What story should we tell about electric lights? A Critical Inquiry into Lewis Latimer and the Nature of Invention

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From Alexander Graham Bell to Hiram Maxim to Thomas Edison, individual inventors tend to be celebrated in elementary social studies curriculum for bringing forth unmitigated social progress to all groups. However, this narrative is problematic on several counts.

First, educators need to decouple technological advancements and social progress. All technologies involve trade-offs as technologies rarely bring forth benefits alone. Young students can likely understand that while smartphones and tablets provide access to information, games, and videos, they also can distract them from giving attention to family and friends around them. Teachers can help students be more *technoskeptical* about technologies by discussing what is gained, what is lost, and for whom.

Second, teachers need to challenge *myths of the hero inventor*.³ Inventions are almost always the product of many people—sometimes working together and other times working in isolation. They build on each other's ideas, and benefit from the support of those working for them. Moreover, invention also is the

¹Daniel G. Krutka, Scott Alan Metzger, and R. Zackary Seitz, ""Technology inevitably involves trade-offs": The framing of technology in social studies standards," *Theory & Research in Social Education* 50, no. 2 (2022): 226-254.

² Neil Postman, "Five things we need to know about technological change." (1998).

³ Mark A Lemley, "The myth of the sole inventor," *Mich. L. Rev.* 110 (2011): 709; Rayvon Fouché, *Black inventors in the Age of Segregation* (Baltimore, MD: The John Hopkins University Press, 2003); For more on teaching the "complex and human dimensions" of Black history, see King, LaGarrett J. "Introduction: How Do I Start Teaching Black History?" *Social Studies and the Young Learner 35*, no. 3 (2023): 3-4.

byproduct of opportunity and access, and the technology sector has a long history of exclusion of women, People of Color, and Indigenous people. While Black inventors faced racist systems, their experiences varied. As this inquiry will show, Lewis Latimer's life conveys the story of a Black inventor living during legal segregation.⁴

Third, educators need to empower students to make decisions about what role technologies *should* play in our collective lives. Too often, technological change is presented as inevitable. However, citizens in a democracy have a responsibility to refuse and resist technologies that create a world that we do not want.

Technoskeptical Inquiry

Scholars have increasingly argued that cultivating *technoskepticism* in students' thinking should be a goal of schools.⁵ Technoskeptical citizens suspend their judgment about technologies to consider their collateral, unintended, and disproportionate effects. Citizens are then better informed to advocate for the role those technologies should play in their lives and communities.⁶

There are at least two aspects of technoskeptical thinking that can help students think more critically about technology. First, students should recognize that *technologies are not neutral tools* that people simply use for good or bad. Instead, technologies should be understood to have ideological biases that nudge people toward certain ways of thinking and being. The old adage says, "To a person with a hammer, everything looks like a nail," and this applies to other technologies too: "To a person with a pencil, everything looks like a sentence. To a person with a TV camera, everything looks like an image. To a person with a computer, everything looks like data." Also, technologies always require trade-offs that benefit some while harming others, and cause unexpected and unintended changes. Once a

⁴ Learn more about Lewis Latimer and "the Black Inventor Myth" in Fouché, *Black inventors in the Age of Segregation*.

⁵ Aaron Cavazos and Jacob Pleasants, "Teaching students to think critically about technology," *Social Education*, In Press; Daniel G. Krutka, Marie K. Heath, and Ryan M. Smits, "Toward a civics of technology," *Journal of Technology and Teacher Education* 30, no. 2 (2022): 229-237; Scott A. Metzger and Daniel G. Krutka, "Interrogating the Smartphone: Teaching through Technoskeptical Questions." *Social Education*, In Press; Jacob Pleasants, Daniel G. Krutka, and T. Phillip Nichols, "What Relationships Do We Want with Technology? Toward Technoskepticism in Schools." *Harvard Educational Review* 93, no. 4 (2023).

⁶ Krutka, Metzger and Seitz ""Technology inevitably involves trade-offs"".

⁷ Postman, "Five things we need to know about technological change," p.3.

technology is widely adopted, people even come to see it as natural to the world. For example, people have trouble imagining a world without smartphones, cars, and as we will explore, electric lights.

