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The New Media Landscape & Its Effect on Science Journalism

IF YOU can *fully* answer the question “Why did Madonna drop her record label and replace it with a concert promotion company?” you can skip ahead to the next chapter - you completely understand that we live in a new media world. If not, remove your records from the turntable, turn off the VCR and give me a few minutes to share some facts and figures that will give you a way to think about the revolution occurring in the media world.

I recognized the need for such an overview when I mentioned to a colleague that I'd been on public radio's *Marketplace* the night before, and thus had reached about six million people. He said “That's all?” The degree to which you express incredulity at his answer might serve as a litmus test for reading this chapter about as well as any questions about Madonna's career.

A key aspect of my career has been the realization that engineers need to make mass media an integral **Audience** - perhaps *the* integral - part of our outreach. We **Numbers** have many great programs that work at the local level - mobile units like my university's “physics van” which transports demonstrations to students - but what we really need is to dramatically leverage our time. That calls for mass

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media. This requires, of course, understanding the current environment so that we can see where to fit in. We should be able to figure out what size audience we can realistically aim for and to anticipate audience trends. So, let's take a look at audience numbers in order to get a feeling for the media landscape and our goals.

Fragmentation as measured by sitcom finale I start with the “big three” networks' evening national news programs.² (Do you still watch this? I stopped in 1984!) ABC, NBC and CBS have about six to nine million viewers. That number alone isn't interesting, but over the last twenty-five years, network news has lost one million viewers each *year* -- that's half their audience in the last twenty years.³ This fact reveals an essential truth about the expansion of the television dial and the fragmentation of the audience.

I've developed a new statistic to illustrate this splintering of the dial, which I call “fragmentation as measured by sitcom finale.” Here are the relevant data:

Viewership for final episode

M*A*S*H (1983)	106,000,000 ⁴
Seinfeld (1998)	76,300,000 ⁵
Friends (2004)	51,100,000 ⁶

²For those under fifty: Up until the mid-1990s the dominant source of information for most Americans was the nightly network news on one of the only four networks ABC, NBC, CBS, and PBS. These broadcasts got huge audiences and drove the news cycle. The “king” of the news, if you will, was Walter Cronkite, who retired in 1981.

³<http://www.journalism.org/node/943>, State of the News Media 2008, Journalism.org.

⁴AP David Bauer, February 4, 2008, story on The Super Bowl.

⁵*New York Times*, March 16, 1998.

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Since *M*A*S*H*, the final episodes of very popular shows have lost about 25 million viewers each decade or so. Is *Friends* 50% “worse” than *M*A*S*H*? No, it isn't that *Friends* is a lesser sitcom than *M*A*S*H* - I mean, neither of these is *Charles in Charge* - but rather the dial has fragmented. We can see this fragmentation clearly if we study ratings for various news and information media - or at least what passes for news and information today.

Listenership & viewership for today's news/information programs (March 2008)

Rush Limbaugh (radio)	13,700,000
Morning Edition (NPR)	13,200,000
Evening Network News	~7,500,000
O'Reilly (Fox News)	3,070,000
Dobbs (CNN)	1,222,700
<i>New York Times</i>	1,037,000
Hardball (MSNBC)	600,000

No doubt that by the time this is published some of shows listed might even be canceled, but the trends and punchlines are clear:

- Television has large numbers in the aggregate, but it has completely fragmented; often you are one of 100,000 or so watching a show on a cable network.
- Public radio has not fragmented and has gone gangbusters - this is an educated, voting, active audience whom we don't want to lose.⁷

⁶*Multichannel News*, August 14, 2006.

⁷Some facts about the demographics of the public radio audience: These listeners

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- Printed newspapers are on the decline. The top 20 papers have lost about 10% or so in circulation in the last two years, and their circulation further drops every quarter. The printed newspaper lost its economic model when Craigslist took over the classified ads. Online newspapers are doing better, but there is no economic model to make as much revenue as the printed papers.⁸
- Engineering communicators need to look at economic ways to get chunks of 100,000 listeners and, when it can be done, a million or more.

With these numbers, I've put in perspective that reaching six million people with a commentary on *Marketplace* is pretty darn good! Still, the numbers reveal a story of crisis for journalism.

The crisis in journalism Every day brings more dire news for journalism: declining circulation of newspapers, dropping viewership of television news, and fewer listeners for commercial radio. Nowhere is the impact more profound than on science, technology, engineering, and medical journalism. Ralph Cicerone, President of the National Academy of Sciences, clearly spelled out the crisis:

are intellectually curious and enjoy learning about the world around them. They are 33% more likely than the general population to express an interest in theories and 32% more likely to enjoy learning about art, culture, and history. This is an active audience. Over 70% voted in the most recent local, state, or federal election. NPR listeners are 22% more likely to be involved in clubs and organizations than the general population. NPR listeners are more than twice as likely to have addressed a public meeting, written to an elected official, or written to an editor of a magazine or newspaper. Approximately 9.3% of the NPR audience is African-American.

