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Includes

Regular Refereed Papers
Review and Trigger Articles

Brunelleschi's Florentine dome, Florence, Italy, by Izis Salvador Pinto

Archnet-IJAR is published and archived by ARCHNET, the most comprehensive online community for architects, planners, urban designers, interior designers, landscape architects, and scholars working in these fields, developed at the MIT School of Architecture and Planning in close cooperation with, and with the full support of The Aga Khan Trust for Culture, an agency of the Aga Khan Development Network.

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Archnet- IJAR

ArchNet International Journal of Architectural Research – Archnet-IJAR is the first of its kind; an interdisciplinary comprehensive scholarly journal of architecture, planning, and built environment studies, that is blind reviewed and published on the World Wide Web three times a year.

Objectives

Archnet-IJAR objective is to establish a bridge between theory and practice in the fields of architectural and design research, and urban planning and built environment studies. It reports on the latest research findings and innovative approaches for creating responsive environments, with special focus on architecture and planning in developing countries.

Archnet-IJAR is truly international and aims at strengthening ties between scholars from different parts of the world with contributors and readers reaching across geography, boundaries, and cultures.

Archnet-IJAR articles come from architects, interior designers, planners, and landscape architects, and from those working in these fields in academic institutions, universities, research centers, government agencies, and private practice.

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Archnet-IJAR addresses academics, practitioners, and students of archi-tecture, planning and interior design. It addresses those who are interested in developing their understanding and enhancing their knowledge about how environments are designed, created, and used in physical, social, cultural, economic, and aesthetic terms. Archnet-IJAR content keeps readers up-to-date on the latest ideas, designs, and developments in built environment related fields.

Archnet-JAR publishes research studies, criticisms and evaluation studies, and critical analyses about the creation, use, and evaluation of different types of environments at the macro and micro scales. The journal includes original empirical research papers, analytical case studies, and high quality position papers. Three major areas are covered by Archnet-IJAR:

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Topics include –but not limited to: architectural pedagogy and design studio teaching practices; architectural technology and sustainable design; design methods and architectural theories; design and project programming; environment-behavior studies; information technology; Islamic architecture; computer applications and virtual environments; post occupancy and facility performance evaluation; and social and cultural factors in design.

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Topics include --but not limited to: administrative and political factors contributing to the shaping of communities, cities and urban regions, community planning; sustainable urban conservation; environmental planning and eco

development; housing policy, planning, and design; new urbanism; sustainable development; space syntax and GIS applications; and way-finding and signage systems.

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The Chief Editor is in charge of developing journal issues, seeking out resources and articles, establishing publishing strategies, coordinating the review process, and posting each issue and its articles online. Archnet-IJAR has two boards; advisory and editorial. The range of expertise of the boards that include the panel of referees –academics and professionals-- ensures high quality scholarly papers and allows for a comprehensive academic review of contributions that span wide spectrum of issues, methods, theoretical approaches, and professional practice.

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Unlike other printed Journals where contributors wait for periods that reach two or three years for their work to get published, the value of Archnet-IJAR as an online journal is that it eliminates the large lead time needed for publication. However, submission, referee, and publishing processes are strict and adhere to the following procedures:

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The chief editor consults with the advisory and editorial board members according to their relevant expertise.

Soon after receiving feedback from the referees, author(s) are contacted to submit their full papers.

When full papers are received, they will be forwarded to two editorial board members for blind review, according to the referee form.

The chief editor contacts the author(s) with the referee form filled by the reviewers. While papers will be blind reviewed, in exceptional cases author(s) will be asked to communicate directly with the reviewers.

Author(s) revise their papers as noted by the reviewers and re-submit their work to the chief editor.

Author(s) should make sure that their submissions should be free of jargon, clear, simple and to the point.

Papers will be published in the next issue according to the following schedule:

March 30th (publishing date): December 15th (deadline to receive papers after reviews)
July 30th (publishing date): April 15th (deadline to receive papers after reviews)
November 30th (publishing date): August 15th (deadline to receive papers after reviews)

Interested reviewers and members of the advisory board may submit their work for publication in Archnet-IJAR. Their work will go

through the same blind review process and will follow the preceding procedures.

Notes to Contributors

1. Submission of Manuscripts

The language of the journal is English. All submissions will be online. One copy of the manuscript (in word document format) together with original figures and tables must be submitted to the editor: Ashraf Salama ijar@mit.edu

The name, mailing address, position, affiliation, telephone, fax, and email of each author must be supplied in a cover letter attached to an email. All papers will be blind reviewed and assessed by at least two referees.

2. Preparation of Manuscripts

Layout

Manuscripts should be typed in double spacing on one side of A4 (21x29.7 cm) paper with reasonable margins (2.5 cm). All pages should be numbered consecutively.

Title page (page 1)

The first page of the manuscript must contain a concise and informative title; names, affiliations and addresses (including e-mail) of all authors, and identify the corresponding author (who will be responsible for correspondence and reviewing proofs). An abbreviated title of less than 50 characters (including letters and spaces) should also be suggested.

Title of paper, abstract and keywords (page 2)

Title of the paper should be witten at the top of abstract without authors' name. A concise and informative abstract must not exceed 300 words in length, should summarize the objective, methods and major findings of the paper. Keywords must be carefully selected to facilitate the readers' search on Archnet Website, and should not exceed 5 key words.

Articles

Articles should not exceed 6000 words, including references.

Notes

Avoid the use of footnotes and endnotes, if unavoidable, label as (1), (2) and list all together at the end of the paper.

References

References in the text should give the surname of the author and the year of publication in brackets, for example, Rowe (1985) or (Rowe, 1985), followed by a, b,...when two or more references to work by one author are given for the same year. Page numbers should be given for quotes (Mitchell, 2003:33). At the end of the text the references should be listed in alphabetical order of authors' names and in chronological order for each author. Initial and final page numbers of articles and papers should be given. The names of books and periodicals should be given in full, and the publisher and the city of publication should be given for books, conference proceedings, etc. Details of availability should be given for unpublished conference papers. Full references should also be given for legal judgments, bylaws and regulations, and government publications, etc. Examples of reference citation are given below.

Dutton, T.A. (Ed.). (1991). Voices in Architectural Education: Cultural Politics and Pedagogy, Bergin & Garvey, New York, NY, USA.

Hegvold, L. (1999). "Seeking an Effective Cross-Cultural Design Pedagogy." In William O'Reilly (Ed.), Architectural Knowledge and Cultural Diversity,

Comportments, Lausanne, Switzerland, pp. 93-100.

Salama, A. (1998). "Integrating Environment-Behavior Studies into Architectural Education Teaching Practices," In J. Teklenburg, J. Van Andel, J. Smeets, & A. Seidel (Eds.), Shifting Balances: Changing Roles in Policy, Research, and Design, EIRSS Publishers, Eindhoven, Netherlands, pp.128-139.

Salama, A. (2006). "Learning from the Environment: Evaluation Research and Experience Based Architectural Pedagogy," Transactions, CEBE-Center for Education in the Built Environment, Cardiff, UK, 3 (1), pp. 64-83.

Salama, A., O'Reilly, W. & Nochis, K. (Eds.). (2002). Architectural Education Today: Cross Cultural Perspectives, Comportments, Lausanne, Switzerland.

Sanoff, H. (1992). Integrating Programming, Evaluation, and Participation in Design, Avery, London, UK.

Tables

Each table must be typed, and con-secutively numbered. They should have a brief informative title placed as a heading. Tables should be understand-able without reference to the text, but they should be referred to in the text. Explanatory captions should be brief and placed beneath the table.

Figures

Figures should be numbered consecuti-
- vely throughout the paper and identified with the authors' name and the figure number outside the reproduction area. Figures should be referred to in the text and should be placed within the body of the paper. However, all figures should be supplied in separate files as JPEG file format. Figure dimensions should not exceed 21x30 cm. Photographs should be used with restraint and must be of high quality. Explanatory captions should be brief, placed beneath the figure.

3. Submission Process, Copyright, and Originality of Work

Proofs will be sent to the corresponding author for checking. Proofs should be returned within one week of receipt. Authors should correct typesetting errors only; they should not add any new material to the paper at proof stage.

Please read the submission process and procedures, and copyright notes under the general outline of the ARCHNET-IJAR.

All correspondence should be addressed to the chief editor.

Professor Ashraf M. Salama
asalama@archnetijaronline.org
archnet.ijar.editor@gmail.com

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Volume (6) - Issue (3) - November 2012

Contents

Regular Articles

International Journal of Architectural Research
Archnet- IJAR
Volume (6) - Issue (3) - November 2011

Review and Trigger Articles

BRINGING STRUCTURE TO JUDGING SUCCESS IN ARCHITECTURAL DESIGN: THE 'TIOSE' QUALITATIVE MEASURE

Philip D. Plowright and Matthew L. Cole

Abstract

Explicit measures of design quality are almost unknown in architectural design, particularly since judging quality in architecture, as in most design disciplines in general, resists quantification. Resistance in the judgement of design quality can be traced to requirements for evaluating complex intra- and inter-discipline factor integration, as well as cultural knowledge which is tacit in nature. This paper aims to introduce the TIOSE Qualitative Measure, an outcome evaluation tool developed for a study on team interaction, cognitive style, team processes, and quality in design. The TIOSE contains five factors for judging architectural design success: thoroughness, informativeness, organisation, synthesis, and evocativeness. The methodology for the study involved evaluating the intra- and inter-rater reliability of six architectural critics who utilized the TIOSE to judge team project quality and success among 84 graduate students working in 12 teams. Analysis found high intraclass correlations within and between critics across three rounds of ratings, suggesting the TIOSE showed excellent intra- and inter-rater reliability, respectively. Study results provide evidence that evaluating the innovation and creativity of architecture and design projects can reliably extend past ratings of efficiency (time) and productivity (volume) as objective performance measures as the testing mechanism for success. In conclusion, this study demonstrates that qualitative measures of project success can be quantified in a reliable manner and can attain internalized agreement between architectural critics. The TIOSE measure provides a rating scale with explicit definitions for the qualitative measure of architectural design quality.

Keywords

Design judgement, inter-rater reliability, qualitative factors, project success..

Introduction

A measure for design quality success was needed as part of a larger study on the interaction between inter-personal relationships, team structures based on cognitive style, and design outcomes. While the study stressed communication structures, feedback and conceptual development, the critical factor for team interaction success was final proposal quality. Architectural quality, however, is a factor that is considered contentious and ill-defined, falling into the "I know it when I see it" category (Ronn, 2011). In addition, the assessment of architectural design in normative architectural culture is often completed as an unstructured, negotiated and ad hoc event. Outside of architecture, studies needing to

determine success use objective performance measures such as task completion duration and productive outcome volumes, factors of little relevance for success in architectural design.

Accordingly, the TIOSE Measure for the Judgement of Architectural Design Success was developed in order to address the gap between objective performance measures and qualitative, unstructured assessment. The measure is focused on rating the qualitative significance and relevance of an architectural design proposal. The TIOSE was evaluated for inter-rater and intra-rater reliability using the intraclass correlation coefficient (ICC). The measure needed a high degree of validity and reliability in order for it to be useful to the overall study.

Assessing Quality in Architectural Design

Explicit measures of design quality rating are almost unknown in architectural design, particularly since knowledge held in architecture, as in most design disciplines in general, is tacit in nature and resists quantification. Architecture presents a system of knowledge which can be defined as "poorly articulated" (Cummings & Teng, 2003), making it difficult to learn, teach, and study. Research that examines innovation and creativity (design) is predominantly focused on judgement as on objective performance measure (Vanderheyden et al, 2010) which tends to rate efficiency and productivity as the testing mechanism for success (Kickul & Neuman, 2000; Priola et al, 2004; Volkema & Gorman, 1998). Research that departs from this norm utilizes poorly defined qualitative judgement processes that assume agreement in terminology (Dorst, 2001; Kruger & Cross, 2006). Nevertheless, rating scales for qualitative measures should be capable of development since internalized agreement between architectural critics has been shown to exist (Rönn, 2011; Svensson, 2010).

The focus for a rating scale addressing documented success in architectural design needs to address the quality of the final proposal. As Rönn notes "Architectural quality is the combination of elements that form a whole. This is fundamental for the assessment of projects, especially in early stages. Quality in architecture and urban design is seen as a holistic idea among professionals" (Rönn, 2011). Architecture is a systems-based discipline, meaning that it is impossible to simply add up parts to create an understanding of the whole. Instead the whole is judged as a new synthesized entity that is independent to either the time it took to create, the individual strength of isolated component or the physical volume of information about the product.

Study Methodology

The TIOSE Qualitative Measure for the Judgement of Architectural Design Success is an outcome evaluation tool for the measurement of quality in an architectural design. It is not focused on physically constructed projects (built work) but on schematic design proposal. As a new tool that was developed to satisfy the need for an outcome evaluation of architectural design quality, the TIOSE was tested for soundness in psychometric properties according to reliability testing. Consequently, we evaluated the measure's reliability among six raters (i.e., critics/judges) using the intraclass correlation (ICC) index of the reliability of a measure.

Description of the TIOSE Measure

The TIOSE Measure contains five (5) factors for architectural design quality judgement. The factors were developed by reviewing the priorities of multi-year outcomes of architectural design projects, discussions with master practitioners and design educators, and the identification of issues involved in core success of architectural projects over a multi-year period.

The five factors of the TIOSE are divided into two groups. The first group contains the three baseline factors, Thoroughness, Informativeness, and Organisation. These factors pertain to research, data gathering, communication, and project structure.

Thoroughness refers to the depth of information and addresses both lateral and longitudinal vectors. In both directions, it is fundamentally about research, data collection and knowledge. On the lateral level, the factor includes initial research breadth, exploration for opportunities and alternatives and cross-disciplinary investigation. The longitudinal vector includes evidence of rigorous application of research. On individual items and applications, there needs to be depth and specificity in content. Ultimately, scoring is dependent on evidence of clear and intimate knowledge of the research subjects.

Informativeness addresses the ability of the project to communicate its content and intentions. The factor rates the proposal's position for clarity and its content as understandable in both graphic and written communication elements. While informativeness has strong responsibilities in helping the other factors be successful, especially synthesis and evocativeness, it is considered a separate baseline factor. Voice, style, tone, and clarity need to be addressed and integrated with project intention.

Organisation refers to the structure of the proposal, with higher ratings provided to projects with a strong organisational logic of both conceptual and physical elements. This factor refers to the project itself and not the presentation/communication, which is rated by informativeness. Instead, organisation refers to the arrangement of critical architectural elements, experiential intentions, activity containers, and formal structuring of the layers of the proposal resolution.

The second group contains the two design quality factors, Synthesis and Evocativeness. Group two factors are considered advanced factors involving complex intra- and inter-discipline integration, as well as cultural knowledge. This second group of factors requires competency in all three baseline factors in order for the final proposal to be successful.

Synthesis addresses issues of relevance and quality. To be rated highly in this factor, the project must produce a proposal resolution which has generated unique and new entity from the combination of two or more entities. Entities considered for source material are not just simply formal objects, but also can be sub-systems, patterns, experiences, activities and experiences. Part of the success of synthesis is the combination of disconnected and disassociated entities into new and significant wholes. Synthesis, in this way, is not simply the adjacency of entities, but rather, it is the combination of like and dislikes constituent elements into a new, cohesive, unified entity.

This factor also includes the integration of, rather than avoidance of, existing context.

Evocativeness refers to the other major factor in judging quality in architectural design—significance. A high rating in evocativeness implies that the project engaged either an evocative or a provocative position. Evocative work has the power to extend intentions and concerns into the world and address cultural values. The project should either call up memories, associations and conditions that are of concern, or produce opportunities among this particular configuration of layers. If provocative, the overall intentions and resolution of the proposal should be stimulating, insightful, and challenging to normative or baseline practices. A high rating in this factor implies that the proposal has clearly initiated a deeper conversation that draws attention to important but overlooked opportunities, issues, or potentials. The overall effect is to invoke or rouse discussion regarding the evocative and provocative intentions of the project. Either of these aspects of evocativeness should have clearly exploited unseen opportunities, rather than simply addressing an apparent 'problem' that the proposal needs to extend past a one-dimensional gesture. Consequently, the factor considers a significant human dimension.

All five factors are presumed to interact with each other to yield the final outcome evaluation score. Nevertheless, factors from group one should be considered individually, whereas factors from group two should be considered from a systems-based perspective where the whole is not only generated by the parts, but also extends beyond the parts.

Research Study for which the TIOSE was developed

The TIOSE was developed as the architectural design quality outcome measure for a team-based graduate research study, "Third Coasting: Ecology Networks in the Great Lakes". The study occurred during the summer semester, and involved research, enquiry, exploration, and a design proposal centred on ecology networks, human habitation and formal/system interventions. The study had five intervals during which team work was discussed and rated using the TIOSE. Each project interval had duration of two weeks, with the exception of interval 3 which spanned three days. While interval 1 consisted mainly of research and interval 3 was considered exploratory; intervals 2, 4, and 5 were of equal duration and complexity with matched outcomes. For this study, only time intervals 2, 4 and 5 were used for data analysis due to their content, process and outcome equivalence. These intervals are referred to respectively as Round One, Round Two and Round Three.

Participants

The study sample for the research study was comprised of 84 participants, working in 12 teams composed of 7 members each, lead through advanced design exercises by six master instructors. Participants were graduate students enrolled in architecture, urban design, or interior design Master programs at a university in the Midwest region of the United States. All participants had a minimum of 4 years formal design education. The minimum age of participants was 21, with the maximum age being 48; mean age was 28. The majority of the population was ethnically White or Hispanic

(86%), with minority populations of South Asian (4%), East Asian (2%), and Arabic (8%). Gender was fairly balanced across all ethnicities, with the overall sample containing a higher population of males (63%) as compared to females (37%).

Teams

All participants completed the Basadur Creative Problem Solving Profile (CPSP) Inventory (Basadur & Head, 2001), and the Keirsey Temperment Sorter variation of the Myers-Briggs Type Indicator (Keirsey, 1998), prior to the beginning of the research study. Results of the Basadur CPSP Inventory were used to determine each participant's putative cognitive style in the creative process. The study required the 12 teams to be assembled by diversity in cognitive style in order to create strong heterogeneity and implying low cohesion in the teams. Heterogeneity in cognitive styles appears to have a positive effect on team performance in creative problem solving tasks (Basadur & Head, 2001). The study engaged cohesiveness as a critical factor of increasing team success when membership was based in heterogeneity.

The composition of the study sample according to the four quadrants of the Basadur CPSP Inventory was implementer (45%), followed by conceptualizer (21%), generator (19%), and optimizer (14%). The composition of each team was made up of at least one member from each of the four Basadur quadrants, with the remaining 3 members of the team being randomly assigned for maximum variation. Gender was purposely not a feature of the research, and there was no attempt to select for equal balance of male and female participants on the teams. However, other participant characteristics (such as home location, distance from the university, and work schedule) were used to select team membership so long as they did not impact the cognitive style balance. Teams had consistent membership throughout the research study.

This project received ethical approval to conduct research with human participants from the Institutional Review Board of the University.

Procedure for Judging Team Work

Team work from the research study was evaluated by raters who utilized the TIOSE measure to judge team work quality and success. A graphic rating mechanism, rather than a numeric scale, was chosen for the measure's scoring worksheet. This graphic approach allowed the rater to feel more natural and instinctual in their identification of success and failure as it did not ask them to translate a qualitative factor into a precise number. The gradient scale allowed a visual identification of a centreline of "meeting basic requirement" as a visual node. Three notations are identified on the grading line: "exceptional" at the left terminus, "decent" at the centre point, and "poor" at the right terminus. The rater judged the quality of the factor based on distance away from the centreline. Rating for projects identified as surpassing expectations or not meeting basic requirements were notations further to the left (or right) of each factors gradient.

Rating of team work was completed during a group judging session in which each team's project was presented as a hard-copy poster (7 panels of 24"x36"). All presentations occurred in the same presentation/critique space to maintain stable and consistent

review conditions for the raters (Flemenbaum & Zimmermann, 1973). Each team initially had 10 minutes to orally present the important qualities of the work. As needed, presentations were extended to a hard cap of 30 minutes in order to ensure comprehension of important points and clarification of any deficiencies between intentions and results. Raters were instructed to use the hard-copy poster for grading, and use the oral presentation for orientation only. Judging occurred in a semi-blind process in that none of the raters had access to the worksheet of other raters. Worksheets were submitted to the study's Principal Investigator after each judging period, and raters were not allowed access to worksheets, nor were they given the opportunity to change ratings once submitted.

Raters

Six raters (critics/judges) performed the judging of team work quality and team success at Round One, Round Two, and Round Three. Raters consisted of 4 males and 2 females who were considered to have reached, or were above, a level of mastery in design. All raters had a terminal degree in their sub-field of design (architecture, urban), and all acted in accordance with the definition of an "expert performer" involved in deliberate practice with continued and sustained training and effort (Ericsson, 2006). The six raters had an average of 18 years of continuous practice experience in the study of design (range 10-25 years).

Raters were introduced to the TIOSE measure and the scoring worksheet during a one-hour training session which occurred before the first rating period. Each of the factors was presented for definition and examples of successes and failures for each factor were provided. Discussion occurred after each factor presentation, as well as a general discussion of the overall measure at the conclusion of the session. The raters had minimum questions and the factors were agreed upon as being understood and instinctual by the raters.

Data Analysis

All raters evaluated the five TIOSE factors for each of the 12 team projects on Rounds One, Two, and Three. After raters completed scoring, ratings were entered into a spread sheet. A grading key translated the graphic marks on the measure's worksheet into a 100 point scale. The conversion occurred after all rating was completed and independent to the rater or any inter-rater discussion. Importantly, both groups of factors and the corresponding rating process are for project results only, i.e., the visual representation which is the mode that architecture communicates the intentions of the proposal. Other factors, such as individual, team interaction and development/learning ratings, are not addressed by the TIOSE measure. Consequently, all data was analysed (no missing data). Submitted rating values for the five categories were combined into an overall Project Success category. Data was analysed using Minitab 16.1 statistical analysis software to determine the intraclass correlation (ICC) index of the reliability of the TIOSE.

Results

ICCs and mean summary ratings between raters for each round are presented in Tables 1-3; ICCs and mean ratings between- and within-raters across all three rounds are presented in Table 4. For all results, ICC values 0.75 or higher reflect excellent agreement within- and between-raters of the same team project.

As shown in Table 1, excellent agreement in the individual team ratings between raters on Round One was found for 4 out of 5 categories and the composite Project Success construct (ICC values range from 0.78-0.85). The between-rater agreement on Round One for Evocativeness was 0.70, which is slightly below the criterion cut-off for excellent agreement. In contrast to the excellent agreement between raters on Round One, agreement between raters was moderate on Round Two and Round Three (see Table 2 and Table 3, respectively), with Round Two containing the lowest ICCs across all three rounds. Specifically, ICCs on the TIOSE rating categories during rounds Two and Three ranged from 0.47-0.62, and 0.64-0.79, respectively. ICCs for the rounds Two and Three composite category Project Success were 0.58 and 0.73, respectively.

ANOVA found significant differences in the Round One mean ratings between raters 2 and 5 on the rating categories Thoroughness and Informativeness. Significant differences in the Round Two mean ratings were found between raters 5 and 6 on the rating categories Informativeness and Organisation, and between raters 1-2 and 5-6 on Evocativeness. In Round Three, significant differences in mean ratings were found between raters 1-3 and 2-5 on the rating categories Organisation and Synthesis, and between raters 1-2 and 5-6 on the rating category Evocativeness. Taken together, these ANOVA results support ranking of ICCs on the Project Success composite rating category across the three rounds: Round One (ICC = 0.79) > Round Three (ICC = 0.73) > Round Two (ICC = 0.58).

Rating Categories	ICC[a] (95% CI)	Total[b] Raters	Rater1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6
Thoroughness*	.85 (.65-.95)	83.96 (1.06)	86.00 (1.54)	89.75 (2.74)	81.92 (3.40)	81.50 (2.76)	78.75 (1.83)	85.83 (2.03)
Informativeness*	.80 (.55-.93)	85.06 (1.08)	86.42 (1.90)	91.33 (2.75)	84.83 (3.18)	82.08 (2.42)	78.42 (2.08)	87.25 (2.13)
Organization	.78 (.52-.92)	85.38 (.95)	89.58 (1.84)	87.00 (2.63)	85.46 (2.42)	84.00 (2.35)	80.67 (1.82)	85.58 (2.36)
Synthesis	.83 (.62-.94)	82.33 (1.06)	85.33 (2.03)	83.42 (2.66)	83.96 (3.43)	79.54 (2.87)	79.00 (1.95)	82.75 (2.29)
Evocativeness	.70 (.36-.90)	83.61 (1.03)	89.42 (1.17)	82.42 (3.11)	84.92 (3.48)	82.50 (1.99)	78.67 (1.64)	83.75 (2.42)
Project Success*	.79 (.68-.86)	84.07 (.46)	87.35 (.78)	86.78 (1.28)	84.22 (1.39)	81.93 (1.10)	79.10 (.81)	85.03 (.99)

Table 1: Inter-rater Reliability and Mean Ratings on Round One.

aIntraclass correlations (ICC) for inter-rater reliability derived from a 2-way, random effects ANOVA model according to the procedure of Shrout and Fleiss (1979); 95% confidence interval (CI) in parentheses. bMean ratings of each category for Total and individual Raters on round; standard error of the mean (SEM) in parentheses. *p < .05 **p < .01 significant difference between ratings according to ANOVA.

Rating Categories	ICC[a] (95% CI)	Total[b] Raters	Rater1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6
Thoroughness	.53 (-.05-.84)	87.01 (1.08)	87.42 (1.29)	88.83 (3.38)	89.92 (2.18)	87.08 (3.29)	86.42 (2.24)	82.42 (2.84)
Informativeness**	.50 (.01-.82)	85.88 (1.11)	88.83 (1.48)	89.25 (3.42)	89.58 (2.14)	87.50 (2.51)	77.83 (2.07)	82.25 (2.81)
Organization*	.47 (-.06-.81)	86.18 (1.18)	90.50 (1.03)	85.42 (3.74)	92.33 (2.30)	86.33 (2.91)	79.33 (2.27)	83.17 (3.12)
Synthesis	.67 (.30-.89)	82.17 (1.17)	86.92 (1.82)	79.67 (3.48)	84.42 (3.69)	85.50 (3.22)	79.08 (1.87)	77.42 (1.77)
Evocativeness**	.62 (.24-.86)	85.74 (1.07)	91.17 (1.50)	93.00 (2.30)	86.33 (2.65)	86.00 (2.72)	79.33 (1.65)	78.58 (2.02)
Project Success**	.58 (.39-.72)	85.39 (.51)	88.97 (.66)	87.23 (1.54)	88.52 (1.20)	86.48 (1.28)	80.40 (.96)	80.77 (1.15)

Note. See Table 1 for description of table elements.
Table 2: Inter-rater Reliability and Mean Ratings on Round Two.

Rating Categories	ICC[a] (95% CI)	Total[b] Raters	Rater1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6
Thoroughness	.79 (.54-.93)	91.83 (.86)	92.42 (1.51)	96.75 (1.54)	92.83 (2.54)	88.00 (2.35)	91.83 (1.36)	89.17 (2.40)
Informativeness	.75 (.45-.92)	88.28 (1.09)	90.42 (1.76)	89.75 (2.88)	89.50 (2.98)	86.42 (3.26)	84.75 (1.86)	88.83 (3.13)
Organization*	.72 (.42-.91)	89.72 (.98)	94.83 (1.44)	92.25 (2.01)	87.75 (3.29)	88.33 (2.38)	84.00 (1.39)	91.17 (2.38)
Synthesis*	.64 (.27-.87)	86.67 (1.08)	92.25 (1.62)	90.67 (2.90)	81.75 (3.17)	86.83 (2.63)	80.08 (1.35)	88.42 (2.23)
Evocativeness*	.69 (.35-.89)	90.03 (.92)	94.58 (1.33)	94.33 (2.04)	87.75 (3.38)	89.17 (1.77)	86.33 (2.09)	88.00 (1.52)
Project Success*	.73 (.60-.82)	89.31 (.45)	92.90 (.70)	92.75 (1.06)	87.92 (1.41)	87.75 (1.10)	85.40 (0.87)	89.12 (1.04)

Note. See Table 1 for description of table elements
Table 3: Inter-rater Reliability and Mean Ratings on Round Three.

Table 4 presents both inter-rater reliability and intra-rater reliability across all three rounds. The lowest ICC was, surprisingly, found in Organisation while the highest was in Thoroughness. Out of the three base-line categories, Organisation is the more difficult to assess as it relates to issues of clarity on the part of proposal but also the rater's ability in pattern recognition, often across multiple scales. Thoroughness, consistently high in agreement between raters, can be defined as a fairly quantitative category and had excellent agreement when compared across

all three rounds. Overall, there was consistency between the raters on all categories from less tacit to more tacit, with a range from 0.68 to 0.80 ICC.

Rating Categories	ICC[a] (95% CI)	ICC[b] (95% CI)	Total[c] Raters	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6
Thoroughness*	.80 (.68-.89)	.73 (.47-.90)	87.60 (.62)	88.61 (.94)	91.78 (1.61)	88.22 (1.73)	85.53 (1.66)	85.67 (1.38)	85.81 (1.45)
Informativeness**	.71 (.53-.83)	.84 (.67-.94)	86.40 (.64)	88.56 (1.01)	90.11 (1.71)	87.97 (1.62)	85.33 (1.59)	80.33 (1.24)	86.11 (1.60)
Organization**	.68 (.49-.82)	.77 (.55-.92)	87.10 (.61)	91.64 (.91)	88.22 (1.69)	88.51 (1.59)	86.22 (1.47)	81.33 (1.09)	86.64 (1.59)
Synthesis**	.73 (.58-.85)	.77 (.53-.92)	83.72 (.65)	88.17 (1.14)	84.58 (1.87)	83.38 (1.94)	83.96 (1.72)	79.39 (.98)	82.86 (1.41)
Evocativeness**	.72 (.54-.84)	.71 (.45-.90)	86.46 (.61)	91.72 (.83)	89.92 (1.68)	86.33 (1.80)	85.89 (1.32)	81.44 (1.17)	83.44 (1.31)
Project Success**	.74 (.67-.80)	.78 (.69-.85)	86.26 (.28)	89.74 (.45)	88.92 (.78)	86.88 (.78)	85.39 (.69)	81.63 (.55)	84.97 (.66)

Table 4: Inter-rater and Intra-rater Reliability and Mean Ratings across All Three Rounds.

aICCs for inter-rater reliability across all rounds. bICCs for intra-rater reliability across all rounds. cMean ratings of each category for Total and individual Raters across all rounds; standard error of the mean (SEM) in parentheses. *p < .05 **p < .01 significant difference within ratings according to ANOVA.

Discussion

Summary and Implications

In summary, when looking at intra-rater reliability for the measure, the agreement within raters was excellent for 3 of the 5 rating categories and the composite Project Success construct. The coefficient was the highest for the categories Informativeness, Organisation, and Synthesis. The lowest ICC was found for the category Evocativeness, suggesting that this category was the most difficult for each rater to judge. The fact that Synthesis rated with excellent agreement speaks to the ability to have consensus, without prior discussion, on the core nature of design as a qualitative, tacit and systems-based composition.

The agreement between raters was highest on the first round (Table 1), dipped for the second round (Table 2), and then came back up for the third round (Table 3), with all of the Round Two ICCs for inter-rater reliability within the moderate agreement range of 0.40-0.75. Since one of the needs for the TIOSE measure was to handle "real-world" variation in project presentation, there was a variation of requirement between the delivered project proposals between rounds one-three. Round Two contained a shift of priorities and complexity for the teams, with greater emphasis placed on Synthesis and Evocativeness, thereby requiring evidence of a deep understanding of the topic. This finding seems to be reflected in the range of rater's assessment, and implies that Thoroughness,

Informativeness and Organisation are not as well defined or agreed upon when there is an increase in complex and system based information. We also recognized an issue that raters, in judging design work, may be biased by projecting their own interpretation onto a project, creating a dimension of possibility that doesn't actually exist in the work itself. The rating on the measure then relates to the rater's view of the project's potential rather than objectively rating the project itself. The differences in ratings seen between Round 2 and Round 3 may be related to raters recognizing this intrinsic bias for self-evaluation.

As mentioned above, agreement between the six raters on Round Three was higher than on Round Two, with 2 out of 5 categories on Round Three satisfying the inter-rater reliability criterion for excellent agreement. Again, it was the composite and more highly tacit categories of Synthesis and Evocativeness which had lower ICCs than the baseline categories. The categories of Thoroughness, Informativeness and Organisation followed the same pattern of ratings in Round Three as in Round One, with Thoroughness rating the highest followed by a decrease in each subsequent category. There was more agreement on Evocativeness in Round Three than the previous rounds, although it didn't quite reach the criterion for excellent agreement.

Overall, the reliability of the TIOSE measure was excellent since the Project Success ICC between- and within-raters across all three rounds of project evaluations was excellent (mean = 0.76, see Table 4). The decrease in reliability in Round Two (Table 2) possibly represents change in project focus and an increase in the use of tacit knowledge, as well as more advanced design integration skills. As the study progressed, personal interaction between the raters and the teams increased in a constant manner. Additionally, there was less tacit knowledge available early in the study, and Round Two judging may have therefore been confounded by the personal interactions with the teams, thereby increasing personal bias amongst the raters. It was observed that in the final round (Round Three), the raters appeared to be more objective, and remove any personal bias. Thus, Round Two appeared to be instrumental in 'training' the teams as to the expectations of the raters, as well as preparing the raters to withdraw personal claims on the presented work. In terms of the teams, expectations of success in design were not made available as explicit instructions, but were implied through the discussion and question periods of the project development. As the raters acquired experience with each team, and the teams acquired more experience to the overall expectations of success, reliability increased.

