Town+Gown

Building Ideas

8+9

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2016-2017 | 2017-2018

Systemic Action Research in the Built Enviroronment

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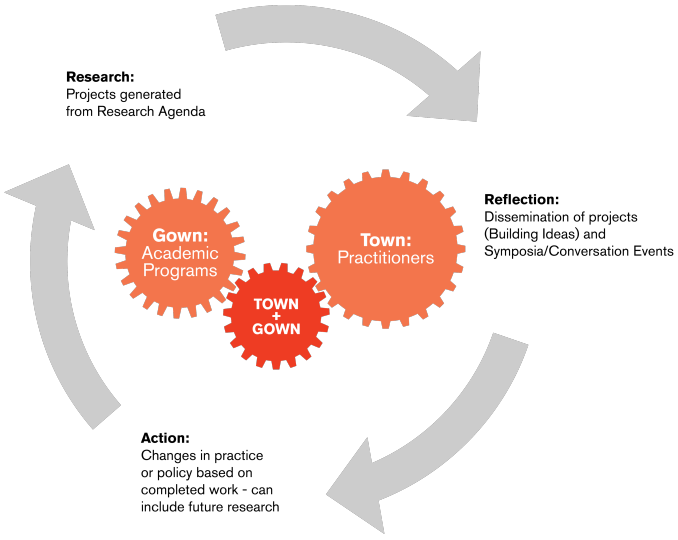
About Town+Gown:NYC

Town+Gown:NYC is a city-wide systemic action research platform, resident at the New York City Department of Design and Construction, that links academics and practitioners to increase applied built environment research across disciplines and sectors. As new and previously unresolved built environment issues become apparent, so too the unmet need for applied research to increase common understanding. Town+Gown:NYC scales long-standing structural hurdles that make increasing applied research difficult—low levels of investment, low levels of public sponsorship, especially at the local government level, inadequate linkages between research and application, and fragmentation in both industry and academia. The city's inter-related physical and governance setting serves as a laboratory for applied research in the built environment, which is a complex and dynamic social system with "wicked problem" characteristics that are further complicated by issues of geographical and temporal scale. Thus, built environment research requires active attention to context and multiple modes of inquiry, research methodologies and types of academic-practitioner collaborations, operating within an open and interactive system over as long as needed to move toward action. Systemic action research, a form of cooperative inquiry involving both practitioner and academic as equal partners in knowledge creation, addresses the continual need to integrate research within the broader context and provides systemic scaffolding to support system stakeholders as they bring about changes in practice and policy based on research results. The purpose of generating research results, within a broad, open and cyclical process, is to increase the common knowledge base and support systemic change over time.

At the end of each academic year, Town+Gown:NYC abstracts the results of all completed projects in this annual review, *Building Ideas*, which is disseminated within the Town+Gown:NYC community, setting the stage for reflection among participants and future action based on research. Following the release of *Building Ideas*, the annual symposia series provides a space for Town+Gown:NYC members to explore the topics raised by completed projects so that they may collectively use research results to inform future changes in policy and practice. Working groups, centered around practice, take up issues raised in completed projects and symposium events and move them forward with additional research and symposium events aimed at future innovative policy design.



At the end of its ninth year of operation, Town+Gown:NYC has hosted or captured a total of 138 completed projects with 34 practitioner partners and 42 academic programs and departments, and has hosted seven series of symposium events, consisting of 23 separate symposium events, using completed research projects as the foundation for open-ended conversations among Town+Gown:NYC members. This combined Volumes 8+9 of *Building Ideas* represent the capstone of Town+Gown:NYC 2016- 2017 and 2017-2018 academic years. *Building Ideas* is organized along the lines of the six disciplines—Management, Geography, Economics, Law, Technology and Design—that Town+Gown:NYC has modified from the recognized inter-disciplinary Built Environment field. Symposium events are recorded in a separate section.

Index of Abbreviations

Gown- academic programs with experiential learning programs and opportunities

BLS: Brooklyn Law School
Carnegie/Heinz: Carnegie Mellon University/Heinz College
Columbia/SIPA: Columbia University/School of International and Public Affairs
Columbia/Statistics: Columbia University/Statistics Department
CUNY: City University of New York
CUNY/CCNY—Spitzer: CUNY /City College of New York—Spitzer School of Architecture
CUNY/Graduate Center: CUNY /Graduate Center—New York City Labor Market Information Service
CUNY/Hunter—Planning: CUNY/Hunter College—Planning
Fordham/Gabelli—Fordham University/Gabelli Business School
CUNY/LAGCC: CUNY LaGuardia Community College
Manhattan/O'Malley: Manhattan College/O'Malley School of Business
New School/Milano: The New School/Milano School of Policy, Management and Environment
New School/Parsons: The New School/Parsons School of Design
NYU/Gallatin: New York University/Gallatin School of Individualized Study
NYU/Tandon: New York University/Tandon School of Engineering
Pratt/Planning: Pratt Institute/City and Regional Planning
Pratt/Communications Design: Pratt Institute/Graduate Communications Design
SUNY/Stony Brook: State University of New York/Stony Brook University

Town- city agency or nonprofit organization acting as a partner in the completion of these experiential learning projects

NYC MOCS: Mayor's Office of Contract Services
NYC DCP: New York City Department of City Planning
NYC DDC: New York City Department of Design and Construction
NYC DEP: New York City Department of Environmental Conservation
NYC DOF: New York City Department of Finance
NYC EDC: New York City Economic Development Corporation
NYC IBO: New York City Independent Budget Office
NYCHA: New York City Housing Authority

NYC MOIA: Mayor's Office of Immigrant Affairs
NYC SBS: New York City Department of Small Business Services
NYC SCA: New York City School Construction Authority

Dissemination: Abstracts of Completed Projects

Town+Gown:NYC disseminates research results in *Building Ideas*, as one way to foster ongoing discussions. Many completed projects have served as the focus of collaborative symposia and other events that bring academics and practitioners together to discuss the results of research with an eye to future research and potential action. Town+Gown:NYC functions as a clearing house for applied research in the Built Environment, and the abstracts contained in *Building Ideas* volumes serve as resources for practitioners and academics, reducing the need to re-invent the research wheel each time a project focusing on recurring systemic issues arises. *Building Ideas* presents the work of academic programs to a wider audience of built environment practitioners, showcasing the work of academic researchers outside the academic sphere.

Management

The projects that follow under **Management** primarily focus on the built environment from the perspectives of its archetypal participants—owner, designer, constructor and financier. 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 innovations in materials, building methods and information technology by using an evolving menu of service delivery methodologies and management theories, techniques and tools, not dissimilar to those found in other industries or sectors. Research projects involving public projects also include separate analytical issues related to the public planning, budgeting and financing processes.

Title: Best Value Alignment Process for Public Works Construction in New York State (2016-2017)

Town: Town+Gown:NYC

Gown: NYU/Tandon

Researcher(s): Frank DarConte

Objective: This Ph.D. dissertation sought to formulate an effective project delivery method for public works projects under current New York law and the condition that there would be no option for failure on projects. Imposing this condition would focus the analysis on project team functions and management—the single variable subject to innovation under current law—of identified interests of project team members during project delivery for high performance project delivery.