Second, students should recognize that *societies are not neutral*, and technologies can often extend or amplify existing biases and systems of oppression. Technological industries have often disproportionately excluded People of Color, women, and other minoritized groups, which makes it more likely the technologies were not designed with those groups in mind. For example, Google has been criticized for racist and sexist search results, but when they hired a Black computer scientist in Dr. Timnit Gebru to study these types of problems, she ended up being forced out of the company.⁸ Even when Gebru was included, her vision for a just society was rejected by the culture of Google and Silicon Valley.⁹

In this article, I present a technoskeptical Inquiry Design Model (IDM) lesson where upper elementary students critically inquire into the story of Lewis Latimer and the development of the electric light. ¹⁰ Elementary students often learn stories about Thomas Edison and the invention of electric lights in units on inventors in science and social studies as is evident by the a 5th grade standard from Florida that asks students to "trace the development of technology and the impact of major inventions on business productivity during the early development of the United States." Sometimes, students learn about Black inventors like Lewis Latimer during Black History Month as is the case in a 4th grade New York standard that identifies "Lewis H. Latimer" as an entrepreneur and inventor "associated with New York State" who has "made important contributions to business and technology."

This topic is well suited for inquiry because it explores a compelling question that does not offer right or wrong answers, but instead encourages students to make value judgments based on evidence. My inquiry will position students to confront the problematic narrative of Thomas Edison as the sole inventor of the light bulb who made the world better for everyone, but students must decide what story

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⁸ Karen Hao, "We read the paper that forced Timnit Gebru out of Google. Here's what it says," *Retrieved January 21* (2020): 2021.

⁹ To learn more, I recommend reading Black women scholars who have detailed how discriminatory design and oppressive algorithms pervade technological design: Ruha Benjamin, *Race after technology: Abolitionist tools for the new Jim code* (Medford: Polity Press, 2019); Safiya Umoja, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018); Meredith Broussard, *More Than a Glitch: Confronting Race, Gender, and Ability Bias in Tech* (Cambridge: The MIT Press, 2023).

¹⁰ Swan, Kathy, S. G. Grant, and John Lee. *Blueprinting an inquiry-based curriculum: Planning with the inquiry design model*. National Council for the Social Studies, 2019.

we *should* tell. The inquiry is designed as a flexible lesson for upper elementary students, but it could easily be modified for different grade levels, adapted to be taught in one class or over one week, and potentially expanded into an interdisciplinary project with science integration.

What story should we tell about electric lights?

Most discussions of technology focus on the newest technologies, but there is a benefit to interrogating older technologies whose impact can be taken for granted. As Douglas Adams said, people have the tendency to think that "anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works." In this critical inquiry, ¹¹ I pose the compelling question, what story should we tell about electric lights? This compelling question provides room for students to confront the three aspects of the problematic narratives around technology with which I opened this paper. You can also access the full IDM at https://www.civicsoftechnology.org/lights-and-latimer-idm.

Teachers can stage the question by drawing on students' prior experiences with electric lighting. I recommend asking a question such as: *How would our lives be different without electric lights?*From my experience teaching this inquiry, students can sometimes focus exclusively on what is lost. They often recognize that without electric lights it would be hard to do activities at night. They sometimes realize that car travel relies on electric lights. I encourage technoskeptical thinking by asking follow-up questions that consider how people in the past lived prior to electric lighting, or how some people live without electric lighting today. Teachers can also ask, *could a life without electric lighting be better in any way?* Students will return to this discussion with supporting question 3.

Interrogating the Technological Industry

In supporting question 1, students will answer, who invented the electric light? Students are often told the myth that *Thomas Edison invented the lightbulb*. However, inventions are rarely the creation of one (often white and male) inventor. Instead, inventions tend to be developed by communities of people who work—together and separately—to tinker toward technological advancements. Students can begin to

¹¹ Ryan M. Crowley and LaGarrett J. King. "Making inquiry critical: Examining power and inequity in the classroom," *Social Education* 82, no. 1 (2018): 14-17.

