

# R

## esearch tools for design

SPATIAL LAYOUT AND PATTERNS OF USERS' BEHAVIOUR

Proceedings of Seminar, 28-29 January 2010, Department  
of Architectural Technology and Design "P. Spadolini",  
University of Florence

a cura di

Nicoletta Setola



PROCEEDINGS E REPORT



Research tools for design.  
Spatial layout and patterns  
of users' behaviour

Proceedings of Seminar,  
28-29 January 2010, Department of Architectural  
Technology and Design "P. Spadolini",  
University of Florence

Edited by  
NICOLETTA SETOLA

FIRENZE UNIVERSITY PRESS

2011

Research tools for design. Spatial layout and patterns of users' behaviour : proceedings of Seminar, 28-29 January 2010, Department of Architectural Technology and Design "P. Spadolini", University of Florence / edited by Nicoletta Setola – Firenze : Firenze University Press, 2011.  
(Proceedings e report, 76).

<http://digital.casalini.it/9788866550273>

ISBN 978-88-6655-024-2 (print)  
ISBN 978-88-6655-027-3 (online)



Department of Architectural Technology  
and Design "P. Spadolini"

Revision and translation of texts by italian authors: Bridget Mason

Cover image:

© Space Syntax 2011

Graphic Design Alberto Pizarro Fernández

© 2011 Firenze University Press  
Università degli Studi di Firenze  
Firenze University Press  
Borgo Albizi, 28, 50122 Firenze, Italy  
<http://www.fupress.com/>

*Printed in Italy*

## TABLE OF CONTENTS

|  |     |
|--|-----|
| DESIGN RESEARCH AND THE SOCIAL NATURE<br>OF ARCHITECTURE<br><i>Maria Chiara Torricelli</i>   | VII |
| PROGRAM  | XV  |
| SPEAKERS PRESENTATION  | XIX |
| FIRST DAY  |     |
| ARCHITECTURE AND THE SOCIAL<br><i>From a lecture by Alan Penn</i>  | 1   |
| THE NEED FOR AN EVIDENCE-BASED TOOLKIT.<br>THE SPATIAL DNA OF HOSPITALS: EVIDENCE BASED<br>PLANNING AND DESIGN<br><i>Maximo Martinez</i> | 11  |
| THE MARMOT REVIEW: EMERGING IMPLICATIONS<br>FOR BUILT ENVIRONMENT PRACTITIONERS<br><i>Ilaria Geddes, Matilda Allen</i>                   | 23  |
| STUDENTS' HOUSING: FUNCTIONAL MODEL QUALITY<br><i>Adolfo Baratta</i>   | 35  |
| ENVIRONMENTAL COMMUNICATIVENESS<br><i>Antonio Lauria</i>   | 39  |
| DESIGN FOR EMERGENCY. TEMPORARY ARCHITECTURE<br><i>Sabrina Borgianni, Virginia Serrani</i>   | 45  |

|  |    |
|--|----|
| AIRPORT TERMINAL DESIGN COMMUNICATION PROCESSES.<br>THE TXP GROUP METHODOLOGY<br><i>Irene Macchi, Maria Antonietta Esposito</i>  | 51 |
| HOSPITAL PROJECT AND BUILDING MONITORING.<br>THE MONLAB EXPERIENCE<br><i>Nicoletta Setola, Francesca Reale</i>   | 55 |
| SECOND DAY   |    |
| SANTA MARIA NUOVA HOSPITAL: THE PUBLIC<br>SPACES SYSTEM<br><i>Nicoletta Setola</i>   | 63 |
| SEEDS OF A DISCUSSION.<br>Marco Geddes da Filicaia, Francesco Napolitano, Roberto<br>Lapi, Vincenzo Vaccaro talking with Alan Penn, Maximo<br>Martinez, Maria Chiara Torricelli<br><i>Nicoletta Setola</i> | 67 |

# AIRPORT TERMINAL DESIGN COMMUNICATION PROCESSES. THE TXP GROUP METHODOLOGY

*Irene Macchi, Maria Antonietta Esposito*

The TxP (Technologies for Project) research group conducts experimental studies applied to design technologies. TxP operates in the field of performance-based and management optimisation for architectural and engineering design. Project planning, development, communication and management are conducted using methodologies that integrate quality, environment and communication.

