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Challenging the Dominant Image:

Culture, Communication, Technology

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How do we know when the work we're doing here, this research, is any good? Does research in aviation communication make a difference? How can we predict better how the results of our work will be received? We researchers spend a great deal of our time producing new knowledge, but is anybody listening out there? Emphasizing knowledge production has led to a deemphasis on knowledge distribution or dissemination. Might it be helpful to pay more attention to the pathways through which our new ideas are disseminated, received, and used?

What I'd like to suggest tonight is that our work has value in the areas we study to the extent that it challenges the dominate images that operate there, challenge them by making visible or revealing what these dominant images hide. In particular, research in aviation communication makes a difference to the extent that it challenges, or intervenes in, dominant images of communication and technology by making visible what these images hide. With the term dominant images, I am referring to meanings that are taken for granted in everyday language and everyday activities. They are images that appear so routinely in what we do that they appear to need no explanation.

Culture

For example, think for a moment about how you use the word 'culture' in everyday language or what you think when you hear people talk about American culture, Latino culture, the culture of pilots, corporate culture, and the like. Common usage defines this term as something like "the total way of life of a people or social group." as "an integrated pattern of beliefs and values," or as I was trained to understand the term, a "system of symbols and meanings." A culture is something that someone is 'in'; it's a kind of membership group.

This definition first emerged in the 1930s and 1940s in the United States through the work of such famous anthropologists as Ruth Benedict and Margaret Mead. First published in 1934, Benedict's book *Patterns of Culture* served for over thirty years as the main standard of reference for the concept of culture. Over a million copies translated into fourteen languages held readers' rapt attention with paragraphs such as the following:

> No man ever looks at the world with pristine eyes. He sees it edited by a definite set of customs and institutions and ways of thinking. Even in his philosophical probings he cannot go behind these stereotypes; his very concepts of the true and the false will still have reference to his particular traditional customs. . . . The life history of the individual is first and foremost an accommodation to the patterns

and standards traditionally handed down in his community. From the moment of his birth, the customs into which he is born shape his experience and behavior. By the time he can talk, he is the little creature of his culture, and by the time he is grown and able to take part in its activities, its habits are his habits, its beliefs his beliefs, its impossibilities his impossibilities.

Margaret Mead added compelling images to this way of thinking with a study of adolescent girls on a Pacific island in her book *Coming of Age in Samoa.* In sharp contrast with the sexual ambiguities and emotional traumas associated with adolescence in the West, Samoan girls seemed to move easily from childhood to adulthood, including entering into casual sexual relationships. This book was news because it shared with Benedict's work the explicit message that distinct cultures were not higher or lower than one another, just different.

At the time, the dominant image in everyday language and everyday activities was that primitive peoples were somehow lower than civilized peoples and that everyone was evolving from less advanced to more advanced states of civilization. An implicit assumption was that, if we sat around watching long enough, everyone would eventually turn into Europeans or Americans.

But at that time, the world was changing. The dominant image of evolutionary change helped explain a world that had been colonized and ruled by the nations of the West. On the yardstick of evolutionary development, it had been might that had made height. The decline of colonialism and growing population of independent states raised significant questions about the dominant Western image of Western superiority.

The new culture theory from anthropologists had such great impact because it challenged the dominant image and intervened in it, displaying its authority by advancing a plausible alternative account of differences in the world. This was not a simple substitution or replacement but a complex shift in dominant images to take account of changing circumstances. By the late 1950s and 1960s, the idea that we all live in distinct cultures had seeped into and saturated the popular mind, and the idea that peoples of the world were different from one another because they lived in different cultures could be taken for granted. It needed no further explanation.

But the world is changing once again. Great shifts in population are taking place as people cross national boundaries to pursue lives and careers, and global involvement in communications technologies brings distant peoples into one's own daily life. The number one television show in India is Oprah Winfrey, and CNN is everywhere. The image of the world as a set of discrete bounded cultures assumes a homogeneity inside each one, yet the big problem for the concept of culture today is the hybrid person.