Methodology: Using a mixed qualitative and quantitative methods research design, the researcher sought to investigate how proper alignment of stakeholder interest within a theoretical framework of behavioral and social constructs throughout the project management lifecycle can enhance value creation and improve project outcomes; to develop a propositional logic argument that the New York State public owner's utilization of design-bid-build, the traditional project delivery method, creates a misalignment among project stakeholder interests resulting in lost opportunities for a best value project outcome; and, to develop a conceptual framework for a risk management and strategic planning tool for the public sector owner. Research propositions and hypotheses included: appropriate project delivery systems and contract strategies support proper alignment of project stakeholders and best value outcomes; ethical behavior, transparency and trust are the foundation for building an effective delivery team; clearly defined objectives and goals facilitate stakeholder role and interest alignment and improved project outcomes; sustained visible leadership is key to enhancing and supporting primary stakeholder collaboration during the project lifecycle; project team stakeholders must demonstrate competencies and capabilities in design and construction for successful project outcomes; developing and managing relationships and team integration throughout the project lifecycle will enhance project outcomes; and, equitable risk allocation and financial objectives alignment among primary stakeholders contribute to project success (the research propositions). The research plan began with a

literature review of project delivery concepts and social science theories, followed by a case study investigation of the West Campus/Transportation Building program of the United States Tennis Association, Billie Jean King National Tennis Center to serve as an applied research platform (case study project) to link highly successful project outcomes with project team stakeholder alignment strategies and behavioral constructs; development of a stakeholder alignment survey that linked the case study's qualitative findings and research propositions fielded with an industry-wide group and a large public owner group; and, analyses of collected data from the survey data, 60 percent of which questions were selected for correlational analysis and principal component analysis for consolidation into the seven research propositions as independent variables, with project performance outcomes as the dependent variable.

Findings: The conceptual result of this research, which was termed Rapid Alignment Initiated Delivery (RAID) for high-performance project management, began with treating complex building programs as if there is no option for failure and integrated the research propositions to facilitate creation of best value on public construction projects. Regression results from industry-wide model explained 82 percent of variance, while the result for the public owner group explained 56 percent of variance, suggesting that data constraints and methodological issues posed issues at a time when qualitative analysis was premature and a longer-term horizon was needed for theory building.

Next Steps: RAID can serve as a springboard for future research that would require a larger population sample and project-specific data and documented application of the RAID concept in different public owner settings as a diagnostic tool to permit refinement of the model and survey; mathematical benchmarking and dominance analysis of the research propositions; and, application of systems analysis techniques to investigate and analyze the complex system that is public construction.

Title: Construction Workforce Development Programs for Small Businesses (2016-2017)

Town: NYC DDC

Gown: New School/Milano

Researcher(s): Luisa Rodriguez

Objective: Using the 2016-2017 Opportunity Academy program developed by NYC SCA and NYC DDC with CUNY/LAGCC as the case study, the researcher explored ways for local government to leverage its role as owner of public construction to provide efficient, effective and replicable workforce development programming at a college or university for entry-level business administration jobs at small construction business enterprises.

Methodology: The researcher used three approaches to document business administration workforce development issues within the local construction industry. After a literature survey, the researcher interviewed NYC DDC staff and other key subject matter and field experts to identify local supply and demand trends—historical and forecast—with respect to the construction-related professions and trades. The researcher also identified other workforce development models to identify issues in the field from other efforts made in this area.

The researcher then deployed a Comparative Analytic Matrix to evaluate the strengths of three selected workforce development programs across three criteria—maximizing the effectiveness of relationships, maximizing feasibility and maximizing access. Though not included in the formal criteria, time was also considered as part of developing potential programs.

Findings: Among the three model programs evaluated *via* the Analytic Matrix's criteria, the researcher identified the Opportunity Academy model as the most feasible, accessible, and the most efficient in maximizing relationships. The researcher also found that the Opportunity Academy program could be a suitable model for expansion as a replicable certificate program and/or a degree-granting program that would lead to a pipeline of qualified construction business administration professionals for the industry and provide an opportunity for stronger partnerships with key stakeholders in the industry. Additional findings included expanding the Construction Mentorship Program

model to include a workshop series for individuals who have received formal business administration training and are interested in starting a small business enterprise and developing a Technical Training Careers in Construction Consortium Program that would include a lead agency establishing a steering committee to develop a consortium with industry organizations, public construction owners and academic workforce development programs.

Next Steps: The three evaluated and ranked model programs, with specific next steps, serve as a foundation for future research and development.

Title: Improving NYC Infrastructure: Public-Private Partnerships as a Chance for a More Efficient Project Delivery (2016-2017)

Town: NYC DDC

Gown: Columbia/SIPA

Researcher(s): Kuba Wisniewski

Objective: This project focused on service delivery methodologies as one way to address multiple shortcomings of public infrastructure practices and policies by improving the efficiency of infrastructure development.

Methodology: In addition to a literature survey, the researcher analyzed current legal boundaries and conducted interviews. The researcher analyzed how different models of project delivery could improve the efficiency of infrastructure development and studied the political dynamics between New York State and its local governments, including New York City, to assess the likelihood of legislative changes to permit alternative methods of service delivery to increase project delivery efficiency.

Findings: The researcher concluded that it was unlikely that the State would authorize any form of public-private partnership (PPP) legislation, though, over time, he thought that New York will eventually follow examples from other states and permit its municipalities to utilize the Design-Build service delivery methodology. With the City's "Coordinated Street Furniture Franchise", as a case study model, the researcher proposed expanding the use of franchises, an existing power of the City, as a methodology to approximate PPPs on certain capital projects. Like PPPs, franchises permit some degree of risk redistribution between the public and private sectors, develop partnerships with the private sector, and ensure the provision of public assets.

Next Steps: Apart from recommending the City continue to lobby the State for modern service delivery methodologies and expand the use of franchises, there were no specific next steps.

Title: Explorations of Construction Claims Data (2017-2018)

Town: NYC DDC

Gown: Fordham/Gabelli

Researcher(s): Binyang Hu, Yufei Long, Xuzhi Wen, Yongdong Zhang and Qianxia Zhu

Objective: Using the Comptroller's construction claims data containing numeric fields, for the period from 2006 to 2015, the research team applied standard business data analytic techniques to citywide construction claims data, informed by the risk management methodology used in the healthcare industry, as modified for construction, in order to explore potential root causes of such claims with the ultimate goal of providing a basis to develop changes in project management practices and policies aimed at minimizing or avoiding such root causes in the future. The healthcare industry's risk management methodology identifies "sentinel" events, which are unanticipated events resulting in death or serious injury not related to illness, that form the basis of a feedback mechanism performed by an interdisciplinary team to identify high-risk or high-vulnerability root causes of these events in order to analyze them and revise practices and policies to reduce the risk of such events happening in the future.

Methodology: The research team began with location analysis of claims, which, along with a review of the claimants' names, justified the assumption that these claims were contract claims—and not other causes of action—which the data indicated did not result in judgments against the City. The City's construction contract requires its contractors to file formal claims related to work in dispute under the contract, and it is not unreasonable to expect the majority, if not all, claims of this type to be resolved without proceeding to final judgment. The fact of a construction contract claim thus constituted a "sentinel" event for construction process management. The team performed descriptive statistical analysis of the claims including claim amount, claim count, including by calendar quarter and by agency. The team then performed a data analysis of an NYC DDC bid dataset, similar to analyses performed in earlier projects, to provide a sense of relationships among variables and potential underlying causes of contract claims. The team ended their analysis with predictive modeling for the NYC DDC projects in the construction claims dataset.

Findings: Since this was the first time that the construction claims within this administrative project dataset was subjected to data analytic techniques, the actual findings were less important than the fact that the Comptroller's construction claims data, in conjunction with agencies' granular project management data, are amenable to business data analytic techniques in conjunction with risk management theory.

Next Steps: Replication of this methodology with an updated claims dataset and corresponding agency project data would be the next step for future research.

Title: Insights into Construction Project Data (2017-2018)

Town: NYC DDC

Gown: Fordham/Gabelli

Researcher(s): Yiting Cai, Long Huang, Nianting Ouyang and Minglu Sun

Objective: The researchers had two objectives: first, to examine the capital efficiency of the completed projects by exploring correlations among project type, cost, contract duration, and location and, then, to focus more specifically on insights into "soft" costs, which are those project costs attributed to agency project personnel and to certain consultants, such as architects and engineers who work during the design phase of the project and possibly during the construction phase, which is in contrast to costs that are paid under the construction contracts.

