Situated Design: A Space for Interaction and "Reading"

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ABSTRACT   While the act of reading engages a reader through intense interiorization and reflection, reading is placed within more exteriorized social contexts through ubiquitous computing, networking and densely designed public spaces. The proliferation of these contexts elaborate and compete with the primacy of a traditional reader's experience with a codex.

Using semantic/episodic/procedural ideas of cognition as a framework, this paper develops "situational design" as a conceptual basis for looking at a reader's/participant's experiences as a user. Three design case studies are examined that develop practical concepts for understanding users. They are used to outline processes and methods applied from semantic and episodic experiences, the use of "point of view" and audience

discourse, and, lastly, integration of concepts of image schemata (Lakoff and Johnson 1999) applied to motion/interaction in the comprehension of information.

KEYWORDS: embodiment, social interaction, dynamic visualization, interaction

> As a writer I became very conscious of the space on a page. I started to get obsessed with questions such as what makes you move from left margin to right margin? from top of the page to bottom of the page? In other words, I saw the page as a field over which I as a writer could move and you as the viewer could move too. I then figured that if I was so concerned with space why was I limiting myself to a piece of paper when there is a floor or a street to work with. So things then went to an art context. I started off the process by thinking how do I move in real space and what makes me move? … I think that it all began with that notion of movement, in that you move through the page, you move within yourself, you move within a space and back and forth. Gradually it becomes clear that you/the people are in a space. The question then is how to react to a space. The great thing about architecture and design is that people are aware of it even if they think that they aren't.
>
> Interview with Vito Acconci on recent design work of the Acconci Studio (Designboom 2006)

Acconci's professional transition from writing to architecture and audience interaction suggests an elaboration on how we think of communication. The nature of reading is changing and becoming more varied. While a reader can still experience the immersive and reflective qualities of a codex "to become lost in a book," reading expands into and becomes more contingent on various new contexts of settings and activities. There are many reasons for this. Ubiquitous computing, networked media and dynamic visualization place writing in contexts and spaces with different goals, social interactions and juxtapositions of information. Networks and networked portable devices change the nature of reading. Interfaces reorder information based on user controls or preferences, while a Google search juxtaposes information sources as if they were competing products on a shelf, weakening the concept of a trusted authorial source. The design of interfaces reinforces goal-oriented behavior in the reader. The act of reading is motivated from tasks sped up by interconnectivity, and often being in a particular mobile context. Reading therefore becomes more linked to other sources, chunked and patterned for quick comprehension and use applied

to problem-solving, entertainment, social networks and instantaneous texting. Contrasted with the immersive quality of a codex and a single author's voice, technology integrated into contemporary culture places messages in our environment at a rate that requires quick comprehension and surface scan, with a simultaneous understanding of how it is immediately relevant to us in a larger experiential whole. The upshot of this is that many forms of reading, writing and comprehension are increasingly "situated," borrowing a term from John Dewey (Dewey [1925] 1981). "Situatedness" connotes more than merely "context." To cite Robert Innis:

> Integral experience, in Dewey's sense of the term, obtains form through dynamic organization in as much as the perceiver is caught up in and solicited by the emerging experiential whole. Even while experiencing the perceptual whole as an outcome over which it has no explicit control, the perceiver is creating its own experience through continuous participation … The philosophical pivot of Dewey's pragmatist aesthetic is likewise, as in his epistemology as a whole, the picture of the organism as a force rather than a transparency. (Innis 1994: 62)

Arguably, reading a novel is informed from this position of "having an experience," although the scope of immediate participation by a reader is mostly reflective. Situatedness in a more directly physical sense places us within environments with agency and in ways that are "embodied." Further, George Lakoff and Mark Johnson argue that our mental life is shaped by our physical existence (Lakoff and Johnson 1999). Johnson contends that our belief in the duality between mind and body is incorrect – that knowledge does not exist as a kind of independent rationality. Our understanding is, rather, based on developmental experiences, which allow us to construct a knowledge based on analogy and metaphor through our interaction with our environment (Johnson 1987). We understand through physicality, motion, point of view and other embodied traits that are the basis for meaning and also language. "What we call mind and what we call body are not two different things, but rather aspects of one organic process, so that all our meaning, thought and language emerge from the aesthetic dimensions of this embodied activity. Chief among those aesthetic dimensions are qualities, images, patterns of sensorimotor processes, and emotions" (Johnson 2007: 1).

