Northeastern University

ARTG 5620 Notational Systems for Experience

Fall 2018 Syllabus
Tuesday 8-11:30am
427 Ryder
Ann McDonald

course description

Examines theoretical foundations, concepts and methods of visual notational systems used in the effective analysis and communication of existing experiences and in the envisioning of conditions for future experiences.

Notational systems are sets of graphic signs and codes that denote or prescribe specific actions, forces, operations, events or performances that occur over time. Students engage with concepts and models through readings, discussion, case study analyses and speculative design projects. Students evaluate the role that notational systems play in documenting, analyzing and understanding the human goals, actions, behaviors and perceptions key to experience and assess their value in designing for agency and new experiences.

additional context

We will work as a research collective to investigate standards of notation and experimental methods used across multiple disciplines where human experiences over time are analyzed and envisioned such as music, dance, theater, management, architecture, urban planning and design. We will pay particular attention to time in relation to experience, waiting, perceived time and flow and and the space and time in between touchstone events and disciplinary approaches.

We will critically analyze diagrams and notational systems used to represent actions, perceptions, thoughts, emotions and exchanges over time through detailed case studies. We will review historical examples and templates that are currently in use professionally and test and propose alternative, experimental models. We will identify the value of various notational systems in representing experiences varying in complexity from individual to multi-agent and from short duration to longer sustained engagements. Building on readings and case study research, you will complete short weekly notation and diagrammatic exercises, complete detailed research and a class presentation on a select project and over multiple weeks design a speculative notation system for understanding or future envisioning–defining intent, audience, agency, time frame, scenario and assessment method.

Students experiment with the role of visualization and notational systems play in these areas of intent:

DOCUMENT | ANALYZE | SYNTHESIZE
to understand existing conditions and experiences *(from varied POV)*

SPECULATE | ENVISION | CREATE
to envision and orchestrate future experiences/frameworks
(including those that anticipate participation and improvisation)
to implement conditions and assess new experiences

REFLECT | INSTRUCT | SHARE *?could add*

learning objectives

- Examine the use of notational systems to represent, visualize, analyze and propose conditions and variables that change over time as part of an event or experience
- Explore methods of research, design and testing in information representation for experience
- Evaluate visualization projects and contextualize design work in existing research
- Synthesize, organize and communicate case study findings in easily understandable visual narratives
- Develop basic critical language and procedures integral to representing, understanding and designing for human experience

course activities/assignments
Weekly progress is expected on projects as outlined in schedule and assignment briefs:

readings and research journal
Complete assigned readings and summarize and record written reflections describing how texts are relevant to overarching course topics and for your ongoing work. Pose at least one question in response to each reading. Add these weekly items to your folder within class Google folder.

discussions
Be prepared to participate fully in weekly discussions on overarching topics and readings.
Guest speakers, as available, will contribute relevant research and practical experience to the weekly topic discussion select weeks in term.

weekly experimental projects
Create multiple iterative design solutions to weekly prompts

class presentation including case study analyses
Choose a topic from select list for class presentation, research topic thoroughly, identify existing notational/diagrammatic examples and analyze through written and visual presentation to class
Propose ways to improve on diagrams and apply learning to other contexts
Consult reference books and articles listed under resources, plus discuss with instructor for suggestions on additional resources.

speculative notation system project
Choose an experience/event(s) of interest to investigate through notational systems and iterative making (in conversation with instructor)
Identify ways that templates, case studies and historical examples inform speculative project

assessment and grades
Students are expected to demonstrate week-to-week progress on assignments as outlined in schedule. Assignments are due as indicated. Grades are based on attendance, timely completion of projects and analyses, quality of work, level of in-class participation and valuable contributions to discussions and critiques. Willingness to share resources and knowledge with class community and personal progress will also be reflected in grades. Each project is evaluated by: concept, realization, craft, and adherence to assignment specifications.

