



Building Ideas

Systemic Action Research in the Built Environment **VOLUME 3: 2011-12**



Building Ideas

3 Systemic Action
Research in the
Built Environment
VOLUME 3: 2011-12

TOWN+GOWN
BUILDING
IDEAS

DDC
NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

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ABOUT TOWN+GOWN

Town+Gown is a systemic action research program that marshals academic and practitioner resources to increase applied built environment research. As unresolved built environment issues become more apparent, there has been an increased need for these research activities. Town+Gown's response to this need scales long-standing structural hurdles that have made increasing such research difficult, such as low levels of investment, low levels of public sponsorship, inadequate linkages between research and application, and the fragmented nature of construction industry. Systemic action research is a form of cooperative inquiry involving both practitioner and academic as equal partners in knowledge creation. This pragmatic and integrated approach to producing applied research accepts multiple modes of inquiry and analysis to generate research results that will, in time, support changes in practices and policies.

Town+Gown supports and facilitates systemic changes in practice and policy based on applied research. The annual Research Agenda, released at the end of each academic year, is the primary resource for

participating members to collaborate on research projects throughout the next academic year. The City's built environment serves as a laboratory for the formal disciplines and multi-disciplinary fields that overlap the multi-disciplinary built environment field. Town+Gown supports all stages of academic-practitioner collaborations within its broad, open and cyclical process.

At the end of each academic year, Town+Gown abstracts and disseminates all completed research projects, setting the stage for reflection among participants and future action based on research. At the end of its third year of operation, Town+Gown has completed 16 projects, joining earlier projects for a total of 48 completed projects with 21 practitioner partners and 15 academic programs. In its third year of operation, Town+Gown sponsored its first series of symposium events, using completed research projects generated during the prior two years as the foundation for open-ended conversations among Town+Gown members.

Each volume of *Building Ideas* represents the capstone of Town+Gown's academic year. The first half of this Volume 3 abstracts the completed 2011-2012 projects, performing a dissemination function, and the second half contains the proceedings from the symposium events, capturing some of the reflection and refocusing of issues that took place among Town+Gown participants.

Town + Gown website:
www.nyc.gov/html/ddc/html/design/tg.shtml

DISSEMINATION:
ABSTRACTS
OF COMPLETED
PROJECTS

MANAGEMENT

The projects that follow under Management primarily focus on the built environment from the perspectives of the archetypal participants—owner, designer and constructor. A critical objective for participants is to align their various interests in budget, schedule, safety and quality to make individual projects successful, in a context where information asymmetries continually change. Practitioners adapt to changes “on the ground” and changes in materials, building methods and information technology by using an evolving menu of service delivery methodologies as well as various management theories, techniques and tools, not dissimilar to those found in other industries or sectors. To the extent research projects involve public projects, there are separate analytical issues related to the public planning and budget processes.

The next phase of NYC's sustainability agenda: fixtures, furnishings & equipment

MANAGEMENT

Town

OLTPS, DCAS, DDC

Gown

New School/Milano

Graduate students, Tiffanie Harris, Ariana Rosas, Joseph Taranto and Hiwet Tesfamariam (the “Team”), were asked to explore how the City could expand its sustainability agenda to include fixtures, furnishings and equipment (FF&E). While the City has, over the recent past years, initiated a range of local laws and policies to reduce the negative environmental impacts of the City’s renovation and construction projects, none of them specifically address the FF&E component of such projects.

| | | COMPREHENSIVENESS | EASE OF IMPLEMENTATION | COST OF IMPLEMENTATION |
|-------------------------|---|-------------------|------------------------|---------------------------|
| Sustainability Criteria | Leverage LEED's Commercial Interiors guidelines | Moderate | High | 0-10% price differential |
| | Create comprehensive city standards | High | Low | 10-20% price differential |
| Implementation Approach | Expand DCAS's Space Guidelines and requirements contracts | High | High | Approx \$50-60K |
| | Expand MOCS's EPP Program | High | Moderate | Approx \$100-120K |

Methodology The Team’s literature survey and series of interviews revealed two distinct issues that any proposal to apply environmental sustainability principles to FF&E would need to address. The first issue stems from the fact that application of sustainability principles to FF&E is a relatively recent phenomenon. Thus, there is less policy and practical consensus on implementing sustainability criteria for FF&E relative to other aspects of renovation and construction. The second issue stems from the complex regulatory environment constraining an already complex process—that of public building renovation and construction. These two issues—defining sustainability criteria and identifying an implementation approach—formed the basis of various potential proposals identified by the Team as well as the criteria by which the Team evaluated such proposals.

Research Findings The Team concluded that initially focusing on the smaller range of sustainability aspects required by LEED Commercial Interiors guidelines was preferable to focusing on any of the more comprehensive set of standards. Focusing on a smaller range, in the context of legal constraints imposed on City procurement practice and existing space and furniture guidelines that reflect such constraints, would be relatively easier to implement and less costly. Implementation of relatively less comprehensive standards by incorporating them into existing procurement practices related to FF+E nonetheless would represent “a solid first step” in reducing gaps between current practice and sustainability concerns, including reducing the negative health consequences in office interiors. The application of LEED Commercial Interiors guidelines to existing City practices, such as its office space guidelines and FF+E-related requirements contracts, also suggested the appropriate actor for the optimal implementation approach. Having DCAS revise its office space guidelines and furniture requirements contracts to reflect LEED Commercial Interiors guidelines would be highly comprehensive in view of DCAS’s role in the purchase of all City goods, fairly easy to implement with minimal barriers to successful implementation.

Next Steps Since this project was a management-focused inquiry, the next steps were focused on practical steps toward implementation, and there were no recommendations for future research.

