Space Shifting: New Technologies, New Opportunities¹

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Humans have a long history of using natural environments and built space (see e.g. Low and Chambers, 1989) to give meaning to interactions, roles, and relationships. This includes representing spatial relationships in language, as in wayfinding and reference (e.g. Brown and Levinson 1993), or the use of spatial metaphors for indicating time. It also includes the creation of pictorial representations, such as graphs and navigational charts which manipulate the terrain in ways that influence cognition and imagination. Pacific island houses and Berber houses (Bourdieu, 1973) are places for "writing" and "reading" status differentiation, as the body is manipulated through manners of entrance and activity (Duranti, 1992). New technologies allow us to create new kinds of built spaces and to manipulate space in new ways, by amplifying certain aspects of human perceptive systems (Keating, 2005), through the construction of virtual space fields, by altering means of representation, and through new forms of mobility within spaces. This consequently affects how meaning is produced, possible actions, collaborations and perceptions. Computer gamers, for example, collaborate in new kinds of worlds with new properties, and deaf signers communicate through dimensionally reduced, but globally expansive technological spaces. I argue here that with advanced technologies, space becomes a semiotic tool of new potential, including new elements of choice, contrast, sequence, and simultaneity.

Drawing from a number of research projects including deaf signers with webcameras; mobile phone users in fifteen societies; blind, deaf, and elderly mobile phone users in the U.S., and online student gamers, I discuss some aspects of the role of space in new technological environments: how particular spaces are new opportunities for social

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interaction, using multiple modalities in making cyberaction possible across technologically-mediated and unmediated space, relationships between embodied action units and their onscreen representations, aspects of unequal access to space due to differing physical abilities, and how humans can manipulate the role of space in interaction in ways that have not been discussed before.

1.0 New Opportunities for Interaction

There are many effects of new technological spaces on activity organization. These include participation framework possibilities, planning, language use, embodied action, the role of the object, audience management, privacy, access, work, learning and innovation. Participants in many societies are managing new aspects of communicative context and reference due to technologies, acquiring new levels of competency and technologically-provoked habits of sequential understanding and clarification. In the excerpt below, for example, two deaf people organize virtual onscreen interaction in sign language. They refer to how to move and even edit the visual self and other to coordinate on and offscreen vision, size of person, and the spatial framework of the interaction with each other as they talk. This work includes negotiating two separate, but now technologically joined spaces in which the interaction takes place.

(1) C and J organize their space for interaction

(note: capital letters indicate approximate glosses for American Sign Language, dashes between words indicate one sign for corresponding multiple English meanings, [bracket indicates overlapped conversation)

- J: BETTER. NOW I MOVE-SIDES-IN. That's better. Now I've made the image smaller. [C: OK. (16.0)
- J: I MAKE YOUR IMAGE BIG. I am making your image big.

(2.0)

- C: OK.YOU MOVE-SIDES-IN YOU MOVE-SIDES-IN OK? Ok. You move the sides of the image in ok?
- J: MOVE-SIDES-IN. YOU WIDEN. UNDERSTAND? Move the sides of the image in. Make it wider. Understand?

C: OK. RIGHT.

J: NOT IMPORTANT LOOK ME LOOK. YOU MORE IMPORTANT YOU. IMAGE.

It's not important [for me] to see how I look. It's more important how you look

C: YES.

J: RIGHT. BUT IMPORTANT CAN LOOK YOU FIRST. Right. But it's important to check yourself first.

The topic here is manipulating the image or virtual presence of the self and the other person. The software allows the image of both sides of the webcam interaction to be represented on each person's screen at the same time. Here participants are communicating aspects of recipiency or reciprocal perspectives in a differently shared interaction space. The computer also has a perspective which users orient to over time, building habitual communicative understanding and practice. Signers (and others) find the ability to see themselves useful so they can understand and adjust to the other's view of themselves optimally. Most signers keep their own image small, and enlarge the image of the other person. Onscreen space is used in a novel way to differentiate interaction status. In this case the computer reduces perspective to only two dimensional and rather limited space (see Keating and Mirus 2003); in gaming space, to be discussed below, properties of space are more radically transformed and more complex perspective shifts are possible. Both gamers and signers can, through the machine software and hardware, control gaze, sight, and sound parameters not only of their own relationship to space but others.' By moving a mouse, point of view or perspective on the onscreen interactional space can be manipulated.