Inquiry Design Model (IDM) Blueprint			
Access IDM at https://www.civicsoftechnology.org/lights-and-latimer-idm			
Compelling Question	What story should we tell about electric lights?		
Standard(s)	Teachers should include relevant state standard(s). Example standards: New York—4th grade (4.6e): Entrepreneurs and inventors associated with New York State have made important contributions to business and technology. Students will research several people who made important contributions to business, technology, and New York State communities. Some people to consider include Thomas Edison, Lewis H. Latimer, and others, as locally appropriate. Florida—5th grade (SS.5.E.1.3): Trace the development of technology and the impact of major inventions on business productivity during the early development of the United States.		
Technoskeptical Practice	Technology is too often only understood for its intended purpose and benefits (Krutka et al., 2022). Cultivating a technoskeptical outlook encourages students to suspend their judgment and critically inquire into not just benefits, but also unintended, collateral, and disproportionate effects of technological change. This inquiry is particularly aligned with the following technoskeptical questions: What does society give up for the benefits of the technology? Why is it difficult to imagine our world without the technology?		
Staging the Question	Teachers can draw on students' prior experiences by asking a question such as: How would our lives be different without electric lights?		

Supporting Question 1	Supporting Question 2	Supporting Question 3
Who invented the electric light?	Why does Lewis Latimer's story matter?	What do we give up for the benefits of electric lighting?
Formative Performance Task	Formative Performance Task	
For sources A and B, teachers can ask students: What do you see? What do you think? What do you wonder? Small groups of students should work together to write answers to the supporting question, and then discuss answers as a whole class.	For sources D and E, students can answer the question, Who is Lewis Latimer?, by writing down facts about his life in small groups. For sources F, G, and H teachers can lead a discussion using the questions: What do you see? What do you think? What do you wonder?	Teachers can ask questions the following while reading: How do we know who invented the electric light? (Edison picture page) Why is it hard to imagine our world without air conditioning? ("TOO HOT AND STICKY" page) Teachers should then facilitate a whole class discussion answering the supporting question.
Featured Sources	Featured Sources	
Source A: <u>U.S. Patent 223.898. "Application for the Incandescent Light Bulb."</u> 1880 Source B: <u>U.S. Patent 247.097. "Electric lamp."</u> 1881 Source C: <u>Who Really Invented the Light Bulb?</u> , History.com, 2013	Source D: "Lewis Latimer," in What Color Is My World?: The Lost History of African-American Inventors by Kareem Abdul-Jabbar, 2012 Source E: Lewis Latimer, Deeper than Read [video], 2023 Source F: General Electric Legal Department, Expert's Office, 1894 Source G: Edison Pioneers, 1918 Source H: Edison Pioneers, 1920	Source I: <u>Blackout</u> by John Rocco, 2011

Summative Performance Task	Argument	Students should draw on sources to make informed arguments in a whole class discussion that answers the compelling question, what story should we tell about electric lights?	
	Extension	Students can create a poster or other creative project that uses evidence to answer the compelling question from the perspective of an anthropomorphic electric light. Teachers can encourage students to have their electric light discuss their "inventors," talk about Lewis Latimer's influence, share their proudest accomplishments, and detail their biggest shortcomings.	
Taking Informed Action	parents, p 2. Students	 Students can identify individual and community changes they might make around use of electric lights, and take those changes to their parents, principal, or city council. Students could investigate whether students from all races are equally represented in advanced STEM classes in their district, and whether the curriculum is culturally responsive and pursues a more just world. They can advocate for change as is necessary. 	

examine how much credit different individuals and groups deserve by defining and learning about patents. The teacher can start with a definition from the U.S. Patent and Trademark Office:

A U.S. patent gives you, the inventor, the right to "exclude others from making, using, offering for sale, or selling" an invention or "importing" it into the $U.S.^{12}$

Then teachers can ask students to view two patents—source A from Thomas Edison and source B from Lewis Latimer—and ask them: What do you see? What do you think? What do you wonder? Students will offer an array of theories about what is being patented, how the inventions function, who submitted these patents, and of course, who benefits from securing them. Examining these sources offer space to integrate science content into the lesson. Edison's famous patent for the "Electric-Lamp" used a carbon filament (source A), and then Latimer and his co-inventor, Joseph Nichols, made the carbon filament last longer by creating a better attachment from the filament to the wire connections (source B). Latimer's patent helped his employer, Hiram Maxim and the United States Electric Lighting Company, in the competitive lamp market against Thomas Edison's Companies.