Both situatedness and embodiment are placed easily within a contemporary model of cognition. This model begins with divisions between procedural, semantic and episodic memory. First, procedural memory is connected to somatic relationships and skills-based knowledge. Episodic memory "is involved in the recording and subsequent retrieval of memories of personal happenings and doings," while semantic memory is "the knowledge of the world that is independent of a person's identity and past" (Tulving 1983: 9). In

other words, semantic memory privileges symbolic and abstracted categories of memory and knowledge, which is based more within writing and literacy, while episodic tends to privilege the experience and memory of a situation.

Semantic memory and knowledge are by and large more valued in highly literate cultures. The mastery of a culture's writing and language is a mark of intelligence. We tend to value these forms of knowledge as "real" knowledge. Being illiterate is a pejorative term, even though complex and insightful understandings are as common in oral cultures as in literate cultures, though often derived differently.

An anecdote is useful to illustrate a bias towards a literate, abstracted way of knowing. In his early studies, the linguist A.R. Luria found that when people were shown images of objects, literates tended to group objects into abstract categories (such as a category for tools). When non-literates were shown the same images, they tended to group them into situational categories that reflected their recollection of their direct experiences; such as a saw to a log; a hammer to a nail, and so on. The way that they explained these causal relationships between objects, rather than placing them within abstracted categories, would often reflect their direct experience. The tool was a potentiality that could be placed within a situational context. When asked, "But can you say that a saw, hatchet, and a log are the same types of things?" answers suggested that "similar" meant the effect produced by the interactions of objects: "Sure, they're alike, they work together" (Luria 1976: 69). Episodic knowledge is still propositional, rational and deductive; however, objects are no longer labels, but active things based on the recall of personal memory: of time, place and event.

Table 1 Cross-listing of episodic and semantic traits (based on Tulving 1983).

Information	Episodic	Semantic
source	sensation	comprehension
unit	events; episodes	ideas; concepts
organization	in time	concept relationships
reference	the self	abstracted knowledge
true?	personal belief/"eyewitness"	consensus
Operations		
registration	your experiences	symbolic
temporal coding	through the present, directly	indirect
affect	more important	less important
Can you infer things from this?	limited	rich
How do you access content?	time and place	categorization
What happens when you do?	change system	system does not change
How do you get an understanding?	gestalt or synergy	linear: "unfolding"
How do you retrieve content?	You remember	You know

Episodic memory and experiential context are given new emphasis in contemporary culture, in addition to semantic knowledge and high literacy. Design disciplines may fail to take into account the totality of experiences found in enlarged contexts. From a design perspective, professional practice still tends to be dominated by specializations rather than an integration of disciplines that would begin to address these broad, situated contexts. The division in work ends up creating incomplete perspectives. For example, in interaction design, a wireframe is a simple, block-style diagram that helps the interaction designer develop interaction based on categories such as functionality (such as the placement of buttons and their location in relation to text-based information that the user can interact with) and general choices in hierarchy, navigation and content. The wireframe can be both a way of creating a layout for a designer, and also a prototype to facilitate user testing. Wireframing establishes a baseline of functional responses from a prospective user,[1] yet often subtracts the actual experience of the content from the design of the interaction; wireframes often contain empty boxes with descriptions of the actual content that they will have.

Graphic design, on the other hand, has a tradition of interpreting very specific content, which is a strength in considering subtle experiences with information and meaning. Formal nuance in typographic layout, picture editing, materiality in printing and binding, plus a more comprehensive sense of translating written content to functional and evocative presentation is ingrained in both the contemporary practice and history of graphic design. However, graphic design practice is still at a developmental stage for understanding broader audience experiences. The need to examine a fuller range of audience experiences is inherently practical in light of shifting design practices responding to a reordering of design contexts. A contingent, situated design process may be part of a solution to engaging audiences in ways that are very different from the further professional hardening of these disciplinary boundaries. Pragmatically, this helps facilitate designing for education and instruction, exhibition design and architecture, dynamic visualization and interaction, and in general, social spaces where language/writing/text is discursive, performative and often goal-oriented within an environment.