Project specific, driven based contingency estimating model in construction

MANAGEMENT

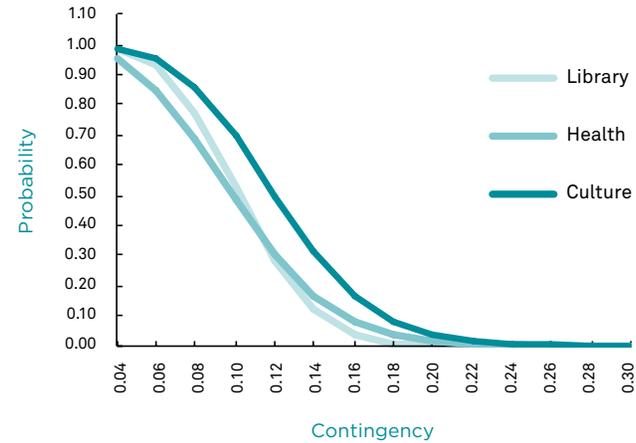
Town

DDC

Gown

NYU/Polytechnic
Institute

In the context of a dissertation related to the research question *What Is the State of Building Information Modeling and Integrated Project Delivery in Public Sector Construction?*, Mei Liu, Ph.D. candidate, Department of Civil Engineering, analyzed historical change order cost data for specific project types to assess the feasibility of developing a reference class forecasting model for estimating capital project contingency.



Methodology Liu applied probability theory to contingency estimating, evaluating the random nature of changes and various risk drivers and using historical cost data for specific project types, to identify levels of confidence that an estimated contingency amount will keep total project costs within the estimated project budget. Case study analyses on selected projects are presented to demonstrate the utility of the model in estimating the “right” contingency amount.

Research Findings Liu demonstrates the feasibility of using probability theory in the context of a large owner’s contingency estimation practice.

Next Steps Limitations with the data set, including a limited number of project types, a limited number of projects and distortions produced by prior recording practices, prevent immediate application of this particular model. This project, however, sets out the methodological steps to develop a model based on a larger data set not limited by such earlier practices, which has the potential to become an executable model.

Gypsum recycling in PlaNYC 2030: spaces for government intervention

MANAGEMENT

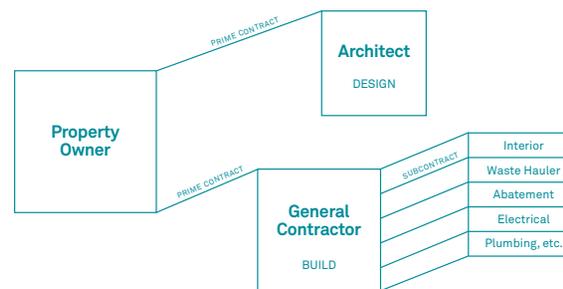
Town

DDC

Gown

Columbia/GSAPP

In the context of a master of urban planning thesis guided by the research question *How to Design Incentives for Sustainability Implementation?*, Caroline Bauer focused on gypsum recycling at two public owners in New York City, as a case study to assess how government, as regulator, can create incentives for desired behavior. While PlaNYC lists gypsum scrap recycling as a priority, it also notes the lack of gypsum recycling resources and infrastructure. This project specifically sought to identify the kinds of actions the City might take to incentivize gypsum recycling.



Methodology Bauer conducted a literature survey related to both government regulation and gypsum production and recycling, in particular to document the lifecycle of gypsum wallboard from extraction to disposal. Bauer conducted two series of interviews, one of government officials to describe the culture in which decisions about recycling regulations and enforcement occur and another of supply chain participants to describe current practices related to gypsum use and recycling and the nature of the current market for gypsum recycling services. Bauer also analyzed standard contractual relationships on construction projects to identify the roles and responsibilities related to construction product inputs such as gypsum in order to conduct a proto cost benefit analysis of feasible incentives.

Research Findings During the process of assessing the benefits and costs of the various incentive proposals identified, Bauer found that the original question of how the City should incentivize gypsum recycling shifted to whether the City should incentivize gypsum recycling. Gypsum is an abundant and cheap material to extract, recycled scrap is difficult to sell and synthetic gypsum has emerged as a “greener” and cheaper alternative to recycled gypsum. The nature of the material and the market for its production, which is at the national level, suggested that local government was not the appropriate or optimum actor for gypsum recycling regulation or incentives to increase recycling compliance. Bauer concluded that the City should re-examine whether gypsum recycling should remain a policy priority.

Next Steps Bauer included recommendations on how other stakeholders in the supply chain could handle the material given its incompatibility with the transfer station and landfill environment. The methodology Bauer followed also provides a basis to develop a model for use in analyzing future local recycling proposals.

Balancing cost and quality for New York City infrastructure projects

MANAGEMENT

Town

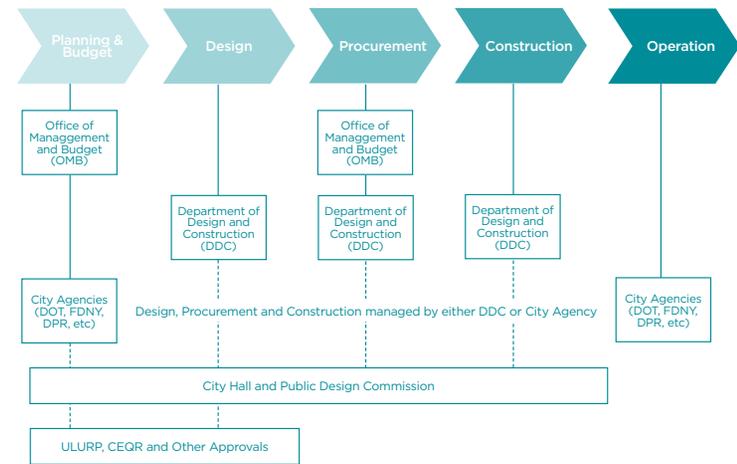
OMB, DDC

Gown

Columbia/SIPA

Graduate students, Hannah Henn, Kate Johnson, Kermit Jones, Mahama Nyankamawu, Jessica Taylor and Mitch Thakran (the “Team”), were asked to identify the City’s pre-construction practices and policies, including those related to the capital project process, the design phase and management techniques, that constrain the ability of project management teams to keep project costs and schedule within estimates during the project construction phase. Since the ability to influence total costs is greatest during planning and design phases of a capital project and decreases precipitously after design is complete, activities taken, or not taken, during that period have significant impacts on total project costs.