Take for example a person we'll call Juan Lucena, born and raised in Bogotá, Colombia but educated from high school through the Ph.D. in the United States. In many ways, he is more north American than I am. According to the dominant image, Juan is bicultural, which is a sorry mutant with a body that, because it belongs in two worlds, does not really belong anywhere at all. A real pathology. But are these two worlds themselves all that distinct from one another? In some ways, city life in Bogotá today is more like city life in Phoenix that rural life elsewhere in Colombia. The whole idea of cultures as distinct membership groups is breaking down.

An alternative view of culture that takes account of these changing circumstances is that,

rather than locating people in groups, cultural meanings challenge people with labels and expectations, and then people have to figure out what to do with them. From this perspective, Juan is challenged by two distinct sets of dominant images rather than endowed with membership in two groups at the same time. Furthermore, Juan does not only have two sets of meanings to deal with--he is challenged by the cultural meanings of life as an engineer, a humanist, a man, a husband, a scuba instructor, a racqetball champion. Extending the point, we are all arguably cultural hybrids in one sense or another, for we all have to deal with challenges from distinct cultural images that we experience simultaneously. A female aeronautical engineer from Embry-Riddle turned shuttle pilot has had to deal with dominant, stereotypical images of engineers, pilots, and women all at the same time. The phenomenon of multiculturalism resides in people's responss to these combinations. The multicultural achievement of Susan Still is that she has succesfully found ways of reconciling competing expectations.

The larger point is that new anthropological research on cultural hybrids will likely be seen to have value and make a difference to the extent that it challenges the dominant image of cultures and makes visible what was hidden. If successful, we will find it increasingly difficult to see new types of people around us as members of strange cultures and instead find outselves asking "So, what combination of multicultural challenges confronts you?"

Communication

How can this be applied to research on communication? It is probably safe to say that the dominant popular image of communication is something like "a process by which information is exchanged between individuals through a common system of symbols or signs, a common code." The key point here is that the dominant image of communication presupposes success as the natural state of affairs. Communication is just one thing. It either happens or it does not. It exists if all goes well and does not exist if something goes wrong or throws up a barrier. In the dominant image, there is only communication and miscommunication.

From this perspective, the analysis of aircraft communication becomes largely an investigation of failures. Successful communication needs no explanation, other than satisfying the purely technical criterion of making sure that all the links and factors, technical and human, are in their place. By contrast, failures are unnatural, unique events in which something gets in the way to prevent or inhibit proper communication. The focus is on breakdown, imperfection, inappropriateness. Was it someone's lousy accent, their broken English, their failure to follow rules, or some unexpected variable that managed to sneak in and screw things up? When it takes the dominant image for granted, research on communication helps attribute blame, rectify failures, and return everyone to the natural state by preventing further deviances down the road.

But wait, this natural state is difficult to achieve. The problems are not disappearing. Barriers remain, mistakes continue. In some cases, these seem to be growing, getting worse, with consequences that may be increasingly severe. This is confusing. Is the world going mad, standards falling, moral responsibility declining? What happened to people's sense of commitment? Although new types of failures may insure continued funding for research, these frustrate both the researchers who genuinely care about what they do and the funders who never seem to be able to plug all the leaks.

The dominant image of communication as just one thing is like the dominant image of

culture in that it puts people into membership groups, such as speakers of English or people who share proper aircraft protocol. Inside the group, everyone is supposed to be the same, sharing the same code and taking turns serving as speakers and hearers. But as researchers in this Forum have been pointing out over the past two days, this image hides a lot. In actual events of communication, people come from different places with different experiences, expectations, and interpretations of what is taking place. For example, what takes place between pilots and controllers . . . .

In an important sense, a collaboration is taking place in this conference to make visible events and variables that got hidden by the dominant image of communication. Will the relative value of different studies and approaches depend upon how they challenge and intervene in this dominant image or others that operate in our research domains?

As the world gets more complex, as networks of communication become denser and denser, and as systems of communication multiply, might it be helpful to think about communication not in the singular but as a plural, as communications, or modes of communication? Might it be helpful to think about the natural state of successful communication not as natural at all, but as the outcome of hard work, as a fragile outcome that depends upon people accepting a novel or unnatural state of affairs, such as training in aircraft communication?