Within these social spaces reading (a) becomes an amalgam of episodic memory with semantic memory and procedural memory in terms of immediate interpretation; (b) occurs in socially moderated and discursive contexts: the immediacy of information is shared and negotiated; (c) is context-specific to particular spaces: the history of experiences represented in a particular environment (which is not a new idea, but one that the general public is more aware of as urban spaces are redeveloped, or where local identity is under pressure from influxes of new people), or, somewhat paradoxically, the highly designed and dense public architecture of commercial spaces (which often integrates into media-disseminated ideas and concepts

– for example, the role that advertising plays in a developed nation's culture); and (d) is therefore related to manipulating or directly interpreting particular environments (wayfinding, information in general through ubiquitous computing, texting, advertising through various media channels, etc.).

Case Study 1: Scaffolding Semantic and Episodic Participant Experiences

Interaction design often begins with a consumer object as the basis for user experiences. This often tends to ingrain a certain amount of bias about how social relationships are constructed from an individual consumer viewpoint, and is highly dependent on the technology embedded in the object. "Scaffolding" is a term that distances the creation of situations and conditions from the creation of consumer products only. The following example elucidates one simple way of conceptualizing and strategizing large and generalized episodic and semantic interactions fundamental to reading.

In 2008 I developed an interactive project shown in the Mitte region of Berlin, comparing the historical Berlin Wall with the current Strategic Border Initiative in the United States, and also encouraging active negotiation of issues of social identity within both of these geographical areas (see Figures 1-6).[2] One part of the project visualizes the local space and the Berlin Wall based on various research and documentation sources. This section presents graphics that visualize more or less traditional "semantic" information. The behavior of most viewers was predictable. The participants read and quietly contemplated the written text and visual diagrams. However, a larger

Figure 1
Alexander Platz, East Berlin. Photograph by Scott Townsend.

Figure 2
East Berlin. Photograph by John Pickel.

program of site-specific events placed the local audiences in particular locations through itineraries: a walk to a particular site generated a series of running conversations. These conversations recounted a participant's store of episodic memory – for example, participants observed and discussed the change in accent overheard on a street, a GDR era apartment block now being transformed into upper-income apartments, the fountain at Karl Marx Allee now wrapped with the multicolored graphics of a cell phone company, and so on.

The second section of the interactive project is designed to work with the situated activities in the neighborhood. It utilizes metaphoric and first-person address and scenarios based on the theme of "split hemispheres" (the split hemispheres of the globe, the split hemispheres of personal identity) to engage audience participation. Audience members can participate in real time by answering questions relative to their own social identity. This part of the project uses some similar strategies often found in advertising: photographic portraiture, short aphoristic texts that have direct address to the viewer, though the usual closure of an advertising message is deferred through the daily addition of answers displayed graphically. The information presented in the gallery space on returning from these itineraries took on new import. Individuals recounted episodic memories of where they and their parents and grandparents were born and how the neighborhood had changed since Unification. A shift occurred in the social interaction: by using visualization tied to personal recall, dialogue shifted away from historical abstraction to personal experience, which not only aided social interaction and dialogue, but also made the audience invested in how they contributed to the information as it evolved.

Figure 3
Advertisement for BMW, East Berlin. Photograph by John Pickel.