PROJECT STAKEHOLDERS



Methodology The Team conducted interviews of public and private practitioners, including a number of construction-related departments at the City, to understand and document the practices and policies and their impact. The Team also performed supplemental research on design and risk management tools in use on federal government projects as well as private sector projects, which along with the interview results, permitted them to identify potential changes in practice and policy that could increase project cost certainty and consensus on project quality elements.

Research Findings The Team identified a number of policy and practices changes, mostly of low to moderate levels of difficulty, that would be possible to implement within existing legal constraints in the three functional areas they identified for the pre-construction period: pre-project planning and cost estimating; project ownership and design decision-making; and approval process and communication. These recommendations are compatible with several existing policies and practices that already target activities during the project planning and design phase.

Next Steps As this was a management-focused research project that culminated in a series of actionable recommendations, the Team did not identify areas for future research.

GEO GRA PHY

In the projects that follow under Geography (formerly Management with an Urban Planning Twist), some management issues are made more powerful when the owner is also a governmental entity with formal municipal planning powers. These questions are also of interest to planners working outside of government.

Sustainable development of the Gowanus neighborhood in Brooklyn, New York

GEOGRAPHY

Town

DDC

Gown

NYIT/Engineering

In the context of an energy management master of science thesis related to the research question *How to Promote More Sustainable Neighborhoods—Economically, Socially and Environmentally?*, Gordon Jones explored aspects of full cost accounting urban planning, focusing on the neighborhoods surrounding the Gowanus Canal, currently undergoing federal Super Fund remediation. Although a man-made artifact, the Gowanus Canal has its origins in the earth, and the purpose of this exploration was to take account of the natural features related to the site and the science implicit in its features, in the context of environmental remediation and future development.

Methodology After a literature survey that encompassed comparative analysis and historical accounts, Jones applied the biomimetic approach to various aspects of the Gowanus neighborhood that would be technically feasible and environmentally suitable for development of the post-remediated site, working from the science of the natural systems present at the site and then applying them to the man-made systems. Jones also focused on the neighborhood at the building level, identifying a variety of building and operating techniques to support implementation of the biomimetic planning approach.

Research Findings Jones found it feasible to translate ideas emanating from the biomimetic approach to planning and financing options that could be undertaken during and after the remediation period.

Next Steps In addition to planning and financing options suggested by the analysis, Jones suggested that the holistic methodology might become a template for developing other neighborhoods in tandem with addressing environmental issues.

Sustainability assessment: East Side Community High School

GEOGRAPHY

Town

DDC

Gown

Columbia/EI

In the context of a sustainability management master of science independent study capstone related to the research question, *How to Promote More Sustainable Neighborhoods—Economically, Socially and Environmentally?*, Sarah Bacon performed an energy use assessment of P.S. 60, a large school building constructed in 1924, to identify short- and mid-term strategies to assist the school in raising its Energy Performance Rating over the next five years. Since public school buildings generate a significant share of the City's public building carbon emissions, the City aims to lead by example and reduce emissions at all City agencies by 2017, as part of its plan to reduce greenhouse gas emissions 30 percent overall by 2030.

Methodology Bacon designed an assessment of two emissions areas—waste stream and electricity—to identify opportunities to lower emissions within constraints that include keeping costs as low as possible, minimizing implementation time and maximizing resulting fiscal and social benefits. Bacon's methodology included a literature review of institutional green initiatives, including those of the City's, case studies for benchmarking methodologies, and programmatic models; site visits for interviews and observations of practices; a kitchen and cafeteria waste audit conducted with students; and meter readings for computers.

Research Findings The connection between a school, physically represented by its building, and the neighborhood in which it is located is often revealed during public discussions related to schools, here in the City and elsewhere. The poor energy performance of an old building that, in the case of P.S. 60, houses an academically high performing school, in the context of public goods competing for scarce public resources, is the challenge facing a majority of neighborhood school buildings and their administrators across the City. Bacon found that not only do old school buildings require systems modifications and/or upgrades in lighting, computers and procurement practices, but also that their administrators must proceed while being held accountable for waste output and energy usage before the necessary investments can be made.

Next Steps The City has articulated a planned audit of all school buildings by 2017. In view of the importance of reducing emissions within current financial and operating constraints, Bacon's energy use assessment suggests ways to refocus planned efforts at reduction.

The car-share operation: a new vehicle for sustainable neighborhoods

GEOGRAPHY

Town

DDC

Gown

BLS/Fellowship

In the context of a post-graduate fellowship project related to the research question, *How to Promote More Sustainable Neighborhoods—Economically, Socially and Environmentally?*, Mark Jackson focused on the potential impacts presented by the recent expansion in car-share operations (CSOs) in the United States.

Methodology Jackson conducted a meta-analysis of the car-share mechanism and related transportation and land use issues to extrapolate from an observable set of facts—the recent expansion and evolution of CSOs and governments’ attempts at regulating them—and translate them into potential changes in practice and policy in urban transportation and land use.

Research Findings The recent evolution of CSOs is primarily the result of the ability of sophisticated information technology (IT) to extract greater value from traditional transportation infrastructure, in addition to socio-economic trends favoring urban density and “collaborative consumption.” In addition to being dependent on private-sector IT development, CSOs are also dependent upon government investment and support of the personal vehicle network, from vehicle manufacturing to roadway planning and insurance regulations. Government, in particular at the federal and local levels, has begun to focus on and address issues raised by CSOs, as they expand and evolve into stand-alone mode of transportation, with distinct models of vehicles, parking structures and social networks.

Next Steps The optimum nature of government intervention with respect to CSOs will require future analysis of CSOs as a combination public and private good since they are creatures of private enterprise that depend and capitalize on public investments and can provide positive externalities. Such characterization would provide a framework for appropriate government intervention. In addition, research related to traffic and land use can help assess the effects, including economic, environmental and social, within various jurisdictional and geographic areas.