20% presentation including detailed case studies and written summary
40% weekly experiments (20%) and speculative notation project (20%)
quality of original concepts and analysis, rigor and completeness in documenting your process
40% research journal, reflections, participation in reading discussions, attendance, participation in critiques, progress & effort

Course grading system adheres to Northeastern University policies:
A
outstanding achievement, exceptional quality and craft, demonstrates intellectual passion, curiosity, initiative, and exploration
B
good achievement, good quality and craft, achieves project goals, demonstrates awareness of principles studied
C
satisfactory achievement, does not satisfy one or more project goals, satisfactory quality and craft
F
failure, insufficient work accomplished to justify credit for the course, two unexcused absences

Students are expected to abide by Northeastern University's Academic Integrity Policy:

http://www.northeastern.edu/osccr/academicintegrity

Students receive a progress grade at midterm. Assignment deadlines missed due to illness should be made-up as quickly as possible and communicated with instructor. Unexcused absences negatively affect grades and two unexcused absences results in failure of the course.

Ann McDonald
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Office hours tentatively Wednesdays 2-3:30pm and Thursdays 2-3:30pm
(may need to adjust as I think many have class during these times)
We can meet in my office 325 Ryder or virtually
I will also be available right after class Tuesdays from 11:30-12:30pm for individual assistance as desired
(University meetings permitting)

overview schedule

	M	T	W	Th	F		S	S				
1		9|11							**introductions, goals, definitions**	**presentations determine**		
2		9|18							**time, timelines, visual representation**	–	–	–
3		9|25							**mental models visual composition principles**	–	–	–
4		10|2							**external representations, models**	–	–	–
5	holi	10|9							**body in motion, efficiency quantified self**	**Houjiang** body in motion, efficiency		–
6		10|16							**gesture, language, business processes, flow, conversations, cybernetics,**	**Erin** business processes	**Lauren** cybernetics	**Mary** gesture
7		10|23							**sound, music, composition**	**Colin** digital audio workstation	**Sylvia** jazz improvisation	-
8		10|30							**dance, film, choreography,**	**Kyle** dance	**8**	**Tony** guest compose
9		11|6							**art, performance, movement and the body**	**Jeremy** art, garden, score improvisation	**9**	**Nicole** guest choreogr
10	holi	11|13							**bodies in motion, geo-locative**	**Alyssa** technology in urban spaces	**Estefania** airports and travel	**Brittani** event planning
11		11|20	holi	holi	holi				**performance analysis, sports, games, play**	**Madisen** basketball stats?	**Rick** esports	
12		11|27							**narrative, textual, hierarchical, relational, craft, building, and the body**	**Shivani** natural forces geolocative	**16**	–
13		12|4							**time-based processes_ physics, math, chemistry natural processes**	**17**	**18**	–
14		12|11							**revisions, review, reflection**			

detailed schedule still updating readings….

blue = assignments due day they are shown | ***green** = in-class topics* | each week links to folder with readings

week 1	**Notational Systems Introduction**	
9|11	Introduction to Notational Systems for Experience Review of course and project structure Review and question nomenclature and definitions Visualization: understanding through mapping, models, diagrams and notational systems and their role in the analysis and envisioning of experience	PRESENTATION | DISCUSS *Notational Systems_**AM*** IN-CLASS EXPLORATION **draw time**
basics	**Visual Representation and Communication**	
to be scheduled	Visual Elements, Gestalt Principles, 2D Representation Graphic Elements: point, line, plane, area, volume, texture, color, orientation, shape, pattern. symbol Gestalt principles: similarity, closure, proximity, continuation, figure ground visual perception and external cognition diagrams and drawing as methods for understanding READINGS *A Primer of Visual Literacy*, Donis A Dondis *Visual Grammar*, Christian Leborg *The Thinking Eye*, Paul Klee	IN-CLASS REVIEW DEPENDING ON BACKGROUNDS visual representation principles EXTRA TUTORIALS AS NEEDED Adobe CC Illustrator Sketch DISCUSS *review 2D vs 3D vs 4D vs interaction solution options for weekly experiment assignments and speculative project*
week 2	**Time, Representation and Drawing**	
9|18	Review aspects of the temporal in modernity keeping time (measurement), changing time (in music), waiting, doing time (incarceration), lifetime Philosophy of Time Time in Social Theory strategies for visualizing time: duration, interruption, sustained, synchronicity Indexical representations of time Juggling: representing events over time: role of representation over time_ in framing and explaining apprentice model>video>diagram The Experience and Perception of Time, Stanford Encyclopedia of Philosophy https://plato.stanford.edu/entries/time-experience/#1 Languages of Art, Nelson Goodman, Chapter IV The Theory of Notational, pp 127-163 (pdf)	ASSIGNMENT **draw time** **survey re interests for presentations** PRESENTATION *Jugglinl_**AM***