TxP is a research group that works in synergy with the National Network of PhD courses in Architectural Technology (OsDotta). The TxP Group is a network node at Florence University, which aims to offer experimental and applied research opportunities for promoting innovation in industry and in the construction sector.

TxP Group defines and applies innovative methodologies and tools for: design management and development, design integration, communication and control, according to international standards and methodologies, together with project validation.

Our Group has achieved significant results in terms of new methodologies and tools for design development, control and integration, innovative technological applications and field trials.

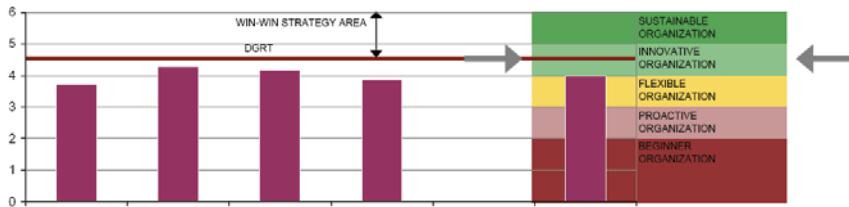
This paper reports the results of a doctoral research project that analyses the communication processes in building design teams specialising in airport passenger terminal projects. The analysis focuses on the demands of the communication processes. The topic fundamentally concerns the Construction Industry, given the complex relationships existing within design teams. These teams encompass different organisations, based in various sites or countries, who speak different languages and who, most importantly, are culturally different.

*The first question is: how can the relationship between architectural space and social space in the development of airport and terminal buildings be identified and how does it affect Design Management and Owner Governance strategies?*



Airport terminals are essentially the mechanisms for generating and controlling interactions during passenger embarkation worldwide. Thus airport design has to conform to international standards; it has to meet a series of common targets in regard both to spatial function and to technical specifications. Project Management – and Integrated Management Systems in particular – is needed to underpin all performance targets engendered by the complex nature of airport projects. These targets need to be seen as continually evolving planning activities. The evolutionary nature of terminal design calls for interdisciplinary design groups and extremely fast communication tools.

The research identifies the lack of communication management. The basic concept of the method is to compare the designer's approach to design communication with a theoretical threshold known as the Design Gap Risk Threshold. When over the DGRT, the project may prove more effective in achieving the quality targets (pro-active area).



*The second question is: how does this relationship affect Design and Design Methods? And what solutions are offered by PM and SGI methods?*

This study stems from doctoral research and is currently undergoing field validation during the construction of the terminal addition at the Amerigo Vespucci Airport of Florence (ICAO: FLR).

The basic research was carried out during the doctoral course (XX cycle; 2004–2008), taking point 7.3 of the ISO 10006:2005 standard as its starting point. This states that Communication Processes are defined as an Appropriate Requirement of the Quality Management System for improving work methodology in effective design development. The research focuses on four main topics which are:

- Design and communication planning;
- Design development and communication management;
- Design verification and communication control;
- Data and information purchasing processes.

The results of the field research pick up on many interesting points: for example we found that certified quality standard organisations often fail to plan, carry out checks or properly implement communication pro-

cesses. In brief, we flag up evidence of non-awareness of the critical importance of communication processes and their impact on design quality.

*The third question is: what kind of tools can help communication process management within the design group relationship in the design practice?*

The methodology developed in the research is a toolkit for planning, managing and controlling communication in design projects.

The results of the research demonstrate the possibility of fully exploiting the potential of communication processes in design projects with effective methodologies, tailored to each individual project. The research provides an actual customised methodology for planning and managing communication processes within project teams. The TxP methodology is generalised and addresses the following targets according to the main design development stages.