Source C is a short 2-minute video from the History Channel that serves as a secondary source explaining how inventors from Frederick de Moleyns and Joseph Swan preceded Edison, but Edison's use of carbonized bamboo as filament helped make the light bulbs last longer and be commercially viable. Teachers can also explain that securing patents required access to capital to pay the patent application fee, lawyers to defend the patent against infringement, and turn the secured patent into a commercially viable product. While turning patents into profits was difficult for most inventors, Black inventors like Lewis Latimer were at an increased disadvantage due to systemic bias and inequality concerning access to the financial and human capital often needed to see through the inventive process.

For the formative performance task, small groups of students should work together to write answers to supporting question 1, and then discuss answers as a whole class. While students should generally agree that many people contributed to inventing the lightbulb, there is room for debate about how much credit different inventors should receive.

Centering a Counterstory¹³

¹² "Patent Essentials," United States Patent and Trademark Office - An Agency of the Department of Commerce, May 2, 2023, https://www.uspto.gov/patents/basics/essentials#questions.

¹³ These sources provide a counterstory to dominant narratives about "technological progress" that exclusively celebrate the genius of white men. Counterstories have roots in Critical Race Scholarship taken up in social studies: Wise, Crystal N., Brittany L. Jones, Blake A. Thompson, and Anne-Lise Halvorsen. "Family Stories, Counter-Storytelling, and Chronological

In supporting question 2, students seek to answer, why does Lewis Latimer's story matter? Lewis Latimer's story challenges the myth of the sole inventor, 14 highlights the agency of an often-overlooked Black inventor, and encourages students to confront anti-Black oppression in the past and present. Counterstories like Lewis Latimer's can encourage students to ask other questions such as: Who else's stories have been excluded? Who was never afforded opportunity in their time? How did anti-Black racism affect Black men in these industries, and how did they respond to it?

Source D (two-page reading) and source E (6-minute animated video) both tell Lewis Latimer's unlikely story. Lewis Howard Latimer was born in 1848 to Rebecca and George Latimer. Through hiding and disguise, his parents self-emancipated from slavery in Virginia because they did not want to raise their children in slavery. However, George was soon identified and jailed once they reached Boston. First the Black community and then the larger abolitionist movement championed George's case by holding "Latimer meetings," distributing "Latimer petitions," creating "The Latimer Journal, and North Star," and passing the 1843 Massachusetts Personal Liberty Act known as the "Latimer Law." This law prevented the Massachusetts government from detaining people who escaped enslavement, but it was shortly thereafter overturned by the Fugitive Slave Act of 1850. Table 1 provides sources to further investigate the story of Lewis Latimer and his family.

Sources D and E focus primarily on providing an overview of Lewis Latimer's life from his time as a soldier in the Union navy during the Civil War to his rise as a patent draftsman and inventor who worked alongside Alexander Graham Bell, Hiram Maxim, and Thomas Edison. Students should read the two-page biography of Latimer's life and then watch a 6-minute video. Students can compare the two secondary sources and answer, who was Lewis Latimer? in small groups by writing down facts about his life. Students can identify different roles of Lewis Latimer's life such as: Civil War veteran, draftsman, inventor, poet, husband, and father. Students should also learn about how Latimer experienced Black joy through family, poetry, and music. This shows that oppressive structures of white supremacy and segregation did not define Black people's lives, but encourages students to think about the "full range of

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Overlaying: Exploring Black Historical Consciousness in Elementary Social Studies." *Social Studies and the Young Learner* 35, no. 3 (2023): 5-12; Crowley and King, "Making inquiry critical,"; Amanda E. Vickery and Noreen Naseem Rodríguez, eds. *Critical Race Theory and Social Studies Futures: From the Nightmare of Racial Realism to Dreaming Out Loud Teachers* (New York: Teachers College Press, 2022).