⁸Keep in mind the difference between circulation and readership. In this Internet age one can indeed have high readership of a newspaper website but low circulation of the printed paper. The problem is turning readership into income.

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[W]e are also seeing troubling signs that communicating science, engineering, and medicine to the general public is getting harder. With recent downsizings at newspapers, magazines, and broadcast outlets, there are now fewer full-time science writers and less space or time for serious, in-depth reporting.⁹

As print media retrenches, it often regards science journalism as a luxury. For example, in 2004 the *Dallas Morning News* let go of their esteemed, well-recognized, award-winning science editor in the wake of a costly circulation scandal.¹⁰ A struggling *San Francisco Chronicle* laid off award-winning medical journalist Sabin Russell, who had covered health policy and medical science for twenty-two years at the publication.¹¹ The *Houston Chronicle* laid off its aerospace reporter of twenty years. The venerable *Boston Globe* got rid of its Health/Science section, moving health to the Arts & Lifestyle pages and relegating science to its Business columns. And in 2008, CNN completely dismantled its science, space, and technology unit.¹² According to Mooney and Kirshenbaum, only one minute out of every 300 on cable news is devoted to science and technology, or one-third of 1 percent. These changes are emblematic of a wider shift in viewer and reader habits that have affected the presentation of science on television.

⁹Cicerone, Ralph, "Celebrating and Rethinking Science Communication," *The National Academies InFocus*, Fall 2006, vol. 6, No. 3.

¹⁰Layton, Charles, "The Dallas Mourning News," *American Journalism Review*, April/May 2005.

¹¹Mooney, Chris and Sheril Kirshenbaum, "Unpopular Science," *The Nation*, August 17, 2009.

¹²Brainard, Curtis, "CNN Cuts Entire Science, Tech Team," *Columbia Journalism Review*, December 4, 2008.

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The fracturing of science television programming Likely every reader over fifty recalls the great science shows of the 1970s: Carl Sagan's compelling *Cosmos* or Jacob Bronowski's majestic *The Ascent of Man*. Yet today the rise of cable and satellite has fractured the television dial into thousands of small pieces, each of which grabs a fraction of the audience of the past. The ratings for quality shows like PBS's *NOVA* have seen over a 50% decrease - typically, a *NOVA* episode sees an audience of one and one-half to two million viewers.¹³ Other outlets for science programming, like the *Discovery Channel*, have fallen 30% in the last four years - from 1.3 million in prime time to about one million today.¹⁴

In addition to a declining audience, the fragmented dial has changed the quality and impact of television programming - impairing the ability to offer rich, detailed, and thoughtful coverage of science, technology, and health. Because the television dial features hundreds of channels, we have become a nation of "channel surfing" viewers. As a television producer once put it to me, "We don't worry that people will tune away, we know they will, we worry about bringing them back." This means that TV has become a land of sound bites and arresting visual images that may or may not have meaning. Images are chosen first and foremost for their ability to return viewers to the channel, not to convey meaning. The programmers of the *Discovery Channel*, for example, often make prime time represent a "theme" -

¹³Private Communication, 2006.

¹⁴Steinert-Threlkeld, Tom, "Dirty Work," *Multichannel News*, August 14, 2006, vol. 27, #32, pp. 18-20.

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recent examples include “shark week” or a focus on “dirty jobs.”¹⁵

Is there hope? No, not in the sense that large audiences will ever be aggregated again. This issue is one that the journalism profession continues to struggle with, especially in looking for an economic model. The implications for our liberal democracy may well be profound: media choice might well increase inequality in political involvement and polarize elections.¹⁶ Yet this troubled media landscape *does* offer an opportunity for the engineering profession.

**We now live
in a world
of niche
audiences**

In the age of monolithic audiences, which required expensive tools - networks, costly cameras, sophisticated microphones - engineers found it hard to be heard. It was difficult to get mentioned on the nightly news or to be featured in a television drama. Nobel Laureate Leon Lederman suggested development of a “television pilot that would instead show researchers as skeptical, creative romantics.”¹⁷ In the fragmented world of niche audiences, by using cheap digital tools and internet distribution, the engineering profession can now target and reach the

¹⁵As of this writing, *Discovery Channel* prime time consists of these “dirty job” shows: Garbage Pit Technician, Skull Cleaner, Geoduck Farmer, and Fuel Tank Cleaner. *Multichannel News* as cited above.

¹⁶See, for example, Prior, Makurs, *Post-Broadcast Democracy: How Media Choice Increases Inequality in Political Involvement and Polarizes Elections* (Cambridge: Cambridge University Press, 2007).

¹⁷*New York Times Magazine*, August 13, 1995, Section 6, page 16. Lederman worked with professional script writers, AAAS staffers, and even got funding from the National Science Foundation and the Department of Energy. He wanted to counter a growing anti-scientist feeling by presenting scientists with the same allure as the lawyers and doctors on *L.A. Law* and *ER*. He called it, “Scientists fall in love.”

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audience we want - audiences of perhaps the 100,000 I mentioned above. The power of these niche audiences lies in their engagement with what they've read or watched.

Internet users like to forward science & technology stories

Two University of Pennsylvania researchers studied how internet users share information.¹⁸ Jonah Berger and Katherine Milkman learned that people preferred to forward articles with positive themes, and they liked to send long articles on intellectually challenging topics. “Science kept doing better than we expected,” said Dr. Berger, a social psychologist and a professor of marketing at Penn’s Wharton School. He continued:

We anticipated that people would share articles with practical information about health or gadgets, and they did, but they also sent articles about paleontology and cosmology. You’d see articles shooting up the list that were about the optics of deer vision.¹⁹

That, of course, is exactly the type of engagement that engineers want for their message. To fulfill the potential of these niche audiences, though, we need to understand thoroughly how new media works and to understand how young people use media differently than their parents.

The younger generation has replaced Descartes' “I think, therefore I am” with “I have a webcam, therefore I am.” No one under 25 uses e-mail any more; it's all instant messaging. Facebook now dominates in every campus computer cluster. The 20-something set even uses media communally: at

¹⁸Berger, Jonah and Katherine L. Milkman, *Social Transmission and Viral Culture* (unpublished research report, University of Pennsylvania, 2009).

¹⁹Tierney, John, “Will You Be E-Mailing This Column? It's Awesome,” *New York Times*, February 9, 2010.

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parties, five or six people might gather around a laptop and share their favorite YouTube videos. New media aren't just a different outlet, they fundamentally change how the media world works.

For example, in the music industry the change from records to tapes to CDs was what I will call **The concert** “linear.” In other words, the sales model remained **is now king** the same with each higher-resolution medium. The iPod, though, disrupted this chain. iTunes and the iPod have ended the age of the CD - music now arrives piecemeal, song-by-song, making little money. In 2000, record companies sold \$13.5 billion worth of records. By 2008, this number had dropped to nearly half - \$8 billion.²⁰ In fact, the very popular band Radiohead shocked the music industry by releasing their latest album for free. When they later released the CD in stores, however, it was the top-selling album! This phenomenon is part of the new rules that I discuss in the next chapter. The big payoff in music now lies in using the songs to bring fans in for large concerts. Madonna, for example, fired her record company and signed up to be managed by a concert promotion group. She signed a \$100 million dollar contract with LiveNation, a company that specializes in concerts. The deal is simple: they give her \$100 million, and she gives them records and the rights to license and sell merchandise. Clearly, in this day and age, LiveNation isn't counting on making back its money on record sales. Instead they hope to profit from ancillary streams, such as commercials that license the music, ticket sales, t-shirts, etc. Nothing illustrates the financial power of concerts and the arrival of a new media age more than the

²⁰ EconTalk, “Meyer on the Music Industry and the Internet,” March 22, 2010.

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oldest rock band alive. In 1975, one could buy a concert ticket to see Mick Jagger strut for \$8.50, which would be \$34.00 in today's dollars. When the Stones toured in 2006, a ticket cost \$100, a threefold increase in constant dollars.²¹ Small wonder the Fox network organized a concert tour for the cast of *Glee*. One way to increase profits from their television show is to move their performers around the nation, instead of just broadcasting over the airwaves.

Isn't new media just a bunch of toys? You're probably thinking that these new media are just toys, yet every new medium starts as a toy. The first copyrighted motion picture in the U.S. was *The Sneeze* by Thomas Edison. Second, we've been at these crossroads before, just with different media. In 1950, both television and 3D movies debuted. Many thought television to be a fad; some thought 3D movies were the wave of the future. That same holds true of the "new" media we have today. We don't fully understand this new landscape: some things will be duds, some will be fads, and some will become permanent parts of our culture. But if you think something like Facebook is a toy, keep this in mind: the *New York Times* and ABC News collaborated on a project using Facebook to deliver election news, including sponsorship of a debate.

The Facebook generation So, the expectation of the Facebook generation is that they will be able to participate, create, and share multimedia. Science and engineering communicators need to participate in and even shape those media, both of which require a deep understanding of how and why new media works.

²¹ *On the Media*, National Public Radio, October 23, 2009.