Relation between land use law techniques and urban design and function: post-script

GEOGRAPHY

Town

DDC

Gown

Brooklyn Law School/
Fellowship

In the context of a post-graduate fellowship project, Matthew Lawrence, Jr., developed a foundational analysis that followed up on issues raised by a 2010-2011 Town+Gown project, entitled *What is the Relation between Land Use Law Techniques and Urban Design and Function?*, and provided a link to a 2009-2010 Town+Gown project, entitled *Ex Post Facto Rezoning Evaluation Model*. The purpose of this foundational analysis was to explore developing a methodology to analyze broad historical trends in zoning actions to provide context for evaluating the results of discreet zoning actions.

Methodology Using zoning amendment data since 1993, the earliest date of zoning code amendments available on-line, as his data set, Lawrence experimented with ways to analyze various aspects of zoning amendments historically and contextually. Lawrence then reviewed a case study zoning action to test the ex post facto evaluation methodology against broader contextual trends discernable from analyzing zoning actions over time.

Research Findings Lawrence found that establishing historical and policy contexts for application of the ex post facto evaluation methodology would increase the usefulness of the methodology and provide a fuller evaluation of any particular land use action.

Next Steps In view of the City's practice of comprehensive planning as a continuous and dynamic process, it is important to increase the types of analytical tools and models for evaluation of zoning actions to inform future actions. Future researchers from other disciplines could focus on the existing database to identify useful categories across the spectrum of history and policy, sort the land use actions according to categories, identify and assess what the data suggest, and expand application of this methodology to additional data as they become available on-line.

Multi-dimensional investigations of Sheridan Expressway and Hunts Point

GEOGRAPHY

Town

DCP

Gown

New School/Parsons

In the context of the research question *How to Promote More Sustainable Neighborhoods—Economically, Socially and Environmentally?*, New School/Parsons used the various options for the Sheridan Expressway, then under consideration, as the case study subject for its Spring semester 2012 Digital Modeling course CRN 750 to practice multi-dimensional research, merging urban design theory and analysis with digital modeling techniques, such as digital mapping, geo tagging, three dimensional modeling, video capture and editing and web publishing and interactive presentation, in order to make such understanding accessible to a wide audience, including decision-makers.

Methodology Various simulated scenarios permitted the students to explore and understand how a wide range of issues affect and are affected by the urban framework of a particular place and the public decision-making process. The students began by creating digital models of the City and the area surrounding the Sheridan Expressway and Hunts Point, and then analyzed the case study site, using digital modeling techniques, along three perspectives—archeological, genealogical and schizoanalytical—to combine historical and abstract knowledge with “ground truth” empirical knowledge to frame urban design and public policy issues. Governmental agency staff and professional urban designers participated at the student presentation roundtable discussions to provide practitioner perspective to the complex issues raised by the presentations.

Research Findings Highlights of the students’ presentations during the semester included demographic and economic analyses, historical analysis of infrastructure development, and urban design ideas focusing on Hunts Point and the Bronx River.

Next Steps In the context of a class setting, resulting analyses and ideas were ends in themselves, but they can provide the foundation for future work focusing on the Bronx in general and the Hunts Point area in particular.

Project Links

<http://dm2012.parsons.edu/>

<http://vimeo.com/47202559>

What color is mixed use on a land use map: a technical exploration

GEOGRAPHY

Town

DCP, DDC

Gown

NYIT/Architecture

Picking up from the theoretical approach explored in the 2010-2011 project *What Color is Mixed Use on an Land Use Map* project, students in NYIT's spring semester course ARCH 842 — Computer-Aided Design and Planning II pursued a technical approach using geographic information system (GIS) technology to examine the relevancy of the land use map —as well as its relationship to zoning—in its current form and, in the process, develop an appreciation and understanding for the role and function of the land use map, what it means to have 'good' data, the sources of publicly accessible information and how data can be effectively visualized and presented through the use of GIS technology.

Methodology Using the Greenpoint - Williamsburg community district as the study area, students conducted a field survey of existing land use and compared that to the latest DCP PLUTO dataset, which contains information from DCP, the Department of Finance and the Department of Buildings. Using information gathered from the fields in PLUTO, as well as from alternative data sources, students visualized, in two- and three-dimensional formats, land use at various scales recommended in the previous project.

Research Findings Students went beyond traditional two-dimensional mapping to develop a new language that conveys land use for a dense urban environment where growth is vertical rather than horizontal. In the process of working the datasets and GIS software, they also learned about the limitations of data as well technology limitations in conveying three-dimensional information at various scales.

Next Steps In the context of a class setting, resulting analyses and ideas were ends in themselves, but they can provide the foundation for future work focusing on issues related to limitations of the land use map.

ECONOMICS

Projects that follow under Economics make it possible to see government acting in and on the built environment in the different roles it often plays simultaneously. Public capital programs are, in essence, work orders for facilities relating to “social” or “public” goods and to “mixed goods” that correct for negative and positive externalities. Yet, at the same time government participates in the built environment as an owner, it also operates in its other roles—economic catalyst, economic policy maker, regulator and financier—increasing the complexity of built environment systems and affecting the effectiveness and efficiency of public and private capital programs and projects.

Labor supply and demand mis-matching in the construction sector: issues and solutions

ECONOMICS

Town

DDC

Gown

New School/Milano

In the context of an urban policy analysis and management master of science professional decision report (PDR) related to the research question, *Future Workforce Needs and Development—What Are the Conditions for Construction Business Formation and Success?*, Jared Carrano explored the impact of changing economic conditions on labor supply and demand matching within a local construction market, using New York City as the case study, in order to provide a set of recommendations on how a local government such as the City might address issues arising from potential mismatches of labor supply and demand.

Methodology After a literature survey encompassing academic, industry and government publications on construction economics and the building cycle, Carrano conducted interviews within various public owner entities in the City, and at construction companies, contractors associations and labor unions, and with other industry experts to identify types of actions the public sector can take to mitigate the mismatch between construction labor supply and demand across building cycles and increase stability within a local construction labor market.