Lower ICCs reflect less agreement between raters, less ability to access the knowledge held in the TIOSE categories and address the distinction between tacit verses explicit knowledge. For example, lower ICCs were obtained for those categories which are traditionally considered as systems-based and more difficult to define (i.e. Synthesis, Evocativeness), compared to the higher ICCs for the more explicit and quantitative categories (Thoroughness, Informativeness, Organisation). In terms of the raters, higher ICCs are indicative that there was more agreement amongst held tacit knowledge (i.e., the raters had more access to that knowledge), and

more clarity in the category.

Conclusion

The TIOSE measure, overall, showed excellent agreement within and between raters to depict agreement of success in architectural design projects. A key feature of the research was increased reliability when raters appeared to have access to deep, disciplinary knowledge (expert performer). Consequently, increases in variation of the experience of the rater group will contribute to an increase in the reliability of the measure. Key factors identified in the study were inter-personal interaction with the students/teams to be rated, and the experiential level of the rater.

There are several concerns and suggestions to consider for subsequent applications of the TIOSE measure. First, training will be necessarily minimal since the measure identifies currently accepted implicit practices of judgement to make them explicit, and does not focus on the construction of new factors. Training is meant for orientation and cohesiveness of judgement content for reliability factors in a tacit environment, rather than for educating the rater on unknown procedures or specific aspects of content. Training is also meant for general discussions to occur between raters so that a consensus of operational definitions is determined.

In addition, the blind nature of the rating needs to be maintained. In later applications, multiple events of bias and influence occurred between raters when the blind and discrete nature of the rating was not maintained. This interpersonal bias lead to the rating to normalized around the strongest personality of the raters.

The rating can be, and has been, used as a teaching tool to architectural design students. Discussing the factors of judgement of design allows for transparency of the judgement and grading process. Students understood their responsibilities clearer and were able to address factors both as combined and singular issues. This allowed the instructor to clearly articulate concerns as well as strengths and weaknesses of the final proposal and the design process.

Future Research

In the present study, the TIOSE measure was tested for reliability in terms of the ability of the tool to yield agreement between- and within-raters. Future research will investigate the validity of the tool by comparing it to similar tools (convergent validity). For example, the TIOSE will be examined in relation to the Jackson and Messick (1964) criteria for assessment of the creativity of a product (in terms of unusualness, appropriateness, transformation and condensation), and the creative quality of team conceptualization and optimization.

Future research will also address the issue of rater competence. Specifically, if the rater is not at mastery level, there is concern that identification of the judgement factors in design proposals may lack clarity. Thus, the impact of training and its effect on competency utilizing the TIOSE measure will be investigated.

As noted, teams in the present study were formed according to each member's presumed cognitive style in the creative process. Cognitive styles influence not only the creative problem

solving process (Cools & Van Den Hoeck, 2007), but also team cohesion and team performance (Bradley & Herbert, 1997). Since architecture maintains little to no research in the effect of team structure, cognitive style, and team interaction in the success of design outcomes (Hill, Dong, & Agogino, 2002), future research will use the TIOSE measure to investigate how diverse cognitive thinking styles engage in various phases of the design process, and how tacit knowledge is transferred to complete a successful design outcome. Team member characteristics, such as gender and personality, will also be explored for their impact on team cohesion and quality design outcome.

In summary, this study demonstrates that qualitative measures of project success can be quantified in a reliable manner and can attain internalized agreement between architectural critics. The TIOSE measure adds to the arsenal of available rating scales for the qualitative measure of architectural design quality

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Philip Plowright

Philip Plowright is an Associate Professor of Architectural Design and History/Theory at Lawrence Technological University in Southfield, Michigan, USA; a registered architect in Michigan; a founding member of the synchRG research group; principal of the design research practice rlab.a; and a director for the Architectural Research Centers Consortium (ARCC). He holds degrees in studio art, art history and architecture from the University of Guelph and the University of British Columbia, Canada. His research is focused around issues of meaning in design and includes explorations in architectural theory, design methodology, cognitive science and judgment/decision theory. The shared interest in these knowledge categories serves notions of quality in architecture and the application of conceptual frameworks into application. His upcoming book, Architectural Design Methodologies: Applying Thinking Frameworks to Practice Strategies, will be published by Routledge in early 2014. He can be contacted at pplowrigh@ltu.edu

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Matthew L Cole

Matthew Cole is an Assistant Professor with the College of Management, Lawrence Technological University, Southfield, MI, USA. Dr. Cole teaches Business Statistics, Biostatistics, Research Design-Quantitative Methods, and Research Methods for the Behavioral Sciences. He received his PhD from Wayne State University (Detroit, MI) in Cognitive and Social Psychology across the Lifespan, where he conducted research on growth modeling of risk behaviors and perceptions among adolescents from the U.S. and Vietnam. Dr. Cole holds an MA degree in Biopsychology from Wayne State University, and an MS degree in Clinical Behavioral Psychology from Eastern Michigan University. His research interests focus on the science of teams, cognitive styles in problem solving, entrepreneurship, and research methodology. He can be contacted at mcole@ltu.edu

DESIGN-BUILD IN ARCHITECTURAL EDUCATION: MOTIVATIONS, PRACTICES, CHALLENGES, SUCCESSES AND FAILURES

Vincent B. Canizaro

Abstract

Based on a comprehensive survey of design-build programs conducted in 2011-2012 consisting of interviews and reviews of a number of programs, this article provides a sketch of the motivations, practices, challenges, successes and failures associated with this popular and unique educational practice found in many architectural design programs. It provides a history of, documents the variety of rationale for, as well as the methods used in upstart and well-established Design-build programs. It serves as a guide for the development, improvement, and maintenance of existing and future programs.

Keywords

Design build; architectural education, construction; design process; community service.

Introduction

In looking to document the current state of Design-build education in the US; what follows are the findings of an extensive survey consisting of 15 in-depth interviews with program directors and an extensive review of 19 others. The set of practices and pedagogical activities collectively known as design-build are diverse, but share commons threads, assumptions, and challenges. Uncovering these will serve to benefit those currently facing such challenges and those who wish to. To begin it will be necessary to lay out a description of the heterogeneous practice of design-build, through activities I have gleaned from the literature as well as direct communication with many of those involved in such programs.

As a practice, design-build has many faces. In the industry, it is an alternative to the standard tripartite legal structure comprised of owners, architects, and contractors. In contrast, design-build combines the design and construction entities, typically with the goal of reducing project cost. In education, design-build is a pedagogical alternative to the theoretical, desk-based, and media-driven

(drawings, models, digital models) design process commonly featured in design schools. With design-build, students engage in both the design and construction of projects, small and large, simple and complex. Common to most programs is the intention "to extend students' design skills by making a stronger link with material experimentation and construction." (Wallis, 2007: 201-202). It is referred to variously as hands-on learning, learning-by-making, learning by building, 1:1, and is seen as a variant of experiential learning promoted early by John Dewey and later by David Kolb. Important to this variety of architectural pedagogy is the revision of the context to which the designer responds and an expansion of the designer's role in the making of the built environment. Grounded in the realities that may include the site, setting, clients, schedules, budgets, and technical demands of construction, design decision-making is made more informed and responsive. Such training, it is assumed, will result in more informed and responsive future architects. And while construction is common to all, each program adopts the design-build pedagogy for their own reasons that can range from community service, experimentation with digital delivery methods, to various forms of "building speculation" (Chi, 2002: 161-162).

The heritage of such educational programs can be located in the 19th century with John Ruskin who engaged his students in a community service project by building a road through the marshlands of Ferry Hinksey southwest of Oxford, England (Ellman, 1988: 49-50). About a decade later in the United States, Booker T. Washington prevailed upon the students of the fledgling Tuskegee University to build more than forty campus buildings in exchange for fees to complete their studies (Erdman, 2008: 79-80). In the 20th century, origins of design-build in education lie in the 1920s with the Bauhaus. Under Walter Gropius, they "re-established the critical relationship between the designer and the medium: the materials of construction, the processes of forming and fabrication, and the constraints these place on the design. In a sense, the Bauhaus was the first Design/Build program of the twentieth century" (Lonman, 2010: 67). At mid-century students of R. Buckminster Fuller at Yale, and students at New Zealand's Architectural Centre, built a geodesic dome and demonstration house, respectively (Hayes, 2007: 23). A clash of ideologies sparked the growth of design-build programs in the 1960s. Then as a reaction to the perceived aesthetically driven Beaux-Arts methods, students at Yale sought a socially responsible, non-elitist direction under Charles Moore. By 1967, the Yale Building Project was underway building a community center in Appalachia and continues to this day in a more formulaic fashion, building low-income houses annually in New Haven, Connecticut. Again, in the 1990s, design-build programs expanded, likely in response to theory-laden "paper architecture" and stylistic historicism of the 1980s. Steve Badanes program at the University of Washington along with the now iconic Rural Studio under the direction of Samuel Mockbee emerged at this time. Both are still in operation and continue to influence programs. The themes of alterity, community service, and experimentation that define this history remain and provide a sketch of the activity overall.

In 2010, it remains impossible to know the number of design-build programs in architecture schools worldwide. Nor is it possible to find a singular and common focus, structure, or intentionality

behind them. There are established recurring programs such as Yale's Building Project, Studio 804 and the Rural Studio, but there are many more initiated intermittently by individual faculty. In 2005, there were at least 60 programs and my rough estimate is more than 100 today (Wallis, 2007: 202).

Figure 1: Remote Studio students building their first project, a bird watching station in Fort Davis, Texas in 1997 (Source: Used with permission from the Artemis Institute).

Instructional Intentionalities of Design-build

By "intentionalities", I refer to the primary pedagogical motivations for the institution of the program. Such "intentionalities" can influence the internal processes carried out by the students and faculty, the kinds and sites of projects selected, and even the time frame allowed for the work.

For Construction Experience

Design-build as a pedagogical practice is adopted for many reasons and a variety of intentionalities can be found in almost every program. Yet each program has a focus. As noted above, and implied in the title of the practice, "building" or exposure to construction is common to all, and is for some their primary motivation. In such cases as the Yale Building Project or Southern Polytechnic's Construction Workshop, the programs have been motivated by a desire to introduce students to the art of building. In them, hands-on construction is a renewed medium for the architect's creativity or at least "a guerilla course in large-scale carpentry." (Frampton, 2008: 101).

At its most pragmatic, a focus on building is understood as necessary exposure for future professionals. It is an attempt to demystify the construction site and help students realize what is involved in taking architecture from a drawing to a building. And it is "an opportunity for the students to understand the building process with their own physical labor … recognizing the value of hands-on learning." (Brouard, 2007: 35). For many of the students, this is also their key motivation for joining the programs. Comments from KU's Studio 401 are typical: "the students mentioned an interest in

'learn¬ing about building,' 'understanding how things go together,' 'making things,' or gaining 'real life (real world) experience in place of just designing'" (Nepveux, 2010: 80).

It also serves as the reclamation of disciplinary expertise given up for professional status--a view echoed by Peter Wheelwright about the program at Parsons. He holds that "The Design Workshop was conceived as a different kind of design-build program than those rooted in typical designer vs. builder dichotomies, which either decry the architect's loss of connection to the material world, or their arrogance toward a perceived "underclass" (i.e., builders). Many academic design-build programs were founded with the explicit intention of redressing this situation" (Wheelwright, 2002: 4). In this context, design-build can be understood as a critique of the contemporary class distinctions that characterize contemporary design education. Some historians have argued that such distinctions have been a part of architectural practice since the 18th century when competition emerged between native-born American designer-builders like Asher Benjamin and European-trained architects like Benjamin Latrobe. Historian Dell Upton has, however, demonstrated that early American architects, designers and builders were not divided by class as claimed, but were instead a hybrid mix of gentlemen and craftsmen. In other words, class distinction is a concept imposed on early practices by a society that gradually embraced class-bound categories. Wheelwright and his colleagues are, then, part of a long American conversation (Upton, 1984: 107-150).

As a Form of Community Service

Outside of construction, the most prevalent characteristic of design-build programs is their organization around and intention to provide service to local communities. This is done for both pragmatic and aspirational reasons. In pragmatic terms, it is more reasonable for institutions to support and offer services to those in need when using the labor and talents of students. This keeps them out of competition with local professionals as they tend to work on projects with no potential for profit and it sidesteps the conflict between students paying fees so that they can in turn provide services to others. Virtually every program designs and builds as a public service and as such, engages in service-learning.

Other programs do so out of a commitment to social justice. From the outset, this was the case with the Rural Studio, which in accordance with Auburn University's firm commitment to "outreach," sends students to rural Hale County to design, build, and support the poor. Some of these programs have their origins in community design centers which first appeared in the 1960s and reemerge as means of continuing their commitment to those in need. Design Bridge, a student-run program associated with the University of Oregon, puts it this way: "The focus is to bring the resources and energy that we have as students to communities and organizations that can use our help. We focus on projects that have a mutual benefit to us as design students and to the community." Thomas Dutton, who runs Miami University's Center for Community Engagement, and focuses on supporting the Over-the-Rhine neighborhood, sees a further role. "We're not just trying to help a community, but we're trying to deconstruct

students' privilege. We're trying to get them to be better citizens, better community advocates, and to understand the complexity of urban areas" (Sokol, 2008: 125). This kind of work sees architectural practice as based in an ethical commitment to others. And design-build serves as a rather potent means for manifesting this commitment as it results in real artifacts and shelters that people can see and touch.

For a Larger Vision of Professional Practice

Along with construction, many programs also seek to expose students to a broader range of architectural practice. Dan Rockhill explained it to me by saying that "the building is incidental to the process." By this, he meant that the goal of Studio 804 is for the students to engage all aspects of the design and construction process – dealing with clients, codes, inspectors, contractors, product suppliers, "engineers and neighborhood associations, signing contracts, doing estimates and driving nails." At Yale, a similar intention is realized by "exposing students to all of the forces that come to bear on the making of a building, whether environmental, technical, or political, they can begin to harness them to become more effective as architects" (Sokol, 2008: 126).

As a Critique of Academia

A few programs see design-build as an alternative practice, in which the kinds of questions asked, criteria of success, and basis of judgment are made more relevant by the reality of the project setting. It is a critique of the lack of reality found in many hypothetical academic studio projects as well as of the representational tools used by students in those settings. Mostly, such programs see design-build as a manifold design activity that enriches the student's decision-making through direct engagement. Design solutions are less personal, theoretical, and grounded valuably in a "messy reality" (Hoppa, 2002: 4). Timothy Gray with Ball State University points specifically to the "'distance and disengagement' often associated with virtual rep¬resentation and the inherent abstraction of design studio" (Gray, 2010: 64). While for Brian MacKay Lyons, "Ghost Lab is a critique of the current state of architectural education – of both the role of practice and of the academy in teaching the discipline of architecture. It is based on the view that there is but one world. Thinking and doing, the mind and body are necessarily connected."

For Enhanced Awareness of Place

The realness of design-build projects has also allowed some programs to adopt them as means to train student to be more responsive to specific site and local conditions. Such sensitivity is focused, in these cases, on both climate and local culture. In the case of climate, the necessary performance of the structures for cooling, access to natural light, etc. is not solely diagrammatic, but real. It is out of the same responsibility and presence of a real place, that the students are challenged to respect and consider local architectural character, heritage, and ways of life. This last intention is central to the Koshirakura Landscape Workshop; Travis Price's unique program entitled Spirit of Place/ Spirit of Design, and the Rural Studio. Described as dealing with the consequences of their design work, Koshirakura's projects "are as a result informed as much by the local culture of the community as they are by the craft and tectonic lessons contained in the old buildings in the town." (Coar, 2010: 27). In sympathy with Koshirakura, Andrea Dean has said of the Rural

Figure 2: Remote Studio students working collaboratively to build a windbreak for horses in Montana. Used with permission from the Artemis Institute (Source: Used with permission from the Artemis Institute).

Studio, "It was also thought that this experience would demonstrate that sources for design inspiration could be born from understanding culture and place" (Dean, 2001: 78).

To Enhance Collaborative Skills

A further clear alternative to the studio environment offered by design-build is that of necessary collaborative work, which some programs make a significant point in emphasizing. Most prominent is Steve Badanes Neighborhood Design/Build Studio at the University of Washington, where building consensus is central to his pedagogy. His point is that design-build is by nature a group project that benefits from collegiality and diversity

and that working well together with your team mates is of no less importance as working with your clients and neighbors (Badanes, 2008: 248-255). Projects are of such a scale that "it exposes students to working in teams and accepting that you may not be great at everything. It allows [the students] to grow in self-confidence in terms of working in teams and accepting they don't have to be a genius in everything" (Sokol, 2008: 122).

To Explore New Methods of Project Delivery

A few programs have also begun to realize the potential in design-build to explore new possibilities for project delivery and new ideas about design. Often these projects involve the potentialities that lie in digital design and production or CAD/CAM. At the Harvard Design School, like many others, their aim has been "to realize a project and, through that process, explore and learn about design, material properties, fabrication, and construction techniques" (Better, et al, 2002: 180-182). A more unique case lies with the EcoMOD program run by John Quale at the University of Virginia. Quale has realized the speculative potential that is a part of standard academic design studios. Design-build projects are designed and built as operating hypotheses about the future potential of modular housing. Their mantra, "design/build/evaluate," links design to experimental science in very productive ways. Upon completion, as in science, each evaluation feeds the subsequent design parameters of the next project.

To Explore Materials & Materiality

Lastly, design-build programs have been used as a vehicle for students to explore the uses, characteristics, and potential within building materials, their assembly and tectonic/spatial possibilities. These "1:1 investigations" are intended to serve as both a medium of exploration for the designer-builder, and as a kind of critique of conventional building and assembly (Erdman and Leslie, 2006: 3). They are often singular works that are more sculptural, experimental, and temporary in nature. About the design-build projects completed at the "Ghost Lab", a research laboratory affiliated with MacKay-Lyons Sweetapple Architects, Thomas Fisher praises the opportunity afforded the students "to build and illuminate structures without concern for client programs, code requirements, or change orders" in direct contrast to many of the goals outlined above (Fisher, 2008: 123). More characteristic are "projects [that] share an intense preoccupation with both the making and material of building … a desire for architectural education and practice to engage with materials and processes (Erdman and Leslie, 2006).

In sum, these eight intentions are, in practice, fused or emphasized in patterns that render every program unique.

Instructional Tactics of Design-build

By "instructional tactics" I refer to the specific means adopted by each program in order to carry out its intentions.

Design Process

With regard to pedagogical process, there are two clear models in operation (Wallis, 2010). The first is the collaborative model in which students work alone or in one or more teams to develop a design project for construction. If they work in teams, proposals are developed and fused with other proposals in search of the best set of ideas.

The other model, competitive, asks the students to individually develop proposals, which are then subject to review by faculty, peers, and/or clients for selection. For some it is a single stage process, for others a multi-stage process such that winning selections are redesigned in each round for further competitive judgment. The most dominant model combines the best characteristics of these two approaches. Individual projects are competitively judged and then paired with sympathetic proposals in each subsequent round. Ultimately a single proposal is selected, but the benefits are that everyone has had a say, if not a hand, in the final proposal slated for construction.

Clients

In terms of clients, most design-build programs tend to work for public entities and/or non-profits that work in service to those in need such as community development and housing organizations. A very few work for private clients, and they do so mostly by request and typically in order to advance an agenda that is in the common interest, such as a park pavilion. For most programs having real clients and interacting with them is key, in terms of the student exposure to the building process. Further, some program directors have commented that by working for clients, the students often feel a greater responsibility to something beyond themselves, making them more serious and motivated to complete the work.

Projects

The scopes of projects vary widely both among programs and over time within each program. Many build pavilions, park and recreational structures, interpretive centers, and other outdoor structures, especially at the beginning of a program. The reasons given for the selection of these projects include the desire to avoid code constraints, project visibility (as these are typically in public view and for public use), greater ease of construction, ability for students to explore structural, material, and tectonic issues, and so that projects fit neatly within an academic term. The more established programs tend to build houses as a means of community service by aiding housing providers for those in need including Habitat for Humanity, although some such as the Rural Studio have designed and built complex public buildings as well. Some have lamented the shift to residential housing construction, as it often includes a turn towards more conventional construction and less exploratory potential for the young designers (Hayes, 2007: 40).

Getting Started

A common theme of many start-up programs is that of building trust with the community. Start-ups tend to work on small-scale projects, renovations, and other "as-needed" projects for communities of modest means. The Rural Studio is again, emblematic of this common tactic. As a means of gaining trust in the community, they sought to "do whatever they could" to help completing small renovations to houses and businesses throughout Hale County. The idea being that they could offer skills, labor, and were ready to help so they took on whatever was required. A more recent example at the Rural Studio occurred when the program took stock of its projects to date in Mason's Bend. Upon discovering that the building of houses had neglected one of the three extended families in the area, the Fields, a student sought to rectify this by approaching the family directly. Initially met with skepticism, he was dismissed with the

Figure 3: Students build a wind shelter for horses in Montana as a part of the Remote Studio (Source: Used with permission from the Artemis Institute).

challenge that if he wanted to help, he could cut weeds in the backyard. He did, and in the process built up the trust needed to work more widely for the Field family in the years since (Bell, 2003: 26-28).

In a more activist vein, the University of Kansas School of Architecture initiated what they refer to as either "guerilla architecture" or "insurgent architecture" when they sought to help the citizens of the Seventh Ward of New Orleans in the wake of Hurricane Katrina. Not unlike the Rural Studio, they simply wanted to help. As they put it, we "were paired with a fledgling

community organization [the Porch Cultural Organization], and together we set about deciding what we would do. It was perhaps inevitable that we would start something unorthodox" (Corser and Gore, 2009: 33). What followed was a collaboration of identifying needs and unique solutions that resulted in, to date, five projects that began with "Notice Boards" that aimed to give the neighborhood "a voice in citywide dialogues … and also provide an opportunity for residents to talk with each other about race and class, creativity and activism" (Breunlin, 2008). This was followed by a more conventional set of projects, including a community garden, shade structure, tool shed, and mobile stage, but each integrated/woven within the fabric of the communities emerging needs. Their reference to "insurgency" here, which has become something of a mantra, is instructive. Derived from the work of David Harvey, the "insurgent architect" is a theoretical political figure who employs both a "speculative imagination" and "has available some special resources for critique, resources from which to generate alternative visions as to what might be possible" (Harvey, 2003: 237-238).

Work

Generally, programs rely on students to do all of the work, but with supervision ranging from one or more faculty acting as the project manager(s) or facilitator(s), which one likened to "stacking BB's" and "herding cats." Due to the complexity of many projects, legal and/or code considerations, programs forced to work with consultants and sub-contractors for electrical, plumbing, specialty trades, and the operation of complex equipment. In these cases, most report that students work closely with the consultants, often coordinating them while also receiving on-the-job training. The faculty member's role is also consistent across the programs. They secure the projects, primary funding, and serve as the liaison with clients, although in rare cases the students generate both the funding and projects.

Financing

Project funding is one of the most difficult aspects for design-build programs. The money available is often insufficient to do the work, obtained piecemeal, partially siphoned away by the university or otherwise encumbered, or simply unavailable. Many programs try to work with non-profits and other agencies with active and proven fund-raising capabilities, and a few thrive this way in an entrepreneurial manner such as Studio 804 who sells the completed projects. They work closely with a local Community Design Center who bankrolls the project with a loan. Once complete and sold, profits are split and used for the future operations of both the CDC and Studio 804. Other programs include fundraising as a part of the educational process, but the students tend to be most successful with in-kind donations of materials and products. On the down side, Bruce Lonman summarizes, "unable to acquire the funding some programs downsize the project to match the budget. All in all the orga¬nization and financing of a design/build endeavor discourages many administrators and department heads who would otherwise be sympathetic to the educational benefits." (Lonman, 2010: 70)

Scheduling

While there is a wide range of schemas for the scheduling of projects, most attempt to conform to a single or double academic term for both

the design and construction phases. About half of the programs surveyed utilized only one semester, typically Spring, for both design and construction and rely on the summer term as a backup plan. These programs tend to tailor the type, location, size and scope of the projects according to what could be completed within a tight 15-week time frame. In addition, a few have adopted a formulaic approach, building similar types of projects (pavilions, small houses with conventional construction) so as to effectively manage complexity. All programs were keen not to interrupt the overall studies of their students by having to devote an inordinate amount of time to the project. Of those that did use two semesters, some used the first for research and design, with construction to follow. Others were compelled to use both semesters due to the complexity of the projects. Most rare are programs that use less than a full academic term, usually a few weeks in the summer.

Organization

The majority of the programs situated within academic institutions, and many of those that come and go are design studios reconfigured with a construction component. With success these smaller ad-hoc projects may be developed as clearly delineated programs like Studio 804 (affiliated with the University of Kansas), DesignBuildBluff (affiliated with the University of Utah), or ecoMOD (University of Virginia). In a few cases, for strategic reasons, the programs operated as non-profits that are financially independent of the university, but linked via curriculum and faculty salary.

Location

As for the sites of projects, most prefer to work close to home for pragmatic and ideological reasons. It is easier for students to travel to the job site in between other obligations such as coursework, family, or jobs. Steve Badanes suggests that it is best to "work closer to home, where you can be more productive, save energy, and build community credibility with each new project in the same geographic area (Badanes, 2008: 249). Extending this Adam Hopfner of Yale's Building Project states, "That's exactly how we feel about New Haven. It's a really depleted housing stock. Certain communities are really underserved. We feel we can do the most good at home" (Sokol, 2008: 124). Yet, other programs have found great success working far from the university. Some seek out work in places of need around the globe, such as the BASIC initiative Global Community Studios (once, the University of Washington, now a collaboration entity between Portland State University and University of Texas at Austin, School of Architecture). Others have set up shop in areas of need closer to home, such as the Rural Studio and the many programs that migrated to New Orleans to help rebuild after Hurricane Katrina.

Sustainability

Lastly, whether it is a sign of rising general interest among students, or a feature endemic to the kinds of projects being completed, sustainability is a feature in most programs. For many it is rendered as both an issue of the building's performance as well as the materials that go into its construction as recycling and the use of "found materials" is a common theme. Moreover, inasmuch as sustainability is allied with social justice, the many programs committed to community service also take seriously energy efficiency (as a way to keep operating costs low), and the health effects of

materials deployed in construction.

In sum, these ten strategic tactics describe both the radical heterogeneity of design-build programs as well as the surprising commonalities they share.

Issues and Challenges of Design-build

Running a design-build studio or program is not easy. There are a number of impediments to the successful completion of even the simplest projects. In this section, I detail a few of the recurrent issues faced by those involved with this alternative form of pedagogy and practice.

Perhaps the primary difficulty faced by design-build programs concerns their reception within their own institution. Programs of all types face purposive and unintentional scrutiny, misunderstanding, mistrust, and marginalization by colleagues, administrators, and students. It is a testament to both luck and will that many of the projects ever see the light of day, much less get built.

Collegial Resistance

Amongst colleagues, the resistance to design-build programs is not surprising to anyone familiar with faculty politics. There is a lack of support that appears to stem from both jealousy and legitimate criticism. Much of the jealousy appears to stem from the success of the design-build projects themselves. They are often popular within the community and with administrators because they are tangible, visible, photogenic projects that appear in newspapers, books, and magazines. They are also popular amongst students who wish to be a part of "real" projects after so many theoretical ones. Pedagogically design-build programs critiqued in four general ways:

First, some faculty view design-build as "vocational" because they tend to use conventional construction methods so as to be manageable by students. Many schools see the role of the architect as a critical thinker who challenges such conventions so many design-build studios are dismissed as little more than courses in construction.

Second, other faculty members argue that design-build studios are insufficiently challenging for all students. This logic stems from the fact that only one project is completed in an academic term Such a low level of production is not seen as a sufficient substitute for the traditional design studio, which allows each student freedom for exploration and expression within the design and representational process thought to be central to professional practice and the role of the architect as artist (The only exceptions to this criticism are those projects described above which are framed as explorations of materials). However, Nick Nepveux countered that design-build programs are a "change from the view that architectural education is about develop¬ing individual skills to design "our own" creations, to the view that architecture is an inherently in¬terdisciplinary and collaborative form of artistic expression" (Nepveux, 2010: 84).

Third, criticism is also leveled at the number of credits students receive for their participation in these programs, arguing this stifles opportunities for those students to take a greater variety of coursework, or that it reduces the amount of time available for core studio skill development. And lastly, some feel that design-build studios

may be exploitative because they appropriate student ideas for real projects without compensation.

In sum, design-build programs are "viewed as marginal to design school curricula. They often fall short of the dual goals of exemplary design and lasting social impact, and they are rarely integrated with broader university or national initiatives on community development" (Pearson, 2002: 7). To rectify these impressions, each design-build program, including the AFI, should work harder to develop a discourse that takes these criticisms seriously while also extolling the benefits outlined above. Such programs, as Jori Erdman has argued, need to stop operating at the margins, and be integrated into the "educational framework" of the schools within which they are housed (Erdman, 2008: 77). In this way, perhaps the benefits of both pedagogies can be manifest.

Administrative and Institutional Resistance

Universities and departments are by their nature conservative, if not slow to adapt to change. Design-build programs suffer a variety of impediments due to institutional conservatism, and many of those programs, which have been successful, credit that success to the support of upper level administrators who have paved the way and provided institutional cover. At the local level, some administrators find it problematic to balance unconventional coursework (often exceeding normal workload) within overall staffing demands. Faculty, in turn, finds it frustrating to work so hard only to have such demanding work not recognized. To make matters worse the work of young faculty in particular is not given appropriate consideration with regard to tenure and promotion because few consider it equal to "research" even though community support and funding is often available. At the level of upper administration, there is often pressure for funding to be present at the outset of a project, which does not dovetail with academic schedules. Further, the issues of liability for both student safety and for the protection of property (i.e. risk management) are interpreted or learned differently at every institution as each has their own tolerance for risk. Many programs reported protracted and delayed approvals when permissions were initially sought delaying projects and causing havoc with student schedules and client expectations. Others reported attempts to complete work hidden in plain sight or extolled the benefits of being far from the main campus and out of the sight of the administration. Timothy Gray (Gray, 2010: 65-66) agrees:

"Most faculty that engage in these types of projects over a pe¬riod of time face burn out if the institution is not structured to facilitate and encourage these types of experiences. The fact remains that … ongoing administrative and institu¬tional support for this type of undertaking remains the exception rather than the norm. … The work of Andrew Freear, who is carrying the amazing work of the Rural Studio at Auburn to new levels, still faces a host of administra¬tive frictions with the University. The outstanding work achieved by educators such as Dan Rockhill at Kansas and Bryan McKay-Lyons at Dalhousie is not free from the same issues and concerns experienced throughout the Eco Center project. These flag¬ship programs have either found a way to divorce themselves altogether (Studio 804, Ghost Lab) or distance themselves from the many administrative overlays of the

academy...no small task."

Student Resistance

Students, even those interested in design-build programs, pose a variety of challenges. At the outset, many do not appear to comprehend the scope of the projects and so find the time commitment and skills required to be overwhelming. There are conflicts with the intentionality of the projects, as some join for the chance to work on real projects, but are disinterested in the community service agenda. Others, with the opposite intention, sometimes lack an interest with the demands of construction. Hank Louis of DesignBuildBluff describes the more ideal outcome. "My students come for the hands-on experience. But once we get to the Navajo reservation the whole social aspect of it becomes very strong and there's a love affair that develops between the Navajo family and these students" (Sokol, 2008: 123).

Students possess varying degrees of skill and/time available for participation. For those that lack skills, time must be devoted to training and oversight and progress is often slow. Many have commented that the learning curve in such courses is enormous. Architecture students are also unaccustomed to working in groups, and with any group projects, the interpersonal dynamics must be managed. Once construction begins, maturity and experience in construction sets up the hierarchy of the job site and many faculty report spending a lot of time, especially Dan Rockhill, "balancing the fragile egos" of those participating.

Scheduling problems are also serious and exacerbated by weather and the late arrival of materials. In addition, since there is an ethical and legal obligation to the clients to complete the work on time, the need to "get the job done" can often run counter to the pedagogical goals of student learning. The best strategy for dealing with this is the use of a "study abroad" or residency format in which design-build is the only coursework for the academic term. This gives the students and project directors time to balance student needs with the demands of the project. For those without this possibility, programs have turned to prefabrication as a means to keep the work more local, reasonable, and controllable. For those programs that span multiple semesters, the tension between continuity, turnover, and project ownership by students and faculty alike is problematic. "One group gets started, and the next group has all kinds of critique. They want to move the kitchen to this location or that location. A lot of effort is spent in passing the baton and finding your own [as a student] value in it" (Sokol, 2008). Moreover, since, many programs contribute their success to student engagement the program can suffer when continuity is not maintained.

Equipment and Facilities

Having a place to work, facilities, tools, and proper maintenance are the key to any program's success. In many ad-hoc programs, student and faculty often covertly fund the program by supplying their own tools and replacing consumables such as sandpaper and drill bits with their own funds. More established programs have learned this lesson and build such funding into their budgets, or have already secured facilities. Recently public work by the Rice Building Workshop was brought to a hiatus by the need to erect a covered outdoor workshop on a site accessible from campus just

so students could survive the brutal heat and humidity of Houston. The Shelter incorporates a mobile woodshop and storage space, each adapted from shipping containers.