¹⁴ Lemley, "The myth of the sole inventor."

Black people's emotions." Table 1 includes more detailed picture and chapter book options that teachers could substitute for sources D and E if time permits.

Sources F, G, and H ask students to examine primary source photographs. Source F is an 1894 picture of General Electric's legal team that investigated patent infringement cases. Latimer is the only Black man on a team that included white women. Their job was to protect the patents of Thomas Edison and General Electric. Latimer was particularly suited for this role due to his extensive experience in the electric lighting industry, and due to his ability to read in multiple languages.

In sources G and H, Latimer was the only Person of Color in the all-male Edison Pioneers, a social organization that included employees who worked closely with Thomas Edison before 1886. Pictures of Edison Pioneer meetings in 1918 (source G) and 1920 (source H) provide students an opportunity to consider how Lewis Latimer succeeded in a field segregated by race and sex. As source F illustrated, white women did work on Edison's legal team, but none were invited to be Edison Pioneers. The women in source G appear to be family members. Students, particularly girls and Students of Color, will likely identify that there are not many people who look like them.

Latimer faced anti-Black racism throughout his career as employment opportunities were limited and his abilities questioned by co-workers and subordinates, especially during his time in England. Yet, Latimer's story offers a rare example of a Black man of his time who gained some level of acceptance within the electric light industry dominated by white men. He worked first at Hiram Maxim's U.S. Electric Lighting Company and then for Maxim's competitor Thomas Edison at General Electric. Latimer may have partially succeeded during a time of segregation because he was not as vocal for racial justice.

Latimer's beliefs about race can be characterized as assimilationist. In letters to Booker T. Washington, he expressed views that suggested that Black people were not inherently created equal, but that they had to prove to white people they were "civilized." Jason Reynolds and Ibram X. Kendi described assimilationist racism in a way young learners can understand as "people who like you... if you're like them." This can be contrasted with an antiracist view where people "love you because you're like

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¹⁵ King, "Introduction: How Do I Start Teaching Black History?," 4.

¹⁶ Fouché, Black inventors in the Age of Segregation.

you."¹⁷ Latimer tended to communicate and identify with other elite Black leaders, but he was less involved in Black movements for full equality.

I provide this historical context for teachers because as students learn more about this time period, they may wonder how a Black man navigated a racist society. Teachers can help upper elementary students both cultivate racial consciousness and think historically by discussing white supremacy, and different views on how to address it in the Black community of Latimer's time. The son of previously enslaved parents, Latimer overcame significant racial barriers in his life to achieve professional and personal success, but this does not mean that he was a perfect hero.

As students discuss sources F and G, they might also note why Lewis Latimer was neither famous nor rich like Bell, Maxim, or Edison. As source D notes regarding his improvement of the electric light, "Although he received a patent for his breakthrough, all profits went to Maxim."

Table 1. Recommended Resources for Further Learning

Lewis Latimer House Museum (LLHM) is hosted in Lewis Latimer's historic house, which has been relocated to Queens, New York City. LLHM aims to "preserve and promote the legacy of Lewis Howard Latimer, and other innovators of color who made extraordinary contributions to technology and American life. The Museum offers STEAM educational programs, exhibitions and public programs in poetry, arts, technology, and social justice. Latimer's life story is used as a point of departure from which to examine issues of race, class, immigration and contemporary events." The museum provides educational resources, including field trips or virtual programs. Learn more at https://www.lewislatimerhouse.org/.

Lewis Latimer Biography Chapter for Teachers titled, "Lewis H. Latimer and the Politics of Technological Assimilation" (pages 82-133) in Rayvon Fouché's 2003 book *Black Inventors in the Age of Segregation*. This chapter rejects the heroification of Lewis Latimer and instead can help teachers understand him as a complex Black man of his time.

