EVALUATING THE USE OF A WEB-BASED COLLABORATIVE INTERACTIVE DIGITAL MODEL (CollABITA) IN SUPPORTING THE URBAN DESIGN APPROVAL PROCESS

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ABSTRACT
This research, after analyzing the Urban Development Approval Process in its functionalities and methodologies, is showing the key points at which the process might be supported by new computer technologies, and it establishes a web-based Collaborative Interactive Digital Model (CollABITA Model) that relates and facilitates the graphical representation of the urban design process with some elements of the methodological approach. The CollABITA Model will dramatically facilitate the idea of broadening public participation, and indirectly by this, also collaboration. This new web-based support tool, is focusing on how new Informative Computer Technologies can be used in order to have a more co-operative design process. By utilizing the enormous potential of Internet for informing the process, and software for visualizing its products, the Model will provide an effective support, which will be able to deliver information in various forms to the Designers, Developers, Decision Makers, Agencies and the final user (the Citizens). The Model is concerned with the big challenge of supporting the urban design approval process itself, by exploring different kind of visualizations and communication tools, rather than producing a guide for carrying out the design. CollABITA Model is based on the existent framework structure of the extranet tool already available. Then, more then those, CollABITA Model will try to solve, by adding technical and collaborative functionalities, those issues that are characteristics in the urban design process and that are not jet solved by using one of the software available.

RESEARCH BACKGROUND

Context of the study

Urban Design is the practice at the boundary between architecture and planning. While in architecture the concern primary deal with construction, appearance, and internal organization of buildings, urban design relates the physical landscape of buildings and streets to its

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functionality, and all of these reflect on the social and economic structure, which makes the built environment functional or dysfunctional.

The Life Cycle process of any construction development, can be divided in four big areas:

![Life Cycle Process Diagram]

Even though each phase is graphically similar, we have to be aware that the timing depends of the project, the location, the actors involved and any other social, political, environmental, economical and planning issue specific for each project.

The current process in urban design development begins usually with some formal analyses of the problems based on good information, followed by a systematic analyses of the options that might be designed to solve these problems, and ending with the choice of a best option, which is then implemented. These options are often in the form of alternative plans that then need to be elaborated and evaluated against some preset goals or objectives.

Urban design involves also a series of problems ranging from site selection to the location of buildings and other spaces on the site that demand 3D as well as 2D considerations. As implied, urban design involves a very wide range of issues from the political socio-economic, to the functional and the aesthetic as well as to the constructional and the environmental. There is no well-defined process of synthesizing these requirements although some attempts at representing them in a common way have been developed in the past, often in the manner of overlay analysis, although these tend to be rather narrow manifestations of the process.

**Problem statement**

Urban Designers, Government agencies, public communities and other organizations, are becoming aware of the importance of the common-collaboration and are becoming increasingly dependent on information technology and other spatial representation.
Interaction between the different participants.

The diagram wants to underline how all the participants involved in the urban design process interact one each other and how the object of this interaction is the urban development itself. Generally each of the participants requires the same type of information, but may be with different specification and with different purpose. Virtually all of the information required exists, however it is distributed among a number of different “locations”.

This needs of collaboration and cooperation is valid and necessary throughout all the urban process, but may be in the Approval Process this need is amplified and CollABITA could be the necessary, quick, easy, innovative and useful solution.

I am talking about the Approval Process, because it is the most delicate and critical phase of the entire process. Are involved several Agencies, Developers, Architects and last but not least Communities, all at the same moment and all have the right to change, make notes, approve or stop the flowing of the development. This part of the process is also the less linear, less clear and the more challengeable part of the entire development of the city which it is in.

As a solution, new informative Technologies have opened the door to opportunities to utilize this type of information (graphical, written, informative and so on) for a multitude of uses and services that could not have been imagined even a few short years ago.

But, based on different interviews I did, the most common problems related with this distributed information, are:

- Multiplicity of physical locations for the storage of the information.
- Difficult availability of information, especially when should be obtained from Public Officials and Developers.
- Difficult understandability of information (uses of the buildings, open spaces in relation with housing, parking and so on).
- Multiplicity of digital formats, of information.
• Difficulty in having *consistent* and up to date information.

To better understand how difficult can be the Approval Process, I studied one of the most important approval steps that any Large Project in Boston has to pass before starting the construction phase, the *Article 80 Review Process*. (Chart below)

The fact that I choose only one of the multiple review processes that any project in Boston has to pass, helped me to narrow the research, focusing it in what the CollABITA Model will support.

The example I selected was the Battery Wharf development in Boston. It could be considered an exemplar case regarding its Article 80 approval process; but even if it was fast, it took almost 2 years.