	Cartographies of Time: A History of the Timeline, Daniel Rosenberg and Anthony Grafton Chapter 1, Time in Print, pp 10-25 (pdf) Drawing a Hypothesis, Figures of Thought, Gansterer (pdf) A Line with Variable Direction…, Susanne Leeb pp 29-42 *plus feel free to explore the various hypotheses* (pdf)	
week 3	**Temporal Structures_Mental Models, External Representations, Diagrams, Instructional Processes**	
9|25	representing events over time: role of representation over time in framing and explaining, how-to diagrams apprentice model>video>diagram READINGS *Visual Explanations*, Images, and Quantities, Evidence and Nature, Explaining Magic, Edward Tufte (pdf) Models of Models, Hugh Dubberly (pdf) *Making Comics*, Scott McCloud (pdf) *pp 37-38 and as much else as you find useful to read* *Understanding Comics*, Scott McCloud (pdf) *pp 27-29 and 170-171 and as much else as you find useful to read* *Wordless Diagrams*, Holmes (pdf excerpt) *additional readings in week 3 folder*	IN-CLASS EXPLORATION **map experience w/ tape** ASSIGNMENT DOCUMENT | ANALYZE | SYNTHESIZE **diagram instructional processes** use of notational to communicate multiple levels of information DISCUSS *Notational Systems + Actual and Perceived Time_* DISCUSS *Timelines_* IN-CLASS REVIEW visual representation principles PRESENTATION *Intro to Experience Mapping, Journey Mapping, Story Mapping_**AM***
week 4	**Temporal Structures_Experience/Journey Maps Mapping Goal-Oriented Experiences, Communication Theories**	
10|2	Experience dimensions: duration, continuation, intensity, context, significance, interaction, agency research methods: close observation, recording thinking-feeling-doing-sensing, analysis and synthesis strategies: patterns, categorization, macro/micro views, multiple levels of read READINGS *Mapping Experiences: A Complete Guide to Creating Value through Journeys, Blueprints, and Diagrams*, James Kalbach (excerpt chapter) Adaptive Path's Guide to Experience Mapping (pdf) Beautiful Evidence, The Fundamental Principles of Analytical Design, Edward Tufte (pdf)	ASSIGNMENT DOCUMENT | ANALYZE | SYNTHESIZE **Mapping Goal-Oriented Experience** journey maps representation of events over time: thinking, feeling, doing, sensing MACRO | MICRO