Methodology: In the general capital efficiency component, the researchers applied standard data analytical techniques to clean a dataset of completed public building and infrastructure projects that captured construction process variables and create specific variables to perform descriptive and correlation analyses. The team created cost increase percentage, schedule delay and cost efficiency variables and analyzed duration, from the perspective of contract size and cost increase percentage, and analyzed change orders. In the soft cost exploration, after applying standard data analytical techniques, the team segregated the data set into divisions and delivery types, studied the variable importance using Neural Network, and analyzed the association rules for each class.

Findings: As with all prior data analytics using administrative data from one agency, the actual findings were less important than the fact that this type of data are amenable to business data analytic techniques to produce insight and related tools for construction process management. Preliminary analysis from the first component found that long duration was strongly correlated with high levels of construction efficiency, though the nature of the construction efficiency variable may contribute to this finding. The distribution of the schedule delay variable interval is unbalanced, but the majority of projects fall into the 25-50 percentage interval. The boxplot range of the duration variable is more centralized for infrastructure projects than for public building projects and there are more outliers among public building projects. Analysis for the change order

variable was mostly inconclusive, but the team found that cultural facility and health facility projects were on the higher end. Preliminary analysis from the second component found that project size, for infrastructure, and program unit, for public buildings, to be the most important predictors. The team also built interactive software that can upload dataset and run machine learning to generate predicted results automatically.

Next Steps: Further refinement of these analyses with additional project data as well as expanding the analysis to a City-wide data set of construction projects would be next steps for future research.

Geography

The projects that follow under **Geography** are in related fields, commonly placed under the rubric of Planning, such as urban planning, regional planning and placemaking, as well as land use practices, which are also covered under **Law**.

Title: Across the Yards: Solutions for East Long Island City (2016-2017)

Town: NYC DDC, CUNY/LAGCC

Gown: CUNY/Hunter-Planning

Researcher(s): Lucy Block, Calvin Brown, Greg Cutler, Teresa Garcia, Daisy Gonzalez, Nick Hlat, Anne Kennedy, Harrison Lewis, Elise Tosatti

Objective: Long Island City (LIC) was a significant manufacturing and transportation hub in western Queens that, during the post-WWII era, experienced the departure of manufacturing firms. City initiatives that primarily focused on western LIC, from the East River waterfront to the Sunnyside Rail Yards, which bisects LIC into two distinct parts, have resulted in rapid redevelopment of that area into a mixed-use neighborhood. In the 1970s, CUNY/LAGCC was the first large institution reusing some of the former industrial buildings in eastern LIC, east of the Yards. In 1981, the City, with a $23 million federal Urban Development Action Grant, and a private developer envisioned this cluster of manufacturing buildings as the International Design Center New York—or IDCNY—to become the City's version of furniture "marts" that exist in Chicago and Los Angeles. The 1987 market crash and ensuing recession, however, led, in 1994, to IDCNY's financial failure. But by 1994, NYC SCA had established its operations in the former Chicle Building, under new management, and by 2000, NYC DDC and other city agencies had joined NYC SCA in establishing its operations there. Other companies and institutions followed, attracted by rent subsidies provided by NYC EDC.

While eastern LIC has changed dramatically, since the 1980s, providing the kinds of mixed uses, facilities investment and daytime population that might have helped the original IDCNY succeed, much less comprehensive planning took place there. CUNY/LAGCC, with its large student population, is isolated and next to a dangerous roadway, with little of the street green space programming common elsewhere in the City. Workers from City agencies and other offices and local creative and tech companies lack open space, diverse food options and other functions that in total make a neighborhood work for its users.

The objective of this two-semester planning studio was to conduct a comprehensive plan to analysis to address transportation, access and traffic safety needs in the area; develop strategies to fulfill these needs, including an open space program; identify zoning and land use issues and solutions; and, explore how the area – isolated by the rail yards to the

north and west, more typical manufacturing uses to the east and the Long Island Expressway to the south – can be better integrated into the urban fabric.

Methodology: The student team used several approaches, including quantitative data analysis; stakeholder interviews of office workers, CUNY/LAGCC community members, local business owners, the LIC Partnership and an urban farm collective; charrettes with CUNY/LAGCC students; and, fielding 572 surveys with stakeholders. From the team's comprehensive needs analysis for the diverse groups of area users (office worker, students, start-up companies and manufacturing businesses), the team identified an appropriate study area and developed recommendations for a comprehensive plan to address the project objectives.

Findings: The researchers confirmed the issues that the clients had identified and expanded understanding of the problems and opportunities in the area. The team's initial data collection process, charrette and survey process revealed a broad consensus that the area's public space and commercial amenities are insufficient for both the student and office worker populations. There is effectively no publicly accessible open or green space in the entire study area, the physical infrastructure is deficient, and there is a significant perception of lack of safety in the area after dark. Student and office worker users identified a strong need for lunch options, especially healthy and affordable ones, and other everyday retail amenities such as banks and pharmacies. Dangerous traffic conditions, especially along Thomson Avenue from the 7 train station at 33rd Street to the Thomson Avenue pedestrian overpass and at the intersection of Queens Boulevard, Thomson Avenue, and Van Dam Street, compounded these issues. Additional transportation issues included narrow sidewalks, fast driving vehicles, trucks from the industrial and manufacturing businesses crowding the streets and sidewalks, and insufficient parking options. In view of the area's designation as an Industrial Business Zone with a robust industrial sector and significant workforce, protection of existing industrial and manufacturing uses surfaced as an additional need.

Next Steps: The team transformed their findings into four groups for recommendations. For the *Public Realm*, the team recommended creating an open space looped network to transform the hard edge of Sunnyside Yards on Skillman Avenue into a greenway and activate the Montauk cutoff and 29th Street at the Dutch Kills waterfront, which would be connected to this loop. For *Commercial Activity*, the team recommended attracting new businesses and supporting existing businesses by performing a full retail needs

assessment and establishing a retail recruitment program to attract food service establishments and general merchandise stores to the primary trade area. For *Transportation*, the team recommended improving pedestrian safety and connectivity by reconfiguring and improving pedestrian overpasses and constructing a "Sky Station" at the 33rd Street-Rawson Street subway stop, calming traffic at the Van Dam Street, Queens Boulevard and Thomson Avenue intersection and increasing mixed-mode uses to favor public transit. The team also recommended developing vertical parking for City fleets and implementing a "smart" parking system. Finally, for *Industry & Jobs*, the team recommended densification and preservation of industrial space, improving industrial incentive programs, ensuring zoning regulations support evolving industrial and manufacturing sectors and creating industry-specific training and certification programs at CUNY/LAGCC to support area enterprises, including food and beverage and commercial rooftop agriculture industrial sectors.

Economics

The projects that follow under **Economics** show 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 and 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.

Title: What Makes Small Construction Businesses Tick? (2016-2017)

Town: NYC SBS, NYC MOCS and NYC DDC

Gown: Columbia/Statistics, CUNY/Graduate Center (New York City Labor Market Information Service) and Manhattan/O'Malley

Researcher(s): Jonathan Auerbach, Nathan Lenssen, Lesley Hirsh and Janet Rovenpor

Objective: This third research project under the research question: *Future Workforce Needs and Development—What Are the Conditions for Construction Business Formation and Success?* used the National Establishment Time-Series Database (NETS database) for New York State, a large external database of small business enterprises, to understand the factors contributing to the success of small construction firms that bid on government contracts. Earlier projects revealed an inability to use minority- and women-owned business enterprise (M/WBE) data from public construction agency or City-wide databases to study impediments identified in these projects and other research. With the NETS database, the researchers sought to identify construction business establishment characteristics associated with firm survival rates, with the goal of using these characteristics as a basis for future research.