Quality of Work

Lastly, it is important to reiterate the limiting impact (or resistance) on the quality and scope of work based on all of the above. Because these programs use novice builders, many are limited to the use of familiar or standard building techniques and methods (Fowles, 1984: 8). The more complex the project, and those that require the use of consultants and trades people for completion are often more expensive and afford students less chance for hands-on or experiential learning, relegating to observers. Academic schedules, those of the students and the institution are influential in reframing of the scope of projects (to make them small enough to complete in a semester) or relocating the site of work to a local shop and thereby forcing the use of prefabrication as the method of delivery. As a comprehensive response, some programs now limit their output to a single building type and as stated above, follow a more manageable and formulaic approach. In the process, they open themselves up, rightly or wrongly to the criticisms leveled above.

In sum, these five issues and challenges are present, to varying degrees, in all of the programs studied. Along with the intentions and tactics examined above, they provide a pedagogical context in which to place and improve any or all programs.

Concluding Word

Beyond the suggestions above, I recommend to the reader, a thorough review of companion design-build programs as a means of mining and learning, if not outright stealing any good ideas that can be found. There are many dedicated program directors, instructors, students, and administrators supporting their own local programs throughout the North America and the world. Many face similar challenges, seek similar goals, and many are succeeding in ways small and large. However, there is admittedly still too little theorization and reflection for so widespread a practice as educational design-build. Greater communication can only help and I hope I have done my part in this essay. The summary review above is only a snapshot of present activity and intentions involved in this constantly changing educational practice. Nevertheless, design-build as a methodology has more to offer than just another way of getting something done. It is a unique and complex interdisciplinary practice that can not only bring the interests of designers, builders, and fellow citizens into common purpose, but also make community-engaged pedagogy relevant to other disciplines. Because design-build pedagogy is grounded in realities that include the site, setting, clients, schedules, budgets, and technical demands of construction the intellectual and practical abilities of future architects cannot but be more informed by such learning experience.

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Vincent B. Canizaro

Dr. Vincent Canizaro is Chair of the Department of Architecture, Associate Professor at the University of Texas at San Antonio, and a registered architect in Massachusetts. His research and practice interests include community-oriented design, sustainability, design media & process, cultural landscapes, regionalism, and site-specific design theory, because these relate with his sense of how to live in a place – by connecting to it. He has co- edited two special issues of the Journal of Architectural Education (February 2004 and May 2007) dedicated to the subject of Architecture, Landscape, and Sustainable Architecture, respectively. He has written for Texas Architect Magazine, the AIA San Antonio guidebook to Architecture, and published, with Princeton Architectural Press, Architectural Regionalism: Collected Writings on Place, Identity, Modernity, and Tradition (2007) which documents the its intellectual history. His most recent publication is "Regionalism, Place Specificity, and Sustainable Design," in Pragmatic Sustainability with MIT Press. He can be contacted at vincent.canizaro@utsa.edu

A NEW LANDSCAPE OF ARTS-BASED BUILDINGS AND COMPARATIVE CULTURAL POLICIES ON THE ISLAND OF IRELAND: THE CURSE OF JOCASTA'S NECKLACE

Sarah A. Lappin

Abstract

Much current cultural policy research focuses on activity traditionally viewed as arts practice: visual arts, music, literature and dance. Architecture's role in the discussion of cultural policy is, however, less certain and thus less frequently interrogated. The study presented here both addresses this dearth of in-depth research while also contributing to the interdisciplinary discussion of cultural policy in wider terms. In seeking to better understand how architectural culture is regulated and administered in a specific case study, it unpacks how the complicated relationships of nominal and explicit policies on both sides of the Irish/Northern Irish border contributed to the significant expansion of arts-based buildings 1995-2008. It contrasts political and cultural motivations behind these projects during a period of significant economic growth, investment and inward immigration. Data has been gathered from both official published policies as well as interviews with elite actors in the decision-making field and architects who produced the buildings of interest in both countries. With the sizeable number of arts-based buildings now completed in both Republic of Ireland and Northern Ireland, one must wonder if this necklace of buildings is, like Jocasta's, a thing of both beauty and redolent with a potential future curse. It is the goal of this project to contribute to the larger applied and critical discussion of these issues and to engage with future policy design, administration and, certainly, evaluation.

Keywords

Comparative cultural policy, architecture, Republic of Ireland and Northern Ireland.

Introduction

Much current cultural policy research focuses on activity traditionally viewed as arts practice: visual arts, music, literature and dance. Architecture's role in the discussion of cultural policy is, however, less certain and thus less frequently interrogated. Since the early 1990s, the process and product of architects has been increasingly considered by policy makers as 'culture.' However, little current research work in the area interrogates links of policy to architecture in areas beyond the much-discussed and widely criticized use of flagship buildings as cultural planning. Likewise, while scholars such as Scullion and García list a myriad of disciplines in which research in cultural policy research is based, including communication science, media studies, human geography, urban studies, sociology, history and public policy (2005:123), methodologies

and perspectives developed in the discipline in architecture are rarely deployed.

This study, approached from the perspective of architectural history and practice, seeks to both address this dearth of in-depth research while contributing to the interdisciplinary discussion of cultural policy in wider terms. In seeking to better understand how architectural culture is regulated and administered, it unpacks the complicated relationships of nominal and explicit policies on both sides of the Irish/Northern Irish border contributed to the significant expansion of arts-based buildings 1995-2008. It compares and contrasts the political and cultural motivations for the procurement and development of these buildings during a period of significant economic growth and stability, investment and inward immigration. In so doing, it acts as a means to interrogate, in a specific comparison, the principles and strategies of policy as it relates to the appointment of significant architectural commissions. Data has been gathered from both official published policies as well as interviews with elite actors in the decision-making field and architects who produced the buildings of interest in both countries.

Clearly, this study requires many limitations to its scope. The comparison here is limited to the Republic of Ireland and Northern Ireland; contrasts and similarities are not being drawn here between Great Britain. Likewise, the definition of 'arts-based building' is here limited to those which provide a location for the practice, display and/or performance of theatre, visual arts, music, dance and workspaces for both professionals and amateurs. In addition, the buildings considered here are those that have been funded through public sources. Some initial attempts have been made to catalogue the depth and breadth of these buildings. For instance, Gemma Tipton's book Space Architecture for Art includes a directory, though privately-funded projects, such as the Glucksman Gallery, Cork by Dublin architects O'Donnell + Tuomey are also included in that volume (Tipton, 2005). This paper, while recognizing these efforts, does not seek to exhaustively list these buildings.

These questions grow out of two previous major studies by the author which examined links between cultural policy and national identities. The first, a three-year research project investigated relationships between cultural policy and architecture centres, (organisations which promote issues of the built environment amongst the 'general' public) (Lappin, 2008), while the second, the author's book Full Irish: New Architecture in Ireland (Lappin, 2009) explored the connections of the built realm and cultural identity in both the Republic of Ireland (RoI) and Northern Ireland (NI) from the late 1990s-2008, during the so-called Celtic Tiger boom period.

Gibson and Stevenson note that there is little evidence 'other than certain consultants 'say so,' that the massive public expenditure required for ... [arts-based] redevelopment and re-imaging strategies actually produces outcomes that are in the public interest' (2004: 2). With the sizeable number of arts-based buildings now completed in both RoI and NI, one must wonder if this necklace of buildings is, like Jocasta's, a thing of both beauty and redolent with a potential future curse. Will these buildings contribute to the 'culture for

all' ethos embodied since the 1940s by many governments while simultaneously helping to cure social ills, (including considerable economic problems), as demanded by more recent cultural policies? Through this specific lens, this paper will begin to address an area of research considerably overdue concerted focus.

Background: Architecture Named in Policies

Since its beginnings, the RoI has used particular art forms to help mold its national identity, from painting to literature to architecture. However, these practitioners were encouraged to locate themselves as much in the Irish context as possible, much of their focus, particularly that of architects, was placed on the use of the Modernist idiom in the early decades of the Republic.

The first major cultural legislation in Ireland, the Arts Act of 1951, sets out the definition of culture for the RoI including architecture. In its definition section, the Act states 'the expression "the arts" means painting, sculpture, architecture, music, the drama, literature, design in industry and the fine arts and applied arts generally.'

This early inclusion of architecture in the definition in cultural legislation appears to be singular -- architecture is not considered part of culture officially until late in the 20th century in most European countries. In the succeeding versions of the Arts Act, including the most recent edition of 2003, architecture remains as part of that foundation. Fitzgibbon, who has both studied the swathe of Irish cultural policy and worked in arts councils on both sides of the border, notes that though the nomenclature of 'arts' to 'culture' has been an issue in Irish governmental policy and legislation, the inclusion of architecture was not a significant source of debate (Fitzgibbon 2010a, Fitzgibbon 2010b).

Unlike the RoI, the UK government has never applied a specific definition to culture or the arts, and architecture was not seen as a policy priority for most of the second half of the twentieth century for UK governments. However, in 1995, the Arts Council Northern Ireland (ACNI) underwent a reformation as a public body and included in its remit for the first time an explicit reference to architecture and the built environment. The policy documents demand that ACNI raise 'awareness in the quality of architecture and the built environment' (Arts Council Northern Ireland, 2001a: Aims section) by the 'public,' not simply provide a shell building to host other forms of art. Similarly, in the RoI, this language is reflected in their published plans and strategies; both ACNI and the Arts Council Ireland also appointed an architecture officer for the first time in the late 1990s.

In 2002, the Irish government Department of Arts, Heritage and the Gaeltacht published its first architecture policy Action of Architecture, a Government Policy on Architecture for the period of 2002-2005; in 2006, Northern Ireland followed suit. In 2009, the RoI policy was expanded considerably as the Government Policy on Architecture 2009-2015, published this time by the newly formed Department of the Environment, Heritage and Local Government. In 2002, the Department of Arts, Heritage and the Gaeltacht was dissolved, and most of its responsibilities were transferred

to the new Department of Culture, Sports and Tourism, though some issues were given to the Department of the Environment, Heritage and Local Government (DOEHLG.) One of these was the consultation and writing of the new architecture policy, undertaken with DOEHLG staff in cooperation with the Irish Architecture Foundation, the Republic of Ireland's equivalent of PLACE, Northern Ireland's architecture centre. Architecture has continued as a priority on both sides of the border, named as a specific policy area in such documents as the Partnership for the Arts 2006-2010, the Arts Council/An Chomhairle Ealaíon's main policy document for the current period and in the ACNI's Creative Connections: a five-year plan for developing the arts 2007-2012.

Why specific focus on architecture and the built environment appears in cultural policies in this period is not yet completely understood. We know that architecture policies became increasingly employed after 1991 in Europe, and the European Forum for Architecture Policies was established in 2000. Likewise, the period in which architecture policies are coming to life is the same period in which in the UK methods of procurement such as Public Private Partnerships, Public Finance Initiatives and Design and Build came to the fore as well, methods in which design is often relegated to a secondary or tertiary role in deference to profit or timescale for delivery. Certainly one can point to the growing trend by governments at the time of the espousal of the creative industries as a means to encourage economic growth and inward investment.

However, one might also postulate that the focus on architecture, particularly as more than product, is part of what Edensor calls 'the utility of cultural forms' (2002:16) (author emphasis). Architecture as culture may fill the role of what Edensor sees as a 'practical application of particular forms' (2002:16). This can be read as an effort on the part of governments to see architecture as more than symbolic edifices of national values and identities, but also as a place in which wider publics can ascribe many meanings, including a role in understanding the making of buildings and public spaces.

Certainly, policies on architecture must be seen as part of an international desire of cities, regions and nations to act more competitively in global markets. In these policies, we can see governments attempting to strengthen national uniqueness through architecture, a medium which has, in the past 10-15 years, become more easily consumed as part of popular and visually-based culture through internet-based communication and particularly through mass tourism of architectural sites. Funding research and promotion of national architectures through architecture policies is part of the imperative need of governments to attract capital and ongoing investment in post-industrial contexts.

Arts-based Buildings Prior to 1990s

Despite the recognition in 1940s and 1950s of the importance of culture by both UK and RoI governments, provision of centrally planned arts-based buildings prior to the early 1990s was nearly non-existent in the RoI. This appears to have been due to two main causes – serious deficiency of funding to the arts and lack of a dedicated arts body to administer any funds available. Though the Arts Council/An Chomhairle Ealaíon had been founded in 1951

with the original Arts Act, the body had neither control of funds required for buildings nor the remit to look after capital expenditure. Any buildings provided for performance, display or making of cultural artifacts were deployed not by central government, but by local councils.

Buildings specifically designed for arts activities in the RoI thus began to develop in a piecemeal fashion rather than being overseen by a centralized plan or policy, with a slow increase beginning in the 1980s . These included Belltable Centre Limerick, Garter Lane Arts Centre Waterford, Triskel Arts Centre Cork, Nun's Island Theatre Galway and others, though these were mainly renovations of often listed buildings. In this period, local councils determined local need and provided funding themselves, often in cooperation with local businesses. (Some of these early buildings have been replaced in the period of 1991-2008 with new buildings.) Similarly, in NI, localized support of arts-based buildings depended largely on regional councils.

A 'necklace' of provision: new arts centers throughout the island of Ireland

Procurement of arts centers RoI 1991-2008

In the early 1990s, the RoI was supported as an Objective One nation under the Structural Funding of the EU, specifically targeted for development in 'less prosperous regions.' Ireland received one of the highest amounts of structural funding in the entire EU – between 1973, the date Ireland joined the EEC, and 2009, the country received more than €17 billion, a significant portion of the nation's GNP (Clancy, 2009). In the list for consideration as an Objective One region is 'poor basic infrastructure'; in the 1990s, a lack of arts-based buildings was identified as a lack of infrastructure under the aegis of the provision of culture for all tradition.

These structural funds were deployed for a series of arts-based buildings in the Temple Bar region of Dublin beginning in the early 1990s when Dublin City Council held a competition to revitalize the area. Until 1990, the City Council had planned to create a vast bus station/ transport hub in this area of dense urban fabric which included small streets with three and four-storey buildings. Like many inner city areas, the built environment of Temple Bar had deteriorated significantly. And like many similar areas in large cities throughout Europe, the low rents of Temple Bar had become popular with art and music-based communities.

The competition was awarded to an association of eight, small Irish-based firms, Group 91. Their master plan was not 'one single solution, rather a flexible series of integrated responses' (Group 91, 1991:16). The scheme based its proposal around keeping the informally-grown cultural life of the area while designing new streets, new outdoor public areas and several new cultural buildings and spaces. These new buildings included the Ark Creative Centre for children, the Irish Film Centre, the Contemporary Music Centre and the Gallery of Photography among others; these were to be supported by outdoors spaces for public displays and performances. Supported through EU Structural Funds, the six new cultural institution buildings were required to act as umbrellas programmatically – gallery or performance spaces were to be complimented with work spaces and archives in each case. This method of funding also delineated the size of the buildings; this, in

combination to the Group 91 masterplan which called for height restrictions to the buildings, had significant impact on the buildings' scale, internal planning and even their materials.

Figure 1: Irish Film Centre by O'Donnell + Tuomey Architects, Dublin, 1992 (Source: Author).

Figure 2: Gallery of Photography by O'Donnell + Tuomey Architects, Dublin, 1996 (Source: Author).

As the economy improved and most of the RoI was removed from the Objective One list, funding and procurement of cultural buildings thus became the direct responsibility of centralized Irish government. (At this writing, some regions remain part of the Objective One strategy including the border areas between the Republic of Ireland and Northern Ireland). In 1993, the Department of Arts, Culture and the Gaeltacht (DoACG) was founded creating a single body in government with the remit for capital funding including arts buildings. In 1995, the department established priority areas, and architecture, particularly the public appreciation and understanding of architecture, was listed as one of these areas of concern.

Following the perceived success of the Temple Bar project, in the period of 1994-2008 scores of new arts-based buildings and considerable renovations to others were implemented by the country's central government. These buildings were overseen under two funding schemes – first approximately 20 million Irish punts (before conversion to the Euro) from 1994-2000 was provide to the Cultural Development Incentive Scheme overseen by the DoACG. This scheme, which was targeted specifically at infrastructural development, was still aided with some EU funds. The second main funding mechanism, at a value of approximately €80 million was deployed in two phases -- ACCESS I (2000-2007) and ACCESS II (2007-2010,) overseen by the Department of Culture, Sports and Tourism, though local authorities also provided funds for the capital projects.

In both phases, projects included new build, refurbishment and additions to existing buildings, though ACCESS II aimed to deliver a strategy of sustainability with more refurbishment of buildings. In a major change of policy, local councils were required by law to invest in cultural provision for their residents; the capital investment by centralized government's ACCESS was, in the second phase, in some way matched by local councils. This has manifested itself in both capital spend as well as ongoing

support for programming in the buildings; arts officers were also appointed for each county council as part of this push for increased cultural 'infrastructure.'

Though the three phases of funding have resulted in arts centers in every county, there is no evidence that this was ever the explicit policy of the Arts Council/An Chomhairle Ealaíon or of the various incarnations of the Department of Culture for this to occur. In the development of these buildings, Arts Council/An Chomhairle Ealaíon were consulted both in terms of the potential programming and use of the buildings by cultural organizations and in their built form. However, any unofficial policy, if it existed, was overseen by the central DoACG, and, (after 2002,) by the Department of Culture Sport and Tourism. This remarkable lack of strategic planning, with no long term understanding of the sustainability of this number of organizations to support post-capital spend has already begun to be seen -- several centers forced into partial or total closure, such as Temple Bar's Art House and Design Yard. How they manage or fail to survive, particularly in a period of sustained economic downturn is a subject of anxiety and dismay both amongst those involved with the centers as well as in the popular press and general public. Criticism of the multitude of centres and the problems facing their funding in future has surfaced in the popular press and amongst the arts community (Tipton, 2010).

Procurement of arts centers Northern Ireland 1995-2009 via ACNI

The building of arts-based buildings in NI in this period was backed by two different organizations – the ACNI and Department of Culture, Arts and Leisure (DCAL). ACNI began life as the Council for the Encouragement of Music and the Arts NI, (CEMA NI) founded in 1943 as an organization related to, but separate from, CEMA GB, itself founded in 1939. The Arts Council of Great Britain (ACGB) was founded in 1946, and CEMA NI continued in its separate identity, changing its name in 1962 to the Arts Council Northern Ireland. Like the earlier government cultural organizations in the UK, ACNI began its life rooted in the 'access for all' credo espoused by many early arts policies. Local councils did not support culture to a large degree, though national legislation, passed in 1948, gave local councils the legal authority to support local arts.

As discussed above, in the early 1990s, ACNI was given, for the first time, the remit to examine and support architecture in its strategies and policies. In the past, ACNI had concentrated on visual arts, as well as literature, music and dance, but had not, in any concerted way, acted as proponents for good design in the built environment. At the same time, ACNI established a key new strategy, to ensure that an arts centre of some significance was provided within 20 miles of each resident of NI. Until that time, the Recreation and Youth Service Order of 1986 may have called for 'each district council [to] secure the provision for its area of adequate facilities for recreational, social, physical and cultural activities' (Recreation and Youth Service Order, 1986: Section 10) for all residents, but the legislation had not been tested. In the words of Walker in her extensive research into arts policy in NI from 1960-1995, 'the lack of any official visual art infrastructure across most of Northern Ireland until 1985 is obvious' (Walker, 2008a:71, Walker, 2008b). Similarly, Myerscough reported in his key evaluation of the impact of

the economic impact of the arts in Northern Ireland, (a study considered a turning point in the understanding of cultural policy in the region), that there 'is no cultural policy for the Government of Northern Ireland as a whole' (1996:11).

To these two major developments coincided the announcement on a national basis that Lottery Funding was to be made accessible to arm's length organizations for capital projects. While arts provision which had been provided by government was to remain uninterrupted, the new Lottery funds could be used for the commissioning of new buildings. This was to act, in part, as significant support to architects, increasingly understood by policy makers as cultural practitioners themselves.

While scholars such as Walker identify that considerable arts activity had occurred for decades in informal spaces throughout the region, ACNI thus set out on a decade-long process of providing a series of arts centers for NI. The project was especially concerned with provision west of the River Bann, an area, much of which is rural, particularly underserved at the outset of the project in 1995. Facilities built under Lottery Funding in this part of Northern Ireland include, but aren't limited to the Burnavon Centre, Cookstown, Omagh's Strule Arts Centre and Strabane Arts Center.

Figure 3: Strule Arts Centre, Kennedy FitzGerald Associates, Omagh, 2007 (Source: Author).

In each case, these projects were built in cooperation with local councils and other funders; indeed, ACNI's policy in the development of these buildings included the requirement that local councils identify a need for the centre and, usually, with other funders, financially co-sponsor each project.

Each centre was developed for its context in terms of programme – some centres provided theatres, while others concentrated on work spaces for the creation, by both professionals and local amateur artists – in combination with income generating elements such as cafes or shops.

With Lottery funding diminishing since the inception of the project, the capital spending for these projects, totaling approximately £28 million, came to an end – the completion of the Belfast's Metropolitan Arts Centre (formerly the Old Museum Arts Centre) in 2012 saw the final capital spending for ACNI for the foreseeable future. In 2009, an ACNI study confirmed that the arts centre within 20 miles of all residents had been met with a few exceptions in the sparsely populated area in the Sperrin Mountains.

Procurement of arts centers Northern Ireland 1995-2009 via DCAL

With the ceasefires in place by 1994 and the Good Friday/Belfast Agreement of 1998 came the devolution of government responsibilities to the new local Northern Irish Assembly. One of the ten departments to evolve from the Northern Ireland Act 1998 was DCAL. Its remit includes overseeing Lottery funds and a diversity policy, arts and culture, film, museums, libraries, archives, sports and leisure as well as the bewilderingly boundless category of 'creativity.'

DCAL grew out of its infancy during the very period of building activity vigorously pursued under the remit of ACNI. In 2005-2008, DCAL began its first three-year funding period under the Investment Strategy for Northern Ireland (ISNI,) and 2008-2011 saw the second phase of this process, in both cases part of the Arts Infrastructure Program. Within the large NI block grant from Westminster, DCAL identified two mainly urban areas for specific investment, again in the form of significant arts-based buildings – the northwest, (London/derry in particular,) and Belfast. However, in spite of this commitment to capital spending on the arts, seen as part of an overall investment plan for NI, there does not appear to have been any corresponding published policy.

These projects represent, for the first time, a bespoke capital line of funding for the arts; this was, significantly, the first time culture had been specifically named in the NI budget. DCAL thus provided funds for London/derry buildings such as the Playhouse, Waterside Arts Centre and the Irish language center Cultúrlann Uí Chanáin. In summer 2010, it was announced that London/derry would act as the first UK City of Culture for 2013; much of the success of that bid has been ascribed to the presence of these new buildings, in combination with the city's intact medieval city walls and active cultural community. These buildings were joined by three major refurbishment and new build projects for cultural buildings in Belfast – the Lyric Theatre, the Crescent Arts Centre and the Metropolitan Arts Centre. In their review of provision after the first six years of the major building project, ACNI also identified the Grand Opera House and Ulster Hall as buildings in need of significant refurbishment; these buildings were completed without DCAL cooperation, though the Lyric, MAC and Crescent were all joint projects between the two departments.

The targeting of Belfast by DCAL must be examined in light of a failure in 2003 by the City Council to secure the bid for UK Capital for Culture 2008. Belfast was eliminated in the first round; the evaluation of its bid at the time was that the city simply did not have the arts infrastructure to act as a legitimate city of culture. The excoriating evaluation, in addition to readily available funding from Westminster via the ISNI block grants, spurred DCAL and

ACNI implement the most significant investment in cultural buildings in Belfast in decades that would be key to any future bids of a similar nature. These buildings, labeled by DCAL as 'Legacy Projects,' offer a significant combination of projects. The Lyric, an existing theatre of long standing in the south Belfast community was the object of considerable debate about its siting; many argued that it should be moved to the city centre. The Crescent Arts Centre, in contrast, is

Figure 4: The Lyric Theatre, O'Donnell + Tuomey, Belfast, 2011 (Source: Author).

largely a renovation project for a listed Victorian girls' school building, which had been used for decades as a community arts building focusing mainly on classes in dance, music and the visual arts. The MAC is the only one of the three with a new building and a new site with significantly increased space and thus programming ability. It was seen by both DCAL and ACNI as a critical piece of cultural infrastructure for the city centre. The Lyric and MAC were objects of international design competitions, the former won by O'Donnell + Tuomey, Dublin, and the latter by Hackett Hall McNight, Belfast.

Figure 5: Metropolitan Arts Centre, Hackett Hall McKnight, Belfast, 2012 (Source: Author).

In each of these projects, DCAL reviewed proposals and provided funding with other arm's length bodies, including ACNI and the Heritage Lottery Fund. They saw ACNI as the 'expert delivery arm;' unlike ACNI, DCAL provided funding for the capital expenditure, but they do not, to any great degree, provide any core or project funding for the buildings past their completion. Then, as now, DCAL saw itself as the policy maker and the arm's length bodies as deliverers, but the relationships were clearly far more complicated than that oversimplification represents. The relationships between these various bodies and the specific roles of local councils was not concretized in major policy but has instead developed on an ad hoc basis, not dissimilar to what Lewis and Miller assert if a common occurrence – 'much of what constitutes cultural policy is somewhat inadvertent.' (2003a:4)

Contrasts and Similarities Between the Two Regions

Thus, several key points exemplify the development of architecture in relation to cultural policy (and vice versa) in these two regions. While architecture was named in early arts policies in RoI, it took until 1995 for a similar gesture in NI; in both regions, however, the shift in focus from architecture as an object to the appreciation and the participation with architecture by a wider public as a main aim of government occurred at a similar period, in the late 1990s. EU funding was relied upon heavily on the RoI in this period, whereas in NI, funding was, for the most part, allocated from national sources. The maintenance of centralized control over funding through the RoI ACCESS schemes differed considerably from the regional development with local council control

in the North. Finally, in both RoI and NI, official policies for the procurement of building of this scale corresponded to new funding becoming available – in the case of RoI, though nationally-driven tax base (as opposed to supranational funds in the early 1900s) and via the National Lottery in NI.

This analysis of the differing policies and procurement methods on either side of the border does begin to reveal one particularly significant parallel when looking at the larger landscape of comparative cultural policy studies. Both the RoI and NI entered 'boom' periods for new capital projects at the same time, basically in the mid-1990s. The RoI had been mired in economic doldrums essentially since its beginnings as an independent nation in 1922, while NI had, of course, been corralled in a period of violence and civil unrest, a development desert, since at least 1969. Political stability in the North beginning in 1994, albeit delicate, was matched by availability of funding from government, though the Lottery, while the RoI's economic boom was finally able to support its long-standing cultural policies, including architecture.

The motives for cultural provision are often cited as oppositional in the literature – access for all versus cultural planning as cure for larger social problems, including economic challenges. Significantly, and perhaps singularly, these are conflated in this period for both of these regions. Because neither RoI nor NI had had significant arts-based buildings built until 1990s, the argument, amongst scholars and policy makers alike, did not have room to evolve. The differing reasoning – the more traditional 'access for all,' the use of architectural projects as cultural commodification to attract creative class or cultural tourists à la Richard Florida, and the New Labour-esque desire for cultural projects to act as centers for social change – can all be read throughout this period for both regions. Both the RoI and NI have, in this period, policies aimed at the economic importance of the so-called 'creative industries' including funding mechanisms specifically designed to impact upon 'creatives' (DKM Economic Consultants, 2009, Department of Culture Arts and Leisure, Northern Ireland, 2008, Department of Culture Media and Sport, 2001). Architecture was listed as a 'creative industry' in all of these documents. However, the examining of cultural policies as both an elitist-generated list of objects or values to be preserved versus Raymond Williams's wider anthropological definition can both be seen in the jargon that supported the building of these projects on both sides of the border at the same time.

The Future for these Buildings?

It is understood that 'a full arts infrastructure' is now, more or less, in place in both regions. Some in the Arts Council/An Chomhairle Ealaíon understand that arts is now part of the 'overall societal infrastructure' – that cultural provision is now seen as instrumental as roads or sewerage. Whether or not this is the belief of central government will be sorely tested in coming years as economic cuts continue to rage across all sectors of public services in the RoI. The notion of a network of centers working together may indeed be required in future – one can envision, with the plethora of centers having been built – that some will need to stand empty for periods when programming, touring

or otherwise, is not available due to lack of funding.

Indeed, officials on both sides of the border are now concerned with the sustainability of the necklace of centers which are strung along the countryside. This concern is understandable, particularly in light of the fact that in the RoI, there appears that no overarching policy calling for a centre in every area of the country existed. In NI, DCAL's focus for the foreseeable future will be the 'product' that these centers now make, including their financial sustainability in a period of considerable cutbacks. For ACNI, the reduction in funds for the whole of NI from Westminster effects a reduction in core funding for venues; income generation by the centers overseen by ACNI becomes an increasing issue throughout the region. Any future cultural projects for the region will most likely be funded via branches such the Department of Social Development rather than through one of the cultural departments or arm's length bodies.

Further Questions

Now that these buildings have been afforded in both regions in such multiplicity, it is an excellent time to catalog, with analysis, exactly what has been provided. To this might come an evaluation of any oversights – as impossible as this may seem considering the amount of funds expended on both sides of the border. However, three major cultural buildings were finished in Belfast in 2012; there still exists no major 'national' gallery for the region, for example. The high modernist Ulster Museum extension, hotly debated due to its recent controversial renovation by Hamilton Architects, displays historical and scientific artifacts in addition to its arts collection.

A coincidental body of research, which could run alongside the post-project evaluation of the ACNI 10 year building program, could critically examine the use of these buildings as objects of cultural planning – have these buildings begun to cope with larger societal 'ills' such as unemployment, de-industrialization and social inclusion? Have the arts councils embodied their vision for a greater public awareness of architecture in the buildings they've built, or have they, as per the years prior to 1995, simply commissioned containers for other arts activity? Such interrogation may also contribute to the growing criticality of the espousal of the whole notion of 'creative class' (Edensor et al, 2010:1-16).

It will be important, too, to examine how the lack of planning on the part of RoI government will compare to the NI published strategy in terms of the long-term viability of these organizations. The lack of an overarching strategy at a national level for the buildings in RoI found during this research can surely be criticized and points to that 'mismatch between research and decision making' (Madden, 2005:130) which is so often the basis of cultural policy studies. It may be that the economic situation is so dire that organizations on both sides of the border will fail, but one might predict the better forward planning in NI will be reflected in a longer sustainability. Here is a moment when this research can be part of a larger applied and critical discussion and engage with future policy design, administration and, certainly, evaluation.

Final Reflections

This paper has thus delineated the history and process of the procurement of arts buildings

Figure 6: The Ulster Museum, exterior renovation by Hamilton Architects, Belfast, 2009 (Source: Author).

on either side of the Irish border for the period 1998-2005. These processes have not, to date, been examined in this level of detail, but as many questions have been raised as answered. Among these, perhaps the most significant question remaining to be unpacked is this: why did governments in both regions determine that the building of arts centres, usually by highly esteemed regionally trained and based architects was a germane approach to cultural provision in this period? The espousal by governments of the Bilbao effect and Florida's exhortations of the benefits of a creative economy don't entirely answer the question. Certainly much of the impetus for the development of arts centers in every county could be ascribed to competitiveness amongst local or county governments wishing to appear as wealthy and as forward thinking as their neighbors. Perhaps one might see this growth of arts-based buildings as government playing at Medici, expressing their longed for economic

and political stability. It's perhaps unsurprising that governments in both regions would wish to do so in the long tradition of using architecture as a 'national badges of high culture', a means to express national identity (Edensor, 2002:15).

Figure 7: The Ulster Museum, interior renovation by Hamilton Architects, Belfast, 2009 (Source: Author).

However, with an understanding of the current anxieties and priorities of architects and their critics from this part of the world, we can also begin to understand this necklace as an effort on the part of government and architects alike to explore and express what has been for centuries a confused and often denigrated architectural identity on the island of Ireland. Architecture in this 'peripheral' part of Europe has always been perceived as diluted versions of that produced in other parts of the world, from Rhennish decorative traits to Palladian geometries to English Georgian rules of proportion. This significant and unprecedented investment in an architecture based in RoI and NI can be seen as an attempt to address this perceived lack of architectural identity expression in local terms, an exorcism, on an enormous and unprecedented scale, of the ghosts of other architectures developed on the island over centuries at the edge of Europe. Whether or not this is possible, or necessary in a world globalised in cultural terms, deserves further scrutiny.

In any deliberation of cultural identity, particularly which structured along national lines, one must consider if these arts-based buildings were aimed to reproduce cultural dependency or institute cultural hegemony. If, as Edensor suggests, national identities are formed increasingly through popular culture, then the efficacy of these buildings as top-down producers of some kind of codified artistic and architectural similarity can begin to be questioned, if not dismissed. On the other hand, one might interpret the profligacy of building at this time as a means to increase cultural choice, if not necessarily access, amongst multiple publics. Certainly, what this research has unearthed is the need for policy to work in tandem with more theoretical understandings of culture.

Architecture sits uncomfortably within accepted definitions of culture – it both provides fundamental shelter and is the site of considerable symbolic communication; it is seen by some as a science, by others as art. Its products are sometimes viewed as cultural 'texts' but also as massings of capital, of sites of national identity while its process is seldom understood. Architects create objects and spaces that, on the one hand, are vital to life in a physical sense, but also create culture far more complex terms; architecture is both necessary and acts as a means of signification. Lewis and Miller point to a similarly profound contradiction that they see in arts provision – 'between a democratic spirit (the desire to make art economically accessible and to place it in the public rather than the private realm) and a class-bound aesthetics' (2003b:175). As architecture is largely public and thus physically accessible, how does this availability correspond to any perceived requirement for Bourdieu-ian cultural capital to 'understand' it? Can cultural policies devoted to architecture ever overcome these significant contradictions? Should they?