The term context has become a bit adumbrated through its use in design processes. In many usages it has become a kind of static container in which to place design activities. "Situated" reflects a larger and more dynamic system to arbitrate, where individuals have agency and are stakeholders in the activities: situated suggests modification, changes, discourse and evolution in a user's practices. In the case study example, designed activities are more improvisational. The value in general in this circumstance is that audience members became invested in the discussion in a way that is not characteristic of merely providing information as "semantic knowledge." Experience, the self and affect (which are characteristics of episodic knowledge) are activated in the audience. By cross-listing experiences based on traits of semantic and episodic (as well as procedural) memory and knowledge, interpretation can be elaborated on more as particular settings and conditions: the "design object" is only as valuable as its function within a larger context of audience experience.
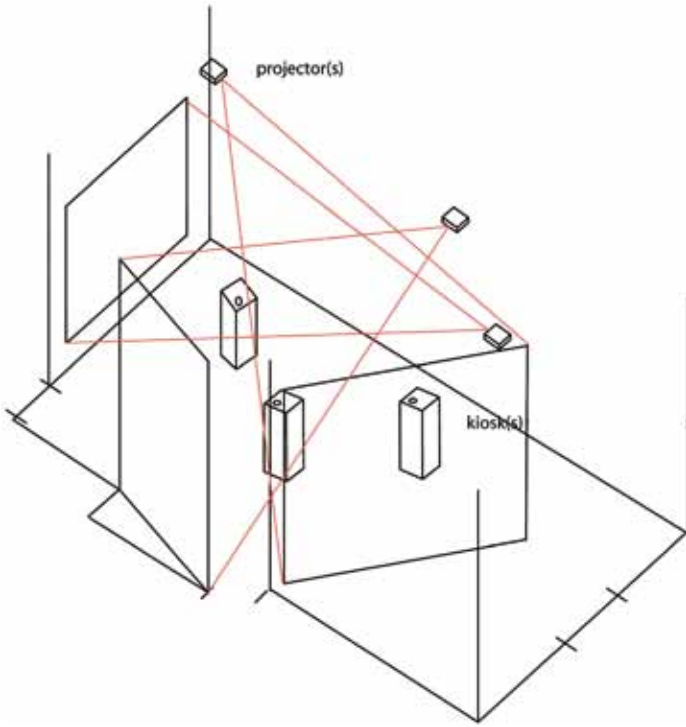
Figure 4
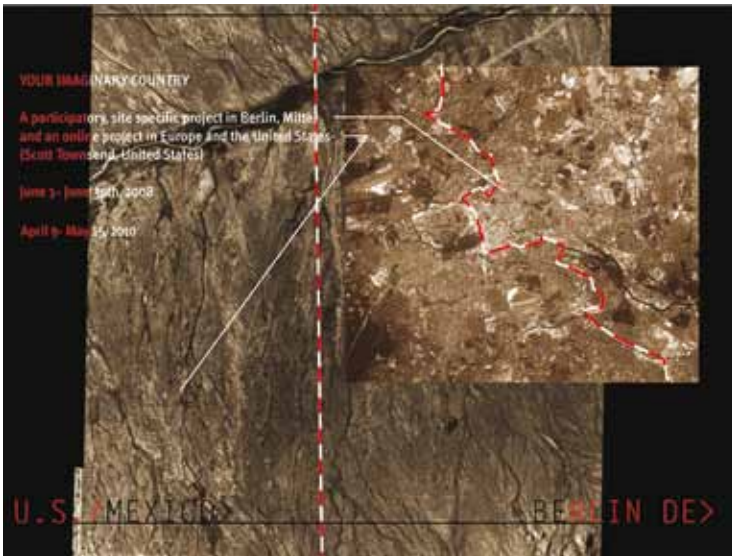Typical installation of interactive projects.

Figure 5
Index page for comparative exhibitions in the southwest United States and
Berlin (2008/2010: United States-based project included additional
interactive work).

Figure 6
Storyboard keyframes of online and projected interactive component, *Your Imaginary Country: the Berlin Wall and the Southwest Border Initiative*, interactive project, 2008 and 2010, Berlin Mitte region and Texas border region.

In assessing design strategies for case study 1, veridicality (is something true?) was a significant category to work with – in this case to use visualization as historical documentation and to be able to reopen negotiations of identity through a sense of place. "What happens (when you access content)?" suggests a division

Table 2 Cross-listing particular traits to strategize various audience experiences.

Information	Episodic	Semantic
source	sensation	comprehension
unit	events; episodes	ideas; concepts
organization	in time	concept relationships
reference	the self	abstracted knowledge
true?	personal belief/"eyewitness"	consensus
Operations		
registration	your experiences	symbolic
temporal coding	through the present, directly	indirect
affect	more important	less important
Can you infer things from this?	limited	rich
How do you access content?	time and place	categorization
What happens when you do?	change system	system does not change
How do you get an understanding?	gestalt or synergy	linear: "unfolding"
How do you retrieve content?	You remember	You know

between personal experiences of the neighborhood and the political expedients of Unification and EU membership rationales and unifying national symbols. On the other hand, "Can you infer things from this?" is associated with the semantic. The visuals used in section one compared the Southwest Border Initiative to the Berlin Wall based on conceptual themes of defense, mortality, and so on, thus promoting comparisons on an abstract level of how power relationships develop between populations and their governing bodies.