Methodology: The researchers created a dataset of construction, financial, insurance, real estate and architectural firms located in the New York City, MSA and State geographic levels over the 2002-2012 time period and focused the analysis, in particular, on whether the establishment is small (less than 10 employees), an M/WBE contractor, or a government contractor.

The dependent variable of interest was the number of years a company survived before going out of business—its survival rate. To understand the importance of various explanatory variables (covariates), the researchers plotted Kaplan-Meyer survival curves, drawn for both New York City M/WBE and non-M/WBE establishments created in 2002. Each curve showed the probability the establishment would still be in business *x* years after 2002. In order to evaluate multiple covariates simultaneously, standard survival literature suggested adopting a regression-type approach. In contrast to the survival rate, the hazard function (which can be thought of as the approximate time of the establishment's death) is estimated, although the interpretation of the analysis remains nearly identical to that of the survival curves.

Confidence intervals were omitted from the initial plot, although the log-rank statistic for this and all other plots was significant at the .001 level. The survival rate varied considerably among firms by M/WBE status and NAICS classification, but it was difficult to visualize and compare the relative amount of variation captured between these variables and provide a succinct summary of the data. The researchers used the Cox Proportional Hazards Model, a semiparametric survival regression method using a baseline hazard function, modified for each business by its covariates, to make distributional assumptions about the baseline hazard function. Coefficients of the Cox Proportional Hazards model were estimated by maximizing the partial likelihood.

The Kaplan-Meier curves and the Cox Proportional Hazards Model naturally account for right censoring, which occurred in companies that were still in business at the end of the data (2012). The researchers accounted for left truncation in the data, which arose in companies that were in business before the start of the study, by including a variable in the model that accounted for the year the business was created. The researchers also accounted for the "birth" of firms during the sample period by limiting the analysis to the population of establishments that were created before and in existence during 2002 and following them until the end of the study at 2012. This time frame corresponded with both the start of the Bloomberg administration as well as the 2001 financial recession and ensured the analysis compares "apples" with "apples". The researchers selected variables that best explained the variability of the hazard rate through a stepwise process—both forward and backward selection—and chose the model with the largest Akaike's Information Criteria statistic for model selection.

Findings: Due to the nature of the study, the findings summarized below do not imply any causal relationships but instead summarize the survivability of these establishments. Coefficients of the Cox Proportional Hazards Model reflected the percent increases in the hazard rate of the corresponding establishment relative to the average. Industry classification and M/WBE status had larger estimated regression coefficients than establishment size and employment, but the magnitude of the coefficients did not necessarily reflect importance. Size and employment explained more variation since these coefficients are in log-units per dollar and employee, respectively, and can thus be magnified by as much as 5 or 6 times.

Much of the model confirmed conventional wisdom. Younger establishments had higher hazard rates, while older firms had lower. Firms with many employees had lower hazard

rates, while small businesses with fewer than 10 employees had higher hazard rates. The hazard rate increased with log-sales, but higher sales do not necessarily translate to higher profits and may instead correspond with establishments more vulnerable to the recessions in the early and late 2000s. Women-owned firms had much lower hazard rates regardless of government contracting. On the other hand, minority firms that contract with government did not have lower hazard rates.

Next Steps: Future analyses may focus on investigating how the survivability of M/WBE status varies by industry classification.

Title: Analysis of Policy Considerations for Private vs. Public Funding of Infrastructure (2016-2017)

Town: NYC DDC

Gown: NYU/Gallatin

Researcher(s): Julia Dupire

Objective: Modern society functions around municipal infrastructure that serves as a pathway to economic, educational and cultural possibilities. The objective of this project was to explore and assess policy theories for public and private investment in infrastructure in view of public finance capacity limits of municipal governments.

Methodology: The researcher conducted a literature review, including behavioral economics, documenting her findings for as a basis for future research.

Findings: The researcher identified the Prioritization Framework, a decision-making tool from the World Bank that provides a methodology for municipalities to consider the appropriate public-private finance plan for identified infrastructure needs in the context of insufficient public finance resources. The Framework's eight-step process is intended to assure efficiency in municipal public investment management. The first two steps—guidance and appraisal—create a link to the development strategy and provide consistency in project preparation; the next two steps—independent review and selections—provide a key to credible selection and authority to screen and reject projects; the following three steps—implementation, adjustment and operation—assure an effective budget and procurement process to support implementation and operation, which includes post-construction inclusion on the list of the enterprise's fixed assets for operation and maintenance purposes; and, the final step—evaluation—provides information to feedback into the guidance step for the next development process and infrastructure project to be accomplished *via* public-private finance. The researcher also identified sources of private capital for these types of financings, such as private corporations and long-term investors, including pension funds, which have various equity and debt capacities.

The presence of public funds in a public-private financed project increases the time to implement, as compared to purely publicly- or purely privately-financed options, which is

necessary to align the financing with public policy objectives that are not present in privately-financed projects, but may mean that the public-private option leaves public infrastructure needs still unmet. The researcher concluded that government's requirement to align private sector objectives to supplement public sector infrastructure needs results in the concession and public-private partnership procurement/contract methods as best suited to achieve optimal outcomes for the private sector to supplement funding for public infrastructure while providing the public sector control over these projects.

Next Steps: There were no next steps identified in this project.

Title: Assessing the Economic Impact of Public Capital Projects on Surrounding Neighborhoods (2017-2018)

Town: NYC DDC

Gown: Columbia/SIPA

Researcher(s): Zoya Aleem, Jea Chang, Maki Komatsu, Chen Lin, Yosuke Ogawa

Objective: The objective of this project was to expand upon a Columbia/SIPA 2015 capstone project that developed a hedonic regression model hedonic regression model integrated with a difference-in-difference approach, which permits a comparison of property sales prices in small rings surrounding a completed capital project with property sales prices of properties outside the ring area but within the same census tract (2015 model) to evaluate the economic impact of public capital projects on their surrounding neighborhoods and produced one application of the model—the Great Kills Library in Staten Island, which showed positive economic benefits. This project applied the model to more library projects across the City to begin a foundation to quantitatively document the economic impact of standard City construction projects as a tool for the City to help prioritize projects across neighborhoods constrained by budgetary limitations.

Methodology: The team conducted its own literature review to enable it to modify the 2015 model to account for variety in urban typologies across the five boroughs.
In addition, the team used the NYC DCP's Neighborhood Tabulation Areas instead of census tracts and tested differences before construction and after construction, confining the analysis to time frames between 1974-2012 and 1993-2014. Unlike the team on the 2015 capstone project, which used NYC DOF property sales data as modified by NYC IBO for its own analytical purposes, the team used 'un-modified' property sales data from NYC DOF. For the first phase of the analysis, the team identified ten library projects, half of which were newly constructed libraries and half of which were major renovations, with one project located in an "underserved neighborhood," determined by ranking the City's Community Boards using unemployment, poverty, and educational attainment metrics. The team was unable to complete the second phase of the analysis that was intended to include more library projects in underserved neighborhoods.

Findings: The results of applying the 2015 model, as modified in this project, to the ten projects did not uniformly align with expected outcomes based on the 2015 capstone project. The team concluded that effects of newly constructed library projects may vary greatly depending on types and neighborhood characteristics and that the effects of major, but internal, renovations were not statistically significant. The team suggested that use of unmodified NYC DOB data, instead of NYC IBO data, may have contributed to these results.

Next Steps: The team suggested further refinement of the hedonic regression model and methodology for statistical robustness to test more capital projects, including libraries, taking into account similar time periods for analysis (comparing economic booms to economic booms and recessions to recessions) and adding a data programmer to the next team to work with these administrative data sets.