Wow in the World is a "science podcast for kids and their grown-ups. Hosts Mindy Thomas and Guy Raz share stories about the latest news in science, technology, and innovation." The

¹⁷ Reynolds, Jason, and Ibram X. Kendi. *Stamped (for kids): Racism, antiracism, and you*. Hachette UK, 2021, 3-4.

episode on Lewis Latimer includes historic events being acted out for both comedy and to help understand events of the time. Listen at https://tinkercast.com/podcasts/lewis-latimer-inventor/.

Other Recommended Children's Books on Lewis Latimer include the 2023 picture book *Lewis Latimer: A Brilliant Inventor* by Janel Rodriguez (Author) and Subi Bosa (Illustrator). The picture book is relatable, accurate, and includes primary sources. The 2021 chapter book *VIP: Lewis Latimer: Engineering Wizard* by Denise Lewis Patrick and Daniel Duncan is intended for middle grade students and provides a readable narrative and excellent detail about Lewis Latimer's life. Both books could replace the two-page narrative from source D if time permits.

Learn more about George Latimer from the Zinn Education Project's *This Day in History* titled, "Nov. 21, 1842: George Latimer Freed in Boston." In addition to the secondary source summary, the page also includes two primary sources. Read more at https://www.zinnedproject.org/news/tdih/george-latimer-freed/.

IEEE REACH has a set of Inquiry Design Model (IDM) units including an inquiry that focuses on the more technical aspects of the development of electric lights for older students, including making a light bulb with batteries. The compelling question is, *how would your life be different without electric lighting?* The inquiry also includes an additional multimedia source that is a biographical video on Lewis Latimer's life. Find the inquiry at https://reach.ieee.org/inquiry-units/electric-lighting/.

Interrogating the Technology

It can be common to strive to add Black or women inventors into the story of technological progress, but a technoskeptical inquiry should also interrogate the technology. Supporting question 3 asks students, what do we give up for the benefits of electric lighting? This critical question challenges students to consider possible downsides to electric lighting. For source I, teachers lead an interactive read aloud of the 2011 picture book *Blackout* by John Rocco. The book tells the story of a family living in a city who are "much too busy" as electricity powers their lights and devices that they each use in isolation. Once the power goes out, family members gather together without the pull of their devices, go outside to view the stars as light pollution is diminished, and join community members in the street. As teachers read the book, they can ask question such as:

- After identifying Thomas Edison's painting on the wall, why is it Edison's picture that is on the wall? (Edison picture page)
- After the book indicates it's "hot and sticky," why is it hard to imagine our world without air conditioning? ("TOO HOT AND STICKY" page)

While electricity and electric lights are generally thought of as technologies humans can use for better or worse, this book shows how technology enacts force on us. People may not be as in control of their decisions as they often think. The family realizes this by identifying all the things they lose with electric lights: connection to family members, the natural world, and community. I like to ask students, *do you think the inventors of electricity and electric lights thought these inventions would cause people to spend less time with families and out in their communities? Do you think they thought electric lights would replace the stars for many people?*

Students might identify that electric lights have effects such as disrupting sleep patterns, extending work into the night and home, and decreasing comfort with darkness. By the end of this read aloud, students should see that technologies change our lives in complex ways. It is their task to figure out which aspects of this change they want to embrace or reject. Students might reconsider their relationship with electric lights in their homes and communities.

Conclusion

Students should conclude by debating the compelling question, what story should we tell about electric lights? This question is meant to interrogate the role of electric lights in our lives, confront problematic narratives about invention, and center the complex story of a Black inventor. Students' answers will likely be varied as they address the degree to which different people—everyday consumers, various inventors, and minoritized inventors—benefited, have been harmed, or have been cheated by the invention and industry of electric lighting. Students can then take informed action around the uses of lights in their homes and communities, but also by interrogating racial and gender opportunities in advanced STEM classes in their schools and fields in their schools. They can demand equitable environments so women and People of Color can not only survive these fields but move them toward racial and economic justice. The story of the invention of the light bulb should help students see that neither technologies nor societies are neutral. When teachers help students reject simplistic narratives

around Black history and invention, they can initiate critical inquiries intended to advance just and humane technological futures.