Research Findings Carrano reported on an industry characterized by cyclical instability due to extreme swings in building investment, a high degree of fragmentation due to the great diversity of specialized skills needed for variable durations on any given project and wider amplitudes between employment peak and trough than in any other industrial sector. A feature of this highly cyclical, fragmented and specialized industry is its high rate of mobility for both workers and firms because, unlike in manufacturing where firms make their commodity products within factories situated more or less permanently, construction firms make their products at sites of specific assets under contract. Carrano further reported on a “public building cycle” that operates within and lags behind the overall local building cycle. Carrano found that public owners in a local market can take advantage of their public building cycles to mitigate the mismatch by promoting better information sharing and timing their projects strategically.

Next Steps Specifically, based on practices in use elsewhere, Carrano suggested that it would be possible for the City to collaborative with labor market participants to create a labor market model that accounts for the specific skilled-labor demand created by specific projects in the planning pipeline and the available labor supply by trade, permitting analysis to identify periods of mismatch and mitigation strategies in advance. As the PDR model is intended to focus on actionable recommendations, Carrano did not identify areas for future research.

Advancing New York City's buildings & its workers: New York City's energy audit and retro commissioning law

ECONOMICS

Town

DDC

Gown

New School/Milano

In the context of an urban policy analysis and management master of science professional decision report related to the research question, *Future Workforce Needs and Development—What Are the Conditions for Construction Business Formation and Success?*, Ian Hardouin developed a model to analyze the impact of built environment regulation on the supply and demand in a local market for built environment workforce, using, as a case study, Local Law 87 of 2009, which mandates energy audits and retro-commissioning for large commercial, mixed-use, and residential structures. Understanding the relationship between regulation and workforce supply is necessary to anticipate and plan for labor market changes in the built environment industry due to regulation.

Methodology Through review of academic and practitioner literature and interviews of experts within government and private sector industry, this research aimed at understanding the construction industry's response to new built environment legislation, in terms of training, labor supply, qualifications, and experience, and examining the effects these activities would have on employees in built environment occupations, including those not directly engaged in these tasks. This research also required the development of a theoretical model to determine how regulation affects workforce economics, which was accomplished with the assistance of academic economists. This project used data from the U.S. Department of Labor's Quarterly Census of Employment and Wages and from a recent project conducted by the Center for Urban Research at CUNY's Graduate Center.

Research Findings Analyzing the rolling requirement deadlines, over a ten-year period, on the three major groups comprising the built environment workforce—architects and engineers, building service workers and construction tradespeople—in the context of current labor supply levels, Hardouin found that the law would have a limited, gradual impact on the workforce. After assuming an average building size, cost per job, number of affected buildings and jobs per \$1M spent, Hardouin was able to estimate elements of the incremental increase in jobs due to the law and relate the incremental increase in types of new work to existing supply of technical capacity within various component labor groups.

Next Steps Hardouin suggested further research to assess the longer term impact of the case study regulation on the local built environment workforce and to develop a baseline workforce demand model for the City in order to evaluate the impact of future legislative proposals impacting the built environment.

The City connected: improving service models for minority and women business enterprises

ECONOMICS

Town

Reboot, Public Policy
Lab, DDC

Gown

Harvard/Kennedy

Researcher Kate Krontiris, a graduate public policy student, conducted two related inquiries, initially sponsored by Reboot and the Public Policy Lab, that touched on aspects of the research question entitled *Future Workforce Needs and Development—What Are the Conditions for Construction Business Formation and Success?*. The first inquiry was inspired by difficulties that service programs have expressed about obtaining information from their target audience members for use in improving their service methodologies/models. The second inquiry, which remains a viable project, further developed preliminary findings from the first.

Methodology Krontiris focused on the City’s minority and women business enterprise (MWBE) program as the case study to explore how service programs can obtain the right kinds of information from their target audiences with the goal of understanding their particular needs and enabling the programs to reach and provide their target audiences with services more effectively. Krontiris researched the MWBE process, developed a sample of small businesses that would likely qualify for MWBE certification were they to comply with the process, identified a smaller sample of those appropriate for formal interviews, and designed a survey instrument for those interviews to ascertain aspects of small businesses that overlap with MWBE program goals and identify why these small businesses did not seek MWBE certification—all as a way to provide a foundation for further research on ways to understand how the certification process might be made more responsive to the needs and context of its “users”.

Research Findings Drawing largely on public MWBE data from the Department of Small Business Services, Krontiris conducted interviews with small business owners, developing and documenting further understanding about the nature of the interactions between firms and public owner entities, and produced a set of profiles that describe the MWBE firms’ experiences with certification and an assessment of the potential for improvements in the certification process. The preliminary interviews were followed by one interview with a DDC MWBE contractor, a small business involved in construction, which provides a significant source of business for MWBE certifications.

Next Steps Krontiris identified further interviews, focusing on the construction industry, as a promising line of research. This second set of inquiries remains an open research question, as additional interviews with a construction-related MWBEs were not feasible during the semester timeframe for this project.

LAW

Projects under Law focus on the impact of the law on built environment activities from the perspective of the archetypal participants—owner, designer and constructor. Statutes and regulations, related case law, and contractual forms and provisions, which are the products of industry standard practice, governing law and past experience, all affect the relationships among the participants, their expectations and behaviors. Deconstructing the law in the context of its impact “on the ground” can provide powerful explanatory insight for the other disciplines analyzing built environment issues.

From Smith to Williamson: the relationship of economic theory and legal theory over time

LAW

Town

DDC, Construction
Law Committee

Gown

BLS/Clinic

Law student, Glennia Napper, was asked to review the history and content of economic theory and contract law theory and articulate the relationship of the two over time as supplemental research for a broader research project related to the research question *How Can Public Owners Better Match Risk Shifting/Mitigation Strategies to Risk?* involving a comparative contract analysis focusing on risk allocation provisions in public and private construction contracts.