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Sarah A. Lappin

Dr. Sarah A. Lappin, BA Columbia, MArch Princeton, taught and practiced architecture on both sides of the Irish border before completing her PhD at the University of Ulster, Belfast in 2008. As Lecturer in Architecture, Queen's University Belfast, she acts as both Stage One and Theory coordinator in the undergraduate course. She teaches theory and design in the BSc and MArch courses while supervising PhD students. Dr. Lappin's research interests centre on the relationship between architecture and cultural identity. She is co-founder of the All-island Architectural Research Group and is the current Chair

of the Steering Group for the Architectural Humanities Research Association. Her first book, Full Irish: New Architecture in Ireland, was published by Princeton Architectural Press in 2009. She can be contacted at s.lappin@qub.ac.uk

MORPHOLOGICAL STUDY OF URBAN HIERARCHY IN BOSHROOYEH CITY OF IRAN

Vahid Ahmadi, Adi Irfan Chi-Ani, Hero Farkisch & Mastor Surat

Abstract

City designs in Iran have used the hierarchy principle in all elements of the cities from the components to the whole. The physical cells of tissues in an urban area are clearly related. However, in the development of cities, traces of the network of space communications to the old city centre remain. Instead of composition streets, squares and communication between, the networks contain filled rows with independent buildings. The purpose of this article is to recover the specific relationships between elements of the city and the urban hierarchy with regard to morphological aspects. In this study, urban tissue and typology are used to assess the pattern of urban streets, blocks, squares and islands. The typology of urban tissue based on evaluation of the mentioned patterns is established through field studies, aerial photos and maps of separated lands. We chose the city of Boshrooyeh in eastern Iran as the case study. The historic city core sector has been evaluated in terms of physical characteristics, which provide the morphological typology of the urban tissue. After analysis, data can be investigated in the presence or absence of access hierarchy in different historical periods of the city. The purpose of identifying the morphological typology of the city's historic fabric is to help us determine the hierarchical order and coherence of the city. The result of this study shows the rapid development of the city, including widening streets, and destruction of the urban form (Main Street and Square). These incidents have led to loss of infrastructure, urban identity, and disorganisation in the urban hierarchy.

Keywords

Urban Morphology, Hierarchy, Urban Tissue, Morphological Typology, Boshrooyeh.

Introduction

Urban morphology is the study of city appearance, its gradual formation, and the interaction among components of the tissue that defines specific compounds and urban faces, such as streets, squares, and other public spaces. Urban morphology is divided among several fields of knowledge. Its theoretical aspects are related to urban geography, history, and architecture.

The study of urban morphology seeks to understand the spatial structure and character of a city by identifying the patterns of its components and the process of its development. This study can involve analysing physical structures at different scales. According to Conzen in 1960, land use, building

structures, plot patterns, and street pattern are considered. Analysis of physical forms focuses on street patterns, plot patterns, and building patterns by comparing cartographic sources and historic maps (Carmona, 2003).

Defining Urban Morphology

Urban morphology is one of the most important physical descriptions of a city. Morphology is a science that investigates the form, shape, external structures, and arrangement of matter (Madanipour, 1996). In 1997, Moudon argued that urban morphology focuses on city studies as a physical environment, but establishes an implicit link between the space elements, material, social, and economic forces of the city.

In 1996, Kropf reported a suitable method for recognising the process character is to study the physical aspects of the city that can be used to build a general character image, because the physical aspects are the most sustainable. Morphological theory describes the historical process of development in the city form and its spatial consequences. This theory tries to present institutions and social forces that give shape to an environment (Rofé, 1995).

German School of Urban Morphology

As characterised by Larkham, Kristjansdottir, and Rofe's views were influenced by Conzen's view description of the development of the city form. Conzen believes that the historical landscape in cities comprises three divisions: building forms, a city map, and land use. These divisions create a hierarchy frame work, and this hierarchy can be used to create a city map (Ahmadi, 2010).

Moreover, Conzen suggested that these three aspects at the most local level combine to make the smallest homogeneous areas of morphology (urban landscape cells). Urban landscape units arise by putting these cells together. They can be combined at different levels to create a hierarchy inside the city (Larkham, 1997).

Italian School of Urban Morphology

Koster (2001) hypothesised that the city is a physical embodiment of cultural development, and he used cartography. Cartography has two aspects: a cultural-historical map (typical features of a period) and reconstruction of structures, such as historical houses (Ahmadi, 2010).

Caniggia attempted to understand the building form through the historical process of shaping cities, including elements (buildings), element construction (urban tissue), construction systems (regions and territories), and a system organism (whole the city). These components create a hierarchy of spatial relationships through synthetic elements (Kristjánsdóttir, 2001).

The Urban Form System and its Components
A morphologic system is one form of urban planning. This system can be divided into three important sections:

- Elements that give shape to the structure (element organisation);
- Elements that are regular (facilities);
- Components (road networks, segmentation, body).

Conzen has identified the system components of the urban form associated with three structures: plan, frame and land use. These components can be classified into five

sections:
• A plan or map shows the general forms of an urban complex or macro form;
• A plot pattern is associated with the ground separated into small and large pieces for allocation or a specific user;
• The frame or building textures is composed of buildings, including their antiquity, style, height, and whether they are in empty urban spaces or public spaces;
• Land uses determine the performance of different parts of urban land. Compared with the other key elements, land uses are relatively temporary. Incoming uses often lead to redevelopment and the creation of new buildings, to plot amalgamations and, less often, to subdivisions and changes in the street pattern (Carmona, 2003);
• The site is a major component of the form and is determined by studying the status rippling, current water flows, and vegetation.

The structure indicates how the elements organise themselves. Structure can be discrete or continuous. All these conditions determine the density, islands, plots, and different ways for the units to be organised. An urban form is described with different elements such as a map, land uses, content, and concepts.

Defining the Type and Urban Tissue

Type is known as the special morphological composition that supports internal organisation among the structures and adjacent spaces. Individual buildings, streets, blocks, and total city area may pertain to a specific type (Scheer and Scheer, 1998). Kropf's (1996) method is about urban character that combined Conzen and Caniggia's views. At the most general level, urban tissue is defined as an arrangement of streets and blocks. A description of urban tissue is included in the study of street and block patterns, the square pattern, the plot pattern, the building pattern, and the architectural style pattern.

After introducing typology, the detection method and type grouping, historical character, and historical tissue, the following are the important factors when defining urban character: 1. the physical background of the city; 2. specific and perspective views of the city; 3. symbolic meaning of the city (Mirmoghtadaee, 2004, 2006).

Islamic and Iranian City

Islamic city is composed of a special plot, narrow streets and short courtyard houses and organised surrounding areas, which leading to the main mosque. Lynch in 1960 labelled this type of city as an inward city. It is a private and closed city. The city is completely surrounded, even in terms of communication. These ways lead to the smaller local streets, then tight and narrow impasses (blind alley), and finally to private entrances. The tree-shaped network of streets is surrounded by shops, gardens, and houses. These neighbourhoods and the central place are connected by a network of narrow winding streets consisting of public, private and semi-private streets and neighbourhood centres.

Ancient Iranian cities were organised according to axial, geometrical patterns. The walled towns and villages that started to develop in eastern Iran from the middle of the first millennium BC were square-shaped and had an internal axial layout. A main street stretched from a single

gateway, was flanked by courtyard houses, and led to a central square, which was the communal park for the cattle (Madanipour, 1996).

In 2008 Habibi demonstrated that several principles led to evident in Iranian urban planning. This article only mentions some of these principles:

• Hierarchy principle: every urban space or building has an outside and inside. The urban space indicates the hierarchical position of the space or building;
• Community principle: the accumulation of different elements in a specific location gives special meaning to a place, which provides a special identity;
• Continuity principle: urban spaces are a gap that is located between buildings, mass and forms;
• Territory principle: every urban space is owned from the little space to the large space;
• Connection principle: every urban space is looking to connect with other components.

Space relations, forms and activities follow these principles, which form the basis for the identity and character of the components and elements. These principles can help us read an Iranian city because it is rooted in all elements. They act as a guide to the urban morphology of the city.

Boshrooyeh City

Boshrooyeh is a city in the South Khorasan province of Iran. It is located on a transit road from the South Khorasan province to the Yazd, Isfahan and Shiraz provinces. The historical urban fabric of this city was registered on the cultural heritage organization list in 2003. The area of the registered historic urban fabric is 22.4 hectares, but the cultural heritage organization of Boshrooyeh is proposing close to 27 hectares of buffer around this fabric (Taniguchi, 2009).

The Boshrooyeh urban texture was formed during the Safavid period, and its greatest historical context has been recorded in Khorasan. It is among the ten historic cities based on its old brick, clay texture, and traditional fabric. Figure 1 shows the character, identity, and physical

Figure 1: Samples of identity, scale, and character of Boshrooyeh city (Source: Authors).

elements of the city. Around the city core are located some indicator buildings, such as the congregational - Jame mosque and a water reservoir; unfortunately, this section has been significantly damaged.

The city has developed to the north, east, and north-west. Development to the south has been limited because it is an agricultural area. The city developed as a harmonious and orderly city. The initial construction of the city formed a circular shape, and then during recent years, city tissues developed following a checked rhythmic form. Part of the old gate of the city remains, but its basic shape has been destroyed because of the expanding circle through the city. The gate diameter was two kilometres, and its height was about six metres. It had four main gates, which allowed entry from four positions into the city (see figure 2).

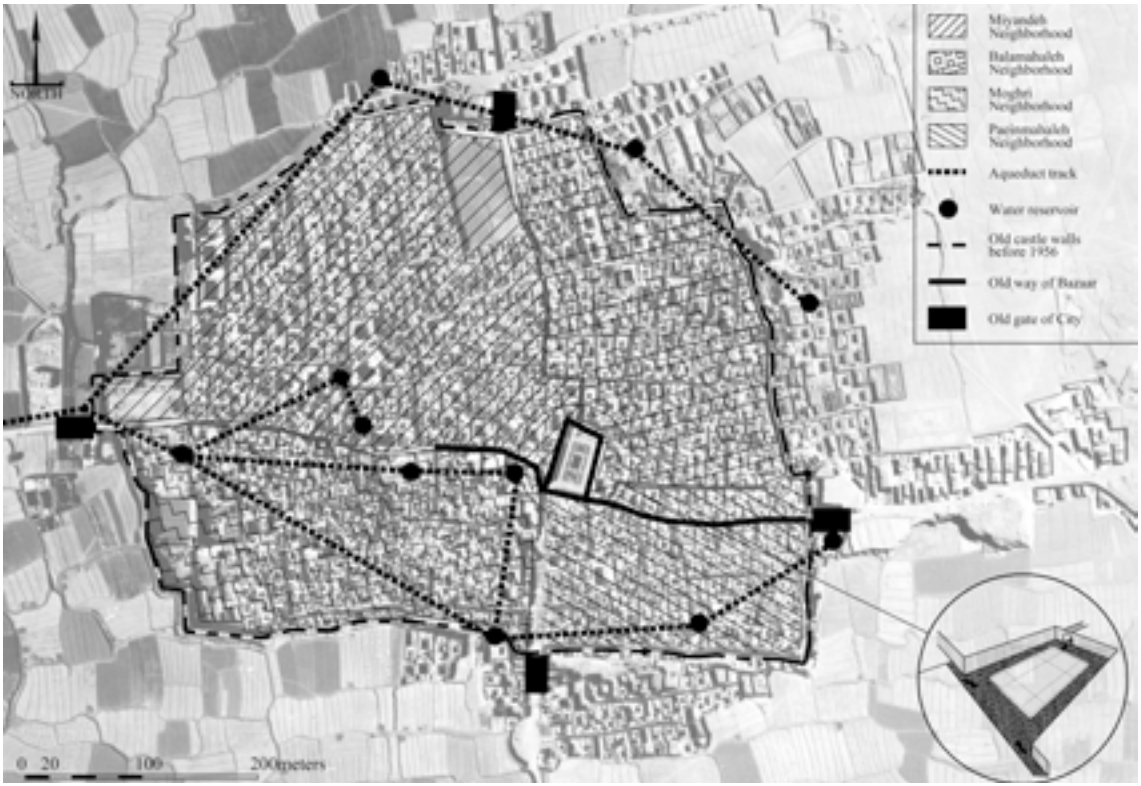

Figure 2: Aerial photo of Boshrooyeh in 1956 and its components (Source: base map by national cartographic centre of Iran and analysed by authors).

Boshrooyeh is composed of four main neighbourhoods. Due to the wind direction from the north and north-west, the wind catcher (Badgir) was placed towards the northwest wind. Markets (Bazaar) are located along the south axis and also in various centres, such as around schools, mosques and Hosseinieh. Hierarchy movement exists from the main square of the city to neighbourhood centres; thus, there are houses. Houses often have introverted architecture. The hierarchical movement is designed according to people, culture and privacy.

The UNESCO mission noted the uncontrolled development pressures, which affect all properties. The pressures mentioned include the demolition of traditional houses in the historical fabric, organising inadequately managed events in the fragile desert ecosystem, building highways through rural gardens, and unplanned installation of infrastructural improvements. If this uncontrolled development and unplanned destruction continue, the whole identity and character of the city risks being irreversibly destroyed.

Analysis of the urban form

In 2003, Carmona suggested the following components to recognise an urban pattern:

• Island pattern: the number of houses and buildings in an urban area that are defined streets. Different morphological islands classified based on size, form, openness, usage and function;

• Plots: segmentation results in land in small and large pieces that is appropriate for building and urban development. It carries the historical signs and represents the individual property and structure of the social-economics of a specific period. In traditional centres, the sizes of small pieces can vary significantly;

• The cadastral pattern: the layout of urban blocks and the public space/movement channels or public space network between them. The ground plan of most settlement patterns of streets and spaces has developed over many hundreds of years, and fragments and 'ghosts' of patterns from different eras can be seen in the ground plans of many cities.

Based on these suggestions, we used the following:

• From the description (maps, pictures, and images), the first operation is to study a land status map. A map is considered to be a superior tool. Aerial photos, particularly from a low altitude provide complete details of the tissue of the city.

• The cadastral plane makes the shapes of roads, land plots, and buildings visible. It is the only sustainable source for following changes in urban fabric. Primary land ownership can separate the plane into large and small pieces.

• The three-dimensional display with plane, section, and height on a map offers an overview of the urban form in three dimensions. Three-dimensional modelling makes the size of urban islands and buildings visible.

• The typology is developed from the details of elements, such as islands, plots, buildings, and multi-floor buildings. Then, the typology is classified according to certain criteria.

Urban spaces show the history of past sediment. One of the methods for describing evolution forms is historical mapping. It uses a comparative analysis to identify changes and urban development. Moreover, this method makes it possible to identify land plots and

analyse the road hierarchy. Potential errors may be due to dependence on the estate archive and problems accessing whole documents (Allain, 2009). The perception of urban tissue is required to collected documentation that will be completed with field work. Part of the analysis in this article used historical mapping of the city.

Hierarchical movement

Urban spaces in historic areas are based on the hierarchical movement from macro to micro. This hierarchy is a movement from public space to private space. Public open spaces are the most fascinating parts of historic cities. Open spaces in historic areas are based on the hierarchical movement from the central part of the city, the main streets, alleys that lead to neighbourhood centres, secondary alleys, 'Hashti' (the traditional entry halls to several houses) of the houses, entry halls and the court yards.

Main access and streets are wider, and alleys, which terminate at houses, are very narrow. In this hierarchical system, the most important urban spaces are the covered semi-private spaces (Sabat) between groups of houses called 'Hashti', and the central square of the neighbourhood (see figure 3). The central space of the neighbourhood is an excellent manifestation of urban design in a certain period of time by the people who used it.

The square (Maidan) is the most distinct element of the urban structure. As a clearly delimited place, it is most easily imaginable and represents a goal for movement. It is the main public space in each neighbourhood. These squares are mostly located in the centre of the neighbourhoods. Therefore, in Iran gates were separate semi-private and private parts of the network from the public spaces. Impasses and internal alleys lead to passages to other neighbourhood components (Ahmadi, 2009).

Figure 3: Half covered passageway (Sabat) as semi-private space (Source: Authors).

The square

Many researchers have presented a different typology for the square (Stübben, P. Lavedon,

P. Zucka, and P. Pinon). For instance, in 1924, Stübben divided squares into star, profit, and decor squares. In 1999, P. Pinon identified squares as dedicated, planned, occupational, and organised. According to Lynch (1960), identifying the core of a city includes identifying the square, and communication roads provide a full description of a complex pattern of the town. Finally, square typology can be based on a function, form, orientation, or design type.

Boshrooyeh city have only a main square. Therefore, it acts as multi-functional space with public and commercial square uses. Main square of Boshrooyeh due to close and proximity to the Bazaar, it has a commercial function. The square was constructed at the intersection of the main roads. Roads located on the sides of the square have created four neighbourhoods (see figure 4). The square is a quadrilateral and is surrounded by shops on three sides. The roads are oriented to the north, south-west, and south-east. The square is a node in the centre of town and is connected to the main roads of the city gate. There was a link between the squares and important urban spaces (see figure 2).

The main road of the city leads to a city gate. Major city centres have been established along the main square and Bazaar (see figure 5). Activities and places around a square are public, for example, the Congregational - Jame Mosque, the Bazaar, and shops. Buildings surrounding the square are related to it.

Figure 4: Type of road and hierarchy movement in Boshrooyeh city (Source: Authors).

Figure 5: Roads map of Boshrooyeh in 1956 (Source: Authors).

The square has changed significantly in recent years. These changes include both its functions and form. Its form changed from rectangular to oval, and it now functions as a roadway. However, it still has public functions and has retained its centrality. Currently, the four main roads enter it.

Type of roads

Streets and squares form the real faces and façade of cities. Streets and squares form the components of urban tissue and are the key of urban fabric understanding and perception. Street's types include main streets (great old streets), narrow and normal streets, combination streets, boulevards, avenues, and underground streets. Squares, like streets, are a complete

urban form and are irresolvable (Carmona, 2003).

The roads hierarchy changes simultaneously based on the urban size and local culture. Boulevards and wide streets provide the longest distance that creates a general island. Ordinary streets and alleys are patterns for infrastructure (Sultanzade, 2006). Wide streets and main streets link and organise neighbourhoods together. Neighbourhood alleys belong to their residents more than to other people. In large and medium cities, shops form along these alleys and used for small gatherings. Therefore, internal roads to the district are public for the residence, but have a semi-public aspect (see figure 6).

Based on comparisons of old and new road maps of Boshrooyeh, we found the following

Figure 6: Roads map of Boshrooyeh in 2008 (Source: cultural heritage organization of Boshrooyeh)

changes:

• The four main edge roads were destroyed (north, south, east, and west);

• The streets are wider, and there are more internal roads and internal alleys;

• The city structure was demolished, especially the hierarchy movement from the main centre of town to the neighbourhood centre because streets and alleys were destroyed or widened (see figure 7).

Figure 7: Comparison between the old and new roads (Source: Authors).

Type of Island

Islands are classified based on the number of houses and buildings in an urban setting that define its street limit. Islands have a different morphological pattern and are classified and divided base on size, form, openness, usage and function. The greatest change and deformations are visible in the main roads and islands (south-east, north-east, and north-west). Usage and function in southern part of north-east Island changed from residential to commercial (see figure 8).

Blocks in terms of form are separable into geometric blocks (trilateral, quadrilateral, and polygon) and non-geometric blocks (polygon with indirect lines). In this section, we only identify general changes in form of the blocks.

Results and Discussion

The physical organisation in an ancient Iranian city is based on the correlation between urban elements, such as squares, main streets and subsidiaries, and neighbourhood centres.

Figure 8: Comparison between the old and new islands (Source: Authors).

Figure 9: Part of the old and new Bazaar (Source: Authors).

Spatial coherence, which is obvious in traditional tissues, is integral to desert cities. New blocks in the city were built without any continuity of form and hierarchy with the traditional part of the city. New islands are amorphous and irrelevant because of their surrounding space. The coordinated system of the town has been destroyed in Boshrooyeh due to disintegrating urban fabric, i.e., the main square, islands and streets. Any interference in the urban tissue requires knowledge of all factors that affect the city.

Briefly, the results of this typology study show the following:

• The main structure of the Bazaar has changed.

Figure 10: Congregational - Jame Mosque and hierarchy movement that remains (Source: Authors).

Part of the Bazaar remains in the old way of Bazaar. The old Bazaar had most proximity with neighbourhoods in compare with new Bazaar. New Bazaar has not connection and closeness to neighbourhoods, and people have come long way to provide their daily need (see figure 9).

• The Congregational - Jame Mosque remains with minor changes, due to the significance of religion in people opinions religious buildings have the least modify in urban change or development (see figure 10).

• Hierarchy movement and networks have changed the most and are very different from the traditional pattern (see figure 10). Nevertheless, the current network structure is along the old city passages. Hierarchy movement is the most important unifying factor in Boshrooyeh.

• The main roads were destroyed and have been wider during the changes of the street and alleys (see figure 11). Movement from outside to inside does not follow traditional urban planning (hierarchy principles).

• The new square has been transformed

Figure 11: Wide road, block destroyed, new main square in the city (Source: Authors).

completely because of moving vehicles and wider streets (see figure 11). The main square of the city has changed from the square shape to the ellipse.

• Gradually, the organic form has become a reticular form in the city structure. Traditional structure of the city was destroyed over the time (see figure 11). New building was constructed without attention to the old pattern and inconsistent with its around fabric.

• Street and block patterns are gradually changing. Non-combinative, non-coordinated, and split urban blocks have been created to allow cars into the tissue.

• Block sizes have been gradually reduced and have been smaller.

• The overall continuation of old patterns (streets, hierarchy movements, islands, and blocks) is not seen in the physical urban fabric, discontinuity happened due changes of old to contemporary pattern inside the traditional part of the city.

Conclusion

New cities form rapidly and usually follow many unconnected concepts that cause confusion in urban spaces, while historical cities formed gradually according to accepted patterns and rules. Many non-local agents influence the form of new cities, while the form of traditional urban spaces depends on the morphology of the site, the historical background and the culture of the local people.

The traditional design system of historic cities in Iran has never allowed direct connections between private and public spaces. A lack of this hierarchical system and damage in the pedestrian network resulting from the

Figure 12: Block in 1956 and block fragmented in 2003 (Source: national cartographic center of Iran).

establishment of new streets has affected historic relationships and traditional social links. Any kind of interference with existing open spaces or the development of new ones should happen in view of the climatic dimensions and architectural criteria (Ahmadi, 2009).

The aim of this study was to assess the physical character of a city based on morphological analysis of urban tissue. According to morphological analysis in this research, we argue that the fundamental city characteristics and its components are going to be destroyed. The city is suddenly fragmented (see figure 12). The results show that quick development, widening streets, and demolition of the city structure may annihilate the infrastructure and identity of the city. These changes also disrupt the hierarchy of a town.

The process of analysis of urban form in the traditional cities had resulted in an approach that could be used in contemporary planning for propose the pattern of the land or region. This included knowledge of space hierarchy that was based on the physical analysis of space and its interconnection and continuity of traditional pattern. The benefit of this approach is assessment of the existing elements in traditional urban pattern. These elements will organize sustainable structure for urban pattern in continuity with the past.

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Vahid Ahmadi

Vahid Ahmadi is currently a PhD candidate in Department of Architecture, Faculty of Engineering and Built Environment, in the Universiti Kebangsaan - Malaysia. His current interested is Urban Morphology. His previous researches also were intended to conservation and restoration of traditional buildings and sites. He can be contacted at vahmadi@eng.ukm.my

Adi Irfan Che Ani

Dr. Irfan is currently an Associate Professor at Department of Architecture, Faculty of Engineering and Built Environment, in the Universiti Kebangsaan - Malaysia. He attained his PhD from the University of Malaya, in the discipline of facility management (performance measurement). His research interests are focused on building condition survey (condition index), affordable housing and high-rise residential management. He can be contacted at adiirfan@vlsi.eng.ukm.my

Hero Farkisch

Farkisch is currently a PhD candidate in Department of Architecture, Faculty of Engineering and Built Environment, in the Universiti of Kebangsaan - Malaysia. Her currents interested are Environmental Psychology and Urban Morphology. Her previous researches also were intended to conservation and restoration of traditional buildings and sites. She can be contacted at farkisch@eng.ukm.my

Mastor Surat

Mastor Surat is currently lecturer at department of architecture, faculty of engineering and built environment, in the Universiti Kebangsaan Malaysia. He is senior fellow researcher of the Institute of the Malay World and Civilization (Atma), University of Kebangsaan Malaysia. His previous researches were intended to sustainability, traditional architecture and traditional typology of the mosque. He can be contacted at mastor@vlsi.eng.ukm.my

BRIDGING OUTDOOR AND INDOOR ENVIRONMENTAL SIMULATION FOR ASSESSING AND AIDING SUSTAINABLE URBAN NEIGHBOURHOOD DESIGN

Chengzhi Peng and Amr F. A. Elwan

Abstract

Urban dwellers in cities located in hot-arid or hot-humid regions have greater needs to live in between outdoor and indoor environments. The sustainability of urban building design in these regions cannot be fully assessed by indoor environmental simulation not taking into account the microclimatic factors of the surrounding urban neighbourhood. We find that the current suites of outdoor and indoor simulation software do not connect with each other to give us a holistic understanding of both outdoor and indoor simulation results. This paper reports on our current development of a methodological framework for bridging the current gap between outdoor and indoor environmental simulation. Our objective is that assessment of sustainability at an urban neighbourhood level can be carried out more holistically, and hence achieving more valid environmental simulations from an urban dwelling point of view. The outdoor-indoor coupling methodology is currently modelled on a digital work flow among three key software platforms: (1) ENVI-met for urban neighbourhood outdoor simulation, (2) Ecotect for building indoor simulation, (3) uCampus for combined outdoor-indoor 3D visualisation modelling of an entire urban neighbourhood including its individual buildings. A case study of a new neighbourhood development proposed for New Cairo is presented to demonstrate how indoor environmental simulation can be grounded on outdoor environmental simulation of the urban neighbourhood. Graphical outputs from this outdoor-indoor coupling approach to neighbourhood simulation can be further brought together onto a Web-based 3D virtual reality modelling platform to enable wider accessibility.

Keywords

Urban neighbourhood design, outdoor-indoor coupled environmental simulation, Web3D visualisation, ENVI-met; ecotect, uCampus.

Introduction

Urban dwelling in cities located in hot-arid and semi-arid regions has a greater need to inhabit in between outdoor and indoor environments whenever the dwellers feel appropriate to do so to gain optimal thermal comfort while minimising energy consumption. Recent studies have highlighted the problems and challenges of attaining thermal comfort in urban open spaces in the cities located in these regions (see, for example, Chalfoun 2003, Ali-Toudert et al. 2005, Fahmy 2010, Yahia & Johansson 2012, among others). Clearly, the environmental sustainability of an existing building or a building design in these regions cannot be fully

assessed by indoor environmental simulation alone without taking into account the urban microclimatic conditions of the surrounding urban neighbourhood areas where the building stands. It is commonly accepted that good environmental performance leads to lower energy consumption in maintaining thermal comfort, which is the first step towards sustainability.

Given the advances in computational modelling in environmental analyses achieved during the past two decades, an architectural college student nowadays can perform sophisticated environmental simulation of building design using industrial software packages such as Autodesk® Ecotect® Analysis and DesignBuilder. However, one must beware the fact that the development and application of these software packages is rooted in how city dwelling is understood mainly in temperate climatic zones where outdoor and indoor living is considered two separate domains. Hence software-based urban outdoor and building indoor environmental simulations can be performed independently of each other. However, one would query the degree of validity of applying the same software simulation procedure to building designs and occupations in different climatic zones, say, one in Cairo-Egypt and one in Sheffield-UK, even with the local climate data loaded. Should we rethink the approaches to environmental simulation that reflects the variations in the patterns of urban dwelling?

In our present study, we are concerned with how a building's indoor environmental analyses could be grounded in the building's surrounding neighbourhood outdoor environmental analyses, and what differences the indoor-outdoor coupling methodology could make in assessing and guiding urban neighbourhood design. To many researchers and practitioners, computational modelling of the environmental performance of a built environment is an essential means to measure its sustainability. It is commonly accepted that good environmental performance leads to lower energy consumption in maintaining thermal comfort, which is the first step towards sustainability. Despite the recent progress in environmental simulation software tools, we see gaps to be bridged such that the software simulation developed for large scale urban outdoor environments could work with software checking indoor environments. In doing so, these two types of software simulations could jointly produce outputs allowing architectural and urban planners/designers a more holistic grasp of outdoor-indoor simulation results that reflect more accurately the urban dwelling patterns in these regions.

Urban climatology is an interdisciplinary field which provides an important source of knowledge and data to inform urban design. However, its complexities and technicalities have prevented planning and design practices from applying rigorous climate knowledge (Oke 1984; Eliasson 2000; Ali-Toudert &. Mayer 2007; Fahmy & Sharples 2008). In searching for better supporting tools, Fahmy and co-workers highlighted that software like ENVI-met for urban microclimate modelling does not have the capability to simulate indoor climate (Fahmy et al. 2009). In an earlier study, Chen and Srebric investigated computational fluid dynamics tools for studying combined indoor and outdoor environment problems (Chen & Srebric 2000), but their study does not cover

calculation of important outdoor parameters such as vegetation and soils. Zhou and co-workers investigated a simple tool which estimates indoor air temperatures for certain thermal mass and determines the internal thermal mass needed to maintain required indoor air temperatures a naturally ventilated building (Zhou et al. 2007). Closer to our focus of study, Tanimoto and co-workers revised the architectural-urban-soil-simultaneous simulation model (AUSSSM) software to provide a graphical user interface intended for non-technical users to better access the complex numerical simulation results from running AUSSSM (Tanimoto et al. 2004). Notably, simulation of the effects of urban vegetation and turbulence on urban microclimate conditions did not play a part in the AUSSSM software framework.

In our research, we have developed a methodology to bridge the current gap between outdoor and indoor environmental simulation such that assessment of sustainability at an urban neighbourhood level can be carried out more holistically, and hence achieving more valid environmental simulations from an urban dwelling point of view. Our outdoor-indoor coupling methodology is currently modelled on an experimental digital workflow among three major software platforms: (1) ENVI-met for urban neighbourhood outdoor simulation, (2) Ecotect for indoor building simulation, (3) uCampus for combined outdoor-indoor 3D visualisation modelling of an entire urban neighbourhood including its individual buildings. The remaining of the paper illustrates the constitution and operation of the outdoor-indoor coupling approach through a case study of a new neighbourhood development proposed for a new town in east Cairo.

Software Tools for Urban Neighbourhood Environmental Simulation: ENVI-met and Ecotect.

Developed by Michael Bruse and his team at the University of Mainz in Germany, ENVI-met is one of the first computational models that seek to reproduce the major processes in the atmosphere that affect the microclimate on a well-founded physical basis (i.e., the fundamental laws of fluid dynamics and thermodynamics). The latest ENVI-met 3.1 combines almost all thermal interactions of built environments (Bruse et al. 2011). Among these later models, ENVI-met has been approved of its validity and reliability to some extent in describing all outdoor built environment interactions using numerical calculations and 3D finite difference computation (Ozkeresteci et al. 2003). In contrast, as shown by Zhou and co-workers' study, CAD-based models attempt to generate the 3D urban scene parallel with an urban heat budget calculation which is far limited when compared with ENVI-met outputs (Zhou et al. 2007). ENVI-met also differs from the Digital Elevation Model (DEM) as reported by Ratti and co-workers (2003), in which simplified ways were developed to present environmental factors on a physical model leading to 2D thematic mapping of urban environment factors. Following Jendritzky and Nubler (1981), ENVI-met assesses outdoor thermal comfort which is based on human biometeorology. An extensive list of ENVI-met's strengths and limitations can be found in Jörg Spangenberg's Master thesis (Spangenberg 2004). The software and documentation are provided freely at the ENVI-met project website (Bruse et al. 2011). Since July 2011, the incorporation of the LEONARDO within ENVI-met as an interactive

visualisation and analysis tool has made the simulation outputs graphically readable from simple line charts to complex 3D animations.

Developed by Square One Research originally and acquired by Autodesk in June 2008, Ecotect (Autodesk® Ecotect® Analysis) is an environmental analysis software tool that allows designers to simulate building performance at the earliest stages of the building design process. Adopting the Chartered Institution of Building Services Engineers admittance method of heating and cooling load calculations for any number of zones within a building model, Ecotect provides a wide range of simulation and analysis functions required to study how an existing building or new building design will operate and perform. It is generally recognised that Ecotect is one of the few tools with which building thermal performance analysis is made simple, reasonably accurate and visually responsive to the needs of non-technical users (Crawley et al. 2008). Again, rigorous validation of the accuracy of Ecotect simulations is beyond the scope of our current research. The more recent validation of Ecotect accuracy for thermal and daylighting simulations reported by Vangimalla and co-workers (2011) provides a useful indicator of the strengths and limitations of the software.