week 5	**Temporal Structures_Work, Process, Efficiency, The Quantified Self**	
10|9	event, sequence, state and activity diagrams causal relationship diagrams notion and time studies for efficiency READINGS *Felt Time: The Psychology of How We Perceive Time,* Marc Wittmann, Chapters 3 and 4 (pdf excerpt) *Graphic Design Theory*, Meredith Davis, Chapter 4 The Language of the Visual World (pdf) Notating Discovery – Discovering Notation, John Stell (pdf) *Mapping Experiences: A Complete Guide to Creating Value through Journeys, Blueprints, and Diagrams*, James Kalbach (**chapter 6 Illustrate: Drawing the Diagram**) available through Safari Online Books via Northeastern University Library https://www.safaribooksonline.com/library/view/mapping-experiences/9781491923528/maex_ch01.xhtml *(optional as to whether you respond via written research journal, as this info informs your making)*	ASSIGNMENT DOCUMENT | ANALYZE | SYNTHESIZE **Revisit Goal-Oriented Experiences w/Notational Systems** PRESENTATION *Body Motion Captured_ Marey_Muybridge* PRESENTATION *Work, Process, Efficiency and Quantifed Self, Panopticon_***Houjiang** PRESENTATION *Further Review of Experience Mapping, Journey Mapping, Story Mapping, Alignment Diagrams and Data_**AM***
week 6	**Temporal Structures_Flow Charts, Cybernetics, Agency, Conversations, Interaction, Kinesthetics, Gesture, Kinesics**	
10|16	READINGS What is Interaction? Are There Different Types?, Hugh Dubberly, Paul Pangaro, Usman Haque Flow diagrams: Rise and fall of the first software engineering notation, S.J. Morris and O.C.Z. Gotel Diagram, gesture, agency: Theorizing embodiment in the mathematics classroom, Elizabeth de Freitas and Nathalie Sinclair	ASSIGNMENT DOCUMENT | ANALYZE | SYNTHESIZE **Revisit Goal-Oriented Experiences w/Notational Systems** *visual storytelling iteration revisions* PRESENTATION *Management and Business Process Diagrams_***Erin** PRESENTATION *Cybernetics and Conversations_***Lauren** PRESENTATION *Kinesthetics, Touch, Gestural Notations_**Mary***

week 7	**Temporal Structures_ Sound and Music Composition**	
10|23	Sound, composition, conventions and experimental notation systems READINGS Neumes, Notes, and Numbers: The Many Methods of Music Notation, Ralph Grier Cromleigh 5 1/2 Examples of Experimental Music Notation, Stamp https://www.smithsonianmag.com/arts-culture/5-12-examples-of-experimental-music-notation-92223646/ REVIEW/SKIM AS REFERENCE Notation, §1: Notations for ease of reading and musical computing, Notation, §2: Notation for 20th-century innovations, Hopkins The Grove Dictionary of American Music, 2013 comprehensive reference publication on American music (pdf) *additional optional readings in week 7 folder*	ASSIGNMENT DOCUMENT | ANALYZE | SYNTHESIZE **Mapping Experience through the Senses** Macro and Micro_ final due PRESENTATION *Digital Music Compsition*_**Colin** PRESENTATION *Music Jazz and Improvisation* _**Sylvia** PRESENTATION *notations for Turntablism* _**AM** RESEARCH JOURNAL midterm review_ all items checked in
week 8	**Temporal Spatio Structures_ Dance, Choreography and Film**	
10|31	Experimental dance, theater, film scores, planning for movement and multi-agent spatial interaction and notational systems READINGS Design Languages, Notation Systems, and Instructional Technology: A Case Study, Sandie H. Waters, Andrew S. Gibbons (pdf) Time, Motion, Symbol, Line, Jonathan Burrows (pdf) Languages of Art, Chapter V Score Sketch Script, Nelson Goodman (pdf) Are Scores Maps: A Cartographic Response to Goodman, Daniel Miller (pdf) FIELD TRIP OUTSIDE ICA exhibition William Forsythe: Choreographic Objects Oct 31, 2018 – Feb 21, 2019 https://www.bostonmagazine.com/arts-entertainment/2018/08/22/ica-forsythe-choreographic-objects/	ASSIGNMENT SPECULATE | ENVISION | CREATE one week body motion assignment PRESENTATION *Dance and Movement Notation Systems Laban etc*_**Kyle** *Guest presenter: Anthony De Ritis Composer* --- PRESENTATION Affordance Interface Gesture, Tap, Swipe Conducting and Juggling_***AM*** PRESENTATION *Semiotics, Signs and Notational Systems*_***AM***