Title: Analyzing Construction and Demolition Waste Flows within New York City (2017-2018)

Town: NYC EDC

Gown: Carnegie/Heinz

Researcher(s): Christian Bergland, Taimur Ahmed Farooq, Alvaro Gonzalez, Jafar Haider, Yue Xu

Objective: The student team sought to explore the viability of various initiatives aimed at minimizing waste, lengthening life-cycles and reusing productive assets as part of a "circular economy" approach using gypsum products generated by construction and demolition activities in the City as a case study.

Methodology: The team selected gypsum as the case study construction and demolition waste (CDW) material because, at under $10 a metric ton, gypsum is a cheap and ever-present material necessary for nearly all types of construction. The inability to find specific, as opposed to aggregated, data for New York City's CDW system, precluded the team from a top-down approach that would identify the market value and material flows within the City's CDW system. Instead, the team first identified restraints that firms experience due to their physical location and business operations as well as the City's lack of direct regulatory oversight over CDW. Then, in order to understand CDW gypsum waste flows and gauge the possibility of its place within a circular economy, the team conducted case studies of national and international construction and waste management firms and interviewed stakeholders familiar with gypsum (its lifecycle, durability, price, usage) and stakeholders involved with construction generally and with the CDW stream specifically.

Findings: The team found that a circular economy approach to recycling and re-use of low-value/high-volume materials, such as gypsum, would require considerable resources to become functional. While gypsum that has not been contaminated with hazardous materials in the old construction can be recycled and re-used, the logistics of on-site sorting and transportation of CDW materials, especially in the City, create a level of initial costs of generating recycled gypsum for eventual re-use. Recycling and reuse of clean gypsum scrap generated during construction due to over-ordering and the installation

process, which the team found comprises most of the gypsum in the CDW stream, are also subject to the same sorting and transportation costs.

The team's research on case studies from Denmark, British Columbia and Hong Kong highlighted the necessity of regulations aimed at increasing gypsum and other CDW recycling rates to support a circular economic approach to CDW. The team concluded that a circular economy approach to gypsum recycling and re-use is possible in New York City, but that it would require resolving financial issues and also greater coordination among government, the construction industry and waste-related industries.

Next Steps: The research team suggested that future research focus on greater data capture of the CDW system to support potential policy options consisting of developing a data capture model and developing incentive programs for low-value CDW diversion to help create a market for recycling and re-using these materials.

Law

The projects that follow under **Law** focus on the impact of laws on built environment activities from the perspective of the archetypal participants—owner, designer, constructor and financier. Statutes and regulations, contractual forms and provisions, and related case law all affect the relationships among built environment participants, their expectations and their 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 and provide a foundation for policy and practice change.

Title: Legal Investigations into Improving Public Capital Project Planning and Budgeting Processes with a View to Increasing Budget and Schedule Certainty (2016-2017)

Town: NYC DDC

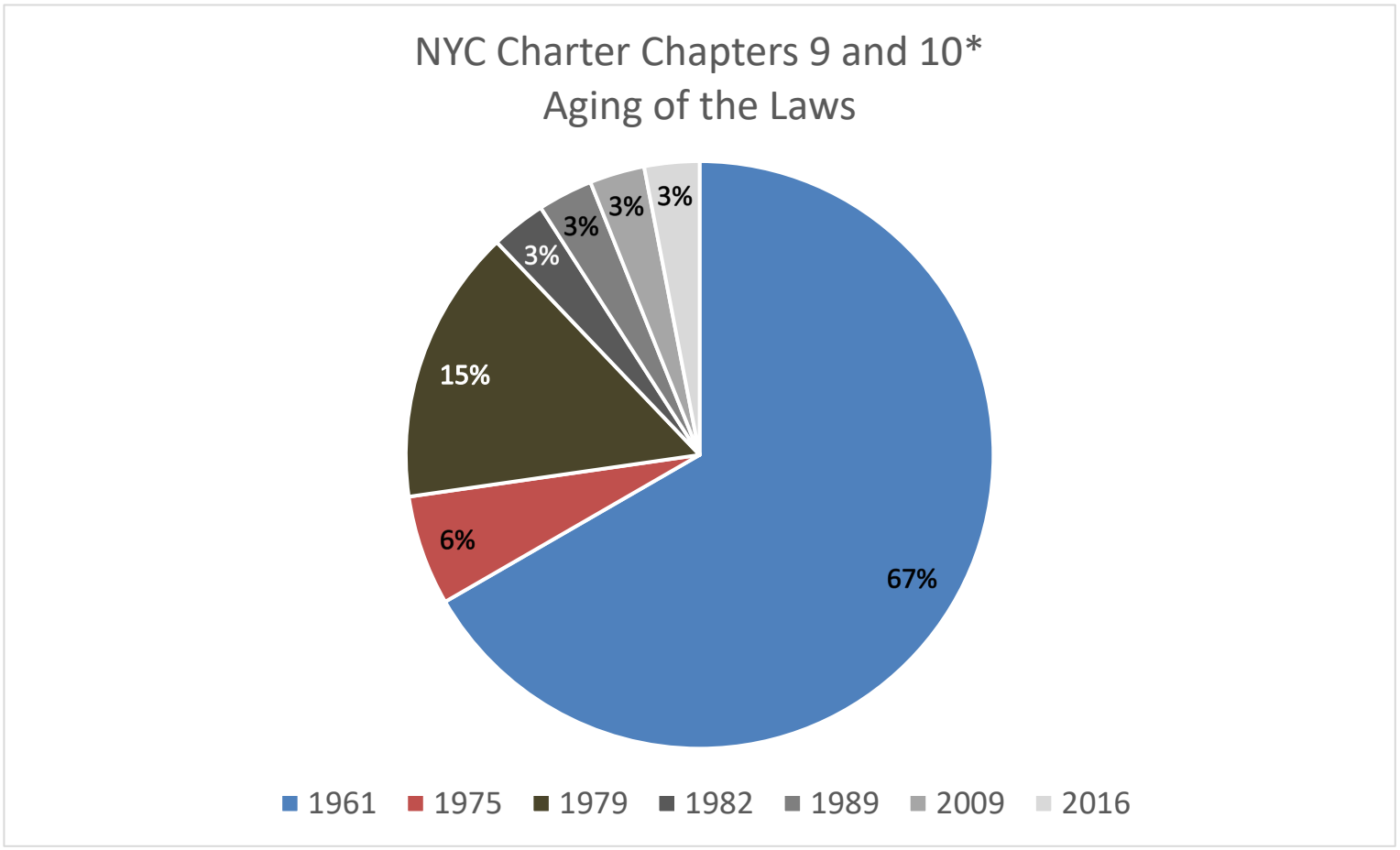
Gown: BLS and Pratt/Planning

Researcher(s): Peter Kowalewska

Objective: This project aimed at identifying root causes of inefficiencies within the City's capital planning and budgeting processes.

Methodology: The researcher conducted a literature review with a focus on a series of research on mega project planning and management by Bent Flyvbjerg, interviews with stakeholders and experts involved in the City's capital planning and budgeting process, a detailed analysis of the current budget provisions in the City Charter, and an historical analysis of these capital budget provisions in a manner that "aged" the budget provisions.

Findings: The literature review pointed to the theme of strategic institutional misrepresentation or "blind eye" that captured the reality of known limitations to the project cost estimation process documented in the interview process. The researcher produced an infograph summarizing his statutory "aging" analysis of Chapters 9 and 10 of the City Charter, showing that 88 percent of the provisions underlying the City's budget process were originally enacted before the 1989 Charter revision, with 67 percent of these provisions from 1961 and before.



*Includes all current Chapter 9 sections and select Chapter 10 sections: 225, 226, 227, 228, 231, 234, 236, 244, 245, 246, 247, 248, 249, 253, 254, and 255.

