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Technology Criticism in the Classroom (Chapter in The Nature of Technology)

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TECHNOLOGY CRITICISM IN THE CLASSROOM

I first heard about a tragedy in Tucson, not from major television news networks, but from a direct message sent by a politically-active friend who was attending the political gathering where a mass shooting took place, including the shooting of an Arizona congresswoman, Gabrielle Giffords. While the television news sputtered around trying to offer details (initially wrongly claiming that she was dead, likely from pressure to be the first to report big news), I found myself reading Google News, piecing together Facebook posts, e-mailing friends and reading Twitter updates.

I turned the television off when the same information was repeated—the news helicopter circling the same grocery store and reporters using the same peppy intonation they would use to announce the final score of a basketball game. While I couldn't see the "expert witnesses" using my methods, I could keep up on National Public Radio's website and then ask medical questions to a friend of mine who is a trauma surgeon.

Meanwhile, I engaged in philosophical conversations with friends and family members about speech and freedom and safety. I watched the tone turn ugly at times and I found myself caught up in it as well. Yet, when we learned of the death of a nine year old girl in that shooting rampage, the tone of the conversations changed. My response was to post on my blog. I probably put things online too soon, but the online environment is where I went. Students sent me messages asking if that was the same Gabrielle Giffords we had interviewed in class. They sent links to YouTube videos and asked hard questions about insanity, justice and the universe itself.

Then I turned it off. All of it. I took a break from Twitter and from Facebook and from YouTube and Google News and Blogger and I walked outside and played baseball with my sons. My son pulled me aside and asked, "Was that real or was it just TV?"

So, how would I handle that in the classroom? I would grieve with the students and ask questions and we would blend social media and face-to-face conversation. We would share our emotions, our thoughts, the information we find, the bias we see and together we would try to piece together the story and how those events relate to our lives. Dealing with traumatic events is not something I can organize in advance.

At one point, I asked my students the question that my son had asked me. "Was that real or was that just the media?" We discussed the nature of reality, of truth, of

tragedy when we feel it locally but also at a distance. We argued about whether the media had enhanced or inhibited human connection.

Many ways exist to be social, and children will choose different methods to maneuver social media. My middle school students are learning, not only how to maneuver social media, but how to think critically about information they encounter. Far too often, children's formal education in technology is about how to use the technology, and if issues are raised that transcend skills, those issues are usually limited to being safe online (or a being a good online citizen) and evaluating website credibility. Images conveyed through modern media blur the distinction between real and "just TV," and we do our students a disservice if we do not address issues in the philosophy of technology and the ways that the media often unknowingly shape our thinking. This chapter illustrates how I raise such issues with my students. In order to make clear that I do not compartmentalize technology criticism into a single unit, I purposely convey my approach to teaching technology criticism in a non-systematic manner. What follows is intended to make clear how I integrate such criticism in the context of what is being studied at any given time.

MEDIA NON-NEUTRALITY

Students walk into my classroom with a sense of excitement. Many of them approach the computers, netbooks and iPods through a lens of entertainment. A few recognize that these will be learning devices. Fewer still understand the negative effects of technology. Therefore, I ask students to complete a technology literacy survey, covering attitudes, beliefs, self-efficacy, experience and skills related to various media. Within the last two years, less than three percent of my students have questioned when it is wise or unwise to use technology. The annual data reflects a larger socio-cultural paradigm of an uncritical embrace of technology. My students' responses and the larger societal context have been the impetus for an intentional, curriculum-embedded approach to technology criticism.

Initially, students struggle to recognize that the power, convenience and efficiency offered by multimedia devices do not necessarily mean an increase in the quality of work, the authenticity of an interaction or the effectiveness of an endeavor. Soon students are able to assess the pros and cons of technology through debate, discussion, reflection and brainstorming. One approach we have used is to engage in a Twitter chat about technology, followed by an in-person debate. Afterward, small groups discuss the pros and cons of both approaches. Other times, we use art work, videos, podcasts and blog posts about the nature of power, technology and "capturing" life through a medium. After awhile, technology criticism becomes another filter that students use when analyzing literature, history, math contexts and science experiments. Suddenly the visuals from Hiroshima and Nagasaki, the tale of John Henry, biographical sketch of Henry Ford and the student-created solar ovens take on a new meaning.