What if researchers in aviation communication were able to shift the dominant image of communication such that what is now called miscommunication were actually taken to be the natural state of affairs? Achieving processes whereby what was taking place really was simply exchanges of information would be seen as true accomplishments. The research challenge would shift from identifying, explaining, and rectifying failures to figuring out how to build shareable systems of communication given heterogeneous mixes of people with diverse training and experience and machines with diverse purposes and capabilities. Everyone, including funders, would likely welcome and expect communications researchers to be proactive rather than reactive, to play major roles in the design and maintenance of fragile systems rather than showing up afterwards to repair unnatural deficiencies. Rather than functioning as police officers and judges who attribute blame and plan rehabilitation, researchers in aviation communication might very well be seen and see themselves as helping to bring people together who were otherwise separate, helping to establish and build multiple systems of communication among otherwise distinct hybrids.

Technology

But what about technology? Am I not overstating the problems in aviation communication in light of opportunities presented by new technologies? Won't automating aircraft communication eliminate all the annoying human barriers to proper communication? After all, technology is technology. Technology is actually the trickiest of the dominant images to work with because we adore it so much. America loves to turn to technology or, bettter, the image of technology as the solution to its problems.

In everyday life and language, Americans regularly understand and characterize technology as an external force that changes human society through its impacts. The human is separated from the machine by a sharp boundary. Technology is an independent variable, with human society as its dependent product.

This separation sets up three different interpretations of the relationship between machines and humans. The dominant image is that impacts are inherently positive. In fact, every generation in American history has made technological advancement a condition of its dreams about a utopian future, usually understood as social progress and human liberation. While the specific contents of progress and liberation have changed from period to period, the sharp boundary between the human and the machine has remained. But alongside utopian dreams about a new technology lies its opposite, dystopian dreams, which pictures the technology as leading away from social progress and human liberation toward some frightening future of social and political domination. Consider the opposed visions widely available of nuclear power, gene splicing, information superhighways, and supersonic transports. When relying upon the standard image, people constrain themselves to regard technological development with either an irrepressible sense of optimism or an immovable sense of pessimism. The future will be wonderful, or it will be horrible.

Public debates over the impacts of new technologies regularly degenerate into confrontations between proponents and opponents. To the proponents, who view the technology as a ticket to progress and liberation, anything short of support is opposition that is anti-technology, anti-progress, neo-Luddite, and, hence, maliciously anti-American. To the opponents, any show of support is a sign that one has been co-opted by a system that depends on inequality and produces domination. Middle ground becomes a dangerous position to occupy, for no one trusts it.

Adopting the dominant positive image is usually a pretty safe strategy politically in the United States, for most everyone likes to look to new technology for solutions to current problems. Championing a new technology is likely the path of least risk and hostility. After all, it is likely to offer some interesting new combination of agencies. On the other hand, challenging new technology can be a highly risky enterprise. Claiming that a new technology is inherently negative is usually also an announcement that one is willing to accept marginal status in society. That is, one is willing to risk being classified as anti-technology, anti-progress, neo-Luddite, and anti-American in order to protest the technology. Even the related, more frequently used, strategy of pointing out negative impacts without making a judgment about the technology as a whole is also dangerous. Given the dominance of positive images, any attempt to put negative images on the agenda provides evidence that one might be a closet anti-technologist, and one can find oneself sliding down the slippery slope down to marginality, irrelevance, and probable unemployment.

There is a third popular interpretation of the sharp separation between the essences of humans and machines: technology is neutral. In this perspective, treating technology as a force on society appears downright foolish. No technology develops without human choice and deliberation. No technology has impacts without human choices to use or abuse them. This interpretation tends to be aligned politically with the proponents' image of a technology as inherently positive, for characterizing a technology as neutral can be an effective way of assuring neutral people that humans are in control. The strategy is particularly useful for advocating weapons and other technologies whose impacts might appear to be intrinsically negative. When

this strategy works, it undercuts opponents by casting them as anthropomorphizing the technology, treating it as somehow having a life of its own, which of course must be ridiculous.