An Outdoor-Indoor Coupling Methodology

One of the potential problems experienced in using Ecotect is the lack of contextual accuracy in the area of weather data. Typically, a user will use whatever weather data preloaded in Ecotect associated with cities. More advanced users may search for alternative weather data closer to the actual site where his or her Ecotect simulation is to take place. However, it is a question of proximity that weather data collected at certain weather stations can be applied directly to represent the site conditions at the microclimate level. For instance, to undertake Ecotect analysis of a building design located somewhere in the City of Sheffield in England, one is likely to use the weather data of the Finningley station as listed at the US DoE weather data web repository (US Department of Energy). The distance between Sheffield and Finningley is about 22 miles (34.5km), and a quick check on the Google Map will show that the natural and urban conditions of Finningley and the nearby Robin Hood Airport are very different from those of urban areas of Sheffield. Therefore, if the Finningley weather data is used, how should we consider the validity of Ecotect simulation of an indoor environment situated in the city of Sheffield? More importantly, given the lack of site-specific weather data, how do architects, planners and urban designers deal with the increasing social and regulatory demands of valid environmental analyses that inform planning and design decision-making at the urban neighbourhood level?

In search for an alternative methodology more appropriate to sustainable urban neighbourhood design studies, our research proposition is that weather data specific to a city site can be attained by urban micro climate modelling on the basis of the macro climate weather data collected by the weather stations around the world. According to our survey as described above, the ENVI-met platform is one such computational tool that we can use to generate site-specific weather data for an urban site, which can then be loaded to Ecotect simulation of an indoor environment

on site. However, the validity of the ENVI-met software package is beyond the scope of our current study. Based on our software-based urban neighbourhood modelling experiments carried out so far, the steps to achieve what we call an outdoor-indoor coupled environmental simulation can be summarized in the following:

Step 1: Working with the ENVI-met receptors

Receptors in ENVI-met are of a particular group of output files that is designed to show the state of the atmosphere, the surface and of the soil at selected points inside the urban site model (ENVI-met 3.1 Manual). As described by the ENVI-met team, the concept of receptors is about allowing users to acquire data for user-selected points in the site model without browsing through several output files to gather the required information. In two earlier studies, Fahmy and co-workers have shown how ENVI-met receptors could be applied in the microclimatic thermal behaviour modelling of street canyon types of urban form in Cairo and Sheffield (Fahmy & Sharples 2009; Fahmy et al. 2011). By placing a set of snapshot receptors around the external walls of a building inside an urban site model with the ENVI-met Editor, one can obtain the near walls climate conditions of the building for specific hours and days in a year.

Step 2: Generating urban site-specific weather data for Ecotect analyses

On the basis of the receptor output files generated from Step 1 above, site-specific weather data can be further generated into micro climatically adjusted weather data files as inputs to Ecotect indoor modelling. Based on the ENVI-met receptor outputs, site-specific weather data files can be generated by replacing the standard weather data files with averaged receptor results of the same day/hour. There are nine factors involved in this weather data refinement operation: Relative Humidity, Dry Bulb Temperature, Dew Point Temperature, Wind Direction, Wind Speed, Global Horizontal Radiation, Diffuse Horizontal Radiation, Direct Normal Radiation, and Atmospheric Pressure. The resultant file needs to be converted to the WEA format using the EneryPlus Weather Convertor tool before loading it up to Ecotect Analysis. In the Case Study section below, we will demonstrate the difference between a typical Ecotect simulation using the US DoE weather data and a refined Ecotect simulation of the same building unit using ENVI-met refined site-specific urban microclimate weather data.

Step 3: Seeing both ENVI-met and Ecotect results on uCampus

As it current stands, ENVI-met and Ecotect are two different software platforms and their simulation outputs are presented in different numerical formats. A further step is required to bring the outdoor and the indoor simulation results together to reveal the total environmental performance of an urban neighbourhood. Our present study suggests that a key to bridge the link is to look at the ENVI-met LEONARDO and Ecotect graphical outputs – both packages contain data visualization modules turning numerical data into visual profiles. Using a vector-based CAD tool such as 3D Studio Max, both ENVI-met LEONARDO urban neighbourhood outdoor profiles and Ecotect building indoor profiles can be inserted into a 3D model of the urban neighbourhood containing buildings, terrains and vegetation etc. The resultant CAD model can be further converted into a Web3D format such as VRML or X3D viewable directly on

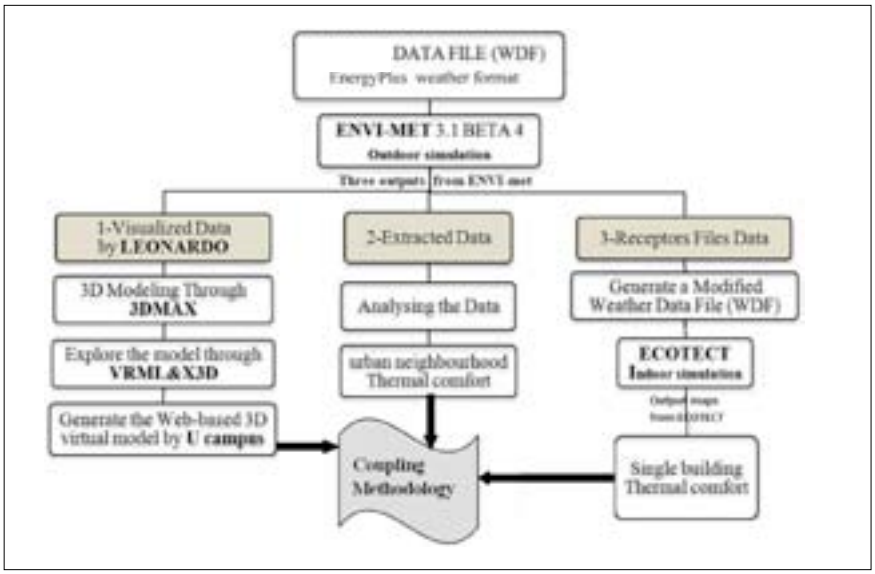


Figure 1: Workflow of an outdoor-indoor coupling methodological framework (Source: Authors).

a Web browser. To complete the final part of the outdoor-indoor bridging, the uCampus platform developed at the University of Sheffield is used to provide user-centred facilities for X3D models depositing and retrieval (Peng et al. 2010; Peng 2011). Use of uCampus-like web platform is to ensure that assembly of both ENVI-met and Ecotect graphical outputs can take place in an overall context of 3D neighbourhood visualization where viewers can freely navigate the environmental performance mapping across the outdoor-indoor boundary.

In doing so, we believe that the important issues and strategies concerning sustainable urban neighbourhood development can be disseminated to a wider audience who may not have the necessary technical and practical knowledge of know-how. Figure 1 shows a summary workflow diagram that underpins our outdoor-indoor coupling framework aimed at assessing the environmental performance of an urban neighbourhood.

Case Study of a Neighbourhood Development proposed for New Cairo

To test and illustrate the above methodology, we have carried out an in-depth case study of a new neighbourhood development scheme proposed for the New Cairo. The new urban development planned for the east of Cairo is now called New Cairo (see figure 2). The Egyptian Government has planned a series of new towns around Cairo to attract the population away from the densely populated

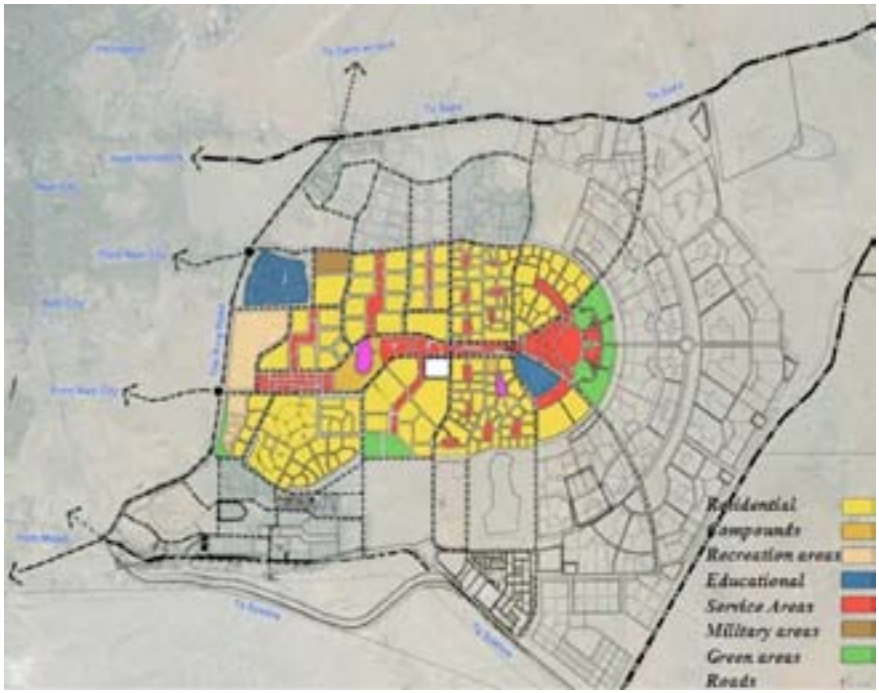


Figure 2: A plan for New Cairo [Source: DAMAK 2010].

metropolitan areas. The urban growth in Greater Cairo region is characterized by the extension on two major axes: the Northeast-Southeast axis and the North-South axis. New Cairo has no agricultural, industrial or trade economies. It is mainly a residential housing community and most of dwellings are of the size of around 500m2.

New Cairo buildings forming residential neighbourhoods are low rise buildings and designed to provide three floors. Our case study selected to test the outdoor-indoor coupling methodology as described above is in a new neighbourhood development delivered by the DAMAK Company (see figure 3). The basic attributes of two typical semi-detached housing units are summarized in Table 1.

The weather station at the Cairo Airport, about 30km west of the case study site, provides the weather data required of environmental simulations for the neighbourhood and building designs. The climatic region of the case study site is classified as arid. This arid region is usually defined as one which receives less than 250mm (10 inch) of rainfall each year. So an arid region has limited water resources and is very dry and has little vegetation. High temperatures during the rainy seasons cause most of the rainfall to

Parameters	Typical Housing Unit Types 1&2	Typical Housing Unit Types 3&4
Total area	540m2	500m2
No. of floor	3 floors	3 floors
Ext. walls	0.25m brick 20mm plaster inside and outside	0.25m brick 20mm plaster inside and outside
Int. walls	0.25m brick 20mm plaster inside and outside	0.25m brick 20 mm plaster inside and outside
Floor height	3.2m	3.2m
Orientation	North to south	East to west
Roof	20 tiles 20 mortar 50 sand 150 mm concert	20 tiles 20 mortar 50 sand 150 mm concert
Glazing	6 mm single glass	6 mm single glass
Thermal zones	Multi zones	Multi zones
lighting	12 w/m2	12 w/m2
occupancy	2 families with average 5 person/ family	2 families with average 5 person/family

Table 1: Key attributes of the four housing unit types of the case study neighbourhood design (Source: Authors).

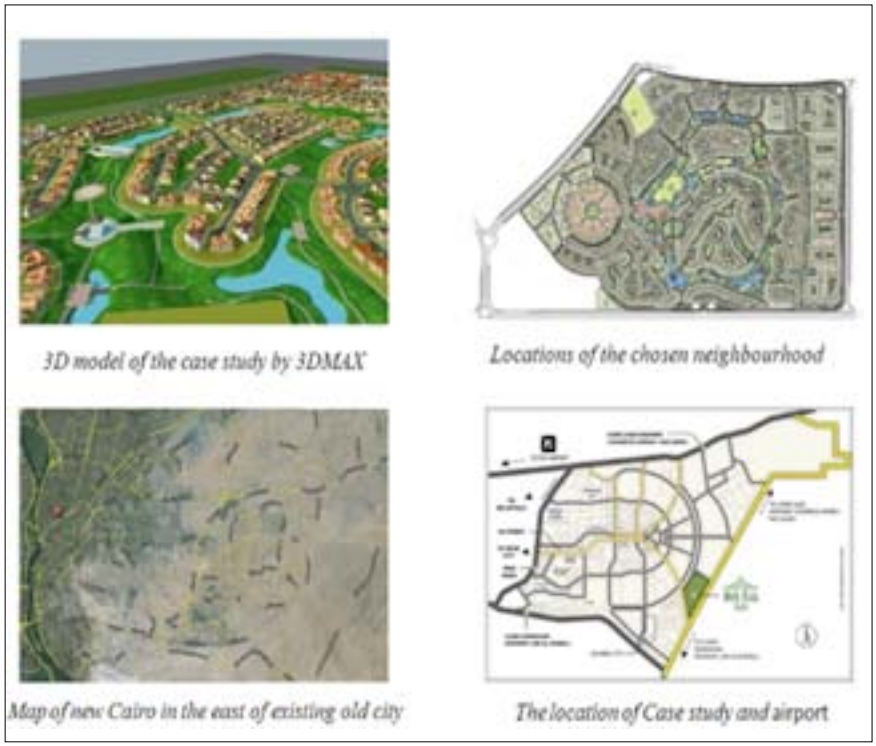


Figure 3: Case Study site (Source: DAMAK 2010).

be lost in evaporation. The water supply is not only meagre but also very limited availability for human and natural uses. Parsons and Abrahams (2009) illustrate that over 47 % of the world's land surfaces are classified as arid lands (excluding cold climate regions). The main problems which have caused people in arid regions to seek relief in shelters are a very high daytime temperature, burning sun, low night temperature in very hot summer days, cold and dry winters, dust storms, and little rainfall. Arid regions could play a vital role in the process of sustainable urban development and they contain most of the world's natural resources. However, such type of region has its special challenging environmental characteristics, which should be taken into consideration within any process of urban development.

ENVI-met and Ecotect Simulations of the Neighbourhood Proposal

Our case study started with gathering 2D CAD drawings and the basic building construction specifications from the case study project developer and consultant. The weather data recorded at the Cairo Airport weather station was retrieved from the USE DoE website. These datasets allow us to carry out the neighbourhood environmental simulations using ENVI-met and Ecotect. More specifically, there are the following four sets of simulation modelling tasks carried out in the case study:

(a) Ecotect analyses of a building unit based on the Cairo Airport weather data

(b) ENVI-met simulation of neighbourhood outdoors based on the Cairo Airport weather data

(c) Ecotect analyses of the building unit based on ENVI-met generated site-specific weather data

(d) Coupling ENVI-met and Ecotect results within a 3D virtual neighbourhood on uCampus

Ecotect analyses based on the Cairo Airport Weather Data

The first simulation task is to carry out Ecotect thermal comfort analyses of a building unit (type 2) selected from the case study neighbourhood proposal. The weather data provided by

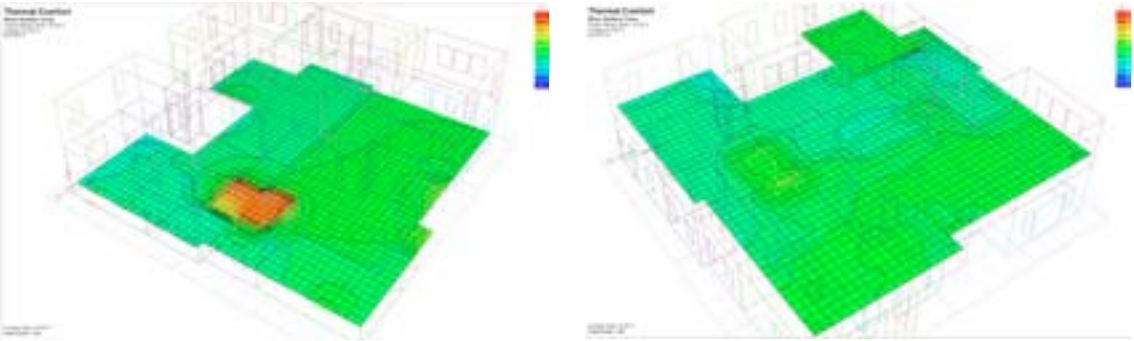
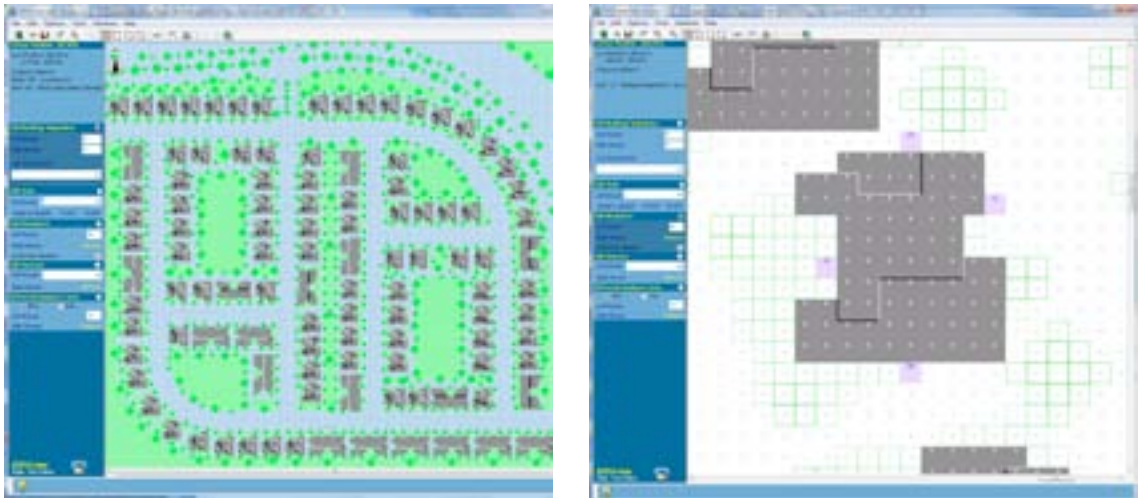


Figure 4: Ecotect Thermal Comfort analyses of a building unit type 2 in the neighbourhood based on the Cairo Airport weather data [Temperature range: 29°C – 41°C in steps of 0.4°C]: (4.a) Ground Floor; (4.b) First Floor (Source: Authors).



a. b.

Figure 5: The Area Input model built for the case study neighbourhood with the ENVI-met graphic editor: (5.a) whole site model; (5.b) zoom into a building unit placed with receptors c1, c2, c3, and b9 (Source: Authors).

the Cairo Airport weather station was used the Ecotect calculations. Figure 4 shows two snapshots of the resultant thermal comfort contours on the ground and 1st floors.

ENVI-met simulation of the neighbourhood design

ENVI-met requires a configuration file that defines the settings for the simulation to run. Among them, the names of the area input file, the output files, and the meteorological settings need to be specified. For the case study, the meteorological setting is configured according to the Cairo Airport weather data.

Another essential input file required to run ENVI-met simulations is the Area Input file which needs to be prepared using ENVI-met graphic editor (see figure 5). It is in the area input model that the basic shapes and locations of the neighbourhood elements are depicted such as buildings (with heights indicated), roads, vegetation, ground surfaces, and soils etc. Equally important is the placement of receptors around selected buildings in the case study neighbourhood with which site specific weather data will be generated as input to further Ecotect simulations of the building interiors. The current limit set by ENVI-met 3.1 for the number of receptors allowed in each area input file is 100.

Depending on the complexity of the area input model and the computing power available at the run time, an ENVI-met simulation is computationally intensive and it can take up many hours or even a day or two for a PC workstation computer to complete the

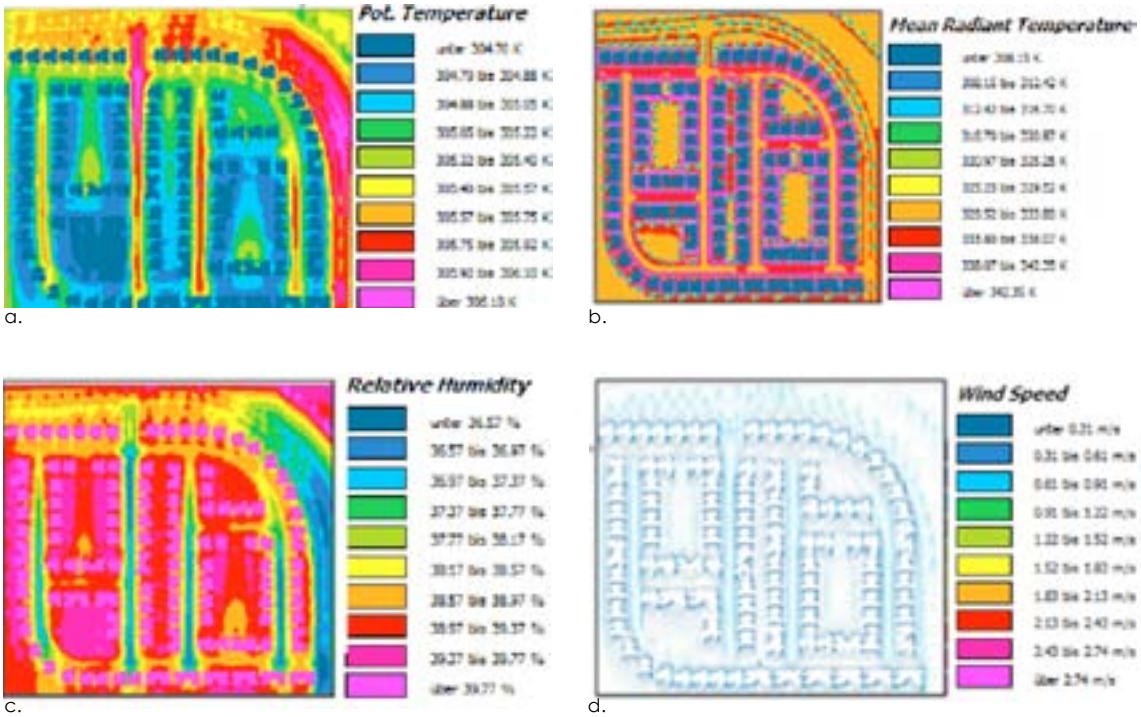
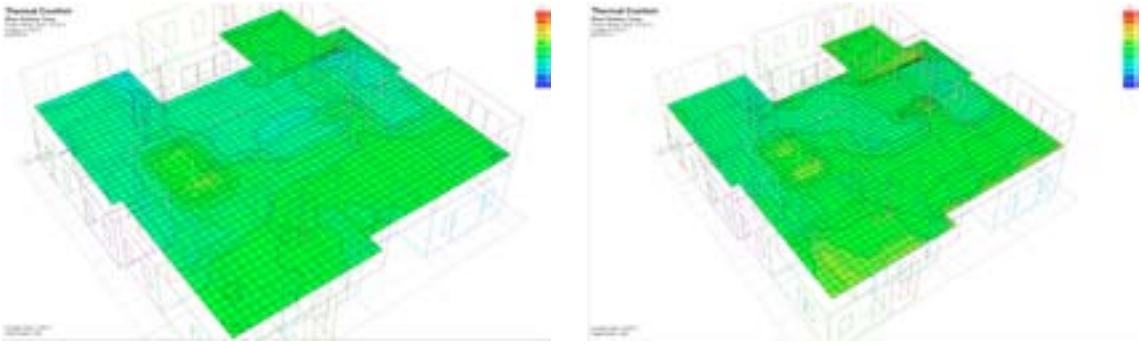


Figure 6: ENVI-met case study neighbourhood simulation results: (6.a) Dry Air Temperature; (6.b) Mean Radian Temperature; (6.c) Relative Humidity; (6.d) Wind Speed (Source: Authors).

calculations. The latest release of ENVI-met includes a data visualization module calls LEONARDO which is a tool to read all types of simulation outputs as image maps in the BMP format. Figure 6 shows four such examples of the case study neighbourhood simulation results through LEONARDO. Clearly, the data visualization can be an efficient way for designers to visually identify the environmental characteristics as predicted by the computational model. However, one should beware the actual correlation between the spectrum of contrasting colours and the range of numerical values. For instance, Figure (6.a) shows that the colour spectrum from deep blue to bright pink represents a temperature difference no more than 2 K. We find no clear documentation in the ENVI-met manual as how the colour coding schemes are correlated with the numerical ranges across the different themes of simulation outputs.

Ecotect analyses of the building unit based on ENVI-met generated site-specific weather data As discussed before, we consider it worth investigating the difference that Ecotect simulations could show between the weather data collected at the remote weather station (Cairo Airport) and the weather data generated with the ENVI-met receptors outputs. This stage of workflow involves finding out the average values among the parameters of all (atmospheric) receptors associated with a specific building unit. A building-specific weather data file is generated by replacing the relevant data fields in the weather station data file with the mean values found from the building's receptors, which is then fed into Ecotect for the building unit's indoor thermal comfort simulations. Figure 7 shows the results from Ecotect's running the building-specific weather data for the case study building unit. In comparison with the results shown in Figure 4 (Cairo Airport weather data), the simulations show that there is +0.29°C on the ground floor and +0.57°C on the first floor when the weather data generated with ENVI-met receptors is loaded.



a. b.

Figure 7: Ecotect thermal comfort analyses of the building unit type 2 based on the site-specific weather data generated with ENVI-met receptors [Temperature range: 29°C – 41°C in steps of 0.4°C]: (7.a) Ground Floor; (7.b) First Floor (Source: Authors).

Viewing ENVI-met and Ecotect results in a 3D virtual neighbourhood on uCampus

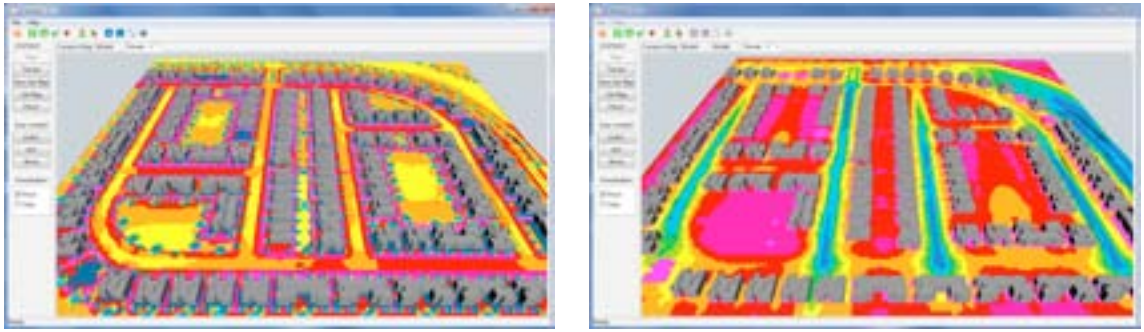
As introduced previously, uCampus is a Web-based Java-enabled X3D model server on which users can open accounts for uploading X3D models. For the case study, several accounts were registered to store various types of X3D models for on-line assembly. Figure 8 shows two views of the basic neighbourhood X3D models assembled via uCampus, which contains the neighbourhood terrain, building blocks, and a detailed building unit model. Due to time limit, no vegetation elements were modelled in the case study. With an X3D viewer plug-in installed (BS Contact 8.0 in this case),

a. b.

Figure 8: The basic X3D models of the case study neighbourhood stored on uCampus 1.1: (8.a) 3D building units and the site terrain; (8.b) a walk-through street scene (Source: Authors).

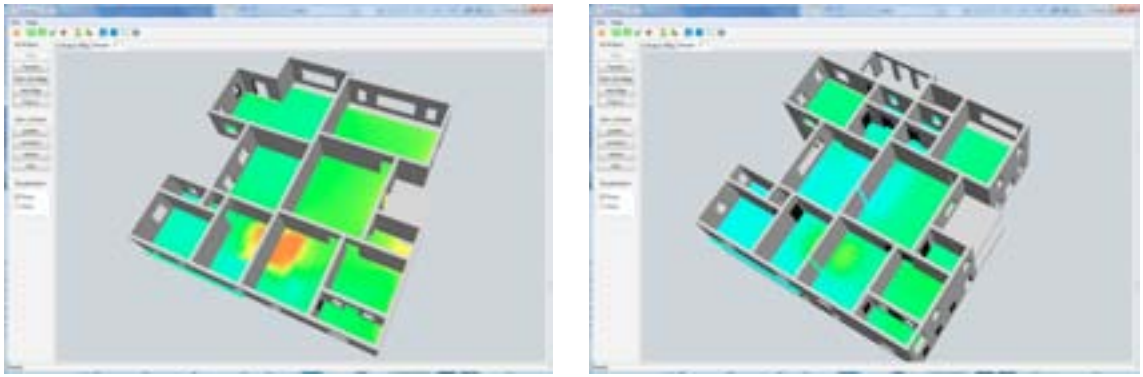
users can freely navigate to anywhere in the virtual neighbourhood.

Through 3D Studio MAX texture image mapping, the ENVI-met LEONARDO outputs from the neighbourhood simulations were inserted into the basic 3D neighbourhood model and converted into separate X3D files. Figure 9 shows two examples of combining the basic architectural model with the PMV (Predicted Mean Vote) and Relative Humidity data models. Similarly, the step of image mapping and data model conversion was applied to the Ecotect simulation outcomes onto the building unit models (see figure 10).



a. b.

Figure 9: ENVI-met LEONARDO outputs mapped onto the X3D virtual neighbourhood: (9.a) PMV [see figure 11 for the colour keys]; (9.b) Relative Humidity [see figure 6.c for colour keys] (Source: Authors).



a. b.

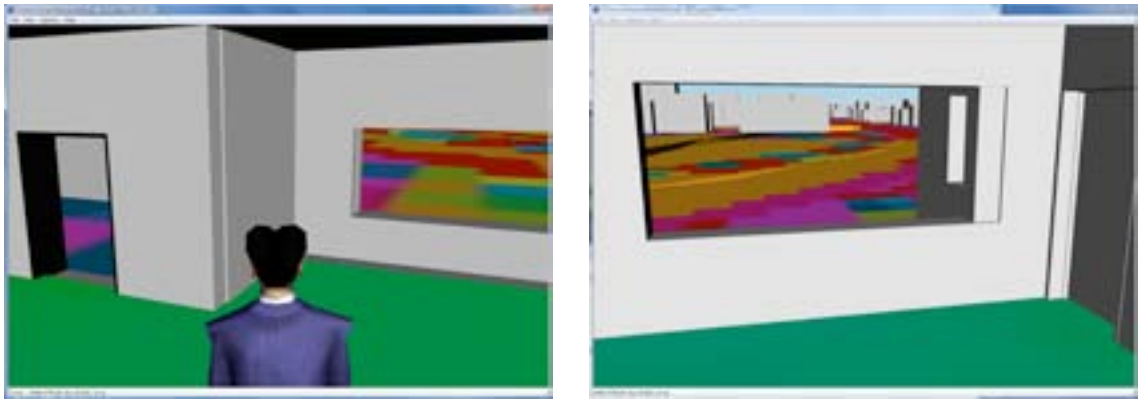
Figure 10: Ecotect outputs based on ENVI-met generated WDF inserted to the X3D building model [Colour keys are provided in Figure 11]: (10.a) Ground Floor; (10.b) First Floor (Source: Authors).

Given the architectural, ENVI-met and Ecotect data model repository and retrieval on uCampus developed for the case study, we went on generating 3D views as examples of visual coupling of ENVI-met outdoor simulations and Ecotect indoor analyses within the virtual neighbourhood (see figure 11). Here we see the 3D virtual neighbourhood playing the role of a unifying spatial and architectural reference framework into which the outdoor and indoor simulations are brought together. It is worth pointing out that the free 3D navigation of the virtual neighbourhood can enable a room-based viewing of the coupled environmental data models (see figure 12). In our view, this visual continuum of indoor and outdoor afforded by the immersive virtual neighbourhood modelling is a response to the need of projecting a sense of urban dwelling whiling reading the environmental data.

Figure 11: Visual coupling ENVI-met PMV (Figure 9.a) and Ecotect Thermal Comfort (Figure 10.a) results into the virtual neighbourhood on uCampus (Source: Authors).

Discussion of the Case Study Simulation Results

The social economic factors that may have shaped the case study neighbourhood design for New Cairo are not within the scope of the current study. Based on the design descriptions and drawings surveyed, we were able to conduct detailed environmental simulations



a. b.

Figure 12: Room-specific views of outdoor-indoor coupled neighbourhood environmental simulations [colour keys are provided in Figure 11]: (12.a) a view out from a room on Ground Floor; (12.b) a view out from a room on First Floor (Source: Authors).

following the outdoor-indoor coupling framework. Ecotect, ENVI-met and uCampus were used to explore how the simulation results could be brought together in a single 3D virtual neighbourhood model showing the predicted outdoor microclimatic and indoor environmental conditions. Assuming that the computational modelling of ENVI-met and Ecotect are sufficiently accurate in reflecting the physical laws of the real world, we could come to the following interpretations as what the outdoor-indoor coupled simulation tells us about the proposed neighbourhood development.

(1) The differences of Ecotect indoor analyses due to ENVI-met neighbourhood microclimate modelling – Ecotect analyses of the selected building unit were performed repeatedly according to different sets of weather data, one with the Cairo Airport weather data (see figures 4.a & 4.b) and the other with the ENVI-met generated site-specific weather data (see figures 7.a & 7.b). Ecotect predicts higher average temperatures for both floors with the ENVI-met modelled weather data (hottest day of present year): 0.29°C difference on the Ground Floor, and 0.57°C on the First Floor. This initial result suggests that Ecotect predicts higher indoor temperatures if the simulations are coupled with ENVI-met neighbourhood-wide outdoor simulations. The differences of indoor temperatures due to ENVI-met localised weather data are yet to be further tested with more building units at different locations in the neighbourhood. However, as reported by Vangimalla and co-workers in their validation of Ecotect accuracy for thermal simulation through field measurements that Ecotect consistently underestimated the building's thermal load, we could speculate the inaccuracy due to the weather data applied in the simulation. Could Ecotect accuracy be improved if building and site specific weather

data as generated through our outdoor-indoor coupling methodology is applied instead? Our hypothesis is that the degree of such differences could be an indicator of the effects of the local neighbourhood fabric on the neighbourhood's microclimate such as the effects of urban heat islands.