However, it is not enough to simply evaluate the trade-offs of a medium. For a deeper level of technology criticism, students need to internalize and articulate the paradoxical nature of technology and its impact on society.

When students first bring their iPods and the class takes out their Chromebooks, I ask them how they have used the technology. After four years of taking an informal survey, just two out of four hundred students have used devices for photo editing, film-making or blogging. None of them have collaborated on a project outside of their local context. We talk about the business models of Google, Apple and Amazon and the notion of a "consumer" device. From there, we discuss the notion of "hacking" and ask what it would mean to create rather than consume. Students engage in a "gallery walk" where they brainstorm ways they could use the devices creatively.

As students begin to rethink their devices, I start to model questions about the limitations of the devices. In Twitter chats, blog posts, videos and live debates, students talk about how technology is changing the social context in negative and positive ways. I add a second layer of reflection as students discuss why they chose their specific technology tool and how it would vary in negative and positive ways if they had used a more traditional tool. When we turn the devices off, students confess that they didn't pay as close attention to body language and they felt anxious with the constant moving of text and images. I'm never entirely sure where the discussion will go, but students are often poetic about the loss of humanity that they experience. One girl said, "My mom looks at her screen more than my little brother. She holds it up to her face when she should be holding him. It bothers me." Students lament the loss of context and physical geography. They lose the audible contact with surrounding events. This is a middle-ground position that avoids an unrealistic fear of technology at one extreme, and unquestioning technophilia on the other. These devices are not neutral; we always lose something, and we are often unaware of what we lose since we are usually focused on what we gain. This is a central concept my students need to understand if they are to make informed decisions about how to spend their time and what technologies to use.

TECHNOLOGY DECENTRALIZES AND CENTRALIZES POWER

We begin with the question, "In a globalized society, who holds more power: corporations or nations?" Students post their answers first to their blogs and then move to a class Twitter chat. A few students choose to read one another's blogs and leave comments. One group debates this issue in-person, while attempting to find facts online to support their positions.

"Who owns the school?" I ask the students.

"The community. The taxpayers, right? It's public, so it belongs to us. That's why I say a country still has more power. Technology can pull us away, but the government can coerce us to be here the entire time?"

"But were you really here?" another student asks. "You were on Blogger and Twitter."

"Maybe it's an issue of who had more power if you were two places at once."

"I think Mr. Spencer had the power. He was the one who gave us the question and told us that we had to answer it."

"Yeah, but who organized the information?"

"True, Mr. Spencer didn't limit us to one-hundred and forty characters."

"Yeah, but we organized it ourselves," another student suggests.

Thus, before viewing power through military or political force, students are able to analyze the role of a medium in shaping, organizing and censoring one's thoughts. Students analyze the organizational structure of Facebook and Twitter through a sociological and anthropological framework. The class reads a journal article about the potential dangers of auto-fill in search.

In the process, students analyze the business and ideological models of various technology platforms. If Apple is essentially a hardware, software and multimedia company, how do they benefit from closed information systems? How do they influence a classroom space? If Google is essentially a transnational advertising agency, how do they benefit from customized search and auto-fill? How does "free" become a deceptive phrase? Students analyze the oft-contentious political battles that exist within democratic movements of Linux, open source and Creative Commons. It is important for students to recognize the social and political forces that shape the development of any media platform.

Students analyze the Roman concept of *panem et circenses* (bread and circuses) as they compare and contrast methods of population control in *Brave New World* and *1984*. In the process, students develop a metaphor for smart phones. The most common metaphors include drugs and weapons, suggesting that students see technology as inherently dangerous, but also necessary. One student points out, "Do we really need a better metaphor for an iPhone than an apple. That forbidden fruit that lets us have the whole world in our hands. We have knowledge of good and evil, but we use it to hide."

Students use a historical framework by analyzing the role of the printing press in the rise of the nation-state, asking whether an Enlightenment worldview, the rise of a modernism and the development of a nation-state were tied directly to the instant access and dissemination of language-specific texts. Students analyze the symbiotic relationship of an Enlightenment philosophy and the printing press. They begin to recognize that those who own the technology often own the collective voice and the public memory.