Methodology Napper conducted a literature review of economic theory, contract law theory and the history of the two to analyze the connection between them over time, focusing in particular on the distinction between complete and incomplete contracting, a critical classification in contract law theory. Although contract law theory and economic theory are distinct, they are related, with each influencing and partly depending on the other.

Research Findings Articulating and analyzing certain assumptions embedded in the related theories over time will facilitate an economics-based analysis of contract provisions in the broader project. As this project joins others in the overall comparative contract analysis project, there were no specific findings.

Next Steps The broader research project is expected to be completed in 2012-2013.

Improving the regulatory and cultural framework of green building in New York City

LAW

Town

See note below

Gown

Fordham/Law

In the context of a final project in a multi-disciplinary seminar course entitled “Sustainability, Technology Law and Policy”, law students Fernando Maimon, Micheal Podolsky, David Ragonetti and Dovid Schattner (the “Team”), performed a comparative legal analysis of energy efficient “green” building law that touched on aspects of the research question *How to Design Incentives for Sustainability Implementation?*

Note: Past volumes of Building Ideas have abstracted projects that originated outside Town+Gown, but nonetheless relate to existing research questions. Since projects like this can provide the foundation for future research projects within Town+Gown, they are captured in Building Ideas.

Methodology The Team analyzed the City’s current regulatory and policy environment as a baseline case study and followed with a comparative analysis of several European regulatory tools and approaches to highlight those that are available for the City to consider as it moves toward critical policy implementation milestones.

Research Findings The Team suggested that many approaches in the United States, including New York City, may tend to fall short of stated objectives due to the nature of the American political and economic structure. Finding the European models to be more effective, the Team recommended an approach that would increase legal mandates and enforcement by fines as well as increase public subsidies to private owners in order to compensate for losses and suggested this approach would create a market in which energy inefficient buildings would no longer be economically viable.

Next Steps The Team made no specific recommendations for future research activity.

DESIGN

The projects under Design can focus on any one of the many aspects raised by design in this complex disciplinary field. Both public and private construction become part of the visible built environment, with public construction particularly subject to the continual balancing of function, build quality and delight, all within the confines of cost. When public owners act as private owners, they are purchasers of design—architectural and engineering—services. When public owners also regulate built environment participants, processes and products, they impact private projects as well as public projects and the larger public space that is the built environment.

There were no projects in the Design fields in academic year 2011-2012.

TECH NOL OGY

Technology, including information technology, can assist project participants in managing construction projects. While technology can be analyzed in conjunction with management techniques and methodologies, technology has a sufficient number of additional aspects that it deserves special attention, and projects under Technology highlight one or more of these aspects. Large public owners also have an ability to advance technology innovation, as economic policy makers but also as collateral from their public capital programs by participating in research and development necessary for innovation in construction technology.

Information systems in construction: curriculum integration as a research methodology

TECHNOLOGY

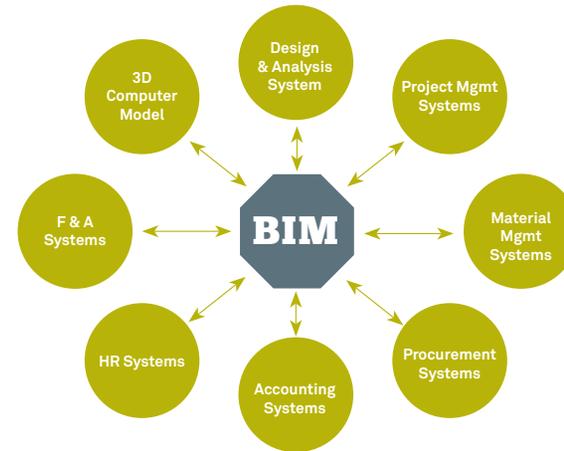
Town

DDC

Gown

NYU/Poly

In the context of the research question *What Is the State of Building Information Modeling and Integrated Project Delivery in Public Sector Construction?*, NYU/Poly Department of Civil Engineering structured its Information Systems in Project Management Course CE8303 to identify and document the information and skills needed to successfully implement building information modeling (BIM) and four-dimensional fully integrated and automated project processes (FIAPP), which integrates BIM and all the other relational databases, in the construction phase of a public sector project. This course was also designed as a controlled experiment to identify, assess and document BIM's role in the additional context of cooperation among project participants in an integrated project delivery (IPD) setting.



Methodology For the first ten classes, student teams, acting in the role of general contractor, performed standard operations leading up to the bid process for a public construction project, using BIM and FIAPP programs. The teams used these programs to develop bidding strategies, prepare preliminary bids, conduct project schedule and time cost trade off analyses, and prepare final bid submissions. The “winning” bid then formed the basis for the final five classes during which re-formed student teams of archetypal construction participants—owner, designer, contractor and steel fabricator subcontractor—applied the principles of IPD and used BIM and FIAPP tools to resolve fact patterns representing changed conditions. The students kept journals and made presentations and produced reports similar to those done by their archetypal participants on actual projects.

Research Findings The documented student team experiences suggest that it is feasible to use BIM tools in the context of IPD principles in the public construction project setting, though existing public construction procurement laws will continue to impose constraints on full application and implementation, thus limiting the full potential to avoid costs.