week 9	**Temporal Multi-Modal Spatio Structures_ Performance Movement and the Body**	
11|6	Experimental dance, theater, film scores, planning for movement and multi-agent spatial interaction and notational systems READINGS Affective Traces in Virtual Spaces: Annotation and Emerging Dance Scores, Hetty Blades (pdf) The RSVP Cycles: Creative Processes in the Human Environment, Lawrence Halprin pages 1-20, and 190-201 (pdf) *(look through rest of the book's examples as time permits)* City Choreographer: Lawrence Halprin in urban renewal, Introduction: Scoring the Participatory City, Alison Bick Hirsch, pages 1-23 (pdf) *additional optional readings in week 9 folder*	ASSIGNMENT SPECULATE | ENVISION | CREATE Review Proposals and Research for Speculative Project PRESENTATION *Garden, Art and Improvisation_**Jeremy*** PRESENTATION *William Forsythe Multi-modal Dance Notation_***guest Nicole Rizzi**
week 10	**Temporal Structures Physical Body Movement and Geo-Locative**	**assignment**
11|13	Body movement, architecture, urban planning, geography, geo-locative data visualization READINGS Bernard Tschumi Architecture: concept & notation, essay Vectors of a Pro-Grammed Event, Frédéric Migayrou pages 21-37 (pdf) Mapping The Unmappable, Stan Allen (pdf) ADDITIONAL READINGS see week 10	ASSIGNMENT SPECULATE | ENVISION | CREATE Review First Sketches for Speculative Project PRESENTATION *Technology and Urban Spaces_**Alyssa*** PRESENTATION *Airport and Travel Notation_**Stef*** PRESENTATION *Event Planning Notation_**Brittany***
week 11	**Temporal Spatio Structures_ Experience Analysis, Sports and Game Play**	
11|20	game design/sports play analysis, quantified-self READINGS Research Methods For Sports Performance Analysis, Peter O'Donoghue, Chapter 1 Performance Analysis Research, pp 16-23 (pdf) Gameplay Practices for Visualizing Video Game Data, Medler and Magerko (pdf) POSSIBLE READING Beyond user experimentation: notational-based systematic evaluation of interaction techniques in virtual	ASSIGNMENT SPECULATE | ENVISION | CREATE Iterations Speculative Project PRESENTATION *ESports Notation_**Rick*** PRESENTATION *Basketball and Sports Notation_**Madisen***

	reality environments, Emmanuel Dubois et al (pdf) *skim, see note on week 11 page* ADDITIONAL READINGS Handbook of Soccer Match Analysis :A systematic approach to improving Performance, Christopher Carling, et al, Chapter 8: From Technical And Tactical Performance Analysis To Training Drills, pp 129-147 Notational Analysis of Sport: Systems for Better Coaching and Performance in Sport, Hughes and Franks Analytics of Play: Using Information Visualization and	
week 12	**Temporal Structures_ Representing Time-Based Processes_ Natural World, Physics, Mathematics, Chemistry...**	
11|27	READINGS How Notations Are Developed: A Proposed Notational Lifecycle, T.R.G. Green1 and Noora Fetais ADDITIONAL READINGS Notational Systems – the Cognitive Dimensions of Notations Framework, Blackwell and Green *see other pdfs in week 12 folder*	ASSIGNMENT SPECULATE | ENVISION | CREATE Revisions Speculative Project PRESENTATION Natural Forces and Notation_***Shivani*** PRESENTATION *Indexical Notation_**AM***
week 13	**Temporal Structures_ Language, Narrative, Textual, Relational and Hierarchical, Craft and Building** Physics, Mathematics, Chemistry...continued	
12|4	READINGS No required readings this week! Please make sure that you access sources that inform your speculative project *(please reach out via email if you want some additional references)* OPTIONAL READINGS Numerical Notation : A Comparative History, Stephen Chrisomalis	PRESENTATION *Knots, Craft, Science, Architecture_**AM*** PRESENTATION *Visualizing the Unknown Improvisation and Participation_**AM***
week 14	**Final Review**	
12|11	Speculative Notation Project: project final review, project process book	
	Readings to be considered for future	
	Textual Structures Over Time, Moretti *The Content of the Form: Narrative Discourse and Historical Representation,* Hayden White *Trees of Life: A Visual History of Evolution*, Pietsch SpecLab: Digital Aesthetics and Projects in Speculative Computing, Johanna Drucker *A Pattern Language*, Alexander	PRESENTATION *Mapping Multi-Agent Systems and Collaboration Processes*