(2) The four north-south streets inside the neighbourhood and the major ring road circumventing the north-east corner present hotter and drier conditions (see figures 6.a-d and figures 9.a-b). This may result from the large surface areas exposed to the solar heat due to the need of handling traffic volumes envisaged or of addressing local urban planning regulations. However, the current vegetation and ground surface designs in these street spaces could be reconsidered to achieve more favourable outdoor conditions beneficial to nearby building units in maintaining indoor thermal comfort with lower energy consumption. Again, the effects of any redesign need to be confirmed with further ENVI-met and Ecotect coupled simulations. Seen more generally, what the case study shows is that thematic visualisation of ENVI-met simulation could reveal precise spots/strips of the neighbourhood in need of achieving better environmental performance.

(3) The assembly of Ecotect thermal comfort and ENVI-met PMV results in the 3D virtual neighbourhood could deliver room-specific views of both indoor and outdoor environmental profiles as inserted in the X3D models (see figure 12.a-b). Such a context-rich and location-specific way of reading the neighbourhood simulations seems appropriate to the urban dwelling viewpoint – How hot is this room going to be and what about outside the room? Especially, one could consider the usefulness of such a visual approach to engaging prospective residents of a new or regenerated neighbourhood with the issues and significance of well-tempered outdoor and indoor architecture. The juxtaposition of a building's indoor analyses and the immediate surrounding outdoor analyses could help designers and residents raising questions as why certain thermal phenomena arise at specific spots of the neighbourhood (see figure 11) – Why is there a hot spot appearing on the ground floor inside the house? Will the hot spot disappear if the house is oriented differently or different species of trees are planted along the neighbourhood's main road?

Conclusion and Further Studies

Sustainable urban neighbourhoods are the foundation of realising sustainable cities. The world's largest portion of energy consumption in the 21st century will remain in the domain of urban dwelling. In this paper, we report our investigation into a new methodological framework for bridging the current gaps between urban microclimate simulation at a neighbourhood scale and indoor environmental analysis at a single building level. We have since developed an experimental software- and data-based simulation workflow such that indoor environmental simulation of buildings in an urban neighbourhood can be grounded on outdoor environmental simulation of the neighbourhood. Simulation outputs from this outdoor-indoor coupling approach can be further brought together by a Web-based 3D virtual reality visualisation modelling platform.

The case study project proposed for a new

neighbourhood development in New Cairo is as an example of urban dwelling in a hot-arid region. By applying the outdoor –indoor coupled methodology to the workflow involving Ecotect, ENVI-met, and uCampus, we demonstrate three key outcomes through the case study neighbourhood design: (a) the differences in Ecotect indoor analyses under 'standard' (remote weather station) and 'site-specific' (ENVI-met locally refined) weather data, (b) the facilities of ENVI-met LEONARDO outputs augmented by 3D architectural and urban modelling in aiding neighbourhood-wide visual identification of precise locations needing design reviews, and (c) the prospects of communicating both outdoor and indoor simulation outputs through a single 3D virtual neighbourhood that affords user-centred interactive navigation to specific viewpoints.

Based on the current research findings, we consider there are the following areas of work to be further undertaken to extend the scope of the methodological framework, to improve the integrity of the software and data workflow, and to better understand the likely impacts of the simulation modelling approach to social engagement with sustainable urban neighbourhood design.

(1) Can the outdoor-indoor coupling methodological framework be extended to address the challenges posed by climate change scenarios associated with global warming? In addition to ENVI-met, Ecotect, and uCampus as used in our current study, what other software tools and datasets are required to assess urban neighbourhood design not only for present day but also for future urban microclimate change scenarios?

(2) How can we define a common visual language for more effective and accurate communication of outdoor-indoor coupled urban neighbourhood environmental simulation results? As we can see from the case study, ENVI-met and Ecotect are designed with different colour coding schemes to represent the ranges of numerical data in different measurement units. Data visualisation may appear more user-friendly, but the resultant coupled visual images shown in virtual neighbourhoods can be confusing and misleading without a well-defined coherent visual language for conveying both indoor and outdoor simulation outcomes.

(3) The current versions of the outdoor-indoor coupling methodological framework and the experimental workflow have been developed with neighbourhood designers as the main end-users in mind. However, the efforts required to traverse the various software platforms and datasets are non-trivial. How will neighbourhood designers perceive the benefits to be gained from the workflow in engaging with stakeholders, clients, and prospective neighbourhood residents?

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Chengzhi Peng

Chengzhi Peng holds BArch, M.Sc. and Ph.D. degrees in Architecture and Computer Aided Architectural Design. He is Senior Lecturer at the School of Architecture, University of Sheffield, UK. He researches and teaches in the areas of architectural design computing and reflective design systems. Drawing on contemporary architectural and urban design theories, information studies, computing and communications technologies and interaction design, he is interested in creating novel digital design tools, interactive modelling environments and contextual information systems to explore new frontiers of architectural and urban design thinking. Actively pursuing funded research often involving interdisciplinary collaboration, he has completed several projects including Sheffield Urban Contextual Databank (SUCoD), Townscaping, uCampus and the Augustine House Experiment. He is currently working with several doctoral students on projects concerning Climate Change Conscious Urban Neighbourhood Design, Collective Memory Enhanced Virtual City, Context-Aware Pervasive Urban Computing, and Mixed Reality Modelling. He can be reached by email at c.peng@sheffield.ac.uk

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Amr Elwan

Amr Elwan holds BArch and MArch degrees in Architecture. He is a PhD candidate at the School of Architecture, University of Sheffield. His doctoral study at the University of Sheffield investigates the current gaps of software-based simulation of outdoor and indoor thermal comfort at an urban neighbourhood scale. He is interested in establishing an innovative methodological framework that supports wider public understanding and engagement with climate change conscious urban neighbourhood design or redesign for cities situated in hot-arid regions such as Cairo. Before joining the PhD Programme at the Sheffield School of Architecture, he was an associate teacher and design officer at the Department of Architectural Engineering, Military Technical College, Cairo. He can be reached by email at a.elwan@sheffield.ac.uk

ECONOMY AND CULTURE IN TRANSITIONS: A COMPARATIVE STUDY OF TWO ARCHITECTURAL HERITAGE SITES OF BAZARS AND HANS OF BURSA AND DHAKA

Tasleem Shakur, Roxana Hafız, Tulin Vural Arslan and Arzu Cahantımur

Abstract

Chawkbazar in Dhaka and Covered Bazaar in Bursa are two unique examples showing the contradiction among the traditional and the contemporary life-styles and their reflections on space uses and architecture. The first example in Dhaka is one of the prime icons of Mughal architecture in Bangladesh, whereas the second one in Bursa is the first example of the typical nucleus of traditional Ottoman city. Based on these two case studies in Dhaka (Bangladesh) and Bursa (Turkey), this paper attempts to illustrate how the emerging cultures and spaces are continuously being either negotiated or contested with their adjacent historic sites (Shakur, 2005). This comparative research between two similar historical sites (Mughal and Ottoman) but miles apart geographically is intended to understand the commonalities in its economic, social, cultural aspects through its transformation from the historic to the contemporary period. It highlights the socio-economic and cultural transformation and its implications for future conservation and development.

Keywords

Urban transformation, architectural and cultural heritage, traditional Bazaar, Bursa, Dhaka.

Introduction

A common understanding of Bazaar is a permanent merchandising area, marketplace, or street of shops where goods and services are exchanged or sold. For both Bangladesh and Turkey (and for many parts of the Islamic world), the word derives from the Persian word 'Pazar' , the etymology of which goes back to the Pahlavi word baha-char (or sometimes spelled as 'Pazar' in English translation) meaning "the place of prices". Historically (and according to some Architiectural/historian academics), Turkish bazars generally contain a number of multifunctional buildings such as bedestens, bath houses (hammams), hans (khans) along with shops, market stalls and a mosques (Peterson, 1996:32). Although the current meaning of the word is believed to have originated in Persia, its use has spread and now has been accepted in the dialects and languages of countries around the world.

It seems that in Bangladesh, this name was derived with the arrival of the Mughals to this region (early seventeenth century). Bazaars have evolved over time and were influenced by the cultures of different regimes that came

to rule the region of Bangladesh. Starting from the open-to-sky markets to glitzy shopping malls - all are evidences of their gradual evolution catering to the needs of people with regard to time, history and locale. Bazaars, in the regions of Bangladesh, are traditional markets located in open spaces where traders gather for part of the day to sell their goods. Traders sat in rows or in a circle to sell their wares; the idea was to display as well see what others had to offer. In the later years, temporary structures were erected for protection from the sun and rains. Much afterward the structures were permanently built with brick and concrete. In Bangladesh the Bazaar or markets are places where people socialize and spend time to recreate from the drudgery of daily life, in addition to trading. The Chawk Bazaar is an evidence of the glorious past of Dhaka and a very old commercial center.

Similarly, Turkey which contains a glorious socio-cultural, architectural and political history has very old and rich examples of traditional commercial districts. Like Dhaka, Bursa (the first capital of the Ottoman Empire) has one of the earliest examples of Turkish bazaar which was first developed in the fourteenth century (Peterson, 1996: 33). However, unlike in Dhaka (Bangladesh), here in Bursa (Turkey) such early examples of bazaar includes half a dozen of mosques, baths (or hammams), khans, madrassahs and a bedesten (closed form of Turkish market, more like a warehouse where goods of high value were traded). However, these districts have faced physical, economic and social decline due to the boom in personal mobility (i.e. the car) and convenience of shopping in out-of-town shopping areas.

Thus, this study intends to provide a comparative study of the development of one of the most fascinating Bazaars - Chawk Bazar of Dhaka (Bangladesh) and the historic covered Bazars and Hans of Bursa (Turkey) which underwent varied economic, social and cultural transformations at different political times. It also attempts to illustrate how the emerging cultures and spaces are continuously either negotiated or contested through various soico-economic, political, cultural and aesthetic factors with their implications from local to international world.

Methodology of the Study

This article intends to investigate a comparative historical development of the old Bazaars in Dhaka (Bangladesh) and covered Bazaar and Han region in Bursa (Turkey). The concept of Bazaar are similar in both the Islamic historic spaces of old Dhaka and old Bursa. However, the historic shopping spaces of Bursa is a bit different than that of Dhaka as it is more of an elaborate complex of buildings and functions where Chawkbazar (Dhaka) is more or less a homogeneous one large layout of shopping. Although, somewhat similar to Bursa, Chawkbazar is surrounded by a few old historic residential places (which at one time was used as Sarai khana or in Turkish concept Kerwan Serai which is more of like a hotel for travelling merchants) mosques and madrassahs. In current usage they are not so much an integral part of the Bazaar. It is therefore the researchers took slightly different approaches in researching two different geographic locations. However, both the research teams adopted a heuristic approach and overview the transformation periods in the development of the Bazaar areas. Because of the high density and mixed

use development in Dhaka, this case study undertook a survey of the Chawk Bazaar to understand the changing land use pattern of the Bazaar and trace the changes that occurred over time. Here some participant observations and focussed group meetings was held with local traders, especially the seniors, in order to know about its past. This was undetaken to compensate the paucity of the existing historical record.

While the Bursa study undertook a survey of the bazaar to understand spatial, social and economic features of the district and trace the changes that occured over time. Within the scope of this study, existing written documents, thesis, articles, old photographs, air photos, old maps and planning studies were searched by both the research teams in Bursa and Dhaka to get all possible data. Comparison of old photographs and maps with current ones showed striking changes in the form and structure of the Bazaars. In the conclusion part of the paper, the commonalities in transformation periods of these two case studies from different geographies are summarized with a table.

A Historical Account of the Development of Dhaka and Bursa

The central location of Dhaka prompted Islam Khan, the Mughal Governor (or Subedar) establish his capital here in 1610 (see Map1a). The Mughal town of Dhaka expanded rapidly growing around the old Fort (presently the Central Jail). It also grew as an important commercial center largely through its

Map 1a (left): Dhaka and its surroundings (insets) (Source: www.banglapedia.org/httpdoc).
Map1b (right): Bursa and its surroundings (Source: Google Earth, http://www.turkiye-rehberi.net/bursa-haritasi.asp).

establishment as an inland port or Shah Bandar. Traders, local and foreign, flocked to Dhaka to do business. As Dhaka grew, artisans, craftsmen and manufacturers came to settle here. Gold, silver, brass, wood and shell work flourished, but the production of cotton goods surpassed all others. The production of the world famous Muslin prospered under the patronage of the Mughal rulers. It is stated that in the 18th century between 28 lakh of rupees to 40 lakh of rupees worth of cotton goods were exported annually from Dhaka, and most of it to Europe (Ahmed, 1986).

At its peak, Dhaka had a population of 900,000. However, Dhaka began to decline when the capital was relocated to Murshidabad by Subedar Murshid Kuli Khan in 1715-16, but it remained the headquarters of the Mughal army and navy in Eastern Bengal. The Mughal General Mir Habib, under the deputy governorship of Mirza Lutfullah (Murshid Kuli Khan II), conquered Tippera and put it under the jurisdiction of Dhaka. Dhaka's commerce grew by leaps and bounds after this conquest.

A sharp decline in trade and commerce was again experienecd when the British East India Company became the ruler of Bengal in 1765. Prior the conquest of India, it was Bengal that the British East India Company subjugated and their near monopolistic control of trade and imposition of heavy customs and duties blighted the trade of Dhaka. Also, the shifting of capital later to Calcutta (now Kolkata) drew away the bulk of commerce from Dhaka. Much of the trade had followed traditional patterns and economic life was listless as the Mughal regime collapsed. The water routes, which were meticulously maintained to keep them navigable throughout the year, fell into despair as a result of dire negligence on the part of the colonial administrators and due to the introduction of the railway and motorized vehicles. Lack of security forced merchants to pay high premiums for export of merchandise to Kolkata. The abolition of inland transit duties and town duties set in motion the recovery of Dhaka and it became the most populous town of Bengal by 1840 (Ahmed, 2009). The commerce of the city was mainly concentrated at Chawk Bazaar, the Mughal's main emporium in Dhaka; other bazaars were located not far away from it.

The other forces that rekindled renewal were administrative, educational and commercial and Dhaka banked on these to spring back to prominence by the end of the 19th century. Then in 1947 it became capital city of the province of East Pakistan and in 1971 it was the capital city of a sovereign state. The finale of transformation of Dhaka was that of a modern metropolis. Newspapers, electronic media, motorized transport, railway, telephone and telegraph, the internet, the shopping malls - all symbolizes modernization (Ahmed, 1986). New forms of trade, commerce and manufactures laid the foundations for renewed economic life in Dhaka.

Bursa, established in Southern Marmara Region in the north-east part of Turkey in 185 B.C., was named "Prusa" after the Bithynian King Prusias I (Map1b). After Roman and Byzantian periods, it was conquered by Sultan Orhan in 1326 and was declared as the first capital of the Ottomans. Bursa continued to serve as the civic center, while Edirne was named the military center in 1365, until Istanbul became the capital of the

Ottoman Empire in 1453 (Dostoglu and Vural, 2002). Various researchers have documented that Bursa became one of the most important commercial and production centers in the world between 1450 and 1600, even though Istanbul was declared as the capital of the Ottomans in 1453 (Yenen, 1992: 303; Dostoglu and Vural, 2002). In this period, Bursa, which was located on the westernmost extension of the Silk Road and Spice Routes, the transfer of both silk from Tabriz to Italy, and spices from India to north European countries was realized through the city. Also it has been the center of sericulture and silk production since the 15th Century. The city, being an important silk production place, had been a fundamental commercial center in marketing silk produced both in domestic market and in Europe. "Han"s and Covered Bazaar Region being situated at the city center had functioned both as a commercial center and also as an important place of socialization for the Ottoman way of life that had a culture of "closed society" (Dostoglu and Vural, 2001).

The city was reduced in size in the 17th and 18th centuries due to the Celali revolts and the decrease in the demand for silk based on the economic crisis in the Mediterranean world. The influence of the Industrial Revolution gradually being observed in the Ottoman Empire, new developments took place in Bursa after mid 19th century. This transformation was inevitable because textile production, which had continued in the form and scale of home production until the 19th century in Bursa, could not compete with textile production in Europe in terms of cost or quality due to technological backwardness. In this process, many silk factories, new state, municipality and bank buildings were constructed in Bursa, and the railway from Bursa to the one of its provinces harbor, Mudanya harbor, was implemented in the second half of the 19th century. In short, the 19th century can be described as a period during which the Ottomans were institutionally directed towards the West (Dostoglu, 1999: 87-91; Dostoglu and Vural, 2001: 241).

The position of Bursa as a commercial center still continues today due to the industrialization process it underwent during the early Republican Period in the 20th century. However, transformations occurring both in the economical and social structures as a corollary of the industrialization and globalization have influenced everyday life of the city as well as the sense of space where everyday life takes place. Industrial and commercial activities in Bursa, which have been diffused in each other throughout the centuries, have become separated and moved to different parts of the city with the establishment of Organized Industrial District in 1961 and its forthcoming industrialization process. During this process of change, historical commercial district in the city center that has been such a place for production, consumption and social interaction, for centuries has begun to lose its importance. However, with the raising awareness about the sustainability and cultural economy in the late 20th century, historical commercial district in Bursa have begun to regain its popularity. Local governments, inhabitants and merchants have reinvented the authenticity and economical value of Bursa. In paralel to this awareness Bursa Metropolitan Municipality was applied for as a UNESCO World Heritage City in 2000. Now Bursa and Cumalikizik Early Ottoman urban and rural settlements is placed in the tentative list of UNESCO (http://alanbaskanligi.bursa.bel.tr/

bursa-alan-baskanligi).

The Chawk Bazar

The Chawk Bazar is one of the most historic and oldest business centre located near the Central Jail and the River Buriganga in Old Dhaka (see Map 2). During the Mughal rules wherever the Subedar put up their tents, invariably a bazar used to develop nearby to cater to the needs of dignitaries and the soldiers.

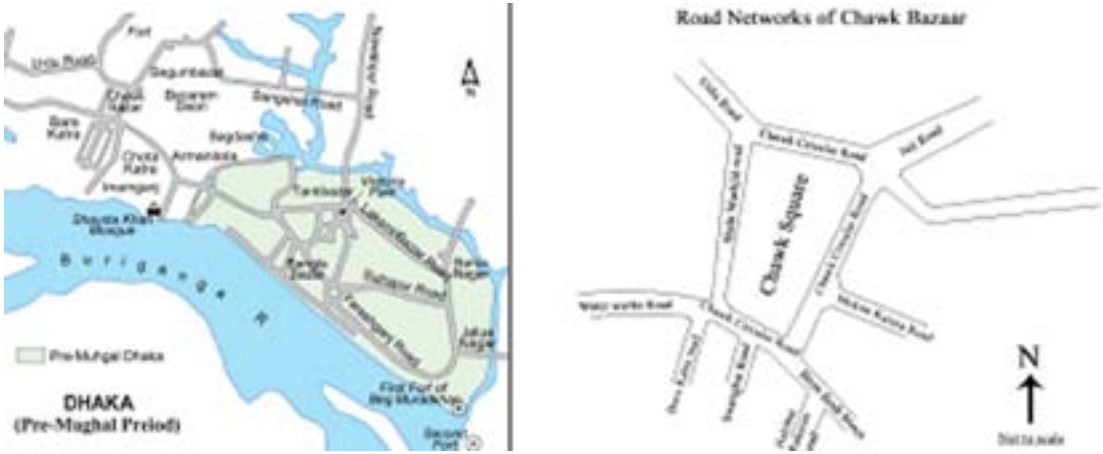
It is stated that Raja Man Singh, on behalf of the then Mughal Emperor, came to East Bengal (presently the region of Bangladesh) to crush a rebellion brewing up in this region. Raja Man Singh in this endeavor shifted his administrative centre to the present Central Jail site in 1602 and established a fort there; and, the Chawk Bazar developed close by as a result. A stone inscription, however, states that it was the Governor or Subedar Murshid Kuli Khan who established this Bazar in 1702 and named it the 'Padshahi Bazar'or the 'Badshahi Bazar.' Murshid Kuli Khan developed the Chawk as self-contained place with caravanserais, mosque, etc. The Chawk Bazar Shahi Mosque was built so that traders and locals could say their prayers on time. It was his son-in-law, Naib Nazim Luthfullah alias Murshid Kuli Khan II, who later rebuilt this Bazar (Mohsin, 2009: 79; Mamun, 1993: 75).

The Chawk Bazar was considered a very posh business center during the Mughal and the British Colonial regimes. The close location of the Boro Katra and the Chhoto Katra, the two magnificent residences of Mughal dignitaries, signifies the importance of this Bazar. A historical account reveal that the old name of this Bazar was 'Nakhas' meaning slave-trader and it is assumed that the Chawk Bazar was also a place for slave-trading (Mamun, 1993). The Chawk Bazar was a nucleus around which Persians, Greeks, Armenians, Portuguese, Kashmiris, etc. conducted their trades. The Chawk Bazar was considered one of the most important business centres in the South-East Asian region.

The Chawk Bazar earned its fame as a place for social, religious and political gathering and tete-a-tete. During the month of Muharram wrestlers, lathials and sword-players gathered in the Chawk to show off their feats. Also marsias were sung, the Holy Qur'an recited and religious discussion held during this month (Taifoor, 1956). The Chawk was, and is still famous, for the Mughlai foods available throughout the year and the varieties of Iftari it offers to the city-dwellers during the holy month of Ramadan.

Transformation of the Chawk Bazar

Early Dhaka, on the bank of River Buriganga, was easily discernible by the pre-Mughal city with its moat-like protection and the Mughal city extending beyond the protection of the moat (see Map 2). This map shows the rectangular Chawk Bazaar (also spelled as Chouk Bazar and very rarely as Chalk Bazaar), the Fort and the Katras are on the left and two pre-Mughal period forts are on the right corner. The physical design of Chawk Bazaar initially shows a rectangular shaped open space with brick paved carriage-ways built all around, which presently forms part of the existing road network. The market used to be held under the sky in the late afternoon or after sundown. Traders thronged to this place with various merchandise which similarly



Map 2: Dhaka on the bank of River Buriganga, showing the rectangular Chawk Bazaar with roads all around, the Fort and the Katras on the left and two pre-Mughal period forts on the right corner
(Source: http://dhakatown.net/dhaka-city-map (left) and the other (on the right) was drawn from Field Survey).

attracted buyers from all places.

The Chawk Bazar Shahi Mosque, built in 1706, had permanent shops on the ground floor level. The Mosque is still in use, but repeated renovations had transformed it beyond recognition.The Boro Katra had 22 shops on the ground level beside the residential spaces on top floor. it had other on site facilities, such as dining, storage space, medical care, and stalls for horses – all for free. The Chhoto Katra, though smaller in size, was built in similar manner like the Boro Katra and had similar facilities. Both the Katras are in dilapidated conditions at present. The Chawk Bazar has also undergone vast changes during the latter part of its 400 years of existence.

Transformation began with the erection of temporary shops within and by containing the space of the Bazaar (see figures 1and 2) with walls (460 feet long, 4 feet high and half a foot wide) all around having 16 entry gates. The changes were done by the then Magistrate Walter between 1823 and 1825. The Magistrate also placed the Bibi Mariam Canon inside the Bazaar. The road running all around the perimeter of the Bazaar was metalled and the road connecting Islampur and the Bazaar was widened and metalled.

The transformation became more apparent with rebuilding of shops in a more permanent manner. After the emergence of Bangladesh, a drastic change was evident in the skyline as temporary structures were gradually replaced by multi-storied, permanent structures. The ground floors of the buildings are being used as commercial, light industries or shops and the upper floors are used either as shops or

godowns or both; very little residential use emerged inside Chawk Bazaar. These buildings were constructed without maintaining set back or regrads for designs of architectural significance. Buildings were built back to back and side to side making it one very jumbled and unaesthetic development (see Map 3 and Figure3). Neither the local people nor the successive city administrators took regard of this matter.

Figure 1: The Chawk Bazaar in 1885 with Bibi Marium Canon at one side. Also note temporary structures built inside the Bazaar (Source: http://en.wikipedia.org/wiki/File:Bibi_Mariam_Cannon.jpg).

Figure 2: The Chawk Bazaar in 1904. Note the open space of the Bazaar filled with structures (Source: http://en.wikipedia.org/wiki/File:Dacca_Town_Chowk.jpg).

Figure 3: Present chaotic Chawk Bazaar (Source: Authors - Field Survey, 2010).

Map 3: Present Chawk Bazaar showing intense development pattern (Source: Authors -Field Survey, 2010)

The Covered Bazaar and Han Region of Bursa

Bursa when conquered by Turks in 1326 was a comparatively small Byzantine settlement. For the establishment of Bursa as an Ottoman city, empty area out of the castle, extending from east to west had been chosen as the place of nucleus. Its proximity to the city walls had provided the security of the bazaar and in addition to that, as a result of the expansion of city on the east-west direction, this place had become a central location for the city of Bursa (Cezar, 1985). The location of the social, economical and cultural center of the city have not been changed throughout the centuries and Covered Bazaar and Han Region, as the major place for trade and social activity, has kept its place in this center.

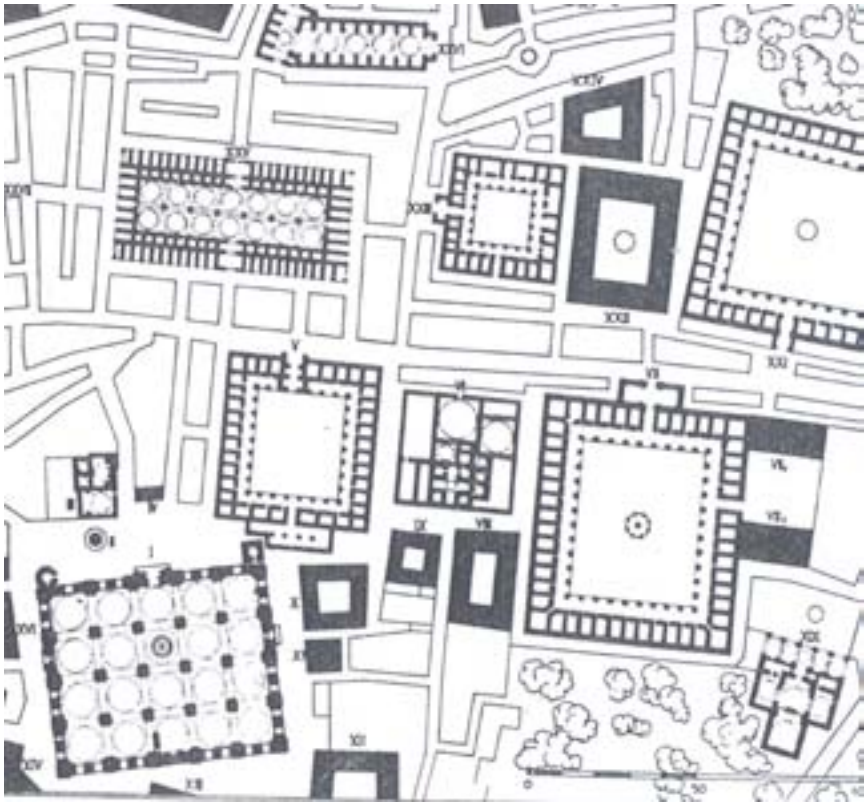
Transformation periods of Bursa's Covered Bazaar and Han Region

Commercial districts in Ottoman cities have generally preserved their spatial characteristics and location through the centuries. Although, they had kept their original form for centuries, they had effected by the social, political and economical changes both in Ottoman Empire and in the world in 19th and 20th centuries. Besides the spatial structure, social and economical structures of these districts have had also some reformations as the results of these changes. This spatial transformation of historical commercial districts in Anatolian Turkish cities can be analyzed within five periods:

1. Establishment: until the 16th century (Cezar, 1985)
2. Stagnation: during the 17th and 18th centuries (Cezar, 1985)
3. Transformation under the forces of early industrialization: the period of spatial and functional transformation from the mid of the 19th century to mid of 20th century (Cezar, 1985).
4. Transformation under the forces of globalization:The period of spatial and functional transformation from the mid of 20th century to 21st century (Vural, 2009)
5. Reinvention of the authenticity: The period of spatial and functional revitalization in 21st century

Establishment period until 16th century

The initial buildings forming the Covered Bazaar and Han District had been built in Orhan Gazi Period (the second Sultan of Ottoman Empire) in 14th century: Emir Han, Orhan Mosque and Orhan Bath. After then, Kapan Han and Bedesten had been built around Emir Han. The presence of Bedesten in Bursa Bazaar had aroused both native and foreign merchants' interest to the city. This had caused the development of long distance trade in Bursa, which had been placed on the important trade roads and led to increase its commercial importance. After Emir Han and Bedesten being constructed, in the following two centuries each of the prevailing Ottoman Sultans had constructed many Han buildings. As the number of the Han buildings increased, new shopping streets appeared on the axes connecting the Hans and Bedesten such as Long Bazaar and Covered Bazaar



Map 4: The center of the Covered Bazaar and Han District (Bursa Metropolitan Municipality Archive) (Black ones shows non-existed buildings in present time).

Figure 4a: A view of Coppersmiths' Street in 1913 (Dostoglu, 2001: 567).

Figure 4b: A view of Pirinchan in 1910 (Dostoglu, 2001: 569).

(Akkilic, 2002). By the time 16th century, Bursa Bazaar had nearly succeeded (see map 4 for the original form of commercial district in Bursa)

Stagnation period between 17th and 18th centuries

Formation of the historical commercial district in Bursa had lasted until the 16th century in such a way as justifying Cezar's thesis. During that time period, Some of the important trade routes like Silk Road or Spice Trade Routes had lost their importance as a result of the discovery of new sea routes. Due to this fact, between the 17th and 18th centuries, such a significant commercial buildings had not been built, after Cocoon Han and Fidan Han. Many of the Ottoman cities, like Bursa, had not lived significant changes in their historical commercial districts until the 19th century (Cezar, 1985) (see table t).

Transformation under the forces of early industrialization: The period of spatial and functional transformation from the mid 19th to mid of 20th centuries.

During the Industrialization of the city in 19th century, the organic structure of the city had been deformed by the opening of new traffic routes. Although these routes were opened in order to provide better transportation for the products of newly appeared factories in the north and west sides of the city, they were also the symbol of the Westernization attempts of Ottoman Empire (Dostoglu and Vural, 2002). There had not been a holistic planning strategy. Local governors who have the authorization of administration on behalf of the government had limited visions. So, short term planning strategies including partial and intuitive approaches were observed. In that period, Covered Bazaar and Han District had been limited with the opening of Cumhuriyet Street on the north, Inonu Street on the east and Atatürk Street on the south(Vural, 2009) (see table 1).

Transformation under the forces of globalization: The period of spatial and functional transformation from the mid of 20th century to 21st century

Radical transformation of Hans and Covered Bazaar Region in Bursa began with the 1958 Bursa fire. 1958 Bursa fire starting in a printing workshop in August 1958 had widely spread through the bazaar area and had almost demolished the historical commercial center for the destructive effects of 1958 fire on commercial district. In order to rehabilitation and partly reconstruction of the district a foreign planner, Prof. Luigi Piccinato was assigned. Professor Luigi Piccinato's project was initiated in 1958 year of which objective was to regain the original structure of the area (Piccinato, 1961).

The dynamism of everyday life in historical commercial district had been interrupted between 1958 and 1965 due to the restoration works. However, 1960s were a significant period for social and economical life in Bursa. Because in the master plan prepared by Piccinato in 1960, the presence of Bursa Organised Industrial District has led to the significant transformations in economical and social life in the city (Dostoglu and Vural, 2002). Bursa had increased its importance as an industrial and commercial city by the end of 1960s. In 1960s, as the importance of Bursa increased as an industrial city, service requirements like banks, insurance companies, offices have become an important necessity. As a result of this, multi-storey blocks, in the middle of 1960s had been constructed with an aim of providing these services on the west part of the commercial district. Another reflection of economical and social transformations in Bursa after 60s has been seen in the north part of historical commercial district. In that area, business centers including shops and offices for wholesale and retail of textile products started to open towards the end of 1970s (see figure 5 and table 1).

Transformations in the concept of shopping and economical changes in Turkey during the 1990s under the influence of consumerism affect the architectural identity of the historical commercial district. Spatial concept of the shops has changed through socio- economical developments. Shops with blinding shop windows, attractive lights, and remarkable shop-signs have become the new architectural characteristics of the historical commercial district. Changes in historical commercial district can not only be limited changing appearance of the shops, but also the products that are sold also changed.

Reinvention Authenticity

The period of spatial and functional revitalization in 21 st century Revitalization works in Bursa Covered Bazaar and "Han"s District in 20th century has begun after its partly burn-off in 1958 Bursa Fire With Prof. Luigi Piccinato's Project which can be considered as the first project having a wholistic approach about the revitalization of the district.

Another wholistic project about revitalization of historical commercial district in Bursa, called "Bursa Reyhan, Kayhan and "Han" s District Preservation and Development Project", was prepared by the academicians affiliated with METU, in 1988. The aim of this project is defined, as follows: rehabilitation of these districts while protecting their unique values; clearing the physical additions which were not belong to the

Figure 5: Aerial view showing the Bursa Covered Bazaar and Han region and its inital surrounding in 2005 (Source: Bursa Metropolitan Municipality Archives).

original structure of the buildings; design of new buildings in consideration to the architectural and historical value of the district (Kırayoglu, 2004).