Case Study 2: Scaffolding "Point of View"

Designing for social interaction acknowledges that audience members have different experiences. Issues of identity have a firm basis in an individual's personal memory and history. A new social phenomena is the emergence of cosmopolitan urban areas that are comprised of smaller overlapping communities. These communities include scores of different ethnicities, languages and dialects, reflecting very different experiences in individuals and their approach towards reading. Designing for social interaction based on the audience members' differences in identity and their cultural point of view is an alternative to the categorization and isolation of target audiences and typologies found in advertising. In these new cosmopolitan environments, social interaction between groups is essential. In this example embodiment is a key element in the design of the potential interactions that can occur in the environment.

People have an embodied way of communicating through their particular dialect or way of speaking. They also make choices about

Figure 7
Borderline Series project, Milwaukee, Wisconsin. Neighborhoods in transition: Esperanza Unida Building. Photograph by Scott Townsend.

Borderline Series project, Milwaukee, Wisconsin. Neighborhoods in transition: rehabbed condominiums. Photograph by Scott Townsend.
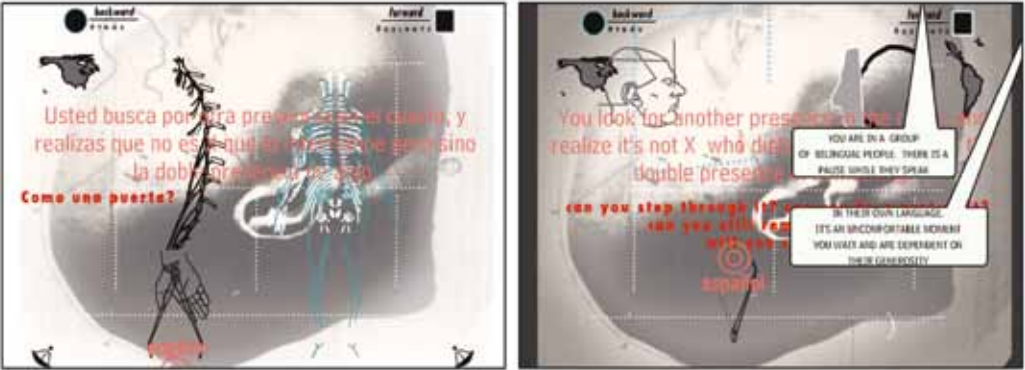
Figure 9
Keyframes, *The Borderline Series: Border Translations*, one of four interactive pieces in the project.

how they speak to modify how they are perceived within different social groups (for example, someone chooses to refrain from using a dialect in "inappropriate" social situations). There can be many different ways of thinking through these relationships, one of which would be particular social interactions based on the role of translation and potential interactions between different communities. In the project *The Borderline Series*, a public interactive work created originally as a component of a larger project placed in an urban neighborhood in transition (Figures 7-9),[3] a scenario is presented in Spanish and English in which one is in a crowd where one does not speak the same language and is consequently an outsider to the group. The scenario relates a decision by an individual in a larger group to choose to translate and be inclusive of the outsider. The scenario text is projected at a theatrical size in the gallery space where it creates a kind of palimpsest, mirroring the actual interactions between people in the space and the divided community. The audience in this site-specific location is a mixture of Spanish- and English-speakers who are also neighbors in the surrounding community. Depending on who is interacting with the piece, either a completely Spanish or a completely English version of the piece is displayed. The interaction of moving between the two sections became a declaration of the person's identity and a choice to develop a public dialogue about two different cultures that are in daily proximity to each other.

The Design of Artifacts in Addition to "Scaffolds"

The following example is based on applying "image schemata" concepts to the design of dynamic visualization and interaction. Dynamic visualization is the use of user interaction to change the presentation of information. It acts "as an extension of cognitive processes, augmenting working memory by providing visual markers for concepts and by revealing structural relationships between problem components" (Ware 2000: 335).

George Lakoff and Mark Johnson have collaborated over the past twenty years to develop a different set of ideas about how we make meaning. They contend that our ways of organizing and framing our knowledge are based on a fundamental relationship between our embodied interactions and the physical world.[4] In particular, the notion of image schemata is a primary part of their argument.