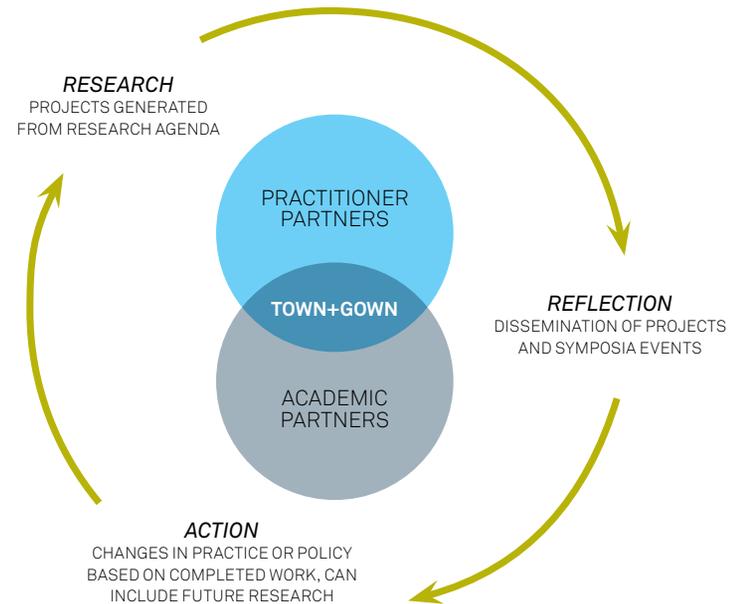
Next Steps Future research, including subsequent iterations of this class, can focus on the particular issues raised in and by the public construction setting since the use of BIM and IPD will continue to expand in the industry.



REFLECTION: PROCEEDINGS FROM SYMPOSIUM EVENTS

The systemic action research methodology provides a “learning architecture” within which system stakeholders can bring about changes in practice and policy in a complex and dynamic social system.¹ In a system such as the built environment, where complex issues are embedded into its fabric, it is necessary to conduct research explicitly within the context of that system. The action research methodology facilitates changes in practices and policies through “the use of small working groups around participants’ practice —what action learning practitioners call ‘action learning sets’— with repeated cycles of action-reflection.”²

In Town+Gown, research results provide the foundation for activities aimed at making changes in practice and policy based on these results. In 2011-2012, Town+Gown initiated the use of the symposium format as a space for reflection, where participants, in an open-ended conversation focusing on the results of particular completed projects, can move toward appropriate action—either as changes in practice and policy based on analysis or as follow-up targeted research.



Conversations with academics about completed projects, which practitioners have sponsored and participated in, can advance ongoing conversations among practitioners. For these symposia, there is no crisis and there is no particular agenda other than what is suggested by the completed project. They are simply research-based conversations within a broader context aimed at action.

The following are brief summary proceedings of the three 2011-2012 symposium events and the annual Handing Off the Research Agenda event that took on elements of a symposia event.

See www.nyc.gov/html/ddc/html/design/tg.shtml for Building Ideas, Volumes 1 and 2 for abstracts of projects discussed at the following symposia events and the précis documents for the symposium events.

¹ Danny Burns, *Systemic Action Research: A Strategy for Whole System Change* (Bristol: 2007), p. 1.

² Sonia Ospina, Waad El Hadidy and Amparo Hofmann-Pinilla, “Cooperative Inquiry for Learning and Connectedness,” *Action Learning: Research and Practice*, July 2008, 5:2 (Taylor & Francis), pp. 131-147; online reprint, <http://www.informaworld.com/smpp/content-db=all?content=10.1080/14767330802185673>, pp. 3-4.

EVENT NAME

WHERE IS LIFE CYCLE COSTING DATA FOR ROADWAYS?

PLACE AND DATE

NEW YORK PUBLIC LIBRARY BRANCH
@ 455 FIFTH AVENUE

FEBRUARY 22, 2012

PURPOSE

This symposium event used, as departure points for a conversation about the nature and availability of roadway life cycle costing data, a 2010-2011 NYU/Wagner capstone project entitled “Transitioning into Lifecycle Cost Analysis”, a presentation on the Port Authority of New York and New Jersey’s cost-benefit analysis framework, and a presentation by a Manhattan College professor on a related Town+Gown research project underway. The capstone project identified data gaps created, in part, by the complex system that consist of urban streets and, in part, by the government systems currently in place to collect cost data at the agencies involved with streets and public spaces. One recommendation included steps to generate data currently missing or difficult to obtain, and this symposium event provided a platform to begin that process.

CONVERSATION

The topics raised and discussed during the open conversation among academic members of Gown and practitioner members of Town began with a general focus on technical and political aspects of life cycle costing and cost-benefit analysis in public capital programs. A technical conversation on data then led to a collectively-experienced introduction to the “on the ground” reality of New York City streets, where a complex set of stakeholders and their practices and policies related to the roadway began to suggest practical reasons for the apparent lack of critical components of life cycle cost data for roadways. The practices and policies of the utilities operating in the streets emerged as an area for further research as they appeared to be connected in some manner to the apparently dysfunctional data environment.

RESULTING ACTION

Underway, in 2012-2013, are several legal analysis projects with BLS/Clinical focusing on state regulation of the private utilities operating under the City’s streets. A project, involving geospatial and quantitative analyses of utility cut permit data, with Columbia/GSAPP is scheduled for 2012-2013 spring semester.

EVENT NAME

HOW TO CREATE SUSTAINABLE NEIGHBORHOODS?

PLACE AND DATE

AIANY CENTER FOR ARCHITECTURE
@ 536 LAGUARDIA PLACE

APRIL 3, 2012

PURPOSE

This symposium event used as a departure point for a conversation about the nature and process of creating sustainable neighborhoods, a deconstruction of the research question *How to Create Sustainable Neighborhoods?*, which contains three powerful words—create, sustainable and neighborhoods. In addition to the deconstruction, several of the projects developed in response to this research question were featured in the précis, and a 2010-2011 Columbia/GSAPP studio project was presented at the event. In addition to the project presentation, the Town member who originally submitted the research question discussed the issues and concerns that animated it and there was a presentation on the types of research conducted at Columbia University's Earth Institute Urban Design Lab program.

CONVERSATION

What is a “neighborhood”, a question of geography, psychology and planning, and what does it mean to “create”, a question of planning and building, are different but related questions because they both involve actor or a “who”. The issues implicit in “who” is in “what neighborhood” and “who” gets to “create” that “neighborhood” resonate at a level that is intensely political and with a particular City history. Not surprisingly, the conversation did not shy away from the remains of that political history but it also evidenced the morphing of what had been a political exercise into what has become identified in the academic literature as the “new governance model” of local planning across the country. Specific issues raised in the conversation included technical issues of scalability of local solutions, the relation of local solutions to the larger infrastructure system and the reluctant mention of that old chestnut—regionalism—which environmental sustainability concerns may finally make operational.