In both gaming and in signing with webcams, the technologically-created space must be coordinated with real space. This is also the case with mobile phone interactions where the very ground and makeup of participants are constantly shifting (Katz and Aakhus, 2002; Ito et al., 2005; Keating and Nagai, 2007). Coordination of activity across real and technologically-mediated spaces is an important issue. Using mobile phones equipped with GPS (global positioning systems) members of the blind community can technologically mediate space, for example, when they get and give information about visual spatial coordinates in new ways. They can also use a mobile phone to control other devices, e.g. to open doors. For the blind, the questions 'where am I' and 'what are the features of the space I am in' can be answered in new ways: on earth, in the GSM network, or with respect to 'what I am connected to' (Keating et al. 2007). For the deaf, the technically enhanced ability for a person to traverse space means sign language interpreters can transcend real space limitations to appear virtually in many locations.

Tactility translates into space-transforming action when the computer mouse and keyboard movement results in onscreen avatar movement and players manage environments with particular relevant next actions, constantly orienting, manipulating, interpreting the body and the body's double in constantly changing space. Similar to the case of deaf users of webcam technology, gamers teach each other how to understand the

consequences of particular actions and settings in an operative "reciprocal field." They build a sense of space which is both similar to and different from their habitual face-toface field in terms of its features. In the case of signers, the technologically-mediated space is one where facial signs cannot be perceived well. Signers adapt by migrating expression across modalities, utilizing gaze differently (Keating, Edwards, and Mirus, 2008). They substitute new manual means to produce contrast to build clarity of expression. They manage new relationships between embodied action and its onscreen representations and representational space.

In technologically-mediated space, interactants are managing at least two operational fields (see e.g. Wasson 2006 looking at virtual meetings) simultaneously and sequentially in which there are different implicatures and conventions, potentials and attributes. Various communicative resources are recruited to transition between spaces, to integrate spaces, to form contiguous spaces, or to focus on a particular space of action, as well as to manage points of view. And participants must coordinate not only their individual actions, but activity with others (see Goodwin and Goodwin, 1996; Suchman, 1992 for a discussion of control room environments). In the interoperation of spaces, participants use head shift, voice, space, gesture, and objects to manage complex collaborations. In excerpt 2 below, four gamers share what they perceive through their individual headphones and on their individual screens, not through sharing the sounds or images themselves, but through sharing their interpretation of their significance, as in David's comment to the others "I hear it somewhere around here" in the first line, and his characterization of the nearness of the sound based on strength and clarity.

(2) Coordinating perspectives on space to prepare for next actions

(note: underline indicates emphasis, numbers indicate length of pause, < indicates rapid speech with no pause between phrases, question mark in parenthesis indicates unclear speech, [indicates overlapped conversation).

David: I hear it somewhere around here. Caitlin: oh really do-David: Like loud and clear (...) David: I see him. (2.0) Keep him off for like ten seconds. Grey: Do you see it? James: I see it<I see it<I see it<I see it. Caitlin: I hear it<I hear it[<I hear it]. James: [<I see it<I see it< I see it. Grey: Where's that-David: Keep him OFF me. I don't know (unclear?) Grav: James: I'm doin it I- I-I'm doin it I'm doin it I'm doin it [doin it David: [alright] James: Exiting ((releases his hands)) Exit exit [exit ((his final 'exit' David: corresponds to his final clicking)) Caitlin: exit exit exit James: [Exit exit exithhhh(.) Awesome

The participants in excerpt 2 report the moment the target of action enters their space. They use repetitive, rapid phrasings, for example, when James says "I see it, I see it, I see it, I see it." It is important to communicate to the others relevant changes in the character of their interaction space, so they can coordinate action. New technology influences the use of space in the planning of next activities and impacts sequence (see e.g. Cherny; 1999, Herring, 1999). As the instructions for the game City of Heroes state:

There is no larger crime in a team setting than walking around with a full inspiration tray...If a teammate can use it more than you can, give them the inspiration by dragging it over to him...If you can't use it right now, but it's taking up space, use it anyway and make room for better stuff to come. Always keep at least one open slot...There's no time for full-on trading during an extreme battle (http://boards.cityofheroes.com).