In a larger sense, schema theory is actually a series of ideas and theories originating from cognitive psychology. The primary idea is that how we construct our knowledge about the world is based on an elaborate structure of abstract connections. An individual's sense of their particularized sense of knowledge is based on experiences and conclusions that they have participated in and have rationalized into an abstract structure: a schema (Neisser 1976). This process is also part of a social enterprise in how we learn and tacitly accept the connections between concepts and ideas that are ingrained in our culture. On a smaller scale we also develop schemas based on our

prior experience with particular objects and situations – for example, we may have a "stair climbing schema" that we have developed so that we can safely rely on how things should unfold when we have the need to climb stairs.

In "image schemata" concepts are recurring and are based on our developmental experiences within the physical world:
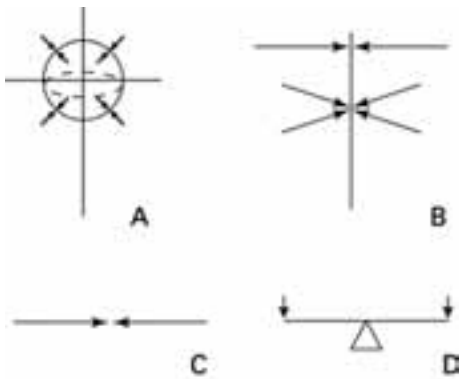
> Image schemata exist at a level of generality and abstraction that allows them to serve repeatedly as identifying a large number of experiences, perceptions, and image formations for objects or events that are similarly structured in relevant ways. Their most important feature is that they have a few basic elements or components that are related by definite structures and yet have certain flexibility. As a result of this simple structure, they are a chief means for achieving order in our experience so that we can comprehend and reason about it … in sum, image schemata operate at a level of mental organization that falls between abstract propositional structures, on the one side, and particular concrete images, on the other. (Johnson 1987: 28–9)

Johnson argues for the extension of image schemata (Figure 10) as the basis for metaphor construction. In his evaluation metaphor creation is a significant act of cognition, and more than just a "surface choice" of being expressive in writing. Through metaphor construction we understand based on analogizing our particular experiences out to other phenomena (Johnson 1987: 65).

For example, the image schema of "balance" is reflected in a sentence construction of "his life hung in the balance." Ultimately the image schemata of balance influences even larger concepts – for example, how we frame concepts of economic trade ("balance of trade"). Johnson states that embodiment and meaning are derived from the whole of the experience, of environment, participant and situation, rather than being hierarchical and reducible to a series of discrete functions:

Table 3 A partial list of image schemata.

Superposition	Process	Restraint removal
Enablement	Attraction	Mass-count
Path	Link	Center-periphery
Cycle	Near-far	Scale
Part-whole	Merging	Splitting
Full-empty	Matching	Container
Iteration	Contact	Blockage
Surface	Object	Balance
Counterforce	Compulsion	

Figure 10
Balance represented as a simple diagram: *A*, equilibrium; *B*, axis balance;
C, point balance; *D*, twin-pan balance (after Johnson 1987: 86–7).

> I am using the term "gestalt structure" to mean an organized
> unified whole within our experience and understanding that
> manifests a repeatable pattern or structure. Some people use
> the term gestalt to mean a mere form or shape with no internal
> structure … experiential gestalts have internal structure that
> connects up aspects of our experience and leads to inferences
> in our conceptual system. What I am calling "image schemata"
> in this book are all gestalt structures in the sense just described.
> (Johnson 1987: 44)

I would assert that written language references image schemata. An
actual oral recitation of language can also include expressive and
performative acts that use gesture to express and underline certain
image schemas directly connected to embodiment. Dynamic visual-
ization and motion design falls between reading and "performative
acts."

Case Study 3: Motion and Interaction

Perhaps most singular, however, is the dynamic quality of time and
motion in reading today; as a representational system they have
changed how we conceive of written language. Motion is an action
and flow rather than a discrete sign within a synchronic system of a
sentence: it can be simultaneous, repeatable; it can overlap other
kinds of motion to create different inferences. It can use realistic
representations (for "balance," an actual figure balancing in space)
or non-referential imagery (a line or shape), yet the non-referential
image can imitate the actual gesture of the referential image, while
both can convey concepts such as tentativeness, symmetry, tension
and release.