- Master plan: the planner's concept of the long-term development of an airport  
Users: Airlines and operators, public, concessionaires, commercial services, airport management, design team, government units, authorities  
PM tools goal: to define the complete development of the airport project and to verify its sustainability.
- Schematic design: conceptual studies, layouts and schematic drawings  
Users: airport management, design team, consultants, governmental units, authorities  
PM tools goal: to define Terminal layout, functional relationships of Terminal components, transit system configurations.
- Construction documents: final version of the design, which has to conform to the specified requirements and be suitable for the next construction stage  
Users: airport management, design team, consultants  
PM tools goal: to assure interoperability and efficient communication strategies between the involved parties.

The fact is that airport terminal design development is essentially relational, in which any 'technical solution' only becomes meaningful in relation to all the others. There is the problem of how to move from abstract representations of design group tasks, knowledge, communication processes and information to a concrete representation of the structure of dialogues and interactions.

### *Foreseen Impacts*


In brief, the research identified the need for some important 'new skills':

- Ability to prevent the threats of the Design Gap, including: formulation of common requirements, early involvement of all team members and their participation in planning and developing the design solution, technical and cultural interoperability, use of customised advanced tools to support the virtual team;
- Ability to plan the required design information: accurate performance information is necessary, the shape and technologies of the building envelope, for example (with particular regard to façade orientation and solar shading, glass and balancing of the main walls, heating, cooling and ventilation systems), have to be assessed on an on-going basis during the project process rather than just at a later stage;
- Ability to pre-check design conformity to requirements: re-engineering the validation process: the later design stage should show evidence of design compliance to building and airside regulations. Faster validation could be achieved using integrated data models;
- Enabling sustainability: ability to organise the project in such a way as to be able to adapt the design process to a modified scenario.

### References

- Esposito, M.A., (2010), *Envelope's Details for the Green Airport Terminal*, Firenze University Press, Florence
- Macchi, I. (2009), "Innovazione negli strumenti di supporto e verifica", *Material from the fourth OsDotta Seminar*, De Paoli, O. and Montacchini, E. (Ed), Firenze University Press, Florence
- Esposito, M.A. and Macchi, I. (2009), "Communication in Design. Results of a field research. Electronic Journal of Information Technology", *Construction*, vol. 14, pp. 328-352
- Esposito, M.A. and Macchi, I. (2009), "How to start Communication in Design", *5th Conference Information and Knowledge Management in Building, 17-19 June 2009, CIB-W102 Rio de Janeiro, RJ, Brazil*
- Esposito, M.A. and Macchi, I. (2009), "I processi di comunicazione del progetto. La Babele delle Costruzioni", *Qualità*, vol. 1, January-February
- Macchi, I. (2008), *Processi di comunicazione del progetto: definizione dei requisiti informativi e comunicativi secondo il metodo del Profilo Utente*. PhD thesis. Research Doctorate in Architectural Technology and Design, University of Florence
- Esposito, M.A. (2008), *Tecnologie di progetto per il terminal aeroportuale*, Firenze University Press, Florence

Finito di stampare presso  
Grafiche Cappelli Srl - Osmannoro (FI)



La pubblicazione propone una lettura critica dei risultati ottenuti dal Seminario organizzato a gennaio 2010 dal Dipartimento TAeD sugli strumenti di ricerca per il progetto architettonico. Il layout spaziale negli edifici e negli spazi urbani influenza i comportamenti e le relazioni degli utenti e in questo si manifesta la natura sociale dell'architettura rispetto ad altri ambiti della progettazione. Space Syntax (teoria, metodologia e tecniche per l'analisi dei sistemi complessi) assume questa tesi alla base delle proprie ricerche. Il seminario è stato occasione di incontro con figure accademiche e professionali di spicco, per un confronto fra ricerche ed esperienze del Dipartimento e del gruppo Space Syntax.

**NICOLETTA SETOLA**, architetto, dottore di ricerca in Tecnologia dell'architettura, è ricercatore a contratto presso il Dipartimento di Tecnologie dell'Architettura e Design "P. Spadolini" dell'Università di Firenze. Svolge attività di ricerca nell'ambito dell'edilizia ospedaliera e sociale, in particolare su temi riguardanti i sistemi di monitoraggio di programmi complessi e lo sviluppo di analisi delle configurazioni spaziali in relazione allo studio dei flussi.

€ 21,90

ISBN 978-88-6655-024-2



9 788866 550242