Next Steps: The researcher suggested that the significant age of the City's organic capital planning and budget laws represent an opportunity to apply a systems approach to modernize them to reflect the needs of system users and the projects themselves that were not contemplated at the time these archaic laws were adopted or amended.

Title: The Limits of Governmental Organization and the Environmental Sustainability Agenda: Role of the State in Implementing Environmental Policy (2016-2017)

Town: NYC DDC

Gown: BLS

Researcher(s): Gabriella Schwalbe

Objective: The impacts of climate change transcend local government jurisdictional boundaries. Using New York State as a case study, the researcher explored how the environmental sustainability agenda exposes the limits of current planning law and organization, by identifying state laws related to planning generally, including those that permit multi-jurisdictional action.

Methodology: The researcher conducted statutory and case law review of New York law and surveyed intergovernmental statutes of several western states, with a tradition of strong state-level land use planning and eastern states, including New York.

Findings: Litigation surrounding the State's Environmental Conservation Law suggests that the State's ability to legislate for state-wide planning can pre-empt local jurisdictional planning efforts when a state-wide concern is present, and the State's Municipal Home Rule Law would not present a significant obstacle. The researcher concluded that Florida's and New Jersey's state-wide planning laws would be good models for New York State to consider.

Next Steps: This foundational research would serve as a resource for future research looking at state-level levers to solve multi-jurisdictional climate change impacts to make planning efforts more efficient and effective.

Design

The projects under **Design** can focus on any aspect raised by this complex disciplinary field. Both public and private construction projects become part of the visible built environment, and this aspect of **Design** includes both Architecture and Engineering. Within or surrounding built objects, several other design disciplines also operate and contribute significantly to the overall success of any built environment object. Interior design, lighting design, landscape design, service design, communications (or visual) design, digital design and product design comprise a suite of integrated design services that interface with Architecture and Engineering and are included under **Design** as well.

Title: The Public... Who Cares? (2016-2017)

Town: NYCHA, NYC DDC

Gown: CUNY/CCNY-Spitzer

Researcher(s): Joseph Arndt, Nataly Chavez-Ortega, Hannah Deegan, Kaitlin Faherty, Xiao Yi Lin, Anais Lokmer, Julia Lu, Marc Mucciaccio, Olushola Owolewa, Jethro Rebollar, Rene Thomas

Objective: This studio explored "re-writing" an existing neighborhood's public life context with proposals for public places to support new forms of public life in neighborhoods, using a NYCHA public housing superblock site in Brownsville as the case study. This studio also sought to apply open systems thinking to architecture practices and explore how space can be part of the public realm.

Methodology: The students investigated current conditions including neighborhood ethnographic and economic data as the foundation for a series of drawings and models proposing design interventions to “re-write” the existing context and developing methods to measure and present the data. They developed a series of models, with the potential for scaling, which explored hybrid digital and physical techniques. After testing the models at multiple scales, the students refined the series of drawings for buildable prototypes for alternatives for public life in Brownsville and created models.

Findings: The scaled model of the Brownsville superblock site, built with recycled homasote sheets, 2x4 wooden studs recycled from the school’s NAAB accreditation show, and standard hardware, demonstrated the importance of including design of usable public space as part of any architecture project. The studio's re-imagined public space model challenged the reality of this superblock’s current design, which severs the public network of streets and roads and awkwardly positioned amenities within the public housing area, sacrificing otherwise available public space.

Next Steps: There were no further next steps.

Title: NYC LEPBridge (#1) and MOIA: Serving Low English Proficiency Residents of New York City (#2) (2016-2017)

Town: NYC MOIA

Gown: New School/Parsons

Researcher(s): Phyo Aung, JiYeon Kim, Jun Kim and Ksenia Muzyka, (Team #1) and , Laura Buitrago, Nicole Hartwig and Phi Tran (Team #2)

Objective: These two communications design research projects sought to enable NYC MOIA to help City agencies address the challenges facing agency frontline staff who work with clients with limited English proficiency (LEP), as well as challenges facing LEP clients seeking city services in navigating and interfacing with agencies' public spaces and communications platforms.

Methodology: The researchers on both projects used qualitative and quantitative data analyses to analyze LEP impediments. Team #1 identified best practices and areas for improvement, creating a UX Checklist that examined potential hurdles in first contact, web portal, online documents, calling 311, agency signage, entry requirements, translation notice, services notice, publications, front desk interaction, frontline staff, translation services, in-house translator, documents, and after-action contact. Team #2 developed a three-pronged framework of content, communication, and culture to guide their field research conducted at several city agencies and performed a strategic analysis focusing on level of commitment and ease of implementation. Data collection methods for both teams included surveys, interviews, observations, and secondary research to understand the landscape, protocols, training programs, user experience, and challenges faced by current LEP programs and provide insights that informed the work products.

Findings: Team #1 leveraged NYC MOIA's comprehensive overview of the city's agencies' LEP programs to develop a prototype website that would permit NYC MOIA to understand agency LEP resources at a glance but with sufficient detail to provide clarity and enable it to improve LEP access standards across City agencies and facilitate partnerships among the diverse City agencies that MOIA oversees. Team #2, concluding that website modification was the most viable option for NYC MOIA to maximize its service delivery, created three different website mockups that identified universal, efficient, and consistent iconography as key to improving LEP services.

Next Steps: These ideas and website prototypes would be available for NYC MOIA to use.

Title: Build with Us: Communicating Capital Projects (2016-2017)

Town: NYC DDC

Gown: Pratt/Communications Design

Researcher(s): Aki Bi, Faye Chen, Jimin Song, Yujia Zhal, Yijia Zhao and Yuechulu Zhuo

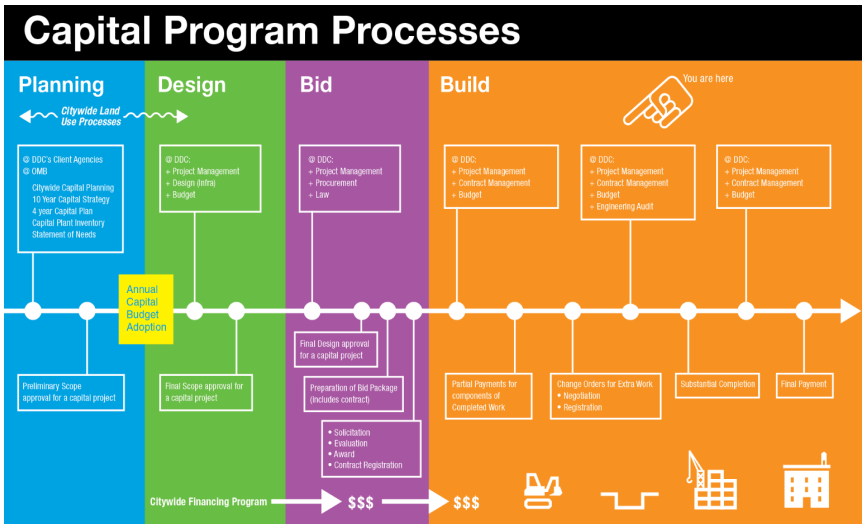
Objective: This communications design project picked up from a 2013-2014 communications design project to create a communications system to make the "invisible" visible and communicate facts about conventional infrastructure projects in the public right of way (PROW) to make casual, everyday interactions with these projects into teaching moments with the potential to increase public and community awareness and stewardship of PROW elements, respond to the needs of communities affected by capital projects and reflect values of transparency, service, and openness.