Inspirations ("one shot boosts to your abilities") are kept in a player's inspiration tray. These new spaces for action challenge existing habits and result in interesting impacts on the organization of interaction, i.e. ways of producing an understandable action, nonlinguistic signals, orientation towards recipiency, alignments, silences, turn-taking,

interruptions, overlapping activities, and participant frameworks. People adapt what is referred to as "multimodal interaction" (Enfield, 2005; Stivers and Sidnell, 2005; Streeck, 1993), including the different effectiveness of particular ways of making sound waves travel through space, the projection of visual representations and what actions bodies can accomplish in rapidly reorganizing and renewing spaces. Mobile phone users manage interruptions and multiple participation frameworks as well as other impacts.

2.0 Managing Modalities

Mechanical attributes of technologically-mediated representation and communication privilege some habits and modalities while stimulating the development of additional routes to collaborative meaning making. This can mean a reorganization of actions which make up conventionalized embodied symbolic behavior, a body differently used for communication. For example, where a signal in ASL (American Sign Language) such as question marking might in face-to-face interaction be communicated through facial grammar, onscreen it is more effective when produced together with a manual sign, thus reorganizing a hierarchy of modalities. Signers adapt to the fact that the use of gaze or evebrows as a way to disambiguate is ineffective when one's conversational partners are reduced in size, space, and clarity, and small movement of the eyes is difficult to discern. After experiencing conversational repairs about the intended addressee, they substitute manual means of indicating addressee instead, pointing or name signs (Keating, Edwards, Mirus, 2008). Signers also effectively exploit what might be called modalities of the object-the lens itself-to elaborate message form. They use properties of the webcam to enhance clarity of message in the case of positioning a hand closer to the camera lens, which enlarges it in the addressee's space or field of vision, a kind of enhanced "eve" of their addressee, performed by the "speaker" or signer. Online gamers also exploit parameters of vision and control multiple eyesights through proficient tactile manipulation of keyboard and mouse, rapidly transitioning from space to space, making machine powered gaze shifts, as they manipulate multiple perspectives.

Blind people using mobile phones equipped with GPS alter their hierarchy of modalities through a new accessibility to sight, when their phone can vocalize space. This is significantly enabling, since without a means to gain moment-by-moment information about the world before them, many blind people adopt unchanging and predictable routes of action and movement, spatially limiting their lives. New technologies for transforming visual maps to vocal ones enable unsighted, independent movement through space affording a break from routines and a change in lifestyle, and increasing their potentials for interaction, activities, and information (see Slatin and Rush 2003). Using a mobile phone camera for sending pictures of landmarks, street signs or storefront signs or utilizing the phone as a prosthetic pair of eyes means that blind people may recruit help outside of the immediate spatial environment. They can send a picture to someone sighted in order to show visual information about where they are to coordinate a meeting place. What blind people refer to as perceptive barriers can be reduced (Keating et al., 2007).

3.0 Space Shifting

The gaming environment includes the most radical potentials for space shifting or the ability to instantly change the attributes of space. In the game City of Heroes, for example, one can perform an instant makeover of a space as ice-covered, use "illusion control," control gravity, or walk and fly through space. Teleportation changes relations with space and special processes such as "bubbles" are available, which are personal shields whose effectiveness is related to spatial distance. Game space has been referred to as "layers of independently moving planes (multiple scrolling backgrounds)" (Wolf, 1997: 60-64). These can be viewed from multiple angles controlled by the player and the software. Players can change the representation of events in space (represented or "mapped" spaces) and orient to events occurring in off-screen space (Wolf, 1997:67). Interacting in virtual spaces requires learning to manipulate visuospatial coordinates, locations and points of view, such as a switch between a first-person perspective on space and another person's perspective, managing the actions of the "self" in other-than ego-based sight. Signers can similarly manipulate space, moving the web camera to shift points of view of self, surroundings and others and have a new range of sight action and next action alternatives, and ways to manipulate space. Gamers have not only multiple human-eye and machine "eye" shifts of view to coordinate, but different visualizations and representations of communicative information on the screen. To coherently and simultaneously manage multiple perspectives, interactants recruit multimodal engagement tools and focus mechanisms, formulating interrelationships between virtual and real spaces, contiguity and complementarity, and shared and unshared reference points.