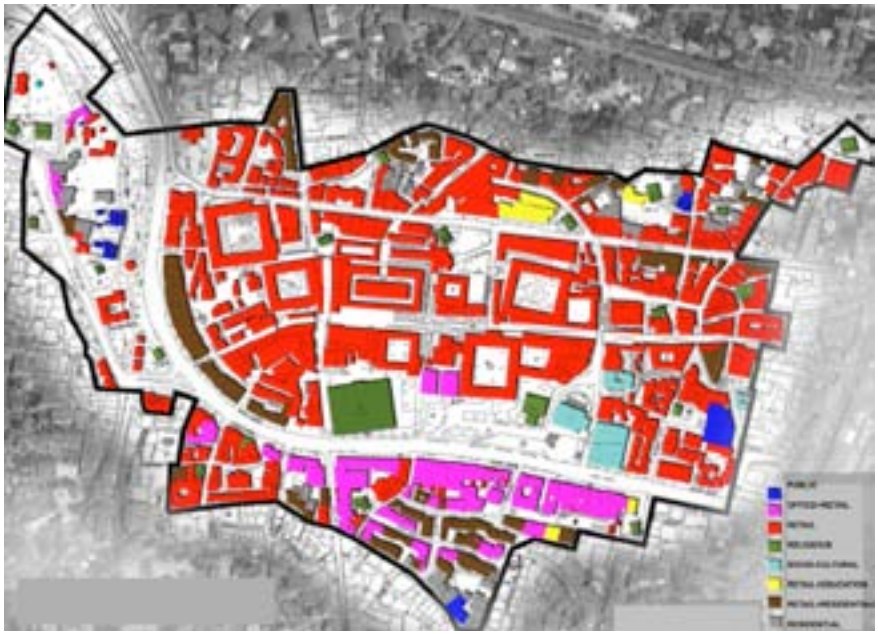
However, in the implementation phase of this project by local municipalities after 2000s, main aims of the METU's project, considering the unique values of the district, have been partly neglected. In restoration of the some of the "Han" buildings, the usage of contemporary building materials and radical changes in their functions give them an appearance of a theatre stage rather than buildings having witnessed 700 year history of Bursa. Also, in revitalization part of the project, facade renovations do not reflect the original characteristics of the district, rather than they reflect the characteristic of the streets in mid-European countries with their ornamented white jambs and colorful facades. Also, different attitudes about the architectural appearance of shelter projects which are applied in different parts of the district give a chaotic appearance to the whole area,(Vural Arslan, et.al, 2011)(see figure 6 and figure 7 to compare the transformation please see also figure 4a and figure 4b, table 1).

Findings and Conclusions

Throughout the study authors intended to find paralells between the development of bazaar areas in two different cultures. The findings of this evaluations are shown in Table 1. In both of the case studies it was found that especially after 1947, unique historical, cultural and economical

Figure 6: A view of Long Bazaar in 2009 (Source: Photo by Vural Arslan).

Figure 7: A view of Pırınc Han in 2009 (Source: photo by Vural Arslan).



Map 5: Land use in the Bursa Covered Bazaar and Han District (Source: Authors - Field survey in 2012).

value of the Bazaars and Hans have been reinvented by local governments, merchants and also inhabitants of the city. In Bursa case, it is seen that although revitalization works in the district in order to regain the authentic character of the district are being done with good faith and effort, the lack of systematised organisation in these works (which includes the support of specialists and academics) turns some part of the district a theatre stage. Also, different architectural attitudes about the additions which are implemented in different parts of the district give a chaotic appearance to the whole area.

In Chawk Bazaar example, it was understood that there had not been any systematized revitalization works, too. However, it is known that transformation from industrial to post-industrial city and rapid globalization have led to the revaluation and commodification of place at a local level. In this process, urban places are re-imagined and invested with new cultural meanings to encourage greater visual and physical consumption. Revitalization works have been the main part of this process. Chawk Bazar still bears the distinctiveness of a traditional bazaar of the Mughal era which are now on the verge of extinct elsewhere. As medieval Mughal business center, Chawk Bazar possesses strong historical background. Till now it is the biggest wholesale market and has a high contribution to the urban and national economy. It also provides employment and business opportunities for a huge number of people. Therefore, Chawk Bazar has a great impact on the national life of Bangladesh because it is both a historical site and a business center. Proper management should be undertaken to preserve both Chawk Bazar and Covered Bazaar and Han District in Bursa as a historical site and to enhance its business so that it has a larger contribution to the economy of the country.

In the article, it is seen that retail activity and retail spaces have changed at a variable speed in terms of establishment, stagnation; transformation and re-invention across two different parts of the world over the past fifty years (see table 1). Among the causes for these changes, although comparable, are profound transformations in the economic, social and physical structures of cities under the influence of modernisation (Europeanization) and globalisation (mainly westernisation).

One important finding which emerged from this comparative study is the influence of long period of British colonisation and the continuation of the policies during the post-colonial period (in Bengal, now Bangladesh) and relatively shorter period of westernisation (in Turkey during the Republican period) . Figure 2 of Chawkbazar (Dhaka in 1904) and Figures 4a and 4b (Bursa in 1913 and 1910) should suggest marked influence of European influence in Dhaka and much lesser impact of westernisation in Bursa. This is subject which should provide us with good understanding with other Islamic cultured of different parts of the world during the same period. It will be also interesting to note how far in the history each cultures are going back to preserve their architectural and cultural heritage?

Due to the pressure on city centres (including the impact of privatisation); traditional commercial districts were abandoned because they could not compensate for the requirements of changing expectations of the

COVERED BAZAAR AND HAN REGION IN BURSA, TURKEY						CHAWK BAZAAR IN DHAKA, BANGLADESH				
Land use and activities	Building Structure	Socio-cultural change	Reign Period	Transformation	Century	Transformation	Reign Period	Land use and activities	Building Structure	Socio-cultural change
Activities: trade, artisan production, accommodation and storage for the valuable goods. Importance: the central hub of business activity. Guild system	A market included enclosed (bedesten/semi enclosed (han) and open to sky(shopping streets) retail areas	Market place for everybody. Centre of trade, fine cuisine for everybody.		Establishment	14th-15th centuries		Pre-Mughal (pre-1526)			
Built no significant commercial buildings due to the decreasing importance of international trade routes. Guild system		Centre of trade, fine cuisine and social, economic, religious and political intercourse.		Stagnation	17th-18th centuries	Establishment	Mughal era (1526-1765)	Activities: trade, artisan production. Importance: central hub of business activity. No Guild system evident. Monetary transactions conducted on trust and belief.	An open market place with retail business activity and other some shops of temporary structures.	No significant activities other than trade. Market place for the elites, nobility and dignitaries.
Old Bursa map including the city plan of the district. Guild system	Changing needs, new buildings with new functions.	Production, accommodation and storage activities lost their importance. Trade become the main activity.		Transformation under the forces of industrialization	19th century-mid 20th century	Stagnation and transformation under the forces of industrialization	British/Colonial era (1765-1947)	Cadastral survey and individual land ownership. No socio stratification. No Guild system has in England.	Construction of 4 ft. height low wall and brick paved carriageway all around to Bazaar. Construction of temporary structures for shops.	Centre of trade and fine cuisine. Beleek (earthenware) used to be hanged publicly near the Chawk Bazaar.
Lost importance as CBD and become the traditional retail centre.	1958 Bursa fire partly demolished the district. New buildings with new functions.	Population increase due to migration. Guild system left its place to merchant associations. Feeding the locals during Ramadan.	Turkish Republic	Transformation under the forces of globalization	Mid 20th century-end of 20th century	Transformation under the forces of globalization	Pakistan era (1947-1971)	Lost importance as CBD due to establishment of new CBD in Motijheel. Became the traditional wholesale centre. No Guild system emerged.	The first 3 storey building constructed, also temporary shop structures built on permanent plinths. Street paved with concrete.	Centre of trade and fine cuisine, social and economic activities. Feeding of the locals during Ramadan.
Economical, social and physical revitalization.	Regio additions to the historical texture. Revitalization works.	Merchant associations. Circumcision ceremonies for poor boys. Feeding the locals during Ramadan.		Revitalization of authenticity	21st century	Revitalization of authenticity	Bangladesh era (1971 to date)	Wholesale with some retail use. The establishment of first ever Association of traders - the Bangladesh Manihari Bank Samity.	No regards for safety or planning standards or architectural designs.	Bangladesh. Feeding of the locals during Ramadan. Circumcision and wedding ceremonies for boys and locals. set on fire purposely to destabilize its popularity.

Table 1: Comparison of the transformation periods in Bursa and Dhaka cases.

commercial areas (such as parking lots, transportation, and entertainment facilities). Both in Dhaka and Bursa cases, the lack of holistic approaches to revitalisation projects (from the city authority and the formal sector) the traditional commercial districts have brought forth only preservation of some physical space and provision of the required financial resources. In order to attain sustainable development of these areas, the old myth still applies, that is holistic approaches to revitalisation of these districts that consider social, economic and cultural revitalisation with physical revitalisation together be developed.

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Tasleem Shakur is a Senior Lecturer NGAS,
Edge Hill University, Lancashire, United Kingdom
shakurt@edgehill.ac.uk

Roxana Hafiz is a Professor, Department of Planning, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh,
roxanahafiz@gmail.com

Tulin Vural Arslan is an Associate Professor at Department of Architecture Uludag University, Bursa, Turkey, tulinv@yahoo.com

Arzu Cahantimur is an Associate Professor at Department of Architecture Uludag University, Bursa, Turkey, arzucahan@gmail.com

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A CROSS-CULTURAL COMPARISON OF TOURISTS' PERCEPTIONS OF HOTEL LOBBIES

Emine Koseoglu, Deniz Erinsel Onder and Omer Bilen

Abstract

This study examines cultural differences in the perception of hotel lobbies. It aims to determine the differences/similarities within spatial preferences in hotel lobbies by focusing on three aspects of space: physical appearance, configuration, and usage and privacy arrangements. To measure the differences, a survey is conducted in Sultanahmet, Istanbul with tourists within two focus groups from Asian and European countries (n= 30 each). They are asked to rate their agreement with each statement about the spatial features on a 5-point Likert scale. As a result, both differences and similarities in the perception of the tourists from different cultures are found. It can be noted that there are statistically significant differences between the two groups in terms of configurational features and usage and privacy arrangement of lobbies. The results provide designers some data to create a space for similar user profiles.

Keywords

Cultural differences, spatial perception, tourist behaviour, user preferences.

Introduction

Architecture has emerged from the interaction between humans and the environment. In this context, environmental psychology provides data for designers by developing these links, as well as questioning and explaining them (Bell et al., 2001; Bonnes & Secchiaroli, 1995; Altman & Chemers, 1980). Environmental perception, an expression of how humans understand, grasp and interpret their environment, is a term used to comprehend how humans understand and interpret spaces within the framework of environmental psychology. Users' perspectives are significant, since spaces designed by architects are used by them. Moreover, the users' point of view is not objective, as the perception of humans is shaped by many personal and social factors. Within the scope of this study, "culture", one of the subjective factors shaping perception, is analyzed.

For the design of spaces that are used by people from different cultures (as in hotel lobbies), a significant issue to consider is whether users have different perceptions of the space due to their cultures, because this condition directly affects spatial preferences

as well as the interactions of people within the space. This study is developed to question whether the perception of space changes according to the culture of the user. Analyzing the users' perception of touristic spaces offering cross-cultural services might be beneficial in providing data necessary for design studies.

The objectives of this study are as follows:
1. To determine the differences in the perceptions of Asian and European tourists regarding spatial preferences.
2. To define the preferences of Asian and European tourists concerning the spatial features of hotel lobbies.

Tourist Behavior, Tourism Environment, and Culture

When personal factors are considered, culture has a significant role. The role of cultural differences in determining tourist behaviour in spatial environments has not been given enough attention in tourism research. Cultural differences specifically pertain to the tourism industry. The tourism industry is gradually becoming more globalized. Moreover, cultural features represent the attractive aspects of tourism products, as tourism is a service industry in which people from different cultures meet (Pizam & Mansfeld, 2000; Reisinger & Turner, 2003:29).

Significant differences were reported among people from different countries or towns in their touristic behaviors (like shopping, buying gifts, or photographing) (Pizam & Reichel, 1996); destination images (Mackay & Fesenmaier, 2000; Lee & Lee, 2009); satisfaction levels of their travel experience with tourist attractions, facilities, services, and prices (Kozak, 2001; Yu & Golden, 2006; Tsang & Ap, 2007); service quality expectation dimensions (Mok & Armstrong, 1998; Kvist & Klefsjo, 2006; Witkowski & Wolfinbarger, 2002); complaint behavior (DeFranco et, al, 2005; Yuksel et. al., 2006); and switching behavior (Lin & Mattila, 2006).

Tsang & Ap (2007) found that among the Asian and Western tourists visiting Hong Kong, Asian tourists were significantly less satisfied with the relational quality of service attributes compared to their Western counterparts. In the study of hotel atmospherics, Mok & Armstrong (1998) found that there were significant differences in service quality expectation dimensions among tourists from the UK, USA, Australia, Japan, and Taiwan. In a study conducted by Kvist & Klefsjo (2006), many similarities were identified between the needs and expectations of the service quality dimensions of Italian and British tourists, although some differences also emerge. Witkowski & Wolfinbarger (2002) compared service expectations of German and American customers. Results showed that German respondents had lower service expectations than American subjects. In terms of atmospherics, there were significant differences in the perception of atmospheric attributes between the Hong Kong and Houston samples. The differences were about "cleanliness", "restaurant temparature", and "restaurant decorations".

There is a rising trend in tourism literature to measure service quality and tangible elements, which seem the closest issues to examining spatial features in commercial areas of hotels. However, these studies cannot go beyond examining spatial environment as a medium for

a servicing facility (Wall & Berry, 2007; Bell, 2008; Tombs & McColl-Kennedy, 2004). For example, DeFranco et al.'s study (2005) distinguished atmospheric (environmental) attributes into six categories: level of cleanliness, level of noise, level of comfort, restaurant's temperature, restaurant's lighting, restaurant's decoration. Bitner (1992) listed three environmental dimensions: ambient conditions that include temperature, air quality, noise, music, and odor; space/function that is formed by layout, equipment, and furnishings; signs & symbols & artifacts that comprise signage, personal artifacts, and style of decor.

Spatial Perception

Perception is a mental process in which an individual chooses, organizes and interprets a stimulant as a meaningful and distinctive picture of the world (Rapoport, 1977; Sartain et al., 1967). It can be defined as "how we perceive the world around us" (Schiffman & Kanuk, 1987). The perceptual process by which we apply meaning to the world is a cognitive fact (Woodside et al., 2000:195). Environmental perception is one of the psychological processes that occur as a result of the interaction of humans with their environment.

Studies related to environmental perception, image and preferences in tourism differ in terms of scale. For example, some studies deal with this issue using the resort scale (Pearce, 2005; Tran & Ralston, 2006; Ryan & Mo, 2002; Vieregge et al., 2007; Awaritefe, 2004; Yuksel & Yuksel, 2001; Awaritefe, 2003). Tourism literature argues that the mental images of tourists concerning resorts are crucial in their decision-making process (Woodside et al., 2000). Similarly, a group of authors emphasize the significance of positive perceptions by consumers in their selection of holiday resorts (Goodrich, 1978; Gartner, 1989; Woodside et al., 2000:193).

In addition to the resort scale, studies in the inner-space scale have been conducted in the tourism field as well, but the number of such studies is relatively few. In studies related to hotels as accommodation facilities, the focus is usually directed toward topics such as service quality and management (Ramsaran-Fowdar, 2007; Shanahan & Hyman, 2007; Mason, et al., 2006). In these studies, spatial features and their impact on preferences are very indirectly mentioned (Yüksel & Yüksel, 2003; Chan & Wong, 2006).

Thus, there is a gap in comparing tourists' perceptions of spatial features in hotel lobbies. This study aims to fill this gap by choosing definite and detailed spatial variables.

Methodology

The study aims to determine how tourists from different cultures perceive hotel lobbies. The people to whom the questions were posed were not expected to be staying at a hotel, since lobbies are spaces that are used not only by residents of a hotel but also by people from outside. They make use of the sitting areas for taking a rest, meanwhile, people can have something to drink, read a newspaper or have meetings there. Therefore, the lobby, which is mostly constructed as an integrated space with the entrance hall, hosts an intensive series of acts and happenings.

Lobbies are major common-usage spaces where different users meet and interact socially,

as their functions and services are offered not only to the residents of the hotel but also to users from outside. This is the primary reason for the choice of lobbies as a field of practice.

Survey Design and Hypotheses

A survey is conducted to measure the perceptual differences of tourists. The survey questions were posed nonrandomly to tourists in Sultanahmet, Istanbul by using the convenience-sampling approach. Before proceeding with the questions related to the space, information on the subject of the study was given by explaining that the study was designed specifically in relation to the lobby of a city hotel planned to be built in Istanbul. The questions were given in a few sections. The first section contains demographic questions regarding gender, age, place of residence and education level. The answer options for these questions are arranged in categories. In the following sections, questions on space are given. These questions consist of three parts. In addition, to avoid any influence, the questions are not grouped into different parts but are arranged consecutively on the survey form.

The questions in the first part are on the physical features of the space:

1. I want a widely-glassed lobby.
2. I want a lobby with a high ceiling.
3. I want a dynamic lobby which is decorated with bright colours.
4. I want a lobby which is decorated in a modern style.
5. I want a lobby which has a traditional style.

Those in the second part are about the configuration and location of the space:

6. I want a lobby that has different levels on the floor (which means a few steps).
7. I want a lobby which can be seen by some other spaces, by galleries, etc.
8. I want a lobby which is directly connected to an entry hall and reception.
9. I want a lobby which is designed with a few small saloons.
10. I want an organic formed space.

In the third part, questions on features of usage and privacy are given:

11. I prefer sitting in small seating clusters which do not have a relation to the other clusters.
12. I enjoy meeting different people; I may sit near a stranger in the lobby.
13. I prefer sitting by the wall in the lobby.
14. I prefer sitting by a window in the lobby.
15. I prefer sitting in the middle part of the lobby.
16. I prefer sitting in a way that I can see the whole place.
17. I prefer sitting nearer to the elevators and stairs.
18. I prefer sitting nearer to the bar.
19. I prefer sitting nearer to the reception.

The survey questions are arranged as close-ended questions. The Likert scale is used to determine the relationship between the perceptions of people from two continents (Europe and Asia), which is one of the main objectives of this study. The scale is also used to measure the attitudes and tendencies of individuals. Attitudes, on the other hand, are developed through culture and perception. Therefore, scales for attitudes are widely used for measuring perceptions as well. According to the Likert scale, the options for answers are rated between the expressions, "I agree-I do not agree". Then, each expression is given

Widely glassed lobby

(Source: http://en.wikipedia.org/wiki/File:Regency_Hong_Kong_Shatin_Hotel_Lobby_View1.jpg)

Lobby with a high ceiling

(Source: http://www.danheller.com/images/LatinAmerica/Cuba/Hotels/Sideshow/img8.html)

Decorated with bright colours

(Source: http://www.radisson.com/melbourne-hotel-vi-3000/ausmelb)

Decorated in a modern style

(Source: http://tigergrowl.wordpress.com/travels/barcelona-2012/)

Having a traditional style

(Source: http://www.exoticexcess.com/travel/pera-palace-hotel-in-istanbul-turkey/)

Figure 1: Sample examples of lobbies to the physical features of the space as research variables (Source: Authors).

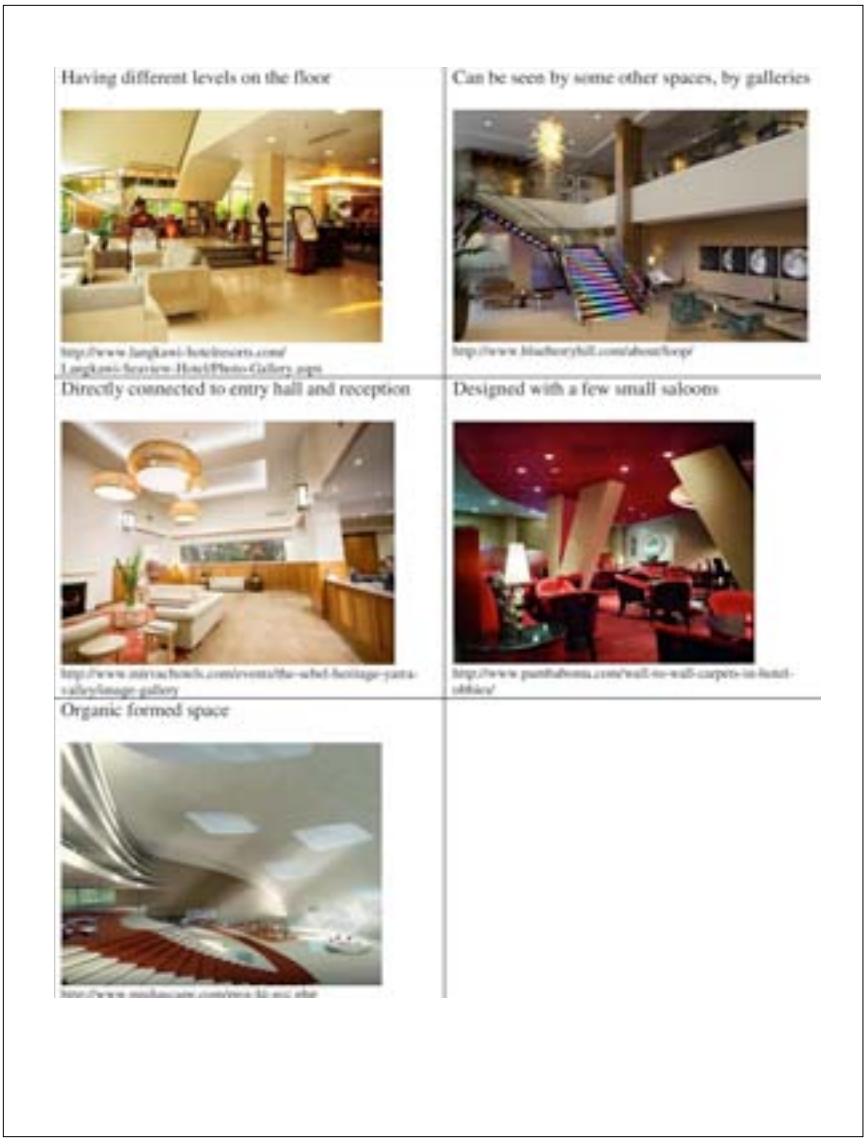

Figure 2: Sample examples of lobbies to the configurational features of the space as research variables. (Source: Authors).

a score, and in this way, oral expressions are transformed into a quantitative state.

In the following phase of the study, the data obtained through the Likert scale are transferred into a computer. At this stage, SPSS (Statistical Package for Social Sciences), which is a statistical data analysis software, is used.

The basic hypothesis to be measured in the study is as follows:
"There is a difference between the spatial preferences of Asian and European tourists."

In addition to this, the other issues to be measured are as follows:
1. Whether the user would prefer a space to be both modern and culturally traditional
2. Whether the scope of the concept of privacy changes according to the culture of the tourist

Results

Participants

In total, 60 people participated in the survey; 30 of these were from Europe and the remaining 30 were from Asia. All the participants answered the questions completely.

Out of the 60 participants, 35 (58.3%) were women and 25 (41.7%) were men. There were 25 participants (41.7%) aged between 15 and 30, 22 (36.7%) between 31 and 50 and 13 (21.7%) were aged 51 and over. Of the 60 participants, 13 (21.6%) were high school graduates while 47 (78.3%) were university graduates or had a higher degree.

	Frequency	Percent	Cumulative
Sexuality			
Female	35	58.3	58.3
Male	25	41.7	100
Total	60	100	
Age			
15-30	25	41.7	41.7
31-50	22	36.7	78.3
51-upper	13	21.6	100
Total	60	100	
Education			
High school	13	21.7	21.7
College-upper	47	78.3	100
Total	60	100	
Country			
Germany	9	15	15
Austria	4	6.7	21.7
Spain	1	1.7	23.3
Italy	1	1.7	25
Switzerland	2	3,3	28.3
Denmark	1	1.7	30
Holland	8	13.3	43.3
Portugal	1	1.7	45
Belgum	3	5	50
Malaysia	2	3.3	53.3
Singapore	2	3.3	56.7
Japan	8	13.3	70
China	4	6.7	76.7
Pakistan	1	1.7	78.3
Iran	3	5	83.3
Syria	2	3.3	86.7
Bangladesh	1	1.7	88.3
Yemen	1	1.7	90
Korea	5	8.3	98.3
Philippines	1	1.7	100
Total	60	100	

Table 1: Respondents (Source: Authors).

Cross-Cultural Differences

Table 2 presents the p-value scores of the independent t-test results. P-values for "I'd prefer a lobby having an organic form" (0.043 with 95% reliability) and "I'd prefer to sit by a window" (0.064 with 90% reliability) showed statistically significant differences between the two cultural groups. Accordingly, the significant differences between the preferences of the two groups were based on the configurational and usage & privacy features of lobbies respectively. Mean values showed that Asian tourists' ratings were higher (3.90 and 4.13) than the Europeans' (3.47 and 3.77) for organic form and sitting near the window.

Preferences concerning "steps on the floor" differ between Europeans and Asians. The mean value of Asians for this item (3.17) was higher than that of Europeans (2.83). The mean value of the European group for "a few small spaces" was under 3 (2.90), whereas the mean value of the Asian group for the same statement was found to be higher than 3 (3.27). Similarly, regarding sitting near the wall variable, the mean score of the t-test for European tourists was under 3 (2.97), although the mean score for this statement of Asian tourists was higher than 3 (3.07). These results show an opposite direction for the preferences, despite the fact that they did not reveal statistically significant differences.

According to the mean values shown in Table 3, the top-rated physical items for the European respondents were "high ceiling" (3.97), "widely glassed lobby" (3.60), and "a traditional style" (3.53); and for the Asian group, "a traditional style" (393), "widely glassed lobby" (3.90), and "high ceiling" (3.83) were the top-rated physical features. Regarding the lowest rated item, it was the same attribute for the two respondent groups: "a modern style" (3.13 for Europeans and 3.20 for Asians).

The largest difference in terms of gap mean score (-0.40) was found in the attribute "a traditional style" with the highest mean score of 3.93 for Asian tourists and the third-highest mean score of 3.53 for European tourists.

In terms of configurational features, the two cultural groups shared the first and second top-rated items: "connection with reception" (3.83 for European group and 4.07 for Asian group) and "organic form" (3.47 for European tourists and 3.90 for Asian tourists) respectively. The lowest-rated item was the same for both groups: "steps on the floor" (2.83 for Europeans and 3.17 for Asians).

The largest difference in the mean gap score (-0.43) was found in the attribute "organic form" with the second highest mean score for both groups (3.47 for Europeans and 3.90 for Asians) (see table 2). This gap explains and supports the significant difference between the two groups in p-value for this item (see table 3).

Regarding usage and privacy arrangement, the top rated items for the European respondents were "sitting where the whole place can be seen" (4.07), "sitting by a window" (3.77), "sitting near a stranger" (3.60), and sitting in small seating clusters" (3.47); on the other hand, for the Asian tourists, "sitting by a window" (4.13), "sitting where the whole place can be seen" (4.00), sitting in small seating clusters" (3.73), and "sitting near a stranger" (3.57) were the top-rated features. The lowest-rated item was shared by the two groups: "sitting near elevators

and stairs" (2.17 for the European tourists and 2.20 for the Asian tourists).

The largest difference in the mean gap score was in the attribute "sitting by a window" with highest score for the Asians (4.13) and the second highest mean score for the Europeans (3.77). Once again, this result supports the significant difference between the two cultural groups in p-value regarding this item (see table 3).

Accordingly, our main hypothesis, which stated that there is a difference among the spatial preferences of Asian and European tourists, is confirmed.

Correlations

Table 4 shows the correlations among three pairs of variables. The first pair was from physical attributes and the second and the third pairs were from privacy & usage attributes.

Independent t-test results

		p-value	Mean
Physical features	Widely glassed	0.258	-0.3
	With a high ceiling	0.592	0.13
	Decorated with bright colours	0.356	-0.27
	Having a modern style	0.823	-0.06
	Having a traditional style	0.174	-0.4
Configurational features	Steps on the floor	0.3	-0.33
	Having a relationship with other spaces	0.697	-0.1
	Having a connection with reception	0.311	-0.2
	A few small spaces	0.126	-0.37
	Having an organic form	0.043**	-0.43
Usage and privacy arrangement	Sitting in small groups	0.303	-0.27
	Sitting near a stranger	0.871	0.03
	Sitting by a wall	0.715	-0.1
	Sitting by a window	0.064*	-0.37
	Sitting in the middle part	0.24	-0.27
	Sitting where all places can be seen	0.75	0.06
	Sitting near elevators and stairs	0.881	-0.03
	Sitting near the bar	0.118	0.4
	Sitting near the reception	0.665	0.1

* = p<0.1; ** = p<0.05

* = p<0.1; ** = p<0.05

Table 2: Independent t-test results (Source: Authors).

Mean values				
		Group	M	St.
Physical features	Widely glassed	Europe	3.60	-0.30
		Asia	3.90	
	With a high ceiling	Europe	3.97	0.13
		Asia	3.83	
	Decorated with bright colours	Europe	3.27	-0.27
		Asia	3.53	
	Having a modern style	Europe	3.13	-0.06
		Asia	3.20	
	Having a traditional style	Europe	3.53	-0.40
		Asia	3.93	
Configurational features	Steps on the floor	Europe	2.83	-0.33
		Asia	3.17	
	Having a relationship with other spaces	Europe	3.47	-0.10
		Asia	3.57	
	Having a connection with reception	Europe	3.87	-0.20
		Asia	4.07	
	A few small spaces	Europe	2.90	-0.37
		Asia	3.27	
	Having an organic form	Europe	3.47	-0.43
		Asia	3.90	
Usage and privacy arrangement	Sitting in small seating clusters	Europe	3.47	-0.27
		Asia	3.73	
	Sitting near a stranger	Europe	3.60	0.03
		Asia	3.57	
	Sitting by a wall	Europe	2.97	-0.10
		Asia	3.07	
	Sitting by a window	Europe	3.77	-0.37
		Asia	4.13	
	Sitting in the middle part	Europe	2.37	-0.27
		Asia	2.63	
	Sitting where the whole place can be seen	Europe	4.07	0.06
		Asia	4.00	
	Sitting near elevators and stairs	Europe	2.17	-0.03
		Asia	2.20	
	Sitting near the bar	Europe	2.93	0.40
		Asia	2.53	
	Sitting near the reception	Europe	2.43	0.10
		Asia	2.33	

Table 3: Mean values of European and Asian tourists' perceptions (Source: Authors).

Modernity and traditionality are two concepts related to architectural styles. They can be assumed to be opposite each other conceptually. Correlation analysis was applied to measure the relation between these two concepts. Table 4 shows that the correlation between modernity and tradtionality was negative for Asians, Europeans, and the total (-0.277 for Europeans, -0.285 for Asians, and -0.267 for the total which was also significant at the 0.05 level). As the trend for preference of traditional style increases, the trend for preferring modernity decreases, or vice versa.

"Sitting in small seating clusters" and "Sitting near a stranger" attributes are are about privacy conception. "Sitting in small seating clusters" may be a sign of a high degree of privacy or being open to communication with other people, whereas "sitting near a stranger" may show a lower degree of privacy. The negative but statistically insignificant correlation between "sitting in small seating clusters" and "sitting near a stranger" attributes showed that as the trend for sitting in small seating clusters increased, the trend for sitting near a stranger decreases, or vice versa. This relation is suitable in terms of the foresights on privacy conception.

As for the third pair, "sitting in the middle" and "sitting in a place where the whole place can be seen" seem to be similar behavior patterns in terms of privacy conception, as they represent being open to communication and contact with other people in the space. The correlation between "sitting in the middle part" and "sitting in a place where all places can be seen" was negative for Europeans (-0.409 and significant at the 0.05 level) but positive for Asians (0.566 and significant at the 0.05 level) with a total of 0.048.

Pearson Correlation Analysis

	R	p	Group
Having a modern style &	-0.277	0.138	Europe
	-0.285	0.127	Asia
Having a traditional style	-0.267	0.039*	**Total**
Sitting in small seating clusters & Sitting	-0.162	0.393	Europa
	0.023	0.906	Asia
near a stranger	-0.065	0.622	**Total**
Sitting in the middle part & Sitting in a	-0.409	0.025*	Europe
	0.566	0.001*	Asia
place where the whole place can be seen	0.048	0.713	**Total**

* Correlation is significant at the 0.05 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 4: Correlation analysis for some spatial variables (Source: Authors).

Conclusion

Lobbies are like the display windows of hotels; moreover, they are significant and functionally rich spaces since they host many forms of activities. If lobbies with common spatial elements and features are established, the individual will not experience a feeling of discomfort due to foreign elements, whichever country they visit. This argument seems to be the positive aspect of the convergence theory.

This study aimed to draw a new framework for the perceptions of tourists of a lobby space. The main research question was whether there were differences between the perceptions of the tourists from European countries and Asian countries. Independent samples, the t-test and mean values were used to measure the differences.

As confirmed in the t-test results for our main hypothesis, tourists from different cultural backgrounds have different perceptions of spatial attributes of lobby spaces. The differences in the perceptions of European and Asian tourists were about configurational spatial attributes and privacy & usage attributes. These findings support the view of past studies (Altman & Chemers, 1980; Hall, 1966; Rapoport, 1977) that made systematic observations about the relationship of human culture and built environment, and determined that built environment was shaped and affected by culture. This study differs from previous architectural studies with its specific descriptions of interior spatial variables and with its choice of a special tourist interior environment: lobby space.