Methodology: After meeting with NYC DDC community engagement staff and NYC DOT wayfinding program staff and reviewing the work from the 2013-2014 project, three student teams conducted field studies at open street cuts for six City roadway reconstruction projects in Manhattan, documenting existing signage and observing pedestrian and vehicular behavior. Each team conducted two series of interviews of pedestrians. The first interview series focused on pedestrians' understanding of existing signs, their feelings about the usefulness of better designed signage and public expectations about public capital project. After the student teams researched examples of good construction hoarding design, the second interview series focused on perceptions of these designs and how they addressed issues raised in the first set of interviews. Using course materials prepared by Town+Gown:NYC for Opportunity Academy (https://www1.nyc.gov/site/ddc/about/town-gown-research-resources.page) that described the public construction process, the student teams used their research findings and practitioner feedback in an iterative participatory design process to develop a holistic communications plan.

Findings: The interviews results indicated that members of the public passing by and living in communities with construction sites thought information on existing construction-related signs was cluttered and overwhelming and did not convey enough useful information about the project. The teams' design reflected information passersby

wanted to know such as when the construction would finish, what it was about and how their taxes were used on the projects. The design contained simplified visual cues and used the space occupied by construction that is useless until completed as an opportunity to make the invisible visible across communications platforms that connected the ongoing construction process to the community. The platforms would provide construction process transparency and encourage the community to learn the project status as a point of entry into the entire process.

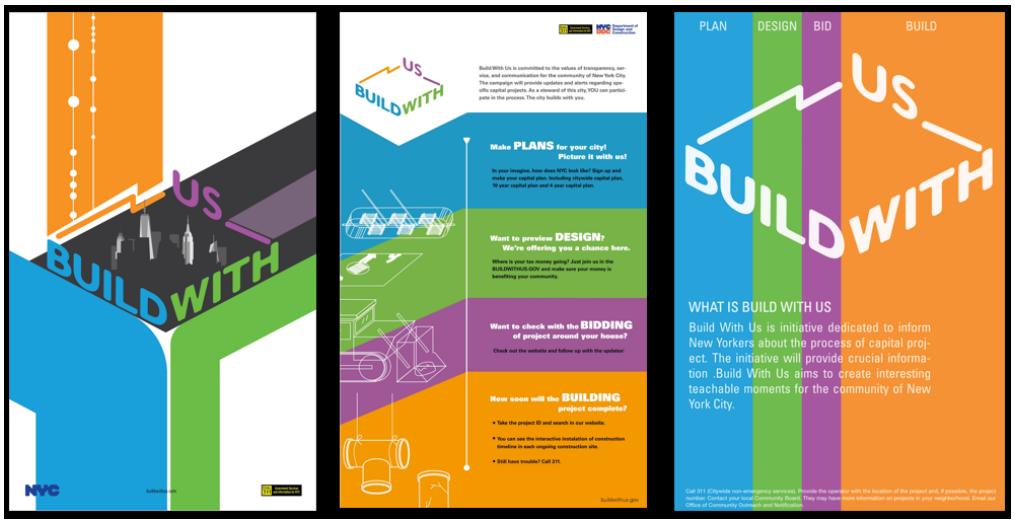
From a capital program process infograph:



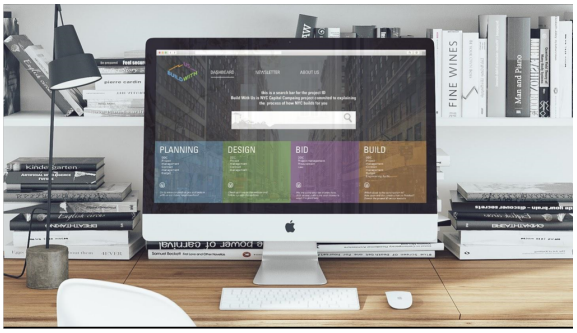
the teams created a construction hoarding template like this:

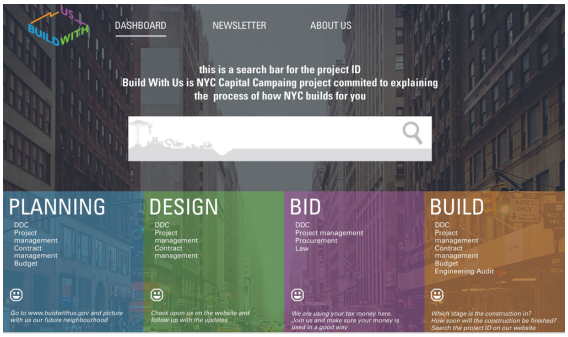
a public notice template like this:

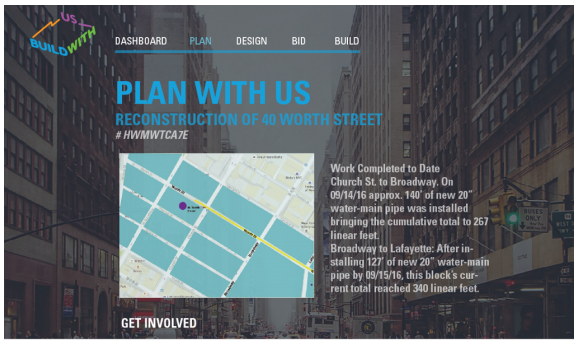
and subway and bus station ad templates like this:

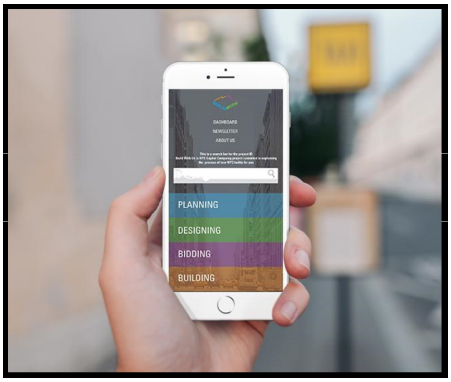


all of which contained specific project identification information and a link to a website that merged all aspects of the campaign so that passersby and community members could learn more about a specific project:









Next Steps: This communications system is available to be used experimentally in order to refine it based on user feedback and future implementation.

Title: Modular Storm Water Filter Design: Preliminary Experiment on Water Quality (2017-2018)

Town: NYC DEP, NYC DDC

Gown: SUNY/Stony Brook

Researcher(s): Xinwei Mao

Objective: The project was part of an ongoing effort to assess the feasibility of using a modular contaminant filtering system (designed storm water filter) for the separate storm sewer system located within the city for storm water run-off, emergency spills and isolated regular discharge flows. A separate storm sewer differs from a combined storm sewer due to the storm water pipes connecting directly to local waterways without passing through a waste water treatment plant. The City's Municipal Separate Storm Sewer System accounts for 30-40 percent of the City's storm water system, and there are many privately-owned separate storm sewer systems within the city. The designed storm filter system had been designed by SUNY/Stony Brook Civil Engineering Department professors, and the researcher performed a "proof of concept" test of the designed storm filter at the SUNY/Stony Brook campus to answer the question: "Can the designed storm filter (for storm water catchment) capture and remove the majority of the contaminants of interests (e.g. oils, heavy metals, pathogens, etc.) during the storm event?"

Methodology: The hypothesis that concentrations of contaminants are much higher in the initial portions of the storm water and that contaminant concentrations will decrease as the collected storm water volume increases formed the basis of the analysis. The researcher sampled "first-flush" storm water from catchments fitted with the designed storm water filter, at one pedestrian walkway and four parking lot locations at the SUNY/Stony Brook campus. The researcher conducted chemical analysis of total suspended solids, chemical oxygen demand and total kjeldahl nitrogen retained by the modular filters from the “first-flush”.

Findings: The researcher found that the first flush of storm water contained the highest levels of the tested contaminates, compared to those in domestic water.

Next Steps: This methodology would permit comparative analysis of various commercially-available modular filtering systems in addition to the one studied. Future

research might include analyzing operations and maintenance issues of using such systems within the City's Municipal Separate Storm Sewer System, including interoperability with existing NYC DEP infrastructure, analyzing expense vs. capital budget implications from adopting such a system and development of budget-related metrics for such a system to permit assessment of first and life cycle costs linked to mechanical performance.