	Graphs, Maps, Trees, Moretti Experimental–Visual–Concrete: Avant-garde Poetry Since the 1960s, Kenneth David Jackson, Eric Vos, Johanna Drucker The Logical Status of Diagrams, Shin Design for Information visual variables essay, Meirelles The Epistemology of Visual Thinking in Mathematics A Brief History of Data Visualization, Friendly Envisioning Information, Tufte Visual Explanations, Tufte Graphesis Visual Forms of Knowledge Production, Drucker Space, Distance, Movement, In Technics and Civilization, Mumford The Logical Status of Diagrams, Shin The Epistemology of Visual Thinking in Mathematics The Mangle of Practice: Time, Agency, and Science, Pickering Conceptual Spaces The Geometry of Thought, Gargenfors Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39." Social Studies of Science, Star & Griesemer Readings in Information Visualization: Using Vision to Think, Mackinlay & Card Frank and Lillian Gilbreth and the Manufacture and Marketing of Motion Study, Price Diagrammatic Representation and Inference: 7th International Conference, Diagrams 2012, Cox, et al Body Diagrams, Choreographic Figures: Vitality Gestures & Embodied Diagrammatics, Gerner, editor Mapping Time, Vasiliev Space Time and Visual Analytics, Andrienko Mapping Graphic Navigational Systems, Fawcett-Tang and Owen Briefly, a Cybernetic Theatre, Pask On Modeling: What Is Conversation, and How Can We Design for It?Dubberly and Pangaro Space Time and Visual Analytics, Andrienko Cage, Schidlowsky, Redman, Cardew, Steiner, Stockhausen, Smalley, additional resources provided online Introduction to Kinesics: An Annotation System for Analysis of Body Motion and Gesture, Birdwhistell Performance: The Art of Notation. Goldberg Body–Space–Expression: The Development of Rudolf Laban's Movement and Dance Concepts, Maletic HISTORICAL/EXPERIMENTAL NOTATION Oskar Schlemmer, Rudolf Von Laban, Raoul-Auger Feuillet, Doris Green Sabar, Kandinsky, additional *Textual Structures Over Time*, Moretti *Trees of Life: A Visual History of Evolution*, Pietsch A Pattern Language, Alexander	

	Graphs, Maps, Trees, Moretti Analytics of Play: Using Information Visualization and Gameplay Practices for Visualizing Video Game Data, Medler and Magerko Notational Analysis of Sport: Systems for Better Coaching and Performance in Sport, Hughes and Franks The Physical Visualization of Information: Designing Data Sculptures in an Educational Context, Vande Moere and Patel List of Physical Visualizations and Related Artifacts, dataphys.org Tangible Scores, Tomas Drawing a Hypothesis: Figures of Thought: A Project, Gansterer Beyond the Pitch/Duration Paradigm	

bibliography to be updated

The Fierce Urgency of Now: Improvisation, Rights, and the Ethics of Cocreation (Improvisation, Community, and Social Practice), Daniel Fischlin, Ajay Heble, George Lipsitz

The Improvisation Studies Reader: Spontaneous Acts, Ajay Heble, Rebecca Caines eds.

What is Visualization? Lev Manovich
http://manovich.net/content/04-projects/064-what-is-visualization/61_article_2010.pdf

McLuhan, Marshall. “Clocks: The scent of time.” Understanding Media: The Extensions of Man (New York: McGraw-Hill Book Company, 1964) (1964): 145-161.
Mumford, Lewis. “The Monastery and the Clock.” Technics and Civilization (New York: Harcourt, Brace and Company, 1934) (1934): 12-18.
Gilloch, Graeme. “‘Seen from the Window’: Rhythm, Improvisation and the City.” Bauhaus and the City: A Contested Heritage for a Challenging Future1 (2011).
Csikszentmihalyi, Mihaly. “A Theoretical Model for Enjoyment.”The Improvisation Studies Reader: Spontaneous Acts. Eds. Rebecca Caines and Ajay Heble, eds. New York: Routledge, 2015. 150-161.
Bertin, J., 2010. Semiology of Graphics: Diagrams, Networks, Maps.