In the case of computer gamers, players orient to emerging sight and sound cues, similar to the control room discussed in the Goodwins' work (Goodwin and Goodwin, 1996). These are distributed across real and virtual spaces, which they interpret. In the excerpt below David expresses his annoyance at a "meaningless" sound cue produced by one of the participants in real space (a sound made when James manipulates his keyboard) that is interfering with David's focus on other sound cues which are more meaningful for the ongoing action in virtual space and his ability to use sound to coordinate his actions with others. Another player, Green, explains how James can silence this cue, and better manage action in contiguous but different spaces.

(3) Noise vs. meaningful sound

David: God James please stop pressing (?) and the (?) button at the same time (?)

James: But that's how I play the game hehhehheh

Green: You can turn it [the sound] off in bios

With the ability to project human activities through space and across different time zones and the possibilities of interacting in technologically-mediated spaces with technologically-mediated representations of ourselves, our environment, and objects in our environment, we experience new affordances for action. The effects of one's actions are

mediated through the imaginations of programmers, developers, designers, and other participants engaged in experimenting, teaching, and learning. Those developing three dimensional video game worlds "continue to experiment with different configurations of space that have not been seen in other media" (Wolf, 1997:74). At the same time increased access to new spaces and types of interaction means that the management of mobile and technosocial space now includes managing illegitimate activities, for example, mobile phones have facilitated illegal activities between drug dealers and consumers and school children have been caught cheating on exams in Korea, the U.S., and Russia, where school children developed a sophisticated system of calls and short messages on mobile phones to check answers. Mobile phones facilitate the organization of assaults in real space and harassment (cyberbullying) in virtual space. Game worlds contain action sequences such as "dominate" which is explained as to "painfully tear at the mind" of a "single target foe." One can dominate another in the sense that an action "renders a foe helpless, lost in is own mind and unable to defend himself' (http://boards.cityof heroes.com). Vulnerable populations, previously limited by physical space constraints or the coordination of group activities in space, can be reached in new ways. Actions can be contiguous across vast spaces. Social and physical inequalities can limit accessibility of space shifting and this makes it difficult to deliver on the new promises of disability theories--to create social freedom through the creation and maintenance of a space already prepared to meet the needs of all.

4.0 Conclusion

As social actors in technologically-mediated space are working at integrating shifting spaces of interaction, they create new ways of using space symbolically with contrastive properties that emerge as important in meaning making. In this process multiple modalities for communication and action are utilized in complex relationships with multiple technological renderings of such modalities. Language resources, including "games" (in the Wittgensteinian sense of a series of moves available to language users) and "play" (in the sense that humans are highly creative) have previously been productively analyzed as forms of context-dependent meaning making. Communicative interactions have also been analyzed through formal properties of code switching (Gumperz, 1982), register shifting, and style shifting. New technologies indicate that "space shifting" might also be productively analyzed as a resource for meaning, as technologies visually and tactilely present us with broader opportunities for play and creativity as we coordinate interactions with others.

Humans are masterful at creating environments for the conduct of social life and utilizing these environments in complex social projects, including creating and maintaining inequalities, the organization of work (Engestrom 1999), categorizing roles and relations, and many forms of collaborative activities. This includes the development and acquisition of complex schemes for conducting ones own actions and interpreting those of others. In the cases described above, people manage multiple operational spaces, virtual and real, in which there are different implicatures and conventions. They use various communicative resources, some new and some recruited and adapted, to transition

between spaces, to integrate spaces, take turns with others within and between spaces, to link a prior with a next, or to focus on a particular space of action.

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