tool to support the community in a process of assisted defence. It is not so much the design of something new, which is of interest, whereas the defence of civil rights potentially attacked by property, business, commercial or other types of interests.

2) Participation is motivated by the testing of proposed solutions with interested groups, especially public housing interventions. Some European cases are exemplary, such as Ralph Erskine's projects for the Byker district, or Peter and Alison Smithson's for Robin Gardens in England, Toulouse Le Mirail by Georges Candilis, and Giancarlo De Carlo's Project for Terni, Italy. In this case, the future inhabitants participate in the design process, enriching and adjusting the hypotheses formulated by the designers.

3) Participation in strategic planning at the urban scale. In many urban plans, the population is consulted on specific problems to construct solutions that correspond to the most widespread needs and expectations, and in various legislation this consultation process is made compulsory. This type of participation is the most direct and open to the joint identification of new solutions between technicians and communities.

The above elements highlight aspects of participatory processes that should not be underestimated[1]. The first is the use of community consultation to validate, perhaps through adjustments and mediation, choices that have been outlined by technicians and government institutions. The actors are put in the condition of better understanding what they want to obtain. To do this, they must be provided with analytical and interpretative tools and useful information. Therefore, one of the objectives of the process of participation in the definition of a strategic plan is the construction of a broader decision-making and participatory fabric. The limitation of this type of participation, however, is often the imprecise, non-binding, non-implementing nature of the decisions taken.

The second aspect to bear in mind is the different connotation and meaning of participation in different cultures and political systems. In many cases, the most widespread reference models relate to the experiences of Western countries, but a decision-making process of collective interest varies profoundly in Switzerland, Norway, Turkey or India.

III. ILAUD'S PARTICIPATORY EXPERIENCE

ILAUD has always been interested in rediscovering a direct and in-depth relationship with the reality of a place (different ways of analysing and understanding it, of living it), of the community to which one refers (ability to listen and share values, needs and proposals), to understand how rich and complex it is, both in a positive and negative sense. It has always been crucial to know a place in an integrated way, thanks to the contribution of several disciplines, but also from the exchange between deeply different cultures.

ILAUD teaching experiences integrate educational methodologies and experiences that are being tested in very different contexts. They are:

- the direct and very open reading of a place and of the meanings it has assumed as a result of the stratification over time of functions and modes of use, attribution of values, physical interventions;
- the rediscovery of elements considered irrelevant but that had fundamental roles in the events of that place, etc.;
- the use of the standard (but always effective) "what if?" approach to identify the problems originated by the transformation processes in a place and to foresee their specific and general consequences;
- the use of the "tentative project" approach as a method for researching and evaluating the response to the problems considered, and a way for identifying possible solutions;
- always enhance a plurality of languages, identifying similarities or differences of values, concepts, ways of acting;

[1]Among contemporary examples of participation, place making, social involvement, appropriation/negotiation of spaces and bottom up approaches is worth mentioning Assemble Studio projects, such as Granby Four Streets in Liverpool in 2013, or the experimental Osthang Project in Darmstadt in 2014. See Mameli Flavia Alice; Polleter, Franziska; Rosengren, Mathilda; Sarkez-Knudsen, Josefine; Urban Appropriation Strategies: exploring Space-making Practices in Contemporary European Cityscapes, transcript Verlag (Bielefeld, 2018)

- an appropriate use of most up-to-date technologies for analysis and design, confirming their fundamental instrumental role.

Even if ILAUD's presidents, Giancarlo De Carlo and Paolo Ceccarelli, used to work on projects under an on-field participatory approach, the institution has never been "directly" involved in participatory planning or design operations. ILAUD used participation as a principle for training activities, as its focus has always been primarily on education aspects. Two of ILAUD's core elements, namely, the reading of the context and the "tentative" project, are fundamental for a proper participatory process. It is indeed necessary for the technician to understand that the analysis of the situation in which he/she operates, and to which he/she must respond, must be done avoiding stereotypes and through direct cognitive work. On the other hand, the "tentative" approach is the use of an open method for tackling and trying to solve problems: an open method that is built up through the contribution of very different subjects. This type of approach also avoids a drift often found in the literature of some ICT and process organisation experts: that of reducing the figure of the designer/technician to a sort of coordinator - director - mediator of a plurality of interests and proposals. This is a model that derives from a market ideology that leads nowhere or, more often, leads to substantial economic interests prevailing, disguised as efficient and effective solutions [12].