Students analyze the ways in which democratic movements of the Arab Spring utilized social media to spread democratic ideas and the ways that official state-run media continue to stifle many of the reforms they once hoped for. We get into a debate about whether the medium created the democratic impulse or if it was simply a product of it.

ANTICIPATE THE UNPREDICTABLE

When students shift from uncritical acceptance of technology toward a more critical approach, our class grapples with a litmus test for implementing a new medium. If we are not careful, students will fall into the fallacy that humanity can use technology wisely by predicting its costs and benefits in advance. However, a brief glimpse into the last century suggests a failure in the human imagination to predict the costs of technology. Scientists had an accurate assessment on the destructive capacities of splitting an atom. However, many in society failed to grasp the larger social fallout from a world changed by the existence of nuclear warfare. Students watch a haunting video of Openheimer saying, "We have become death," and suddenly the raw power of technology becomes something they are forced to wrestle with.

For this reason I require my students to study ancient mythology in connection to the role of technology in society; this is an ideal context to address the social consequences of technology. Students debate the themes of the biblical story of the Tower of Babel, in recognizing that we are speaking a binary language to collaborate on towers that move beyond the clouds, with satellites offering instant access to trans-geographic communication. Some students see the story as a sacred text speaking boldly to our culture. Others see it as a paranoid, tribalistic story that we can now move past as we embrace technology.

Students answer the question, "To what extent have smart phones and social media improved the way we communicate?" This is followed by questions of what we have lost in constantly filtering communication through a technological medium. Students also discuss the unpredictability of technology in the stories of Pandora and Prometheus (both used as names in technology companies). From there, the class studies instances when communities have anticipated the pros and cons of a medium in an effort to use a medium wisely.

Students then analyze current social issues related to social media, including: the loss of privacy within a culture of self-surveillance, social castes based upon digital inequity, inability to empathize, deterioration of wisdom in an age of instant information, speech without context, the push toward being audacious in order to gain a fringe market (also the push toward audacity to gain attention among peers) and the loss of identity with personal branding and informational overload. Afterward, students analyze articles from the early stages of social media with the driving question, "How well did the collective imagination at the time anticipate the issues we are now dealing with?"

Finally, students make predictions regarding nano-technology, the Singularity movement, genetic engineering and artificial intelligence. It is difficult for them to see that their failure in imagination will most likely be on the side of overly conservative estimations of change.

As we create the digital boundaries for our own class, I ask students to keep in mind that the true costs and benefits of using various media are often unpredictable.

However, it is better to anticipate potential changes and monitor for unanticipated changes than to blindly accept technology. Students examine case studies of both neo-Luddite and technocratic communities as we attempt to create a class-wide litmus test for technology usage. As the year progresses, students examine how multimedia shapes our class sense of ethics, privacy, voice, identity and community. In this sense, the class becomes a microcosm of the larger global debate regarding the effects of technology on our sense of humanity.

TECHNOLOGY AS A HUMANIZING AND DEHUMANIZING FORCE

It's a myth of modernity that humanity can simply wield technology in such a way that we access all the benefits while avoiding all the drawbacks. Often, teachers use the term "tool" as a metaphor for technology integration, assuming that the user is the one responsible for the success or failure of the tool, and that the tool is simply neutral. However, technology is perhaps better conceptualized as a double-edged sword that shapes the user along the way.

It is easy for students to identify the man versus machine motif in both classic and contemporary stories. The most accessible starting point has been the question of whether the human spirit truly triumphed in the legend of John Henry. From there, students analyze a persuasive piece suggesting that a deeply human endeavor is the creation of tools and use of them to transform our sense of reality. As a result, students begin to question the paradox of technology as a humanizing and dehumanizing force (often at the same time).

I also have students analyze a video clip of Oppenheimer stating, "We have become death, the destroyer of worlds" (http://www.youtube.com/watch?v=26YLehuMydo). The question is raised whether the nuclear bomb Oppenheimer speaks of was an inhuman invention, and whether his words would have been different had the interview not been filmed for posterity.

In order to recognize the larger historical context, students read about the loss of oral language in the movement toward print (through a Socratic dialogue recorded, perhaps hypocritically by Plato). Students also analyze the role of technology in saving lives alongside the costs of such life-saving efforts with the Green Revolution, hydroelectric power and modern medicine. While choosing their own multimedia format, students then communicate the extent to which technology is humanizing and also dehumanizes.