The results of the study reveal that the negative correlation between modernity and traditionality for both groups proves that they are opposite concepts in terms of architectural style and are also perceived by tourists as opposite concepts. Mean values showed that traditionality got higher ratings from all the tourists in the study when compared to modernity. This result shows that although globalization has brought sameness to spaces and minimized the local and traditional attributes, tourists still prefer to experience traditional and local features of the places they visit. This is consistent with the results of Suh & Gartner's study (2004) who found that travellers from distant origins or countries evaluated local culture as most valuable.

The results of the correlation-analysis-related privacy items showed that behaviour patterns like "sitting in small seating clusters" and "sitting near a stranger" are perceived by Europeans and Asians as items representing the same degree (low degree) of privacy. The correlation of "sitting in the middle part" and "sitting in a place where all places can be seen" was negative for Europeans, which meant Europeans did not form a relation between this pair of items; whereas the correlation for Asians was positive, which can be associated with their having a low degree of privacy and being from a high-contact culture. This is consistant with what Hall (1966) indicated in his study about comparison of Asian and European cultures. Asian people are used to close proximity, and they are seen as members of a high-contact culture.

Studies on spatial perception are significant in terms of comprehending how spaces acquire a reality within the inner worlds of the users. Such

studies have become the subject of sociology, psychology, social anthropology and tourism research. However, these studies should also be given emphasis in the field of architecture, as they enhance spatial quality in accordance with the preferences of users. Researchers could conduct more specific studies related to spatial perception and the impact of culture on spatial perception by limiting the demographic features of the users and having different user profiles.

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Emine Köseoglu

Dr. Koseoglu graduated from Trakya University, Department of Architecture in 2002 and received her Master of Architecture degree (Yildiz Technical University, 2004) with a thesis on spatial perception in hotel lobbies. Her PhD research (2005-2012, Yildiz Techical University, Department of Architecture) is about formal, syntactical and subjective aspects of spatial legibility. She has worked as a Research Assistant at Yildiz Technical University, Department of Architecture between 2006-2012 and then as an Assistant Professor in the Department of Architecture, Okan University between February 2012 and August 2012. She is currently continuing her career as a part-time lecturer at Okan University and Yildiz Technical University, Deparment of Architecture, Istanbul. Her research areas are spatial perception, spatial cognition, spatial legibility, space syntax, design education, architectural paradigms, and tourism studies. She published papers in many international and national journals and presented papers in international symposiums. She also reviewed papers for several international journals and symposiums. Interested in art, she has published articles on photography and sketching in the Yapi Journal, Koridor Journal, and Ovi Magazine. She can be contacted koseogluemine@gmail.com

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Deniz Erinsel Onder

Dr. Onder was born in 1963 in Istanbul. She graduated from Yildiz Technical University, Department of Architecture in 1986. She obtained a doctorate degree in 1996 at YTU Institute of Science and Technology. She has worked at Yildiz Technical University, Department of Architecture since 1987. Her research areas are: social housing, earthquake houses, tourism-tourism buildings, and space syntax. She can be contacted at erinselonder@gmail.com

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Omer Bilen

Omer Bilen was born in 1979 in Istanbul. He graduated from Yildiz Technical University, Department of Statistics in 2001. He is a PhD Student at Yıldız Technical University, Department of Urban and Regional Planning and a Research Assistant at YTÜ, Department of Statistics. His research areas are data mining, multivariate statistical analyses, and criminal statistics. He can be contacted at scaler_tr@yahoo.com

LIGHTWEIGHT AND TRANSPARENT DOMES

Izis Salvador Pinto

Abstract
Domes have existed for centuries, from ancient domed structures such as Igloos to contemporary domes such as the Eden Project. However, over the years there has been a gradual shift in construction of long-span domes, from the use of opaque and heavy materials, to the use of transparent and lightweight structures. The development in material technology provides the opportunity to reduce the weight of materials and structures to be lightweight and high-strength, saving energy, fuel, and contributing to the low carbon agenda. The progress in materials science and the evolution in the technology of construction and manufacturing in architecture make the utopian ideas of the past into a reality. Domes with Ethylene tetrafluoroethylene (ETFE) cushions as cladding system are lightweight and transparent structures. ETFE is a cost-effective, environmentally friendly material. The advantages of ETFE, compared to glass, is that ETFE is one per cent of the weight of glass, transmits more light and costs far less to install. Furthermore, this material does not degrade under ultraviolet light and is unaffected by atmospheric pollutants. This paper presents an overview of contemporary long-span domes constructed with lightweight materials, from the domes in buildings, to the possibility of achieving large city-dome enclosures.

Keywords
ETFE cushions, transparent dome, lightweight structures.design process; community service.

Introduction

Ancient domes were made of mud, stone, masonry, timber and brick, but since the nineteenth century, the predominant materials used for building domes were reinforced concrete, steel, fabrics, glass and plastics. There is a trend towards lightweight materials and structures for building and construction based on progress in materials technology. Parallel to progress in material sciences, the mechanics of materials have also evolved markedly. While the first domes worked in compression only, most of the recent structures combine tension and compression. In compression, the material does not utilize the yield limit and is an inefficient use of resources. Tension is the most efficient use of material because the load bearing capacity is independent of the length and it depends only on the material properties and cross-sectional area. Optimized long-span domes are based on the balance between tension and compression and the use of lightweight materials.

A Lightweight structure is defined by the optimal use of material to carry external loads or pre-stresses. Material is used optimally within a structural member if the member is subjected

to membrane forces rather than bending' (Bletzinger and Ramm, 2001).The more load a structure can carry with least self weight the more efficient it is.

Evolution in the Construction of Domes

Most landmark domed buildings feature some major technological innovation which allowed architects and engineers to achieve longer span structures.

Pre-Industrial Revolution Domes

A remarkable dome of the early architecture is the dome of the Pantheon in Rome (see figure 1) which was built between 118 and 125 Before Christ under Emperor Hadrian, with a span of 43.3 meters. It was constructed with a very strong concrete made of pozzolana cement. The most important problem during the construction was the massive weight of the dome. In order to support it, the thickness of the walls gradually decreases as the height increases and at the top of the dome it has been used a lighter type of concrete. The thickness of the dome varies from 6.4 metres at the base of the dome to 1.2 metres around the oculus. Furthermore, the use of coffers in the ceiling and the oculus of 9.1 metres in diameter also reduce the weight of the dome. The dome's oculus lightens the load and acts as a compression ring. It has always been open to the weather, allowing rain to enter and fall to the floor, where it is carried away through drains. The Pantheon remains the largest unreinforced concrete dome ever constructed.

The Pantheon was the largest dome until Brunelleschi's dome at Santa Maria del Fiore (see figure 2) in Florence was constructed. The

Figure 1: Dome of the Pantheon in Rome, Italy. 118 - 125 A.D. Its diameter is 43.3 metres (Source: Author).

Brunelleschi's dome was built between 1420 and 1436 After Christ and has a diameter of 44 meters which is more than the diameter of the domes of St. Peter's Basilica in Rome and St. Paul's Cathedral in London. Even today, Brunelleschi's dome remains the largest brick dome ever constructed.

Post-Industrial Revolution Domes

Since the Industrial Revolution, many new building materials have been invented. Furthermore,

Figure 2: Brunelleschi's Florentine dome, Florence, Italy 1420 -1436. Its diameter is 44 metres (Source: Author).

in the eighteenth century, mathematicians learned to apply their knowledge to the study of structures, making it possible to calculate the exact tension in any structure. Both tension and compression stresses were increasingly used to calculate structures with new materials such as reinforced concrete, glass and steel, fabric and plastics.

Reinforced concrete domes and shell structures

In the late nineteenth century, the reinforced concrete was created. This allowed wider spans to be constructed because reinforced concrete is able to resist tension, compression and bending. Reinforced concrete is extremely efficient in domes and shell structures. Thin concrete shells become a practical concept

Figure 3: Kresge Auditorium, MIT Campus, Boston, USA 1955. Its span is 49 metres (Source: Author).

in 1924, when Walther Bauersfeld, employed by the Zeiss Corporation, designed a semi-elliptical shell with 16 metres in diameter based on a steel structure geodesic dome in Jena, Germany.

The Kresge Auditorium (see figure 3) designed by Eero Saarinen and constructed in 1955, is a reinforced concrete shell structure supported only on three points. The shell is one-eighth of a sphere with a 49 metres span and a height of 15.24 metres. The glass curtain walls are the cutting planes which gives the sphere three flat edges. The thickness of the concrete shell is 8.9 cm and it is increased at the edge beams to 14 cm.

Thin domes of pre-stressed concrete opened new directions in domes supported merely at points rather than in the traditional constricting ring. Reinforced concrete pioneers such as Pier Luigi Nervi, Eduardo Torroja and Felix Candela introduced new design theories and construction techniques experimenting with shells of different forms.

In recent years, concrete with glass, polypropylene and steel fibres has been created. Structural analysis and design have certain principles common to all types of concrete but some variations are necessary for specific types of concrete.

Glass and steel domes

The development of construction methods in iron and steel was an important innovation in architecture allowing building stronger, taller and longer-span structures with less expenditure of material than stone, brick, or wood. Iron has long been utilized in building, but steel was introduced on the second half of the nineteenth century resulting in the construction of tall structures and long-span domes, bridges and space trusses. The U.S. Pavilion at Expo 67 in Montreal is a famous lightweight geodesic dome designed by R. Buckminster Fuller in 1967 world's fair. It is a space frame of steel pipes


Figure 4 and 5: Reichstag Dome, Berlin, Germany 1999. Its diameter is 38 metres (Source: Author).

of 76.2 meters in diameter, enclosing a more conventional interior construction. In a fire in 1976, during routine repairs, the 1,900 acrylic panels were destroyed.

There has been a change from opaque to translucent and transparent domes. Glass has been known since early times but it was expensive. In the nineteenth century, glass has started to be used in architecture due to the mass production of glass sheets, the development of steel frames, cable structures, fixing devices and elastic and elasto-plastic sealants (Sebestyen, 2003). The use of glass and transparent materials in architecture allowed creating a visual connection between the interior space and the outside scene. Almost all glass domes are assembled from planar glass sheets. Some examples of glass architecture are the Crystal Palace, London and the Reichstag Dome (see figures 4 & 5), Berlin. The Crystal Palace was a cast-iron and barrel vaulted glass roofed building erected in London to house the Great Exhibition of 1851. It was destroyed by fire in 1936. The Reichstag Dome was designed by Norman Foster Architects and constructed in 1999. It is a steel and glass dome of 38 meters in diameter, with a spiral ramp ending in a terrace where visitors can see a 360-degree view of central Berlin.

Fabric and plastic domes

Fabric structures have historically been used in tents (Shaeffer, 1996). However, only since the 1960s tensile structures have been built by engineers and architects. This kind of structure is very efficient because it functions primarily in tension. Fabrication processes of fabric structures favour curved surfaces, and most tensile structures are supported by some form of compression or bending elements, such as masts, compression rings or beams. Examples of tensile structures are the Olympic Stadium in Munich and the Millennium Dome. The Olympic Stadium in Munich was built for the 1972 Summer Olympics, designed by Günther Behnisch and Frei Otto, and was considered revolutionary for its time. It was the first time that large transparent canopies of acrylic glass were used with steel stabilizing cables. The Millennium

Figure 6: The Millennium Dome, London, UK 1999. Its diameter is 365 metres (Source: Author).

Dome (see figure 6) built in London in 1999 by Richard Rogers is a mast-supported, dome-shaped cable network with a diameter of 365 meters. It is the largest of its type in the world. The building structure was engineered by Buro Happold, and the entire roof structure weights less than the air contained within the building. The roof is made of Polytetrafluoroethylene (PTFE) coated glass fibre fabric, a durable and weather-resistant plastic supported by twelve 100 metre-high towers.

Pneumatic structures can be air-supported or inflated. The air-supported structure is a dome-shaped membrane with a fixed perimeter and an interior pressure higher than the atmospheric pressure, whilst an inflated structure is a closed inflated pneumatic beam with inner pressure lower than the atmospheric pressure.

Retractable domes

Many sports stadiums are domed, especially in locations with extreme climates. A major improvement to the domed stadium was accomplished with the construction in 1961 of the Civic Arena in Pittsburgh, the first long-scale structure with a roof that could be opened and closed (Ishii, 2001).The dome had a diameter of 126 meter and it was the largest retractable, stainless steel dome roof in the world supported by a massive 80 meters long cantilevered arm on the exterior. The demolition was completed on March 2012.

The retractable domed roof of the Rogers Centre in Toronto has a diameter of 230 meters and was built in 1989. Another example of retractable domed roofs is the Oita Stadium constructed in 2001. It is a multi-purpose stadium with a diameter of 274 meters in Japan. The roof sections move up from the two sides along the main beam arch, meeting exactly above the centre of the field. The stationary portion of the roof is clad in titanium while the movable roof is clad with Teflon panels. The membrane is not only lighter in weight than glass, but it has great tensile strength and is impermeable.

Etfe Domes and the Utopian Ideas

Utopian ideas

In 1962, Buckminster Fuller and Shoji Sadaoto proposed a bubble dome with a width of 3.2 kilometres above Midtown Manhattan (see figure 7). Fuller's idea was that the giant transparent dome would reduce cooling costs in summer and heating costs in winter by reducing the ratio of surface to volume. Instead of having to heat or cool each building separately, the entire dome would be kept at a moderate temperature level throughout the year. The proposed structure was relatively simple, but the material needed for such a large city scale dome enclosure did not exist at that time.

Figure 7: Midtown Manhattan bubble, New York, USA. 1962. Its diameter is 3.2 kilometres (Source: Fuller, 1981).

A similar vision was also proposed by Frei Otto and Arup in 1971. The project was a pneumatic dome with a span of 2 kilometres over an Arctic city. It was a utopian town of 15,000 to 45,000 inhabitants enclosed within a pneumatically giant envelope suited to deal with extreme climate conditions by creating an adequate climate to live in the Artic.

Neither project was built, but was used as inspiration by the future generations of architects and engineers that with new materials and construction techniques have been able to build what in the past was seen as utopian.

ETFE cushions

Ethylene tetrafluoroethylene, ETFE, is a fluoropolymer developed as an insulating material for the space industry to resist friction and abrasion, immune to radiation, and extremely effective at both high and low temperatures. ETFE was patented by DuPont in 1940 and Tefzel is its registered trademark. Only in the 1970s, the material started to be commercialized and in 1982, Vector Foiltec pioneered ETFE cushion cladding system under the brand name of Texlon. For almost thirty years, ETFE has been used in numerous buildings and public spaces all over the world.

ETFE cushions (see figure 8) are pneumatic structures that consist of two or more layers of ETFE foil with a thickness between 100 and 200 μm, inflated with low-pressure air and restrained in aluminium extrusions supported by a lightweight structure. ETFE is used for cladding and the cushions are continually pressurised by small pumps which maintain the pressure between 250 and 400 Pa. It gives structural stability and insulation to the roof. ETFE cushions are extremely lightweight weighing between 2 and 3.5 kg/m². Furthermore, the raw material is not a petrochemical derivative and many components are fabricated from recycled material (LeCuyer, 2008).

This material does not degrade under ultraviolet light and combines exceptional light transmission with high insulation which can

Figure 8: ETFE foil cushion roof lights at ExCel London, UK. 2010. It covers an area of 25m x 25 m (Source: Author).

reduce winter heating costs. Each layer of foil has a transparency of between 90-95%. The amount of solar shading and the transparency of the building envelope can be modified by changing the translucency, density and number of layers. If desired, photovoltaic cells can be integrated in the cushions to create pollution-free electrical energy.

ETFE can deal with large deflections in the support structure because of its toughness, high resistance to tearing and ability to work over a 300-400% elongation range. An important fact to remember when choosing ETFE cushions for cladding is that it is acoustically transparent with a mass of less than 1 kg/m². In the case of fire, ETFE has the property of self-venting the products of combustion to the atmosphere. ETFE has the ability to self-cleanse under the action of rain due to its synclastic shape. For all of that, ETFE

Figure 9: The Eden Project, Cornwell, UK. 2000. It has domes with diameters up to 240 metres (Source: Author).

cushions provide a lightweight, cost effective and geometrically flexible architectural solution with good thermal performance and high transparency.

ETFE domes

ETFE cushions are currently been chosen by several architects and engineers as an effective alternative to glass when constructing domes and envelopes for buildings. The utopian ideas of a city scale dome enclosure proposed by Buckminster Fuller with the Midtown Manhattan Bubble in 1962 and Frei Otto with the City in the Arctic, 58 Degrees North in 1971, can be constructed with the new lightweight and transparent material.

The Eden Project (see figure 9), an environmental complex in Cornwall designed by Grimshaw Architects and constructed by Vector Foiltec, is a lightweight structure made with ETFE cushions in 2000. The weight of the construction is less than that of the air enclosed. It has a series of intersecting geodesic domes with spans of up to 240 metres. The dome structure is divided into two layers; the outer skin is formed by hexagons and the inner layer by a triangular and hexagonal grid. The Eden Project with 30.000m² was the world's largest ETFE project at that time and helped to increase the number of constructions using this material.

The early ETFE buildings were located in temperate regions, but recent projects have been located in places with harsh climates. One example is the Khan Shatyry Entertainment Centre in Astana, Kazakhstan. It was designed by Foster and Partners in 2010. The building is an ETFE cushion envelope with 100,000 square meters that encloses multiple buildings and an urban-scale tropical landscape. The asymmetrical anticlastic conical form of the biaxial cable net is supported at its apex by a 20 meter high inverted cone that is balanced on a 70 meter tripod mast. The circumferential steel cables resist suction and the radial cables resist positive wind pressure. The net is anchored to a perimeter concrete ring beam of 200 metres in diameter. The ETFE cushions change their form as the structure deflects.

One solution to the environmental challenges facing Houston, such as hurricanes, is to cover it with a mile, 1.6 kilometres, geodesic dome. The project is called the Houston Dome and also aims to shifts the costs for air conditioning and temperature control of buildings. Glass would be too heavy to build the Houston Dome, and for this reason the use of ETFE cushions was proposed because of its lightweight properties.

Another city dome scale project with ETFE cushions is the Walker Lake Dome Project (see figure 10) in Westwood, California. It is an oblate ellipsoidal and geodesic dome that encloses the town with a diameter of 6.4 kilometres, 183 meters tall at the centre and with an area of 120,774 square meters. This project can be used to provide a ground for technology to enclose and protect cities prone to weather related disasters.

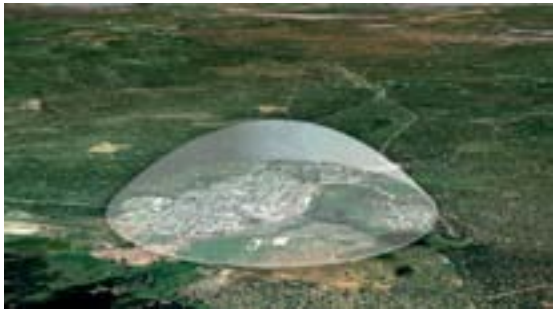

Figure 10: The Walker Lake Dome Project, Westwood, California, USA. Its diameter is 6.4 kilometres (Source: http://sheildgeometry.com/index.html).

Future domed cities

In the future, use smart materials to create innovative advanced `smart dome skins´ that would react similarly to living organisms which can adapt to the climate and other conditions. Smart materials respond to changes in electricity, heat, or magnetic waves to adapt to the conditions in their surroundings. The smart dome skin could reduce global warming, keep warm throughout the winter and reduce energy costs. Furthermore, this skin could protect the cities of hurricanes, and other weather phenomena.

Conclusion

Cladding materials have evolved a great deal in the last two centuries. Since the Industrial Revolution, most building structures are constructed of steel or reinforced concrete. Since the structure of the building is as important as the covering, both parts should be improved to the same extent.

Innovative ideas in architecture have emerged from situations with very high expectations, under pressure, and in critical and competitive circumstances. Climate change provides a very good pretext for innovation. However, architecture continues to focus on immobile structures while scientific fields like aeronautics and the automotive industry invest more in new materials and started investigating flexible lightweight structures almost a century ago.

The evolution of roofs has staggered between compression, tension and the combination of both. The dream of building long-span constructions has become reality, with the possibility of building large city-scale domes.
Our constantly changing society requires more adaptable and sustainable buildings. It is crucial for the further development of architecture and engineering to investigate new materials and lightweight mobile and flexible constructions

that are more energy efficient and cost effective.

The improvement in materials science, structural engineering and computer science has allowed more optimized constructions and longer-span domes. The early domes were small-diameter domes in buildings with an inefficient use of material, but actually, it is possible to construct city-dome enclosures of huge dimensions.

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Izis Salvador Pinto

Izis Salvador Pinto received a degree in architecture and urban planning from the Polytechnic University of Valencia. She later received a Master degree in concrete engineering from the Valencia University of Civil Engineering at the department of Construction Engineering completing her Master´s Thesis about ETFE cushions at the Berlin Institute of Technology. She has worked as an architect and urban planner in Brazil, Russia, Germany and Italy. At present, Izis is finishing a PhD in the University of Westminster at the School of Architecture and Built Environment. She can be contacted at izsalpin@hotmail.com

BOOK REVIEW: REQUALIFYING THE BUILT ENVIRONMENT: CHALLENGES AND RESPONSES BY Roderick J. Lawrence, Hulya Turgut, and Peter Kellett (editors).

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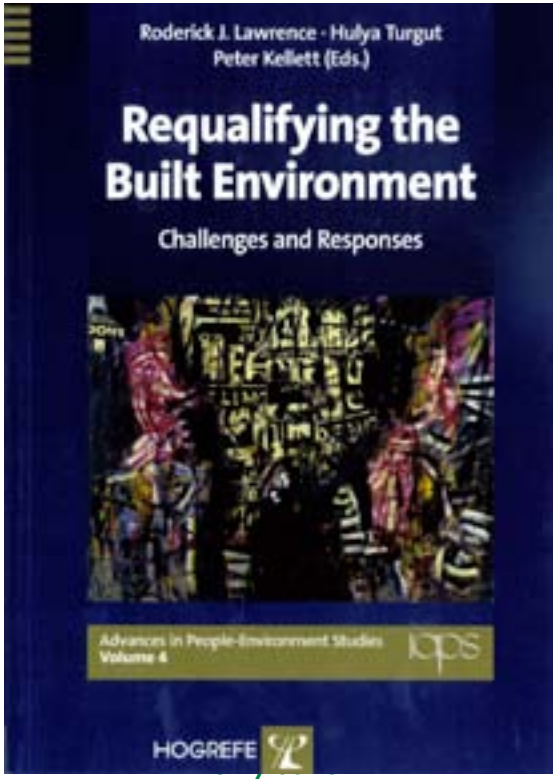
Remah Y. Gharib



Requalifying the Built Environment: Challenges and Responses is the fourth volume of a book series entitled 'Advances in People-Environment Studies,' published by Hogrefe in collaboration with the International Association for People-Environment Studies (IAPS: www.iaps-association.org). It is a product of an international symposium held in 2009. This book addresses three highly important issues relevant to contemporary urban regeneration of old quarters that are indivisibly associated. Explicitly, the book shares thoughts within i) Issues and theories of heritage and cultural identity, ii) The institutional, economic, and political contexts of revitalization, and iii) Implementation, the way in which key challenges can be addressed. Hereby, the book is designed in three sections including 10 chapters representing different international experiences. It is evident that the book is a conscious work from academics, professionals, and experts, emphasizing topics of aging places as a source of identity and synergies toward a responsive process of urban development.

The book can be seen as a gift due to its successful attempt at linking the contemporary

phenomena of globalization, urban change and transformation with the approaches of re-qualifying as revitalization, gentrification, or adaptive reuse. In addition, it reflects different socio-cultural, socio-economic and urban landscape circumstances. The book serves a broad spectrum of readers including students, academics, professional planners, and designers. Technically, the book presents several case studies and conveys several important messages; these are - policies require reformulation and the revisit of motivating objectives, - the built heritage is a value that may contribute to the efficiency and sense of place via unconventional approaches, and – solidify the relation between the theory, practice, and policy to apply more hands-on- solutions.

Section 1: Heritage and Cultural Identity: Key Issues

The first section of the book consists of three chapters that concentrate on the values of heritage and cultural identity and their roles in the process of urban regeneration. In Chapter One, 'The Heritage of the Built Environment as Development: Paradigms, Possibilities, and Problems,' Ashworth outlines a number of experiences in the utilization of the built heritage within development schemes throughout the near past. He supports his idea of built heritage utilization by investigating the role of heritage in development while questioning if it is a source of challenge or collaboration between various efforts initiated toward urban regeneration. Ashworth believes that the built heritage is a multi-usable resource that may affect urban development by producing different strategies and products. In addition, he stresses that development of historic quarters without economic, social and political support would usually stall and weaken by time. Ashworth asserts that it is worth accepting that urban transformation is a changeable concept and our theories toward the built heritage require continuous process of change to meet the new markets.

In Chapter Two, 'Historic City Centers as Catalysts for Wider Sustainable Urban Regeneration,' written by Elnokaly and Elseragy, focuses on the Historic Centre of Barcelona. The authors are investigating the experiences of Barcelona City and the efforts poured within the urban regeneration schemes. Their study relies on exploring the strategies implemented to upgrade the environmental quality since the 1992 Olympic Games development plans. Specifically, strategies investigated include; a) Improvement of natural and man-made environments, b) Optimization of energy and waste management, c) Improvement of ambient air and water quality, d) Enhancing socio-economic equality and social and cultural sustainability, and e) Transportation. The authors confirm that urban regeneration is an efficient tool to ensure sustainability. This analytical chapter pulled some vital lessons learned from the Barcelona experience, few concentrated on the image and branding of the city regionally and internationally, the essential need to promote athletic and socio-cultural led regeneration systems, ensure to work out effective set of policies to drive the urban regeneration process in the proper direction with less averseness, and others concerning the role of public participation toward the urban regeneration. The chapter ends with a discussion of the different strategies introduced and the actual experiences of the City Council of Barcelona as well as other important key players.

In Chapter Three, Rolf Johansson introduces, 'Case Studies in Renovation and Urban Regeneration: Learning by Doing.' This study aims to adapt the role of case-based reasoning in the field of architecture and planning by applying the study of repertoire onto several cases. The advantage of this examination is to deliver multi dimensions explanation toward the characteristics and lessons learned of the case study. Johansson offered the case of Hammarby Sjostad, a Brownfield development of a neglected port and industrial district in Stockholm. The chapter succeeds in delivering a lessons learned section, demonstrating the approaches of urban regeneration through environmental goals. The methodology utilized places emphasis on the organizational models and technological solutions, in addition, it focuses on the operational details and tools measuring the degree to which goals are achieved. From another perspective, the author revealed the efforts generated by project management to gather opinions and advise of the city stakeholders and local firms. The author even touched how governance had changed its direction from rules to goals and how such governing modifications require resources and incentives to complete the regeneration process.

Section 2: Challenges of the Institutional, Economic, and Political Context

The second section of the book focuses on a group of interrelated topics – institutional, economic, and political – toward urban conservation. This section consists of three chapters with different international perspectives. In Chapter Four, Loretta Lees presents 'Ideologies of Gentrification and the Right to the City,' in which she argues how neo-liberal urban revitalization strategies in cities of the Global North allowed other governing ideologies to share participation. The crux of this chapter revolves within the development of concepts of urbanity, diversity, and social mix toward refurbishing urban life. In general, Loretta is questioning these concepts in drawing the direction of revitalization in the Northern hemisphere, yet with a responsible conscious toward the emerging cities of the South. The chapter surfs among several examples of cities in most of the European and North American countries demonstrating gentrification through the rhetoric social and communal values. In contrary, gentrification in Global South cities, is aspired by the rhetoric of modernization and importation. The main challenge that the author addressed was to tie the neo-liberal ideologies of governance with the different approaches of gentrification, such as the 'Right of the inner City.'

In Chapter Five, 'Social and Spatial Re-structuring in Inner-City Residential Areas: The Case of Fener-Balat, Istanbul.' Turgut and Sismanyazici examine the social and spatial restructuring of inner-city housing in Istanbul with a particular focus of the historical housing quarters' rehabilitation. The chapter delivers a theoretical understanding of gentrification and the implication of social and spatial restructuring in general and later with a deeper gaze upon Istanbul. I believe that the chapter would have been better if located before the previous chapter as it provides a wider understanding of gentrification definitions and the process of inner-city developments. These studies construct several views and ideas of gentrification and its relationship with urban culture. Along the study, the authors promote the essentiality of comprehensive urban regeneration constituted by multidimensional visions based on participatory decision-making.
In Chapter Six, the last of this section, and the most related to the cultural and political struggle.

The author, Tarek S. Ragab presents 'Who Won the Battle of Beirut Downtown? Revisiting the Crisis of Cultural Identity in Rehabilitating Post-War Beirut.' Technically, the chapter responds to the recommendations of the previous chapter by acknowledging the participative efforts introduced in the Lebanese Capital's City Centre. He maintains that urban rehabilitation projects were not limited to the development of destroyed infrastructure, yet, pouring new collective socio-political memory and image. The study investigates the approaches of urban rehabilitation and the degree of preserving the intangible meanings. Tarek covers the value of cultural identity, challenges of cross-cultural conflicts in quarters of crisis, and the attempts of how some challenges overruled with the Solidere Urban rehabilitation project. Nevertheless, the study reached to two important findings, the first concerns itself with the shortcoming of management and the investment approaches with fewer concerns toward the cultural and integral structure, while the second stimulates the strong bond between the wealthy business sector and decision-makers, reflecting utilization of the cultural identity as a branding gadget.

Section 3: Implementation Addressing Key Challenges

The third section of the book, presents in more details the concepts, principles, and methods of several examples in re-qualifying the built environment. In Chapter Seven, Despres, Fortin, and Vachon from Quebec City – Canada participated in this publication with a very interesting chapter 'Requalifying Aging Suburbs to Counter Urban Sprawl: The Contribution of GIRBa to Cultural Sustainability.' They focus on engaging the academic stratum into cultural developments and play as an agent of change. The chapter delivers through the GIRBa research project the requalification of aging inner-city principles, in addition it demonstrate the quantitative, qualitative, design and participatory criteria for revealing the challenges and potentials of the re-qualification processes. The authors are keen to declare the leadership role of academics in encouraging the concepts of requalification and gentrification than new construction. However, it would be remarkably important that the partaking academics are aware of the cultural aspects in order to enforce sustainable re-qualification models. Therefore, it is essential that the academics stratum get involved in the research and study of social sciences as they relate to the local context to draw tailored re-qualification parameters.

From London, Chapter Eight discusses urban regeneration by the Residents' extraordinary enforcements. Levent Kerimol contributes with the 'Resident Led Regeneration: Proposals for Large Scale Self-Build Development in London.' As part of a design thesis submitted at the Architectural Association, the author attempts to promote a self-building mechanism for urban regeneration. The study is very innovative in its kind, addressing the concepts of cooperation, independence, social anonymity merged with singular self-building initiatives. The study relies on several international attempts and the lessons learned from these experiences and the degree of relevancy or adaptation. Furthermore, the study tackled several socio-economic methods to offer a liberal governing system within this resident led regeneration model. However, some of the methods discussed in details are hypothetical in nature but maybe useful for local authorities and other governing bodies.

Once more, but from South America, Camilo Calderon presents in Chapter Nine 'Social Urbanism: Integrated and Participatory Urban Upgrading in Medelin, Columbia.' This chapter discusses the use of participatory urban upgrading and integrated solutions, while addressing the advantages and setbacks. The author claims that while implementing urban upgrading some cultural aspects revitalized, due to the communal involvement, produce intangible products. Therefore, while focusing on the tangible built environment, the upgrading programs may need to focus on the cultural potentials within the new public spaces. The author argues that Social Urbanism unifies physical and social improvements, and that this is achievable throughout the upgrading process with effective participatory approaches.

Finally, in Chapter Ten, Maye Yehia reenter the concept of enforcing the power of communities in shaping their urban environments. She presents 'Empowering Local Communities to Revitalize Old Quarters: Cases from Egypt.' Maye takes the Aga Khan Trust of Culture development in Darb Al Ahmar of Old Cairo as raw model of empowering the residents through the energetic and innovative NGOs' founded by the program implementers and handed to the local community for future continuation. She sets a series of learned lessons to test their potentials upon the Turkish quarter development in Alexandria and then examines the possibilities for future urban revitalization developments in a similar community based manner.

In general, this edited book will add to the series of books in the field of urban revitalization due to the enormous cases presented and diverse initiatives of addressing current challenges. Personally, I believe that the book would have been uplifted higher if it was supported with full colored images to give strong sense of the cases. However, it is a great work by the editors and contributors to deliver a concise and efficient academic research rooted in actual experiences. The book is an important reading for academics, students, and researchers in the field of urban heritage, revitalization and conservation.

Remah Y. Gharib

Remah Gharib is an Assistant Professor of Architecture and Urban Design in the Center for Research on Islamic Architecture and Planning at Qatar Faculty of Islamic Studies, Qatar Foundation. Dr. Gharib contributes to the Qatar Faculty of Islamic Studies by teaching two courses at the Masters level; Survey of Islamic Architecture in the world and The Planning principles of the Muslim City. He received his PhD in Architecture and Urban Design from the University of Nottingham, where he developed his knowledge of revitalization and management of historic quarters. His research focuses on the aspects of public policy formulation and Implementation. Prior to receiving his PhD, he earned his Masters of Architecture in Urban Design at the School of Built Environment in the University of Nottingham. He received his Bachelor of Science in Architectural Engineering from Misr International University in Cairo - MIU where he was appointed as an assistant lecturer and taught Urban Design Theories and Urban Design Studios. He can be contacted at rgharib@qfis.edu.qa or remah_gharib@hotmail.com.