IV. REQUIREMENTS OF E-ILAUD

Different ICT tools can bring benefits to participatory design and planning. After introducing some ICT tools used for urban planning, we discuss the various needs that the e-ILAUD tool should satisfy to be beneficial.

A. Participation Planning and ICT

Participation in planning of territory has theoretical and methodological aspects, as well as implementation aspects regarding participatory processes in fields such as transport planning, cultural heritage management, environmental planning or disaster recovery. Participatory planning experiences from different territorial levels – from the macro-regional, e.g., Southeastern Europe, Mediterranean or European metropolitan regions, to national, regional and local levels – are described in [12]. Researchers, planners, public administration officials, decision-makers and the general public should be enabled to understand the advantages, disadvantages and constraints of participatory planning and research.

Some existing ICT-based online platforms for participation, are reviewed in [9], where five platforms are compared. Results show that a majority of these platforms (76%) focus on problem identification and feedback collection. Three platforms (12%) enable users to create their plans and visions, so empowering citizens to design independently. However, many platforms fail to provide the user functionalities needed by users: for example, 40% of the platforms do not provide any tool for citizens to track whether their proposals, plans, or projects were implemented. Another review is presented in

[7], where participatory urban planning is seen as a means to develop local democracy. Mobile technologies are used to engage citizens and policy-makers; the work identifies the types of mobile applications supporting citizen participation in urban planning [15].

Another interesting theme regards the use of *shared Building Information Modelling (BIM) models*, ICT tools employed by architects and engineer to face the task of coordinating multiple phases during the design and the construction of Architecture/Engineering/Construction products. BIM provides a paradigm for all the phases, from the early stages, of construction design [3]. Operating via a shared BIM is fundamental for interdisciplinary teams for defining or modifying geometric, position, material, format, dimensional and other design attributes, sharing these attributes within the work teams, and allowing decisions to be taken with the consensus of various teams and project roles, including communities, citizens, PAs, and other stakeholders [2]. Nowadays, interdisciplinary collaboration is a crucial component also for BIM-driven dynamic processes able to produce, communicate and analyze product models rather than a modelling technology "per se" [17].

B. Participation and e-ILAUD

Reading the context and the tentative project have been fundamentals for a proper participatory process in ILAUD's workshops and *in situ* educational strategies. A tool able to project ILAUD's fundamentals in the digital shift seems mandatory after the latest world's changes and revolutions. The tool should allow collecting and analysing data on the state of the art of each neighbourhood, such as how many people live in it, which kind of people - their provenance, their nationality, their age range - how many and which kind of commercial activities, which kind and how many offices, number and quality of parks or green areas etc. The ideal tool should also support the reasoning about a problem that, once identified as important to a community, allows one to check what consequences the choice of a solution might have in relation to a much wider set of sectors and variables. Traditional participation at best allowed the pros and cons of a solution to be highlighted within a fairly narrow range of problems. In reality, we know that what really matters are wider and more intertwined chains of effects and consequences. These often escape us or remain at a purely generic level of awareness.

The e-ILAUD tool proposed in this paper envisions various functionalities for analysing, understanding and empowering neighborhood communities. The principles are: i) experimental e-learning; ii) reuse, sharing, and decision support, with the capability of collecting and processing a large number of data and processes from various sources, including previous projects. These principles are discussed in the next paragraphs.

C. Collecting and analysing data

The platform needs to collect, in a structured manner, all the data that can be obtained either from open data or by interacting with government institutions and local communities.