The question, "Does this change our sense of humanity?" is an essential question students ask throughout the school year. As students write blog posts, they address how their writing changes without the use of hand-written drafts and questions about what is lost on a personal level when we no longer have an identifiable handwriting style. When they use concept maps, we ask whether this is an authentic reflection of a mental process. When students record their voices, they ask about the potentially dehumanizing effects of compression, editing and surveillance in the auditory media.

Technology criticism varies in its level of explicitness. After a robotics unit, I ask students to analyze how they unintentionally humanized the robot. They ask about the gender assigned to the robots and the social implications of treating machines as humans. They examine the algorithms we use to define our choice processes in search engines, internet media players, and "relevance" selectors among social media. Students also watch selected interviews from proponents of the Singularity Movement.

When learning about personification, I ask students to write letters to personified technology. While many students initially scoff at this idea, they soon realize how often they have personified technology throughout their lives. The letter-writing assignment helps students come to terms with the often-intimate relationship they have with their technological devices. As one student writes, "Oh Android, you are becoming more human than you realize. Who receives more attention than you? Who is allowed closer to my lips? I keep an arms distance from others, but we are constantly holding hands."

TECHNOLOGY REFLECTS AND CONSTRUCTS TRUTH

I ask students to view a picture of Abraham Lincoln and read a primary source description of the former president. Afterward, students use Twitter to discuss which method is more accurate.

"The picture can't be altered, but you can always change your words," a student writes.

"I think a picture is more accurate, because it shows you rather than telling you."

"Yeah, you can see Lincoln. It's more accurate."

"I don't know. He's posing for the camera. Maybe it's actually more fake?" a student asks with a careful question mark.

We move from Twitter to a short class discussion. The students are shocked to find that the picture is an altered photograph, often displayed in textbooks without any explanation of the disingenuous image.

"So, if we can manufacture truth, how do we know something is real? How do we know what is true?"

After the short discussion, I ask students to respond to a discussion question on our class blog: In what ways does the medium itself fail to capture reality compared to oral or written language? It takes a few minutes of think time before they point out the danger in the camera of framing reality and the lack of visual language to capture abstract concepts. Some suggest that symbols work just as well, while others see symbolism as being more dangerous than abstract writing. The discussion is part of a unit on primary and secondary sources, public memory and the way a medium transforms the stories we tell.

When students create a documentary, they compare and contrast the way the medium (video versus verbal) changes the way people answer questions. Students also discuss the role of the medium in making the documentary more

entertaining and the question of whether in-depth information can be conveyed in a multimedia format. Moreover, the act of editing audio and video becomes a chance for students to see the dangers that the medium imposes in providing accurate information.

However, such criticism is not limited to social studies. In science, students can analyze the myth that pictures or videos "capture" the truth better, when in fact they often lead us to pay less attention to the natural phenomenon and oversimplify abstract concepts. For example, the spatial limitations of a diagram lead artists to de-emphasize the relative distance between the parts of an atom or the distance between planets. Thus the medium itself creates an inaccurate conceptual model that children internalize.

In math, students can examine the non-neutrality of data and the manipulation of numbers through graphical representations. Students can analyze graphs from the White House, Fox News, CNN and MSNBC for bias and propaganda. However, students can also analyze cultural attitudes toward statistics, the propensity to value quantitative over qualitative metrics and the worldview that results in an image-based, graphical mindset.

SOCIAL MEDIA AS A TRANS-GEOGRAPHIC AND GEOGRAPHIC FORCE

Social media exists as both a medium and a location. Society borrows from both geographical and procedural language when referring to social networks. One way to analyze the sense of space-less space is for students to create a semantic environment inventory. Students annotate a series of articles related to social media using one color to represent the media-related language and another to represent place-based language. I approach this as a lesson in vocabulary and expository text rather than technology criticism. Next, the class discusses the question, "Where am I when I'm on Facebook?"

From there, students identify the values, norms, tokens and customs of a specific online space and then compare and contrast it to their own location. Afterward, they compare and contrast social media interaction to print-based and oral interaction. Finally, students find a non-verbal way to communicate whether the media element enhances the social interaction and whether the social element improves the ability to express language.