*Battery Wharf – Article 80 Process Chart*

The graphic was developed based on the case study, but it could be easily expanded to all the other developments. What distinct one development from the other are usually factors related with the Agencies, the Developer and the Communities involved. The step-sequence of the applications, reports and Determinations are always the same, and also the timing is regulated.

But what really makes a difference is the actual time that a project could remain chained to a particular status.

Sometimes happens that a developer files a FPIR (Final Project Impact Report), the communities and the BRA (Boston Redevelopment Authority) review it and ask for some changes, and so back and forward until the BRA and the communities agree in the final product. Now, for most of the developments, this loop continued for years and it brought that a simple process, that should take maximum 363 days, took 3, 4, 5 or even 7 years.

*Article 80 Review Process for the Battery Wharf Project.*
To be also noticed in this graph, is that for the first time, is shown how Developer, Agency (BRA) and Communities interact one each other and when this relation is establish for each phase of the project. Probably here is not well depicted the importance of the community participation, but from some interviews I did, came clear how “... without their approvals, nothing can be done.” Daniel J. St. Clair Assistant Vice President, Advisory Services of Spaulding & Slye Collier’s Development Management Group.

This is the only way to sketch down and have visually clear how, even if a really smaller part of the approval process, is not well conducted, it can slow-down the entire project development. CollABITA will be used as tool, digital technique and method helping in analyze, design and communicate the approval process. It will help in the:

- **Description** of the project,
- **Specification** of all the Participants,
- **Graphical Representation** of the geometric form in terms of buildings uses, streets, and public spaces,
- **Easier graphical annotations** from everyone in the process, on a detailed drawing (without changing the original one),
- **Modeling movements and relationships** between the various components of the built environment (public/private spaces, shadow analyses, and relations with the neighborhood’s design)
- Easy development of **different alternative designs** which address a specific problem,
- **Viewing communities comments**, objections and answers in a more collaborative and transparent way,
- **Viewing forms** for permissions and approvals, and consequential easier and faster access at the Determinations issued,
- **Facilitation** in the public acceptance of the proposed project before the public meetings, through more collaboration (Web-Collaboration)
- **Facilitation** in the reliability of the information, their public and 24/hours availability,
- **Reduction** of timing and expensive in the updating, filing and printing the approval material requested

**CollABITA Model ties together all these various steps** in a networked participatory digital environment where various users will participate and collaborate in the process of design functionality to deal with urban design issues.

**Research objectives**

The goal of **CollABITA Model** concerns with the big challenge of **supporting the design process** rather than providing a template for carrying out design. The **CollABITA Model** is a **Collaborative Interactive Digital Model** that urban designers can use to **link** the ideal design to the physical form, and make (communicate) this information during the Urban Design Process. **CollABITA will help** in the communication and collaboration throughout all the Approval Process. By utilizing the enormous potential of Internet for informing the process, and...
software for visualizing its products, the *Model* will provide an effective support, which will be able to *deliver information* in various forms to the designers, decision-makers and the final user.

This is another dimension to urban design, which must be noted early in the process, and for this is likely to affect the development of information technologies in this field.

Such design (the urban design one) is perhaps the more participatory of any on the urban planning-architecture continuum.

Urban design has the greatest potential of any technologies or practices for involving experts and lay-people. Currently, large volumes of information about the environment and the city are being delivered over the internet and its power to open up such issues to a very wide public who might view, reflect upon, and even manipulate designs digitally and remotely should not be underestimated.

*Collaboration, communication* and *visualization* are at the heart of planning, the map and plan in two-dimensional form has been the norm, although extensions to the third dimension are important through urban design that acts as the interface between planning and architecture.

Other visual media such as photographs, virtual animations and statistical presentations through charts of various kinds also supplement the way such communication takes place.

**Scope**

The development of *CollABITA Model*, new digital collaboration-tool, will make it possible to create, maintain, and distribute digital data in a more participatory way.

Using the *CollABITA Model*, architects, planners, decision-makers, municipalities and citizen, may be able to more quickly respond to request for information, and add information in an over-all well-detailed shared-data model.

The *CollABITA Model* will dramatically facilitate the idea of broadening public participation, and indirectly by this, also collaboration.

Actually the less elaborate but nevertheless effective way of broadening participation in urban design and communicating urban design data and solutions through the digital media is simply through the Web (Internet, Extranet/Intranet)

The Web-Based Model (*CollABITA Model*) in which participants come together to work collaboratively on urban-design problems, a web-locus where urban designers and decision makers (agencies, municipalities) engage with other users who are linked-in from remote sites, and begin to actively participate in the process.