Characteristic	Attributes
Inhabitants	Number, gender, age, nationality
	Level of education
	Life expectancy
Residences and housing	Number, type, size range
	Conditions, age
	Private Green Areas [areas]
Commercial and productivity areas	Commercial Activities [areas]
	Productivity areas [areas]
	Offices [areas]
	Agricultural Activities [areas]
	Breeding Activities [areas]
Recreational areas	Sports [areas]
	Leisure [areas]
	Culture (library, theatres, . . .) [areas]
	Parks, Playgrounds and Gardens [areas]
Mobility	Public transport [lines and points]
	Infrastructures [lines]
	Parking lots [areas]
	Shared mobility [areas]
Services	Health Services [areas]
	Security Services [areas]
	Educational Services (kindergartens, schools, ...) [areas]
	Public services (type, ..) [areas]
	Recreational Services (museums, cinemas, ...) [areas]
	Cleaning and Green Maintenance Services [areas]
Risk areas	Event [areas]
	Risk Factor [areas]
	Risk Source [areas]
	Impact [areas]
	Monitoring Devices [areas]
	Protection Elements [areas]
	Alarms [area]
	Recovery actions [areas]
	Previous Accidents Cases [areas]
	Preventive Strategy [areas]
Others	Accessibility
	Crowding
	Pollution (noise, air, light, water. . .)
	Safety

TABLE I

DATA TO BE COLLECTED BY THE E-ILAUD PLATFORM.

Such data include numbers, figures and maps able to represent the reality of the areas of interest. The data collected are both quantitative/objective but also more qualitative, such as socio-economic data, expressed through measurable indicators. Data to be collected are summarized in Table I.

Some data can be directly uploaded by users, institutions, schools etc.; the idea of e-ILAUD is to organize all the data in such a way that they are available through just one tool. Data can be collected both online, e.g., by positioning points on a map or by filling entry fields or directly in situ, e.g., by geo-localizing specific issues like, for example, accessibility ones.

To make the collected data easily comprehensible, comparable and accessible they may be then visualized as simple maps, that may be colored to highlight a given aspect (e.g, private vs. public green areas) or may be rendered as heat-maps (e.g., to represent the intensity/frequency of a phenomenon) with the option of layering one on top of the other to analyse different aspects at the same time.

All data on a particular area should be kept up to date, and a timeline should allow access to information previously uploaded for further analysis. For example, an area may be studied for different purposes in different moments and some data may be changed: the timeline may allow a comparison of the same type of data (for example, data about inhabitants) with previously collected data. Visual maps can provide solid foundations for explorations, the inspiration for creative solutions, or more clarity about the directions to be taken.

Besides collecting structured data, e-ILAUD should allow a direct interaction with local communities via blogs and forums, to open dialogues with the local population to debate issues and crucial topics, e.g., a discussion on the most dangerous

areas in the neighbourhood or aspects that should be improved in public spaces, thus collecting data and feedbacks in a more informal way.

D. E-Learning and Decision Support

e-ILAUD should be imagined as a teaching strategy and an active e-learning tool for training young architects and urban planners. The data collected through the platform should be available as a creative and exploratory ground for e-learning, filling the existing gap between the imaginative teaching at school and the real work after.

The tool is going to allow:

- using real data as a starting point for workshops and studies on possible futures of existing neighbours;
- minimal time and resource wasting for student's work, to be used instead to improve life in the neighbours;
- teaching real issues and creative problem solving to students, preparing them for future work framing solutions and future design according to contemporary challenges;
- creating constructive relationships among local communities, local institutions, and educational institutions.

The platform could develop a two-way relationship with the ILAUD's educational institutions network, where the platform initially provides the information of an area and afterwards students could add their discoveries. Over time, the platform could showcase the information gathered during the university workshops/labs and by some of the student's analysis, getting feedback and direct comments from the inhabitants. This process may turn incredibly useful for institutions and professional planning to design in the area.

e-ILAUD is proposed as a decision support tool for:

1) making the community aware of the positive, but often entirely negative effects of certain choices that at first sight may seem interesting and useful;
2) providing an ways of verifying whether to correct or eliminate the negative aspects, by operating only on certain elements of the chain of consequences, or whether we have to imagine a different solution;
3) providing a tool that is useful not only for institutions and professionals but also for architectural education. This is reminiscent of the ILAUD original principles.