Students analyze the sense of space-less space when they engage in a service learning, problem-based learning activity with other students across the globe. This leads to a discussion about the way the medium creates a difference sense of space while still allowing them to feel like they are in the current location. Each year, students analyze the culture conflict inherent in a collaboration method that allows users to slip into a sense of neutrality based upon the assumption that online space is somehow a non-geographic "other space."

SOCIAL MEDIA MAKES US TRANSPARENTLY OPAQUE

I ask my students, "How do you change when you interact online?"
"I can't be myself," a student says. I watch as the class nods in unison.
"Grown-ups are so concerned with cyber bullying. They think we're being awful online. And sometimes we are. Sometimes we post bad stuff to Facebook. But a lot of the time I feel like I hold back. I can't be myself."

"It's not just Facebook. It's life," another student responds.

"What do you mean?" I ask.

"You never know when someone is videotaping you. It's like we're all celebrities in a reality TV show. But we're the viewers and we're the show."

"So, you're saying it's a culture of surveillance. Is that such a bad thing? I mean, maybe people are being held accountable," I push back.

"Not if they can't be themselves," a student responds.

When I ask students to craft a metaphor for their online identity, the most common answers are masks, brands, labels and gags. However, one student offers a more dramatic, *Harry Potter*-inspired metaphor, "Social media is my Horcrux. I get to be immortal. I get to be in two places at once. But there's a cost. I can't be myself. I've lost my soul."

Often digitial citizenship has been presented as a form of personal public relations, where students manage liability and promote a personalized brand. Rather than using media to develop their voice authentically, schools implore students to behave nicely and avoid leaving an offensive cyber footprint. As a result, students learn to hide online. Some students engage in passive-aggressive anonymous flaming and cyber bullying. Others present a squeaky clean self-image with the hopes of impressing future employers and college entrance screeners.

While a certain level of self-censorship occurs in all social contexts, the permanence and transparency of social media lead students to over-correct. What is gained in being pleasant is lost in the inability to be real. In a culture where anything can be recorded, mixed and displayed publically, we now have the potential to be entirely transparent in a way that forces people to be vigilantly opaque.

CRITICIZE WHAT YOU EMBRACE AND EMBRACE WHAT YOU CRITICIZE

In order to think critically about technology, students need to avoid the polar extremes of blind acceptance or absolute rejection of a medium. However, instead of looking for a Hegelian synthesis or even a "happy medium," I ask students to approach technology dualistically as both technophiles and neo-Luddites. I present these concepts with two prototypes: the geek and the guru.

The geek is someone who not only uncritically embraces technology, but also uses multimedia tools to create something innovative. Geeks can solve social and

political problems through the use of new technology. They are creative, passionate and interested in moving society forward through the constant integration of new tools. In contrast, the guru is someone who thinks critically about technology, who values tradition who embraces vintage ideas, who wants to know how technology changes society and who weighs what is gained and lost in using technology. Geeks run the risk of missing the social impact of technology and constantly "progressing" without defining a sustainable meaning of progress. Gurus run the risk of being irrelevant, cynical and unable to recognize the benefits of new technology to humanize society.

By embracing both concepts, students must wrestle with a certain level of cognitive dissonance. However, seeing the two sides as paradoxical and complementary, students are able to make sense out of the aforementioned paradoxes of technology. I do not approach technology criticism systematically or relegate it to a singular unit of study. Instead, it is an integrated approach; like reading and writing across the curriculum. I choose this method, because I want students to engage in technology criticism within a context and thus avoid compartmentalization.

The end result is often messy, confusing and disorienting to students. However, it is also authentic, holistic and organic in nature. By embracing the nuance of each paradox, students recognize both the limitations and the opportunities of each medium. In the process, they not only learn to be digital citizens, but they move toward being critical thinking, democratic citizens, better equipped to make sense of a rapidly changing globalized world.

APPENDIX C

ADDITIONAL TOPICS AND GUIDING QUESTIONS WHEN TEACHING DIGITAL CITIZENSHIP

Digital citizenship is more than simply playing it safe, just as a democratic citizenship is more than wearing an "I Voted Today" sticker or chanting slogans. The following are examples of the kinds of questions I ask students in order to raise nature of technology issues inherent in everyday technologies. At first, I sound like Red from *One Flew Over the Cuckoo's Nest*, but eventually students catch on to the kind of thinking I am promoting.