Designers or anyone who has an interest in the environment can log on, converse with other users, and engage in structured design and problem solving with others.

The *CollABITA Model* embraces techniques, which are currently browser-oriented in order to solve planning and design communication-problems. By taking our digital data and placing it within a multi-user world we can, again, help planners plan and designers design. If an accurate, realistic context can be set the approval design/planning process, and consecutively the whole process can become more digital and also more democratic in terms of its ability to be digitally distributed (over the WWW or via an extranet site).

*Collaboration, communication and visual interaction* will be available through a variety of relationships: one-to-one, one-to-many, many-to-one and many-to-many in the approval urban design process.
Case studies

To better understand the problematic involved in the approval process and to validate the use of CollABITA, I had taken a case study validation approach. The project chosen by me is the Battery Wharf Development in Boston. It is now it is in his construction phase and he already passed the entire approval process.

Proposed Development: Raymond Properties
Architects: Architectural Team, Inc.

The Battery Wharf Project, before and after the development.

The project removes an existing blight on the waterfront that currently precludes public access to the water’s edge. In its place is a proposed development, welcomed by the governing agencies, which in their view will provide improvements to the neighborhood and waterfront public realms. The proposed development, as approved, represents to the reviewing agencies a traditional urban waterfront structure reminiscent of the old world charm of the historic North End, with fingered piers and a street front building design that reinforces and continues the urban fabric of the area.

Research methodology

Framework and functional model

To better understanding the necessaries capabilities the Model has to have, specific interviews were made from me to the developer, project manager of the Boston Redevelopment Authority and some representatives of the Communities Associations.

After interviewing roughly 15 peoples, I noticed that the major problematic remain the same, and can be summarized in:

- Need from the developer to have a easy access to the different graphic material
• Easy and understandable way to show the impact of the development (zoning),
shadows, heights, traffic, and all the legal requirements; to a better understanding for
the Officials and the Communities
• Easy and innovative way to let the public participate and feel involved in the process
and in the project itself.
• From the Communities there is the need to easily “see” the use of the buildings, the
open spaces in relation with the private one.
• Have a more “human scale” view of the development by having the possibility to
choose personal views of the development.
• Have an easier access to the public “material” (drawings and analyses)
• Have a common location where interact with the other Parties of the process, to feel
more participating in the process.

Based on these extended issue, I started building the CollABITA functional Model that as
Internet Based Support Model, will be able to solve some of those important urban design
problems. The Model tries also to be someway generally applicable, by taking into
consideration the variability of the approval urban design process over time and with changes
in geographical location.
CollABITA Model will be basically a Collaborative-Communication Tool with the intent to
facilitate the Approval Process in Urban Design projects.

As we know, urban design involves a very wide range of issues from the socio-economic, to
the functional and the behavioral, to the aesthetic as well as to the constructional and the
environmental. There is no well-defined process of synthesizing these requirements although
some attempts at representing them in a common spatial metric have been developed in the
past, often in the manner of overlay analysis, although these tend to be rather narrow
manifestations of the process.

With respect to building development, several advantages to using computer-aided tools can be
identified, and once again, we can easily find such advantages also in the urban design
environment, as it implies additional and different issues that may be need to be frame-
worked.

Experimental validation of functional model

To test those hypotheses it was necessary to carry out experiments that assure the how the
CollABITA Model would have helped in the approval urban design process.

The first step in the validation process was the creation of a simple framework of the situation
at the first stage of the development of the Project and the simulation of the Applicant
position in this stage. The total actors involved in the process were: the developer, its
architect, four state Agencies, six Local agencies included the Boston Redevelopment
Authority, and 3 different Interested Group Communities. Below there is the list in the
Model:
This first phase could be done in simple spreadsheet software, and can be compared with other real projects to draw some general conclusions. The second step in the validation process will be the development of the graphical interface that ideally the Applicant would use (CollABITA Model).

CollABITA entrance page.

In the very first page there is just a general introduction of the web site, with the different entries at the different level of accessibility. The user can have the top choice to enter in the Process Overview, or jump directly in the Current Status of the project, or just simply seeing the Document Archive and the List of Participants. At this stage there is no need to log-on, but it will be necessary more you go deep and deep in the project.
After logged-in in the Process Overview, (below the related image) is possible to see the entire timeline of the development, its current stage and what should be done till the end of the approval process.

From this page, it is possible to review any single part of the process, materials filed from the developer, communities, and the answers of the Agencies.

The interface of this detailed pages are the same of the “Current Status” page

CollABITA Current Status.
This could be seen as the central page of the Model, because there is everything that is needed to review the project. It is possible to see a text description of the project and a graphical one, with plans, sections, elevations and so on.