In this design prototype, which would help a middle-school stu-
dent understand aspects of the periodic table, a series of animated

symbols show three basic stages of matter: solid, liquid and gas. The ranges of temperatures are outside of direct human experience, ranging from absolute zero to thousands of degrees. Visual metaphor is employed to reference a physical, everyday environment such as the transition between a solid, such as ice, to liquid/water, to gas/steam. Modifying the display is limited to the variable of temperature. Symbols react through visuals and motion to the movement of a slider that raises or lowers temperature. There is a "pattern language" (Rohrbach 2003)[5] that is developed through the motion and the experience of a participant interacting dynamically with the visuals, creating an overall "gestalt" experience through time as per Johnson's earlier definition of gestalt as primarily temporal. The reader/user has an awareness of the boundary between a solid and a liquid, while the elements that do not progress through the usual stages of solid-liquid-gas become directly apparent. The interface analogizes a physical environment and the agency of a participant to change the situation very much like a direct experience from the concept of episodic memory.

The potential learning experience creates conditions that foster different interpretations by students based on: (a) modification; (b) encouraging conjecture; (c) encouraging immediate discourse; (d) placing semantic content into a simulation of a physical context; (e) identity/point of view: invites comparisons to other personal experiences that the audience members may have; (f) transitive and conditional: ranges of meaning and closure regarding subject matter; (g) interaction is simple, yet interacting with the rate and juxtaposition of dynamic visualization shows the information in various states and is correlated to the direct manipulation of the information by the user (literally, he or she can poke it and watch it react).

Larger implications

Johnson's stress on an "experiential gestalt" as a way of forming and experiencing through image schemata is at odds with user-oriented activities that are only reducible to a series of functions. In developing additional criteria for motion and interaction design as affective and expressive, a parallel can be drawn between performance techniques used in theater and the qualities that particular motion design can have. Originally developed by Mary Overlie, *Six Viewpoints* is a way to build content through embodiment as a counterpoint to the complete reliance on a script and director (Bogart and Landau 2005). Conceived as six major categories of space, shape, time, emotion, movement and story, *Six Viewpoints* is contingent on the director/leader to create the conditions where an ensemble can develop individual and interactive (in the sense of interacting with each other and the environment) content. It is a practice based on building up from small bodily/spatial experiences as a way of constructing, interpreting and performing a story. The concepts behind *Six Viewpoints* are remarkably like the concepts underlying designing for

social interaction. The director creates conditions where participants (the ensemble) can have a range of particular kinds of experiences that they create and mediate for performance. Inspired in part from the *Viewpoints* (Bogart and Landau 2005: 7–15)[6] method of actor and ensemble development of gesture and movement, a criteria can be developed for the exploration of certain kinds of dynamic visualization and interaction.

Motion as sign and affect

1. Gesture as sign. An identifiable visual sign (like a handshake) plus gesture, or non-referential: the motion qualities of a particular sign are applied to other visual forms. Tempo: rate changes influence the gesture/movement's connotations (for example, a quick handshake could carry connotations of a perfunctory relationship).

2. Duration: long or short, for example, influence the attention span and overall perception of the participant: changing the duration changes the overall "gestalt" of a dynamic visualization – certain details emerge in a longer duration, overall pattern between different states becomes more apparent in the shorter duration.

   The context of the story and the participant: "situatedness" is a continuum of design interpretation to narrative storyline to user-oriented experiences.

3. The qualities of the movement: smooth vs. jerky, and so on. Again, this can be the physical interaction of a participant (such as the contrast between interaction in a video game or a word-processing program), or it can be the quality of the artifact, or both based on kinesthetic response and feedback, moderated by cues within the overall environment. Kinesthetic response is the physical response to external stimuli: immersive environments are the most notable examples in interaction (for example, a dynamic presentation of visual information influences how the participant modifies the display or rate of display). Sound design that reinforces feedback is also an additional "channel" for prompting kinesthetic response.

4. Story: all the above elements influence each other and can modify a different element – these emerging qualities have an effect on the interpretation of the story in the same way that film direction, camera framing, sound and editing is an interpretation of a script.