My own field of science and technology studies exists largely to intervene in this dominant image and related images of science, making visible what gets hidden. Think for a moment about your experiences with machines, especially computer and communications technologies. Have you ever felt the sensation of traveling inside a computer or felt yourself and your life being fashioned by your relationships with the machine. Have human experiences or human agencies been transferred to machines? I have interviewed engineers working in computer-aided design on the subject of living with the machine. For example, I asked one young engineer . . .

Gary: Now how about your relations to the computer here? Is there a sense of, I mean, do you climb in the computer? When you get it to run, like how. . . ?

Steve: Well, people like to say that a computer does only what you tell it to do. Sometimes it does more: it doesn't do what you want it to do, or it does something you don't tell it to do. The computer maybe assumed something. It had a default value or something. If you don't declare a variable, it's always going to be zero. If you don't declare it as a number, it's going to be zero. I didn't tell it to be zero. It assumes it's zero. It's not really an artificial intelligence, but that's the way it's pre-programmed, how the memory's pre-programmed, I guess.

I don't know if I could say this, but I'd probably say that I'm one with the computer. I'll be bold and say that, I guess. `Cause I've been working with computers since seventh grade or something like that. I can do a lot of things with a computer besides . . . . I think I'm a real computer person. . . . . I sort of go above and beyond the call of duty, and I turn my computer on everyday, and it's hard for me to live without it.

Think also about flying. Surely students don't come to Embry-Riddle just because they want to interact with machines called airplanes. No, like my older brother, an Air Force Academy graduate and career Air Force pilot of C141's they want to fly. The passion is to fly. Like a bird, together with the airplane. Everything else comes second. I bet at least some people in this room have experienced a sensation of sharedness with their flying machines. The dominant image of things technological sharply separated from things human such experiences, making them seem unnatural and silly.

But total automation never happens, the total replacement of humans by machines. If the dominant image actually made this distinction problematic, people and things might appear differently than they do now. A pilot, for example, would become a human molded to fit the shape and demands of a cockpit. Training would become the transfer of machine agencies to the body--different training, different bodies. Communications technologies would shift from being technical links between humans to quasi-human or humanlike contributors that brought their own languages to the table. For example, just following the communications links that take place in a computer involve one in a huge number of translations from human language to the language of applications software, operating systems, assembly language, firmware, and the binary coding of 1's and 0's in hardware, with each translation fitting a given message to a different code and transforming it in the process. From this point of view, the complex of ever-changing

technologies in systems of aviation communication could not be seen as rescuing researchers from barriers and mistakes. While new technologies may provide important pathways incentives for regulating everybody into standardized behaviors, each new innovation also comes with its own unique language of demands and challenges. New technologies thus add new problems even while fixing others. Perhaps shifting away from the dominant image of humans as sharply separate from machines may keep us from placing unrealistic expectations on the technologies we develop while allowing researchers to participate critically in new developments rather than having to choose between serving as cheerleaders, fearmongers, or disinterested agnostics.

Conclusion

In sum, like people in the early 20th century, we are living in a world of fundamental change. A world of hybrids traveling around from place to place and interacting with one another through an ever-expanding array of communications media differs dramatically from a world of localized peoples living with bounded cultures inside of well-defined nation states. In changing contexts, we can tool along with our old images and get mad and resist when things don't fit. Or we can turn back on ourselves and ask: What are my main assumptions here? What are the dominant images that I have made part of my habits and beliefs? What do these images hide in changing circumstances, and how can I make such things more visible?

I would argue that future research in aviation communication will have value and make a difference to the extent that it challenges the singular model of communication that reject miscommunication as unnatural and sees successful communication as a fragile construction that takes collective effort and work to get there and maintenance to stay there. Our new technologies will work to the extent we do not expect them to provide solutions to all our problems. Through a commitment to challenging and intervening in dominant images, what are now our impossibilities may become not only the possible but also perhaps even the expected. [dominant images define research problems]