Title: Town+Gown:NYC Communications Strategy (2017-2018)

Town: Town+Gown:NYC @ NYC DDC

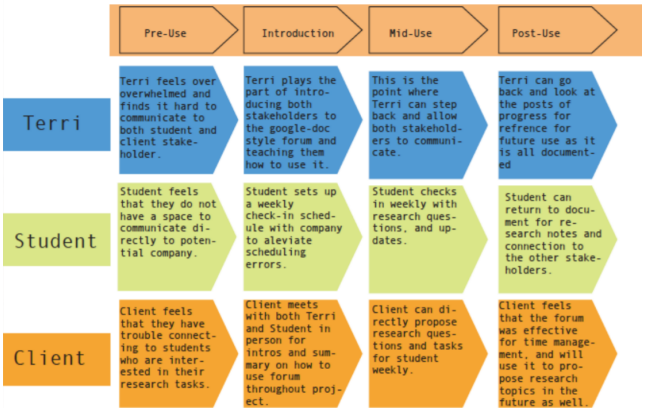
Gown: New School/Parsons

Researcher(s): Charlotte Dimopoulos

Objective: The researcher sought to design a communication strategy to help Town+Gown:NYC optimize its research action program to be more effective within its stakeholder ecosystem consisting of students and schools working on experiential learning research projects, practitioners for whom the research is done, and the Town+Gown:NYC Advisory Board to promote direct interaction within the ecosystem. As the center of its ecosystem, Town+Gown:NYC must develop and support current projects with limited staff capacity so that its communications function must communicate not only what has been done and underway but also what is possible in the future on new projects.

Methodology: The researcher surveyed Town+Gown:NYC's current operational practices and conducted a series of interviews from past program users, including experiential learning program administrators, project clients and advisors, and Advisory Board members, which provided insight into the nature of Town+Gown:NYC's communications needs.

Findings: The researcher designed an online forum that would enable Town+Gown:NYC to bridge the gap temporally among the program's different aspects and users. The designed online forum would be accessible with user-specific login information for clients and students via the NYC DDC website, and would help to improve Town+Gown:NYC's current communication mediation that now relies on direct low-tech Director activity.



Real-time online communication among ecosystem stakeholders on active projects and for future project development would benefit program users and free up Town+Gown:NYC operational capacity for sustainable program growth.

Next Steps: Implementing the online forum would need to comply with the City's social media protocols.

Technology

The projects under **Technology** focus on ways technology can assist built environment participants in their respective domains. While technology can be analyzed in conjunction with, for example, management techniques and methodologies, technology has aspects resulting from technology *qua* technology and how it relates to society, and projects under **Technology** can highlight one or more of these aspects. Large public owners have an ability to advance technology innovation, as economic policy makers and as collateral from their public capital programs by participating in research and development activities necessary for innovation in construction- and built environment-related technology. There were no projects in the Technology discipline in academic years 2016-2017 and 2017-2018.

Reflection: Proceedings from Symposium Events

The systemic action research methodology provides structure for stakeholders to use research results to help bring about changes in practice and policy within a complex and dynamic social system. In the built environment, where complex issues are embedded, it is necessary to conduct research explicitly within context. The action research methodology facilitates change through repeated cycles of research and reflection aimed at eventual action, which the action learning methodology calls 'action learning sets'.

Since 2011-2012, Town+Gown:NYC has been using the symposium format as a space for reflection, where practitioner and academic participants, in an open-ended conversation focusing on particular completed project results, can move toward appropriate action. There no particular agenda other than what is suggested by the completed project or projects, and these events are simply research-based conversations within a broader context aimed at action. The following summaries of symposium events held during 2016-2017 and 2017-2018 show the state of reflection on the completed projects that were subjects of the events.

Title: Birds and Buildings: Case Study for How Our Built Environment Can Better Support Urban Wildlife

Date: October 6, 2016

Purpose. This event began as an initial discussion to explore how asset owners can take advantage of planning and design, supported by the science of animals, to improve outcomes for both humans and animals, and support development of a Town+Gown:NYC research question entitled *Investigations into the Relation of Built Environment Design and Natural Phenomena*. The relationship of the built environment to natural phenomena is complex, especially as our landscapes are becoming increasingly urbanized. Historically, our built environment and the processes that create and maintain them did not consider the ecological needs of non-human animals. For example, migrating birds often collide with glass structures, during day-time stop-overs, and are lured into dangerous environments by night-time lights. Animals find themselves in previously thought unlikely places—above ground utility infrastructure and golf courses.

Conversation. See https://vimeo.com/189649277/f77376d12a..

Title: Approximating Integrated Project Delivery in Design-Bid-Build Environment: Innovations in Design and Construction

Date: November 17, 2016

Purpose: Public projects executed in a statutory environment mandating the design-bid-build service delivery methodology are executed by contracting with firms in a statutory environment based on economic and legal principles of perfect information and price as the single operative variable. At this event, participants discussed several piloted design and construction management innovations that were accomplished within this statutory model that attempted to approximate the benefits of integrated project delivery. Aimed at assisting in the delivering of high-quality public building projects within public sector budget and schedule parameters, these innovations, now suitable for academic review and evaluation, included co-location of designer/contractor/owner team during the design phase; the use of pre-construction design assist (with pre-qualification); the use of lean construction techniques including the "last planner" scheduling technique; and application of building information modeling technology. It was hoped that ongoing academic and applied research related to increasing project delivery efficiency and effectiveness within the design-bid-build framework would provide additional bases to pilot and test innovations on projects to optimize project delivery performance and provide options for contracts that reflect *ex post* realities of construction.

Conversation: See https://www.youtube.com/watch?v=PnavSLhGYHg.

Title: Pushing the Recycling Envelope: Construction and Demolition Waste

Date: November 30, 2017

Purpose: This event was a general exploration of the state of academic research, practical considerations and impediments, and ideas for future research to advance the recycling and reuse of Construction+Demolition Waste (CDW). It was inspired by a CUNY-CCNY 2015-2016 research project involving a partial comparative life cycle assessment (LCA) to compare the environmental impacts of two concrete product systems—concrete with coarse natural aggregate and concrete with coarse recycled aggregate with the New York City Department of Sanitation.

Conversation: The discussion operated like the opening of Pandora's box, with the state of academic research revealing multiple, complex and related areas for further exploration and implicating economic analyses for markets of recycled CDW for new materials and uses. The academic presentation of life cycle cost-benefit modeling for recycled concrete aggregate was intended to serve as one tool to help government, as regulator, by providing sufficient information to help determine options for potential intervention to increase recycling of CDW and re-use of recycled CDW in new building materials. Concrete's GHG profile, unfortunately, does not align well with the City's span of regulatory control—New York State exerts regulatory control over CDW, which not only directly impacts the nature of available data but also impacts the market for recycled CDW. Participants concluded this event interested in pursuing the exploration further.

Title: Pushing Design Research into Implementation

Date: January 31, 2018

Purpose: While the power of design has been celebrated since the Bloomberg Administration and the de Blasio Administration has embedded awareness of the power of design into programs across agencies with agencies training their in-house groups on basic design strategy and community engagement, the issue of implementing design research projects in the public sector remains unresolved. This event explored Town+Gown:NYC's design research implementation focusing on several completed design research projects, which did not follow a straight line toward implementation and proceeded in ways not anticipated at the time the project began but ended in some form of action in addition to future research.

Conversation: The participants discussed various issues, such as the value of such projects in future operations and measures of success for these projects, including pedagogical benefits in the absence of immediate action, to form a more realistic basis for future design research projects in Town+Gown:NYC with its academic partners going forward.

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