CollABITA Current Status Plan and Elevation View.
The big improvement that CollABITA will bring is the opportunity to navigate the 3D project in the web-interface. With a simple navigational interface, everyone deeply involved in the development of the project, can freely navigate the project and make comment on it. This is also the other improvement that a tool as CollABITA is bringing. The opportunity to make comment on everything, views, shadow analyses, wind results and so forth, is a very important part of the Article 80 Review process in Boston.

CollABITA Current Status 3D Navigable-view.

A third step in the validation process was testing the CollABITA functionalities. By letting try the model to the same participants of the development (communities, agencies and developers), by other professionals from Harvard School of Design and students from the Master in Urban Design, I had the possibility to confirm my original objectives and make the necessary variation to complete the model. This last phase will bring me to define better the final CollABITA Model. Next, the integration of the Model with the World Wide Web will provide also real feedback from other researchers, planner and agencies and will aloud me to verify the efficiency and future availability of the same model in other cases. The web is actually a less elaborate but nevertheless an effective way of broadening participation even in urban design by communicating urban design data and solutions through digital media tools.

CONCLUSIONS

The CollABITA Model is a Web-Based Model that will establish collaboration and reduce the typical lack of communication inherent in the approval urban design process.

It will be able to accelerate the Process and will be a useful tool for those users that play a decision-making role in the urban design process; it will also be able to

- Eliminate redundancy on the submitted materials (drawings, text and so on)
• Assure data availability,
• Have a more direct visualization of the development in act.

The advantages on the Internet/Intranet-based Tool will help Project Managers, Architects (Planners), Engineers and all the Parts involved to
• Speed up data collection and management,
• Improve quality assurance,
• Reduce overall project costs,
• Facilitate accessibility and integration of different data,
• Improve data sharing and communication among the project team.

CollABITA Model, then, based on these issues, will be a new extranet tool. It will take the capabilities already well developed from the existing extranet site (for the building industry) and will add the functionalities specifics for the Urban Design Environment. In a well-studied graphic interface, with CollABITA:
• A single person, (Community level) in his own PC will have the chance to see the development, to interact with it by navigating it, to save some views, write comments about it and send them to the specific manager. The same person will save time and money in looking and printing everything online, instead of mailing a formal request, with the obvious consequence.
• The different Agencies would look at the same model. With a different level of accessibility they will be able to download the graphics, and all the other analyses necessaries to give the related permits. They will have also the possibility to just “draw a circle” (drawing capabilities) and send back to the designer firm for “clarifications” or changes. Everything will be faster and easier.
• The Developers, by having a more transparent process and a more clearly fit-back from all the other parties, will check and solve possible problems easier and more efficiently. They will be able also to “talk” with the other consultants (architects, engineers, contractors and so on) involved in the project, and share the information in an easier and faster way.
• At the same time everyone will have the opportunity to see the stage of the project, to know the principal participants and to follow all the process until the end.

CollABITA wont use and develop any new software, but it will be the platform where everyone can collaboratively participate, communicate and eventually manipulate (at a certain level of freedom) their data (drawings, models and so on) and share the one made by the other participants in the approval urban process.

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Research Components:
CV OF THE AUTHOR

Luciana Burdi is a Doctoral student (DDes) at Harvard University Graduate School of Design, where she has studied since the fall 2000. Her research focuses on how Informative Computer Technologies can be used to promote a more collaborative and co-operative design process, for Urban Designers, Decision-Makers, and final users. She is utilizing new communicative technologies, methodologies and graphical solutions to solve the most important collaborative issues and to facilitate the integration of required documentation with the desirable visual-representations.

She is working also as a Project Manager and Team Leader for the Center of Design Informatics (CDI) at Harvard. Her personal research is interlinked with the MetroPortlas.org Portal Project, a web portal that creates a unique online consortium for urban design, government management and planning. The goal is to engage representatives from all groups affected by unique urban situation, and propose interaction in the new and definitive formulation, revision, or implementation of final solutions.

She also lead a creative team, composed of graphic designers, programmers, writers, researchers, and programmers to produce an interactive educational CD-ROM entitled “Brunelleschi’s Dome: La Cupola di Santa Maria del Fiore.” This innovative study of the dome has been distributed worldwide to educational institutions and professional architectural associations.

Prior to her work at CDI she was a SPURS Fellow (Special Program in Urban and Regional Studies) at MIT, working on planning approaches in USA and Europe regarding the “suburbs” of the modern cities. This research was started in 1999, when she was working in collaboration with faculty’s members of the Politecnico di Bari.

She holds a Master’s Degree from the prestigious Istituto Universitario di Architettura in Venice Italy.

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