RESULTING ACTION

The issues raised in the conversation found themselves expressed as additional sub-questions in the 2012-2013 Research Agenda.

EVENT NAME

WHAT CAN PUBLIC BUILT ENVIRONMENT DATA TELL US?

PLACE AND DATE

NEW YORK PUBLIC LIBRARY BRANCH
@ 455 FIFTH AVENUE

APRIL 25, 2012

PURPOSE

This symposium was intended to focus on a Town+Gown program issue. Town+Gown was created in 2009-2010 as one way to increase applied analysis in the built environment. Since 2011, City policy has reflected a significant reorientation, committing City agencies to make public data more widely and more easily available. Now that access to data is no longer the problem it once was, this symposium event focused on how to think about the context for analyzing such data in the complex system that is the built environment. Left to their own devices, the academic disciplines in the traditional research paradigm would likely continue the fragmentation of research that mirrors the fragmentation in the allied built environment industries, perpetuating structural hurdles that impede effective built environment research and action based on research results. Three well executed Town+Gown projects served as examples of the challenges faced by research in the absence of the broader context.

CONVERSATION

This symposium event, unlike the first two, focused on a particular methodological point of view asserted by Town+Gown to spark a conversation among academics from several disciplines and practitioners from many areas about how to solve the bigger problem of the effectiveness of applied built environment research. Professors from Manhattan and LeMoyne Colleges presented their earlier work using a fuzzy-rule case-based reasoning methodology, which permits a systemic and context-based evaluation of the subject under investigation. From the academic perspective, this methodology appeared, to some at the event, to be antagonistic to the traditional methodologies they have been using, some of which have multi-disciplinary characteristics. From the practitioner perspective, playing out the methodology's contextual nature to its logical conclusion seemed, to some, to be on the path to conflicts with the political nature of built environment practice.

RESULTING ACTION

In view of the several new projects focusing on the roadway under way in 2012-2013, a parallel project has emerged to conduct preliminary investigations into applying the fuzzy-rule case-based reasoning methodology to the planning and budgeting functions with respect to the roadway.

EVENT NAME

ANNUAL HANDING OFF THE RESEARCH AGENDA AND PROTOTYPE FOR *DESIGN:* *JUST WHAT THE HECK IS IT?*

PLACE AND DATE

AIANY CENTER FOR ARCHITECTURE
@ 536 LAGUARDIA PLACE

MAY 23, 2012

PURPOSE

The purpose of this annual meeting is to announce the beginning of the action research cycle for each academic year by “handing over” the new Research Agenda for that coming academic year to those in attendance. For the first time since Town+Gown’s inaugural meeting in 2009-2010, we had a speaker on a topic unrelated to the meeting’s initial function of signaling the next action research cycle. NYC and Company discussed the activities surrounding the genesis of and planning for the City’s first Design Week in spring 2013. Town+Gown’s challenges in developing research questions in the design field served as a point of departure to discuss the meaning of design.

CONVERSATION

During the presentation it became clear that design means many different things to many different people and, in the conversation that followed, the participants further explored aspects of this observation. Design included the standard architecture and engineering disciplinary perspectives, but also those from graphic design. From there, however, design was articulated as encompassing diverse functions and ends, such as visualizing data, multi-dimensional management methodology, action, social change, a shaper of urban spaces and a mediator between public and private. It also seems to function as a multi-disciplinary management tool.

RESULTING ACTION

To follow up on this conversation, Town+Gown and AIANY jointly sponsored an Archtober event on October 17, 2013, entitled *Design: Just What the Heck Is It?*

PRACTITIONER PARTNERS (TOWN)

AIA NY Chapter and the Center for Architecture **(AIANY)**

Construction Law Committee of the New York City Bar Association
(Construction Law Committee)

Department of City Planning **(DCP)**

Department of Citywide Administrative Services **(DCAS)**

Department of Design and Construction **(DDC)**

Mayor's Office of Long-Term Planning and Sustainability **(OLTPS)**

Mayor's Office of Management and Budget **(OMB)**

Public Policy Lab **(Public Policy Lab)**

Reboot Service Design **(Reboot)**

ACADEMIC PARTNERS (GOWN)

Brooklyn Law School/Corporate and Real Estate Clinic **(BLS/Clinic)**

Brooklyn Law School/Post-graduate Fellowship Program **(BLS/Fellowship)**

Columbia University/Earth Institute **(Columbia/EI)**

Columbia University/Graduate School of Architecture, Planning and
Preservation **(Columbia/GSAPP)**

Columbia University/School of International and Policy Affairs
(Columbia/SIPA)

Fordham University/School of Law **(Fordham/Law)**

Harvard University/Kennedy School of Government **(Harvard/Kennedy)**

Lemoyne College **(Lemoyne)**

Manhattan College **(Manhattan)**

New York University/Polytechnic Institute **(NYU/Poly)**

New York University/Wagner Graduate School of Public Service **(NYU/Wagner)**

New York Institute of Technology/School of Architecture and Design
(NYIT/Architecture)

New York Institute of Technology/School of Engineering and Computer Science
(NYIT/Engineering)

Parsons The New School for Design **(New School/Parsons)**

The New School for Public Engagement/Milano School of International Affairs,
Management and Urban Policy **(New School/Milano)**

PLANNED SYMPOSIUM EVENTS 2013

JANUARY 23 BIM-fest

FEBRUARY 12 Roadway.2

MARCH 14 When Does Design Begin and End?

APRIL 18 Service Delivery Not Procurement

MAY 21 Town, Gown and Design

JUNE 18 Creating Sustainable Neighborhoods.2

BUILDING IDEAS 3

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CHUNK FIVE, THE LEAGUE OF MOVEABLE TYPE, 2009

TOWN+GOWN

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TOWN+GOWN
BUILDING
IDEAS



NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION