Introduction

Through the centuries, we have used the symbol of a shining light to signal a search for truth. Old Diogenes looked with his lantern for an honest man. The Bible revealed the light of religious truth. The Dark Ages were bad; the Enlightenment, good. It seems only natural that journalists, when their time came, would take the metaphor to heart. From America, Mark Twain reported: "There are only two forces that can carry light to all corners of the globe — the sun in the heavens and The Associated Press down here." Today on their websites, Scripps company newspapers display their logo, a bold blue lighthouse, shining the light "so people can find their own way."

I thought of this one day on Miami Beach, where the summer sun beat down like a Caribbean drum, a pat-a-bee-bee-bam on hot steel. I was looking for my friends in the

crowd but could not see a thing. The light was just too bright. Everyone was hiding in plain sight. Even squinting, I could not see them through the glare.

A lantern, lighthouse or any kind of searchlight, I did not need.

I needed a pair of sunglasses.

Wandering blindly on scalding sand, it's funny what you think about. Diogenes wandered too, a cynical ascetic who was not really looking for the truth, but carrying his lantern during the day to mock all that was Greek. Diogenes was a contrarian. And he had a point: Light is not always good, nor is darkness always bad.

In the digital age of communications, journalists need new metaphors. Shining a light works when information is scarce, and it still is, at times. But today news also can be abundant. When everything is already all lit up, a searchlight is just another thing you can't see. Think of it: The Internet has become a perpetually open library of the human mind; social media, the new Messenger God of breaking news; more data produced every second than can be consumed in a lifetime. The glare is overwhelming. Truth hides in the open.

Today, journalists who want to help us see, to help us find our way, must find a way to provide sunglasses to calm the blinding light. We need honest filters. We need journalistic search engines and tools that dig deep for facts. We need digital sunglasses — technology that can tell you if social media is being generated by software like Twitter Bots or by the public relations people who manage online reputations. All in all, the role of professional journalism has at least doubled. We need to verify and clarify stories, but also navigate and curate cyberspace.

Thinking digitally could save us. Yet two decades after the dawn of this new age, most journalists and journalism educators still resist it. Too many people, processes, policies and products are creatures of the past. In a way this is to be expected. "There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things," wrote Renaissance philosopher Niccolò Machiavelli. The innovator "has for enemies all those who have done well under the old conditions." Every day, however, someone pays the price for journalism's persistent inertia. Once rock-solid companies crumble. Old-school students and professionals can't find work. Our public policies and professional ethics preserve historical fantasies instead of embracing new realities, new possibilities.

I've seen this up-close. I work at the [John S. and James L. Knight Foundation](), a leader in journalism and media innovation philanthropy. The foundation is based on the personal fortunes of Jack and Jim Knight, who built the company that became Knight-Ridder, once the largest newspaper group in America. Foundations, I've learned, are like watering holes. Everyone shows up, from the 20-something social entrepreneurs to the venerable media icons. Access to this broad spectrum of people has shaped this book.

The younger visitors to Knight Foundation, the digital natives, travel light, no clunky machines or ideas weighing them down, fluently negotiating what Paul Simon calls these days "of miracle and wonder." The young live lives with few boundaries. They grew up with smart phones, with literally the whole world in their hands. But the older ones, the digital immigrants, often come to see us in a state of anxious astonishment. When they started in news, no one knew that the mechanical age of mass media, inspired by Gutenberg more than 500 years ago, was coming to an end. The veterans remembered typing stories on manual typewriters. They remember how after much hot lead and

clanking presses our townspeople would get their news. Today, for every new idea young innovators have, elder journalists seem to have a new worry.

This digital book looks at how this new age is changing (or not changing) journalism and journalism education. It consists of field notes from a search for ways that great reporting can survive and thrive amid constant change. Though these articles and speeches first appeared during the past few years, disturbingly little happened to address their issues.

The book's chapters trace the outlines of Knight's journalism and media innovation grant-making during the past decade. The first describes how we arrived at this new age of communication. The next focuses on journalism education reform through the "teaching hospital" model. We then look at issues of freedom and public policy, some of which may never be settled. The next chapter examines what it means to say journalists must not just inform communities, but engage them in every facet of how news is made, from story tip to impact.

Searchlights and Sunglasses is about journalism and change. You do not need be a bleeding-edge technologist to understand this book; it's for the middle of the bell curve, the folks who by now should be changing but can't seem to get started. In a way, the book is like a giant pair of sunglasses, filtering the endless beams of "new information" about the future of news. Thanks to a team organized by the nation's oldest journalism school, the University of Missouri, with the touch of a button the book becomes a classroom edition. In this "learning layer," you will find lessons, discussions, activities, videos, links and research assignments designed to help teachers and students get the most out of a digital book experience.

What you won't find here is a final answer to the question of the future of news, because there isn't one. Like democracy itself, professional journalism is a somewhat messy experiment. We don't know exactly where it's headed, but some things seem clear. The digital age is not some kind of fad. It is nothing less than the fourth great age of human literacy — after the rise of the image, language and mass media. Visual literacy made tribes possible. Language brought us cities. Mass media inspired modern nations. Will digital literacy unite the world? Perhaps. The unprecedented power of data will not automatically end famine, disease or war. Digital tools are just that, tools. They amplify human hopes and fears. They allow the entire networked world to react, or overreact, instantly. Today's tools provide a powerful test for us all.

Without a doubt, the digital age has turned traditional journalism upside down and inside out. Almost everything is in flux: who a journalist is, what a story is, when and where the news arrives and how we deal with newly interactive communities. The times are literally rewriting the fundamental who, what, when, where and how of journalism. A journalist can be anyone. A story can be a database. It can be available anytime, anywhere in any medium. It can include commentary and analysis from the community itself. If the news community doesn't adapt, we may lose an entire century of professional journalism development. The watchdog tradition, the courage, the ethics — all of it — will be as useful as a flashlight in Miami's bright summer sun.

The one thing that isn't changing is the why of journalism, why free people need independent thinkers who will engage, on behalf of us all, in the fair, accurate, contextual search for truth. We assume readers of this book already believe an understanding of current events is essential if free people are to run their communities and their lives. You are a student, teacher, journalist or a citizen consuming and creating news. This is our starting point: We believe in journalism. The challenge is to find our

place as both chroniclers and curators of a new world, to add today's digital skills and ideas to the mix and get on with it, because much more is on the way. Truth be told, we ain't seen nothin' yet.

Accepting continuous change

It's no secret that today's media world is driven by technology -- smart phones, desktops, laptops and tablets -- that very few really believed would come. Digital media unleashed a tidal wave of information but at the same time destroyed traditional media economics. This was never clearer than in recent years, when [journalism lost more than 18,000 local news jobs](#). The [Knight Commission for the Information Needs of Communities](#) joined others to declare a crisis in local news. Newspapers closed. Congress held hearings. Civic leaders worried about their towns.

A journalism grant-maker for more than 60 years, Knight Foundation historically funded the teaching of best practices. Suddenly, we seemed to be training journalists for jobs that no longer existed. Rather than waiting for the next disruptive technology, the foundation decided to help journalists who wanted a say in their own futures. Our first major digital effort was the [Knight News Challenge](#), a $25 million dollar initiative to invest in breakthrough ideas in news and information. The challenge seeks innovations within emerging trends such as open data or mobile media. In six years, the Knight News Challenge reviewed more than 13,000 submissions and funded scores of projects.

Can a foundation without research and development experience change the future of news? Consider news challenge winner [DocumentCloud](#). The software uploads,

organizes and shares documents on an open-source platform. Sharing original documents with readers increases journalistic credibility. Los Angeles Times reporters, for example, used DocumentCloud to crack the [scandal in Bell, California](#), where city leaders had overpaid themselves millions of dollars. This is just what journalists from The New York Times and investigative nonprofit ProPublica hoped for when they developed the powerful tool. After just a few years, [more than 600 newsrooms are using DocumentCloud](#). Two years after launch, it had been downloaded 250,000 times, and the documents themselves had been viewed 60 million times.

This chapter looks at just those sorts of opportunities. In the new digital age of communications, anyone can be a media innovator. Fears of the destruction of traditional media can be replaced by the excitement of creating better, more powerful journalism. If we can adopt them as fast as they come, digital tools and techniques will narrow the gap between where journalism has been and where it needs to be.

A history of the future of news

If we look at media history through a different lens,

the past three centuries can help us predict the century to come.

We'll start with four fundamental points about the future of news:

We're in a profoundly different age of human communication.

In the long run, science fiction writers are better at predicting the future than the experts.

Every American generation grows up with a different form of media on the rise.

Young people always play key roles in inventing new forms of news media.

A definition: When I mention "news" or "media" that is meant to include, most importantly, its use for quality journalism. Journalism excellence is desperately needed, now and in the future.

From visual to digital

There have been only a few major ages of human communication: The visual age, the age of language and the age of mass media. And now, the digital age. That's it. In all of human history, just four great phases of communication.

Evolution of Human Communication, new categories

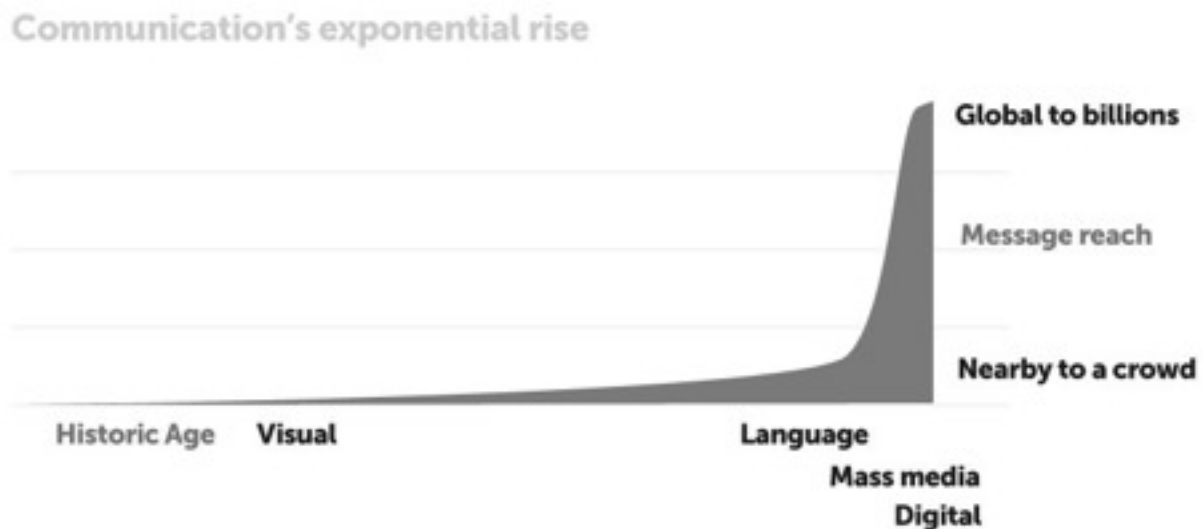| Age	Human capacity	Date (c.)	Concept of time
Visual	Curiosity	1-2 m BC	Natural
Language	Orality	100,000 BC	Cyclical
Mass media	Literacy	1450 AD	Linear
Digital	Fluency	1991 AD	Multi

Source: Various

In the beginning, more than a million years ago, before language, protohumans wandered the earth. We don't know when the first news story occurred. But we can guess the news report went something like this: "Aaaaaaaa!" You can recreate the first news report by standing up, pointing a finger at whatever is about to eat your family and repeating the headline: "Aaaaaaaa!"

Roughly 100,000 years ago, something new happened. Language. A breakthrough. Once we could talk, we figured out how to write. (In my view, talking and writing should be seen as two sub-eras within the larger age of language.) Whether spoken or depicted in symbols, language allowed us to say much more than ever before.

A little more than 500 years ago, the age of mass media arrived. It started with movable metal type in Europe and spread with the rise of popular printed books. Newspapers, radio and TV -- forms of mass media that came after -- had the same one-way, assembly line quality. Journalist, story, medium, audience. Today we call those forms legacy media.

Just 20 years ago, the World Wide Web arrived. Almost immediately after British computer scientist Tim Berners-Lee let loose his HyperText Markup Language and its cousins in 1991, we knew something had happened. The electrons of news now make up a global network, moving in all directions at once. We could communicate one-on-one, one-to-some, one-to-many and, amazingly, the reverse. The result has been a kind of organic ecosystem made up of five billion humans with cell phones who can tell you instantly if news is breaking and research just about anything.

Communication's exponential rise

Global to billions

Message reach

Nearby to a crowd

Historic Age   **Visual**   **Language**

Mass media

Digital

If you draw a picture of the shape of the history of news, it's a familiar one. More than a million years of visual news and then, suddenly, language and everything else. The

historic trend produces a "hockey stick" graph, mirroring the exponential adoption curve we might see when looking at the growth of digital media.

We sometimes talk of the ages of communication as distinct periods of history, but it's important to remember they overlap. As we know, on the web the visual, language and all mass media forms converge. But as you likely haven't heard, media forms joined cyberspace in pretty much the same sequence as they were developed in physical space. First, symbols. Then text, illustrations, photographs, audio and video. We taught computers to shape media in the same order in which we ourselves originally created it.

Did traditional media people see it coming? Hardly any of them. Twenty-five years ago, the American Society of Newspaper Editors has a panel on the future of newspapers. Introducing it was the legendary Christian Science Monitor editor Kay Fanning. She urged the group to stay realistic by avoiding "science fiction." Only the Wall Street Journal's distinguished panelist spoke in earnest about computers. A couple of years later, Fanning would resign over cutbacks at the Monitor. Within a generation, in 2009, the Monitor would become the first national newspaper to switch from print to digital. Shortly after that, ASNE dropped the word newspaper from its name, becoming the American Society of News Editors. Clearly, the panel on the future of newspapers could not see clearly into the future.

Some seemed to have a glimpse of things to come. The Knight-Ridder company spent millions developing editorial ideas for a tablet decades before the iPad. What it couldn't see was the technology that would make the tablet a popular consumer product and how and when that tech would come to market. Why not? Because humans just aren't very good at predicting the future.
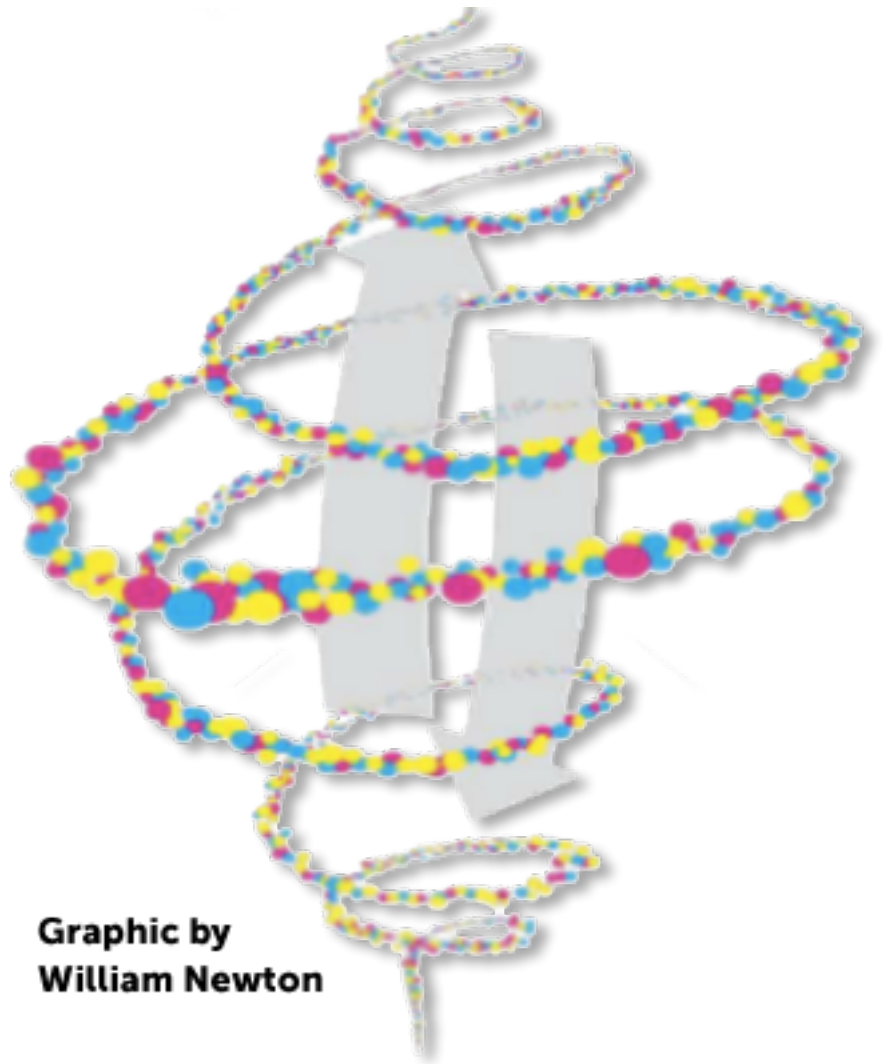
Here's a drawing from Joseph Pulitzer's New York World on Dec. 31, 1899. It predicts life 100 years later, in 1999. At first, it seems right: There are giant buildings, ships and airships. But look closer. The buildings are stone. The boats are steamships. The aircrafts are dirigibles. No glass towers. No jet planes. No nuclear subs. Since giant stone buildings, steamships and blimps are not routine features of modern life, we'd have to say they got it wrong.

But the idea of time, it turns out, is more complex than that. The swirling graphic on this page was drawn to explain the evolution of an idea. To me, it also shows the flow of the sum total of ideas, the flow of history. It's a kind of cyclone that not only cycles, but that

also moves forward, unleashing tremendous forces. We get the future wrong because we don't see the cyclone of things happening all at once around us.

That leads to my second major point. Science fiction writers dream their way to futures the rest of us can't seem to calculate. Jules Verne, for example, wrote a century before it happened that the rocket projectile would leave Florida, go to the moon and splash down in the ocean. Or you might ask why the orbits of geostationary satellites are called

Graphic by William Newton

Clarke Orbits. Why? Because sci-fi writer Arthur C. Clarke conjured communications satellites. He went public with the idea in a 1945 magazine article. Clark would later say he had invented the most commercially viable communications idea of the 20th century, and gotten just $35 — his freelance fee. Twenty years before the web, Clark did it again, predicting how people would be able to get all the information needed for their everyday lives from computer terminals in their homes.

How about Skype, which you could have seen on the 1960s television cartoon, The Jetsons? Or the hand-held communicators from the TV series Star Trek? (The fellow who actually [invented the cellular phone](#) said Star Trek gave him the idea.) And there's the iPad, first appearing in the movie 2001: A Space Odyssey. Imagination, we see, predicts the distant future more accurately than extrapolation. When predicting the future, it's important to think crazy. Not out-of-the-box crazy, but off-the-planet crazy.

Generational Shifts in Media

Trying to follow my own advice, I found two unconventional best-selling books and then combined their messages with everything I'd learned about history when developing the story line and editing the original content at the Newseum, the museum that celebrates news and the First Amendment. The books are [The Fourth Turning](#), by William Strauss and Neil Howe, describing human cycles of history and [The Singularity is Near](#), by Ray Kurzweil, predicting humans will transcend biology in one upward, exponential thrust.

This exercise revealed my third major point. Every American generation has grown up with a different form of media in ascendance. We talk today about how everything's changing, how young people seem to be in a different media world. Actually, that's not at all unusual.

Strauss and Howe list 12 generations of Americans that have come of age since the days of the American Revolution. Let's consider the earliest one, the Republican Generation. Born as English colonists, between 1742 and 1766, the youngest were mere children when the American Revolution arrived. In those early days, the media form on the rise was the pamphlet. Thomas Paine's "Common Sense" was a runaway best seller. There were colonial newspapers. But the pamphlet was the popular form. An estimated 120,000 copies of "Common Sense" were printed.

It wasn't until the next generation that the weekly papers exploded, thanks to a new contentious country, a First Amendment, and the low postal rates that Benjamin Franklin established, the latter representing the first and longest-lasting U.S. government subsidy for news.

A generation later, yet another new form of media rose up: Populist daily newspapers, not just for the elite, but for everyone: the penny press, it was called. After that came immediate news for all those papers from the Associated Press, courtesy of the telegraph.

In each case, there are myriad reasons for the emergence of new forms of media. Still, there is a clear pattern: New generation. New media form rising. Constant change.

Each American generation comes of age as a different news medium is rising

Generation	Age midpoint	Rising media	Cycle
Republican	1775	Pamphlets	American Revolution
Compromise	1800	Partisan Weekly Newspapers (Helped by U.S. Mail, Postal Service)	
Transcendental	1830	Populist Daily Newspapers (The Penny Press)	Transcendental Awakening

SOURCE: GENERATIONS AND CYCLES FROM "THE FOURTH TURNING"; MEDIA TRENDS FROM THE NEWSEUM, WEB RESEARCH

Imagine folks sitting around more than a century ago, one saying to the other: You know, our child never knew a world without daily newspapers. He is a newspaper native. He never knew how long we used to wait for news to come from the other side of the country. No wonder he has no patience. No attention span.

Sound familiar?

The Fourth Turning had a pattern of its own to reveal: About every 80 years — every four generations — there's a crisis. And about every 80 years — the length of a human lifespan, there's a great awakening. Straus and Howe trace this back to the Renaissance. They say it's a social cycle humans have created because of the interplay of generational archetypes going all the way back to our evolution as a species dependent upon the four seasons.

More cycles in time:
Awakening and crises every 80 years

Generation	Age midpoint	Rising media	Cycle
Progressive	1868	Illustrated magazines, niche publications	Civil War
Missionary	1891	Major metropolitan daily newspapers (Industrial era inventions: Light bulb, telephone, linotype, film, etc.)	Third great awakening
Lost	1909	Photography in print	

GI	1933	Radio newscasts, movies and newsreels	Depression, World War Two
Gilded	1851	The Associated Press (The telegraph)	

Maybe. No matter the reason, the pattern is there throughout American history. A crisis: The American Revolution, followed a little more than 80 years later by the Civil War, which was followed a little less than 80 years later by World War II. Each war is associated with its own generation — and with a different form of dominant media. During the Revolution, the pamphlet. During the Civil War, illustrated magazines. During World War II, radio.

I charted the generations and their media. And so it went, through big papers, photographs and tabloids. Each adding something. Before long you could read, see, hear and watch the news.

Each generation shapes media
The cycle persists even as information explodes

Generation	Age midpoint	Rising media	Cycle
Silent	1951	Glossy color magazines (TV, color TV, home telephones)	
Baby Boomers	1969	TV Newscasts (Satellite, cable, video tape)	The 1960s awakening

Generation X	1990	World Wide Web (Digital era inventions, personal computers, the Internet, domestic mail, chat, video games, multimedia)	
Millenial	2009	Mobile and social media (Cell phones, search, blogs, social media, blogosphere, smart phones, tablets, global World Wide Web, universal e-commerce, wearable media)	9/11, recession, World War 3.0

SOURCE: GENERATIONS AND CYCLES FROM "THE FOURTH TURNING";

MEDIA TRENDS FROM THE NEWSEUM, WEB RESEARCH

In this grid we see the Baby Boomers. They grew up when TV was young. When they came of age, so did television. By 1964, it was the most popular news medium in America. The Boomers became lifelong consumers and shapers of TV news. Remember "the revolution will be televised?"

The larger cycles of crisis and awakening appear to be holding. The 1960s "consciousness expansion" came about 80 years after the religious activism called the Third Great Awakening. The crisis continued with 9-11, the global recession and the great cyber war, World War 3.0, coming 80 years after World War Two.

Notice in these charts we do not track when a new medium is invented. We care about

when most people are using it, when it comes of age, pops, becomes ubiquitous. That's when it shapes us and we shape it. So it's not surprising to see the role of the Gen Xers in shaping the web, and of Millennials in shaping mobile and social media. Those will be their media forms.

Digital natives will always have a special affinity for digital media, just as Boomers do for television. For writer Marc Prensky, who in 2001 coined the phrase "digital native," it means thinking "fundamentally differently." But how? In the words of Harvard's John Palfrey and Urs Gasser, it means living a global, multitasking life, much of it online, "without distinguishing between the online and the offline." Digital natives consume information and conduct relationships differently than their elders. Their habits will shape future media, and it will shape the world.

Imagining World War 3.0

Why predict a world war, and why call it World War 3.0? Because it's a war in cyberspace, [a war that already has started](). Our government has declared cyberspace an official arena of war. An estimated 100 countries have cyber armies. Every day there are an undisclosed number of cyber-attacks. If the cycle-of-crisis theory holds, World War 3.0 will expand until it rages around us, the first invisible war, a conflict with the potential to remake the world.

The Millennials will rise up as the heroes of WW 3.0. Though war is destruction at its most unnecessary, at the same time a global crisis can give birth to new unity and purpose. Society could emerge much stronger than before.

A final crisis or another chance to emerge stronger?

Generation	Age midpoint	Rising media	Cycle
Cyber	2035	Intelligent Media (The cloud, grids, robotics, artificial intelligence)	
Visionary	2057	Bio Media (Augmented reality, nanotechnology, media implants, enhanced human capacity	Machine Awakening: The Singularity
Hybrid	2076	Hyper Media (Cranial downloads, thought aggregators, sentient environment)	
Courageous	2098	Omni Media (Thought projection, telepathy, teleportation, telekenisis)	World War 4.0: Humans vs. Environment

SOURCE: GENERATIONS AND CYCLES FROM "THE FOURTH TURNING";

MEDIA TRENDS FROM THE NEWSEUM, WEB RESEARCH

What's next for news technology? Pew Research says that in the near term, news media is becoming more personal, portable and participatory. Where will that lead? How about wearable media? Why carry a phone when soon everything you need for communication can all be in your watch? Dick Tracy will be hip again.

Will the generational patterns continue, one new form of media leading to another? It seems so, even as we move into Ray Kurzweil's exponential explosion of information

technology. Why? Because people provide the fuel that drives media innovation. People want to know. They want to tell. They are billions of minds struggling to understand, billions of voices struggling to be heard.

End of the daily paper, rise of Intelligent Media

To look at the coming century, combine generational media, historical cycles and exploding technology. By 2035, we'll be in the middle of the era of Intelligent Media. All media will be smart. You'll carry on normal conversations with computers, in any language, ask them questions, have them do your research. News bots, news drones, robot scribes will be the norm.

The Leader, the first newspaper in the Territory of Assiniboia, founded in northwest Canada by Nicholas Flood Davin in 1883. The existence of newspapers was considered evidence that regions were ready for official status as towns, territories, etc. Photographer: O.B. Buell

In the United States, this also would be the time when we see the end of the printed, home-delivered, paid circulation daily newspaper. Print won't die. But that particular animal in the ecosystem, the home-delivered daily, will. Household penetration rates

have declined in a straight line for 70 years. Extrapolate that and we'll see the end in April, 2043.

By then, you'll be able to experience any event anywhere on the planet as though you are there, so long as a news bot is there. The NewsBot 360 will send thousands of feeds simultaneously from all angles. You'll be able to sit in a virtual room or wear goggles and see everything, as though you were there. You may even be able to feel and smell it. So if you wanted to see a State of the Union address, or a Super Bowl, if they still exist, you always will have a great seat.

After WW 3.0, free governments will have universal data transparency. Every piece of public information will be public from the moment it enters a government computer. You'll be able to send a research bot out to look for city managers earning $800,000 a year for running small towns like Bell, California. Your digital sunglasses, the filters you use to find what you need, will be many times smarter than those of today. You will be able to access your information profile, the data that controls those filters, and correct it the same way you can correct your credit score today.

The words now describing legacy media will disappear — and so will a lot of those media. They'll morph into new forms. News will not go away. There always will be people who try to manipulate information, to abuse power. There always will be people who try to straighten out information, to check abuses of power.

How do we know these things will happen? We don't know for sure. But we see them in books like The Martian Chronicles, movies likeThe Terminator or Total Recall, television shows like Star Trek: The Next Generation. In science fiction, robotics, bionics and artificial intelligence flourish. If you give up straight line predictions and look at the

exponential pace of technological growth, they seem like a mathematical certainty.

By 2057, America will be in the midst of the era of Bio Media -- implants and augmented reality for everyone. You'll be able to tap into all the information you want about any place you go. Lots of people will appear to be talking to themselves. They'll actually be talking in cyberspace through their media implants. If a journalist wants to know what a city thinks about something, the question is asked and answered live by millions of people. Voting won't be bound by geography. You'll earn votes with civic service and use them on whatever elections you want.

Humans will become more and more indistinguishable from machines. Why would people allow it? That door already is open. Why should Uncle Mike die when a brain implant will save him? Future generations will want nanotechnology to eliminate their genetic flaws, seamless bionics to have perfect replacement limbs. That's Kurzweil's prediction in The Singularity is Near.

Computer memory space will be virtually free. A person's entire life experience will be saved in the cloud: what you thought and did, things you saw and heard. Sophisticated filters will help you pass your life experience along to your children, or to everyone. They'll be able to ask your digital memory questions after you the person are dead.

By 2076, it will have happened. Machines will be self-aware. People will talk about the creators of Data in Star Trek and Sonny in I, Robot (or Robbie, in the original) the way they talk about Jules Verne today. If the pattern holds, it will have been 80 years since the 1960s. Time for another great awakening. The Singularity is a kind of point of no return. Somewhere around mid-century, Kurzweil says, it will happen: The unbelievable result of current, quite believable, exponential increases in computing power.

That's when things really get interesting: An era of Hyper Media, machines creating more intelligent machines exponentially. The code is cracked. Human brains will accept machine downloads. Like Neo in the Matrix, you can learn kung fu, or anything else, in just seconds. Like the movie Avatar, the whole environment comes alive and you can communicate with it in basic ways.

News, then, is whatever we imagine we want to know at any given moment. Much more of it may be in images, with our software being able to find just the right ones. As soon as you think of a question, your filters find the answer from the world's ever-fresh aggregation of data. There is a quantum leap in our ability to solve problems. (Or create them.) Defensive software will be mandatory. Who would want their head to be hacked?

The final generation of the century will see the era of Omni Media. Will we even have language once we can be the gods we always have imagined? We will know everything, do anything: We can read thoughts, project commands to objects, move them, teleport them, change them.

Just like science fiction.

But in the end, at least in this mash-up, we still are human enough to follow the pattern of crisis every 80 years. This last crisis — the fight for our own survival. World War 4.0: Humans against a non-human foe. Maybe it's the machines, or the nanobots, or even the earth itself. But our greatest battle won't be in fighting each other, but a battle against something else entirely.

It's scary enough to want to be gone when it comes. And perhaps it won't actually come

for a few hundred years. If it's sooner, some of today's children will be here when it happens. They will watch the digital people of the future either prevail and rebuild, or see the end. No matter how it comes out, you have to admit, it's a great story to cover.

From the 18th century to the 22nd we have traveled, and for some, the trip surely has been mind-boggling. Perhaps, if it is just crazy enough, if the fiction seems just impossible enough, it could become fact. No matter how it unfolds, the journey should be of intense interest to today's high school and college students. Why? Because of my final point: Throughout American history, young people have played a major role in the constant reinvention of media. Each new generation drives us forward. It's their desire to express themselves in different ways, through music, journalism or whatever you like, that forever pushes the frontiers of news.

Look at Steve Jobs. He was in his 20s when he helped develop the personal computer. At Apple he reinvented the music, telephone and portable print industries. When he died, someone tweeted: "Born to unwed parents, put up for adoption, dropped out of school and changed the world… what's your excuse?"

Have you ever seen the image floating around cyberspace of the early Microsoft team, all in their scruffy 20s? Hardly anyone invested in the early motley Microsoft crew. Other news pioneers who invented new media forms when they were young: Ben Franklin, for one. Horace Greeley. Joseph Pulitzer and William Randolph Hearst, Lord Northcliffe (inventor of the tabloid), David Sarnoff of radio and Philo T. Farnsworth, who got the idea of TV when he was plowing a field as a teenager.

They embraced the new media technologies of their age and used them to strengthen journalism. But it's hard to find photos or statues of these folks when they were thinking

of their greatest ideas. They were just too young. No one knew they'd be famous. That won't be a problem in the era of social media. We'll have the pictures. All today's students have to do is become famous.

New skills for new opportunities

This is a lot to think about. And there's also plenty to do, especially if you are a journalism or communication major. Those things include:

• Engaging with communities before, during and after your search for news.

• Learning truthful storytelling in all media

• Watching a lot more science fiction.

• Fooling around every day with and then mastering new digital tools.

• Inventing new tools yourself — better filters, hopefully — and new business models.

• Rewriting codes of ethics and relearning media law for the digital age.

• Teaching digital media fluency to everyone.

• Finding some good sources so you can cover World War 3.0 (just in case).

I worry about journalism education. I keep thinking of the [annual survey of journalism and mass communication students](#) in America, done when social and mobile media were just taking off. More than half of the college students surveyed either weren't sure anything was changing in media, or said nothing big was changing.

Who are these students, and who is teaching them? I trust the students at the best journalism schools are not among them, because seeing the wonder of the coming century is only the first step. The second step is to worry, because some things never seem to change. As we said in the Newseum: "Always there are those who would control news, and those who would free it; those who would use news to mislead, and those who

would use it to enlighten."

Being sure you are on the right side of both history and the future requires the kind of true humility expressed by famed physicist Isaac Newton. About his heralded discoveries, Newton said:

"I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay undiscovered before me."

Somewhere in the ocean of truth is the future of news. Happy sailing!

This is an updated version of a talk originally given to students and faculty at Arizona State University as part of the Hearst Visiting Professional program.

The opportunity: To seriously improve our news systems

Way back in the age of mass media, in 1986, professor James Beniger, then at Harvard, produced a useful chart on the civilian labor force of the United States. It showed how the bulk of American workers had moved during the past two centuries from working in agriculture to industry to service, and now, to information. Point being: the digital age didn't just sneak up on us. It's been a long, slow evolution. So shame on us for not changing our laws and institutions to keep pace.

We were well warned. Just after World War II, the [Hutchins Commission said](#) that traditional media could do much better: They should take on the social responsibility of providing the news "in a context that gives it meaning." In the 1960s, the [Kerner Commission said](#) mainstream media wasn't diverse enough to properly tell the story of this changing nation. In the same decade, the [Carnegie Commission said](#) the status quo was simply not working, that public broadcasting must be created to fill the gap.

After that, a stream of reports — from the University of Pennsylvania, from Columbia and others - agreed and repeated the same three fundamental findings:

Hutchins: Our news systems are not good enough.

Kerner: They don't engage everyone.

Carnegie: We need alternatives.

Here comes digital media, and — boom! — a universe of alternatives.

So now what? This time, the report comes from the [Knight Commission on the Information Needs of Communities in a Democracy](#), prepared by the [Aspen Institute](#).

We are entering the third decade of an Internet-webbed world. Hutchins, Kerner and Carnegie and the many other reports focused on views from on high of what should be done to improve, diversify, add to — and nowadays, the talk is to save — traditional mass media.

But the Knight Commission started with communities, [visiting them and hearing from their residents.](#) News and information, the commission says, are as important to communities as good schools, safe streets or clean air. Journalism, it says, does not need saving so much as it needs creating.

As a former newspaper editor, I second that last point. Of the nation's tens of thousands of burgs, towns, suburbs and cities, how many are thoroughly covered by the current news system? Ten percent? Five? Less? How do the uncovered get the news and information they need to run their communities and live their lives.

We hope the ideas expressed by the Knight Commission will continue to make a difference. It inspired the Federal Communications Commission to do its own report on the crisis in local news, keeping the Knight recommendations in mind. Free Press, the nation's largest grassroots media policy group, embraced the report's call for universal affordable broadband. Ernie Wilson, dean of USC's Annenberg School and then-chair of the Corporation for Public Broadcasting, called for more innovation in public media, backing things like NPR's Project Argo. Knight itself went on to sponsor Matter, a partnership with San Francisco public media outlet KQED and innovator PRX to accelerate media startups. Librarians across the country pushed the role libraries can play as digital media literacy training and Internet access centers.

The hard part is ahead of us: that is, involving every aspect of our communities, governments, nonprofits, traditional media, schools, universities, libraries, churches, social groups — and, especially, citizens themselves. How do we do that? How do we make "news and information" everyone's issue? It's a tall order.

Universities could help. Nearly two-thirds of the nation's high school graduates enroll in a college at least for a while. These institutions could make digital media literacy or news literacy courses mandatory for incoming students. Understanding and being able to navigate the brave new world of news and information is as fundamental to the college students of our nation as knowing English. Stony Brook began walking that path. There, more than 5,000 students have taken news literacy under the first university-wide

course of its kind, though a digital version is needed. The digital metamorphosis of a society learning to use technology to connect the data and events of daily life to the issues and ideas that can better its life — that's something more college faculty should stop fighting and start teaching.

This may not be a short-term project. It took more than 200 years for America to change from a country where most people grew food to one where most people grow information. It could take time for the wholesale rewriting of America's media policies, not to mention the trillion dollars or more needed to remake both our digital systems and our ability to use them. But remaking digital systems is [all about broadband, which is all about network speed](), where the United States consistently fails to make the top 10 worldwide. Every year we fail to use the e-Rate program to speed up school and library access, every year we fail to lay in fiber optic cable, is another year of opportunity for our global competitors. A nation without universal, affordable broadband is like a nation without highways and railroads, stuck on the surface streets of the new economy.

The goal is an information-healthy nation. That means not just broadband access but adoption. Thomas Jefferson expressed the same idea when he once said newspapers were more important than government. Here's his quote, updated: "The basis of our governments being the opinion of the people, the very first object should be to keep that right; and were it left to me to decide whether we should have a government without the Internet, or the Internet without a government, I should not hesitate a moment to prefer the latter. But I should mean that everyone should receive the Internet and be capable of using it."

In the end, a lifetime has passed since the Hutchins Commission first said it, the story is still the same. The country's news and information systems still aren't good enough.

They still don't engage everyone. There still are not enough alternatives. They say the gatekeepers of mass media are dead, that people can find their own way now. But many millions of American news consumers are still walking on the path where the gate used to be. Our laws and policies — even the high school and college classes we teach — will help determine the future of news in our communities. They can speed innovation or stunt it. So pick a [recommendation](#) — and have at it.

An earlier version of this article appeared on the website Nieman Journalism Lab, produced at Harvard University.