V. ARCHITECTURE OF THE E-ILAUD TOOL

The architecture of the e-ILAUD tool comprises two main areas (see Fig. 1): a *private area* where data and processes constituting the core knowledge of the e-ILAUD tool can be stored and accessed by "qualified" stakeholders, such as professionals, PAs, architects, etc. and a *public area* devoted to participatory design endowed with blogs/forums that support cooperation in the form of dialogues and shared knowledge about planning. It also contains several modules to support the requirements identified in the previous section.

1. Layers. e-ILAUD should be organized into layers, e.g., spatial, temporal, thematic, etc. to be able to analyse and interact with the neighbourhoodaccording to various analysis dimensions. A layer is *mechanism that groups elements under*
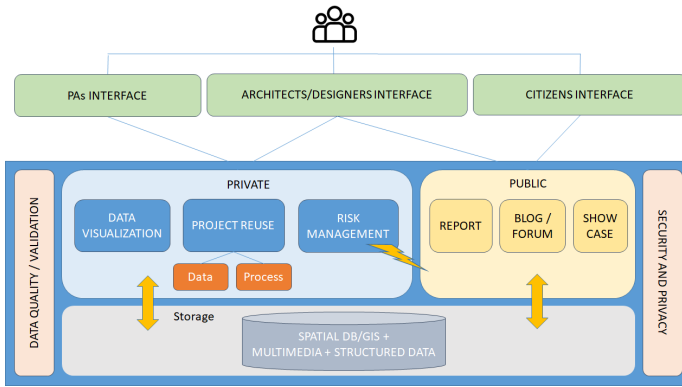
Fig. 1. Reference Architecture for e-ILAUD.

different topics, such as: green, streets, shops, type of homes, types of business, inhabitants, etc. Data are stored in a *Spatial Database/GIS*. For each topic, the tool should allow understanding what is present, what will be done, what should be done etc., graphically showing all the collected data through a *Data Visualization Module*. Moving along layers allows for a decision-oriented use of the tool, partitioning the analysis under different viewpoints.

2. Participatory design. e-ILAUD should give accessibility to the needs of a neighbourhood in decision making. For example, it should cooperatively support reporting notifications, so that these are automatically compared and merged. Notifications by users can regard for instance the lack of certain services (shops, health care points, entertainment services) or the need for aggregation spaces (libraries, green areas, etc.). For these issues, e-ILAUD includes a *Report Module*. For this module, as well as for the basic functionalities of Data Storage and Data Visualization, e-ILAUD will rely on our previous experience of a participatory application for accessibility issues [5] [6].

3. User needs for cooperation. In cooperation, managers, private and public organizations, and individuals or communities can be highly involved not only in service use and delivery, but also in service creation and decision-making. For this aspect, e-ILAUD includes a *User Interface Module* that adapts to the various types of users, namely: i) PAs, which can share data and reuse previous projects, or publish the guidelines about steps and documents regarding a given type of project; ii) Architects/Designers, who can inspect data sources and reload previous "similar" projects, i.e., regarding an analogous territory for which data already exists and can be reloaded and refreshed with up-to-date information; iii) Citizens, who can inspect the status of a project, upload data, give feedback, discuss, and attend workshops, webinars. These users will use the *Blog/Forum Module*, while a *Showcase Module* is also available in the Public Area of e-ILAUD to give evidence to achievements and/or problems.