Cousins, S.B. & Kahn, M.G., 1991. The visual display of temporal information.
Artificial intelligence in medicine, 3(6), pp.341–357.
TIME
Spinney, Laura. 2005. “How Time Flies.” Guardian Unlimited, February 24.
https://www.theguardian.com/science/2005/feb/24/4.
Elias, N. 1992. Time: An Essay. http://www.umlaufoviny.com/Liberec/CAD/texty/Elias_Time.pdf.

Barabra Adams Time
The Practice of Everyday Life, de Certeau, Michel, translated by Steven Rendell
Five Minds for the Future, Howard Gardner

Places of the Heart, The Psychogeography Of Everyday Life Colin Ellard
Where the Action Is
Space and Place
The Presentation of Self In Everyday Life, Erving Goffman
Einstein's Clocks Poincares Maps
Mapping Time
Norman, Donald A. Emotional design: Why we love (or hate) everyday things. Basic books, 2005.
5. Phenomenological Approach in environmental psychology
Phenomenological method. Phenomenological approach. Various ramifications. Focus on meaning. The concept of intentionality. The recovery of Lifeworld. Umwelt. Situatedness. Human space. Reflexive data collection.
Obligatory readings:
Graumann, Carl F. "The phenomenological approach to people-environment studies." Handbook of environmental psychology 5 (2002): 95-113.
Bollnow, Otto Friedrich. Human space. Ed. Joseph Kohlmaier. London: Hyphen, 2011. (choose one chapter)
Bachelard, Gaston, and Maria Jolas. The poetics of space. Vol. 330. Beacon Press, 1994. (choose one chapter)
Additional readings:
Merleau-Ponty, Maurice. Phenomenology of Perception. Routledge & Kegan Paul, 1962.
Tuan, Yi-Fu. Space and place: The perspective of experience. U of Minnesota Press, 1977.
Pask, G. (1969). The architectural relevance of cybernetics. Architectural Design, 39(9), 494–496.
The Human Condition, H Arendt

Perception-Action Cycle: Models, Architectures, and Hardware
Vassilis Cutsuridis, Amir Hussain, John G Taylor (eds)

Modeling and Visualization of Complex Systems and Enterprises: Explorations of Physical, Human, Economic, and Social Phenomena, William B. Rouse

Envisioning Information. Graphics Press, Edward R. Tufte
The Visual Display of Quantitative Information, Edward R. Tufte

Design for Information: An Introduction to the Histories, Theories, and Best Practices Behind Effective Information Visualizations Paperback, Isabel Meirelles
Visual Explanations: Images and Quantities, Evidence and Narrative, Edward R. Tufte

This Means This, This Means That: A User's Guide to Semiotics, Sean Hall

Cartographies of Time: A History of the Timeline, Daniel Rosenberg, Anthony Grafton
Visual Thinking Paperback, Rudolf Arnheim

The Functional Art: An Introduction to Information Graphics and Visualization, Alberto Cairo

Semiology of Graphics: Diagrams, Networks, Maps, Jacques Bertin

Isotype: Design and Contexts 1925–1971, Christopher Burke, Eric Kindel, Sue Walker (eds)

Event: A Philosophical Journey Through A Concept, Slavoj Zizek
Matter and Memory, Henri Bergson

Larkin, Jill H. & Simon, Herbert A. (1987). Why a Diagram is (Sometimes) Worth Ten Thousand Words. Cognitive Science, 11:1, pp. 65-99.

Dialogue Mapping: Building Shared Understanding of Wicked Problems, Conklin
Conceptual Models: Begin by Designing What to Design, Johnson and Henderson