Social Networks
How do sites like Myspace and Facebook shape how we interact with each other? How do those sites make money? Are we becoming desensitized by advertising? Have we made social interaction into a commodity?

Digital Identity
In what ways do you create a digital identity for yourself? What are some of the dangers in being transparent? What are some of the dangers in being anonymous? Are we becoming more image-conscious? Does this make us more arrogant? Are we losing what it means to be human? How does the constant obsession with "new" cause us to mistake novelty for importance?

Search Engines
How does auto-fill change the way we think? What are the dangers in allowing a computer or an algorithm organize our thoughts?

Images
How do images shape your view of concepts? Are pictures more accurate than words? What are the dangers in photo-editing software and our ability to believe what we see? Is a "made-up" picture less real than what you actually saw (especially if your mind is able to misrepresent it as well)? What are the dangers in "capturing" life on camera? Are there people, places or ideas that should not be "captured" on camera? Does the use of digital photography make people less careful about the pictures they choose to take? Does the quantity change the quality?

Video
How do people change when they are on video? What are the dangers of having to be entertaining? In what ways do we live in an entertainment culture? What are the costs of editing a person's words and chopping it up? How does the narrative change? In what ways does the act of video force people to be more amusing? Do Americans trust pretty people more than ugly people as a result of the video-culture demanding good-looking people for things like news and talk shows?

Music
Is the album dead? Is that a good or a bad thing? Are songs going to get shorter or longer as a result of digitization? Do you think the instant availability of recording technology will increase or decrease the overall quality of music? Do you ever feel like you know a lot of songs, but don't know any songs really deeply? Does music have more or less power when it is portable? People listen to music in isolation. They used to listen to it in groups. What is the purpose of music? Why do you think that previous generations have been said to be defined by their music? What did we lose in the process of digitizing music? We have no shared canon of music. What does that mean for our ability to have collective storytelling as a culture?

Intellectual Property
Does creative commons actually destroy innovation? If property should be shared, why not resources? What makes an idea "yours" in a world where so many ideas are synthesized and customized so quickly? What are ways you can be careful about respecting intellectual property?

Wikis
How do wikis fail to safeguard against errors? What are the dangers in wiki anonymity? What are the benefits of a wiki? How does your voice change when you write a wiki?

Blogs
How do people change their tone of voice or their style of writing when it becomes public? How does the structure of the blog change the length that a person writes? If we can easily edit blogs, does that make us more careless in choosing words than if it were on paper? What is the downside of a society where everyone can be a blogger? Is there a danger in a world where anyone can be "right" and no one has to be an expert? What are the dangers of libel? Do most bloggers consider the credibility of their sources? Is a blog a publishing tool or a communication tool? If people can comment at any time and the conversation isn't bound to time or space, what do we sacrifice in terms of space and presence? How does that shape our communication?

Communication Tools

If anyone can access you at any time, are you ever really present when you are with someone? How do communication tools make us more human or less human? Are people lonelier when they are more connected? Or does the instant connection allow people to feel a deeper sense of connection to people? How have communication tools changed our syntax? our grammar? our vocabulary? What is more real to you: an instant message or a face-to-face conversation? Why does it seem like we're not talking as much anymore?

Information

Does the instant availability of information change how we view truth? In an age where it's so easy to manufacture and publish lies, is there any way to know what is true? How does a website's structure affect your ability to decide if it is true? Is it possible to have too much information? What happens to the value we place on knowledge if it is so readily available? Are we getting smarter or dumber, or do we simply think differently than before?

Cyber Footprint

How does your online identity and interaction live on even after you have deleted it? Will that change how you interact online? Is it worth the lack of privacy in order to access the convenience of "living in the cloud?" Have you made mistakes that are now recorded online? How does that make you feel?

Operating Systems

How do operating systems manipulate you? How have you changed the way you think based upon the desktop environment you use? In what ways does your computer itself change your attention span? Is it true (or simply a myth) that operating systems are designed to make people multi-taskers? Have computers changed our work ethic?

Social Decorum

What is the tone of comment posts that follow news items, videos, and blogs? Why does the tenor of these conversations so quickly become toxic? How does the nature of the medium enable this to occur? Why wouldn't such comments be tolerated in a face-to-face setting?

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