4. Information Sources and Validation. In e-ILAUD, information and maps could be implemented by institutions. GIS information is stored in a GIS database, while other relevant

data, such as documents or multimedia elements, are stored in a storage component, which can be relational or NoSQL. Only administrators have access to maps and data, but citizens can contribute directly to parts of blogs and forums. For data insertion, e-ILAUD relies on the supervision of a *Data Quality Validation Module* for source validation. In fact, data are prone to various problems: trust (the source of information must be validated by an authorized entity like the administrations), duplication, timeliness, fairness (according to ethical principles), privacy (according to the GDPR). The module uses tags to characterize the validation status of information and of its provenance.

5. Reuse. We consider reuse of processes (e.g., the steps of a project, formalized e.g. as workflows) and of data. In reusing processes, we consider that upon the termination of a project, a *Project Reuse Module* extracts the project skeleton (basic steps, business models, time sheets, Key Performance Indicators, etc.) that can then be stored in the databases. For data reuse, the module will extract typical documents (e.g., forms, digital maps, and others) that have been elaborated during the project and that apply to similar projects (e.g., green areas restructuring projects or reclamation projects for industrial areas). Examples of project reuse are described in [20]. This module has to be constructed around AI-based algorithms, able to extract process skeletons and meaningful data/documents/images/multimedia data/ etc., from similar projects. Identifying similar projects does not mean the use of identical solutions, but the platform may become a point of comparison.

6. Risk and Safety. To facilitate risk treatment in the neighbour areas, it is critical to design a dashboard that enables communication of relevant risk-related information to different actors in a meaningful way. The new challenges regarding risks and safety regard methodologies safety management based on the standards and directives (i.e., OSHA [14]). The *Risk Management* module is based on our prototype [19], a dashboard for safety management that understands risks arising in a given area, notifies the alarms among the e-ILAUD platform and gives advice about risk management.

7. Security and Privacy. Participation requires shared information, so posing risks to security of information. The *Security and Privacy Module* deals with Confidentiality, Integrity, and Access issues of the involved actors and resources. Different entities sharing data and project "knowledge" might have diverse security and privacy policies that need to be mediated, respecting laws and norms but not impeding data use. Access control rules should restrict access to resources to selected users. Moreover, project participants can leverage existing documents from other project teams, but can also create their associations and collaborations on the fly. Authorization is dynamically provided allowing users to set their sharing policies, without affecting the policies of other users. We have performed a study on the security in shared project documents in [4].

8. Ethics. As for ethical issues, reflections regard how participatory design, which represents efficiency and effec-

tiveness places, and a related support platform in the style of e-ILAUD can contribute to mitigating corruption, illicit market operations, and the like, which negatively affect the city's performance, as pointed out in [10]. It analyses an atlas as a tool to facilitate design dialogues in a case study of a neighbourhood in Genk, Belgium. An atlas is a collective endeavour during which planners, authorities and citizens reflect on possible futures starting from a confrontation of competing uses and perspectives of neighbourhood spaces, analogous to the principles of our proposal. e-ILAUD plans to go a step beyond current studies in that it will include tools that trace the design process, e.g. decision points, data, decision provenance, responsibilities, and all what the users want to be able to track, constituting a practical tool of producing maps-of-discourse that supports the participatory process and the implementation phases themselves, as well as security, privacy and ethics . e-ILAUD handles ethic issues in the *Security and Privacy Module* in Fig. 1.

VI. Concluding Remarks

This paper has outlined the features of e-ILAUD, a concept and tool conceived to enhance the historical participatory concepts of ILAUD's institution, and the will of making them widely available and useful.The platform implies a direct involvement of the local population that can be engaged in an active and fruitful dialogue with scholars and professionals on the present issues and future possibilities of the areas. The inhabitants will be able to discuss their concerns and wishes. The aim is to collect and process via e-ILAUD a great amount of data on different neighbours that is currently often scattered and unavailable, unless spending a huge search effort for each new project. e-ILAUD will work transversely between university and professional activity, enhancing the best of both. On the one hand, it uses the time and creative imagination of students activities and, on the other hand, it integrates real projects and visions. This kind of integration has never been envisioned in existing platforms and it does have incredible potential for promoting sustainable change in our urban environments.

Acknowledgment

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