5. The concept of "topography: the movement of the participant over landscape" from the original *Six Viewpoints* is based on an actor's or dancer's relationship to the physical environment that they move within and respond to. It can be adapted for design usage as user interaction prompted through an environment (recalling the experiences of the Berlin case study). It could also specifically be the goal-oriented behavior of a user of a portable device to find an address, translate a text in situ or sample ambient music, and so on.
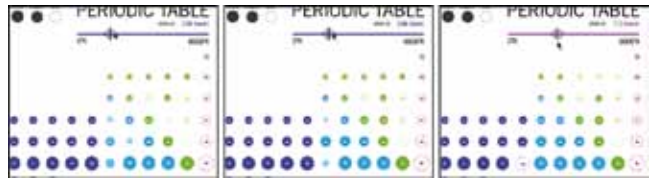
Figure 11
Keyframes of periodic table prototype[7] (prototype from graphic design course 510: Imaging. Marty Maxwell Lane, Samyul Kim and Kelly Murdoch-Kitt, first-year graduate students, 2008).

6. Environment: "reading a space" as a prompt for a story or parts of the story. More than mnemonic recall, it includes bodily orientation, activity, time of day, the awareness of kinds of behavior that occur in the space, the goals of the participant, and so on.

The attempts at creating subtle inflections to motion design and interaction can build out to the larger "storyline" and context of how it is understood: a continuum from design processes to user-oriented activities. Design processes used to arrive at a solution begin to merge into an overlap with user-oriented activities through the telling of the narrative. User experience becomes part of the information interpretation, contingent on activities and conditions in settings (Figure 11).

In summation, reading and comprehension are increasingly placed in more exteriorized social contexts through ubiquitous computing, networking and densely designed public spaces. These additional contexts are more contingent on reader/participant settings and activities. This in turn makes a different kind of cognitive and social demand on the reader/participant. It is therefore essential to look at ways of adapting ideas of cognition to design processes, and understanding user-oriented experiences. "Situatedness" suggests a strong connection and overlap between production and reception: interpretation becomes a form of production. User-oriented experiences and design processes are integral to each other. Design processes must overlap the reader/participant/user environment, since these new contexts privilege production and dissemination by the users themselves.

Abstracting our efforts into a final "user outcome" foregrounds performance, but may not enrich experiences and depth of knowledge. Finding connections between user experiences and design processes (and objects, settings and interpretation in general) can help facilitate meaningful design, enrich potential experiences, enable learning or even find ways to negotiate different cultures and their meanings and language.

To recall Innis's summary of Dewey, knowledge is more than the abstracted meaning of a written language to be transmitted and received: "we are neither mirror or carbon paper" (Innis 1994: 62).

Notes

1. For further examples of wireframing techniques see Zapata 2010.
2. The original project/exhibition was held in a gallery space (Neues Leben, Mitte, Berlin, Germany) in July 2008. The updated project with additional interactive work was recently exhibited in a border state (Texas) at Landmark Galleries (Texas Tech University Galleries) in April/May 2010. Additional project documentation is available online: www.imaginarycountry.org/www_09/imiginary-country.html.
3. The original project/exhibition was held in a gallery space (Walker's Point, Milwaukee, Wisconsin, USA) in 2003. The project continued in several other exhibition venues. Locations included Havana, Cuba; Maracaibo, Venezuela; and Tijuana/Mexico City, Mexico (as part of the *Borderhack* event organized to protest immigration policies in the United States). Additional project documentation is available online: www.imaginarycountry.org/www_09/border_series.html.
4. For additional perspectives on the concept of embodiment, see Wilson 2002: 625–36.
5. Prior to the 2008 course, Stacy Rohrbach (2003) explored issues of motion design and the periodic table in her masters thesis. This provided a valuable underpinning for introducing the periodic table project to the graduate group. Her original thesis is available through the NC State Libraries, and also online.
6. My abridgement and application to motion design of *Six Viewpoints* comprises a different way of looking at the original categories and intent. For the original, consult Bogart and Landau 2005.
7. The periodic table prototype was created by one of two first-year graduate student work groups in a three-credit course that I taught in Spring 2008. The course overviewed basic approaches to the visualization of information. The members of the group were Marty Maxwell Lane, Kelly Murdoch-Kitt and Samyul Kim, affectionately known as "The Protons."

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