

Primary Sources

Interviews

"Ada Lovelace: Challenging Women's Status in Science." *BBC News*. BBC News, 16 Oct. 2012.

Web. 29 Dec. 2015.

This video was about the experiences of four women in their professional lives. They recall their scientific work being dismissed or discredited in the twenty first century. This interview was a primary source in the sense that it helped me understand the prevalence and severity of gender bias in society even today through the eyes of scientists who experienced it.

Bell Burnell, Jocelyn. "Jocelyn Bell Burnell on Being Denied a Nobel Prize." Interview by Jim

Al-Khalili. *BBC*. BBC, 3 Oct. 2013. Web. 28 Dec. 2015.

In this interview, Jocelyn Bell Burnell discusses how she felt when she did not receive the Nobel prize she deserved for her groundbreaking work. Other male scientists working with her were awarded the prize. I had not realized how many scientists and mathematicians, like Lovelace, had been overlooked completely, partly or mostly because of their gender. I did not include her interview in my website, but listening to it helped me organize my thoughts about my page on encounters.

Elite Daily. "How Girls Who Code Is Bridging The Gender Gap In Tech [Disruptive] | Elite Daily."

YouTube. YouTube, 4 Aug. 2015. Web. 19 Feb. 2016.

I categorized the interview with the CEO and founder of *Girls Who Code* as a primary source, not because she discusses Ada Lovelace from primary accounts but, because she talks about her own organization and how its mission is to inspire girls and women to join technology. With the growing number of role models like Lovelace and widening technology accessibility, more girls are interested in STEM.

Autobiographies

Somerville, Mary. *Personal Recollections, from Early Life to Old Age, of Mary Somerville: With Selections from Her Correspondence*. Boston: Roberts Bros., 1874. Print.

I was able to read part of this biography through MicroFiche forms at Rice University.

Somerville, Lovelace's mathematics mentor, discussed what society's, including her parents', thoughts were on her getting an education. Eventually Somerville became a prominent female scientist and inspired Lovelace greatly.

The Lady's Friend, Volume 7. N.p.: Deacon & Peterson, 1870. *Google Books*. Web. 28 Dec. 2015.

A friend of the family, the author discusses the high mathematical abilities and affinity for experimental science of Ada Lovelace. It was very interesting to read about the personal relationships Lovelace had. This letter was particularly important because it proves that other people during her time saw the raw ability Lovelace had and serves as another piece of evidence for Lovelace's authorship of the *Notes*.

Books

Beers, Henry A. *A History of English Romanticism in the Eighteenth Century*. N.p.: Mershon, 1898. Print.

Romanticism influenced Lovelace's work greatly. It allowed her to think of the Analytical Engine as more than just technical work. Although this piece did not discuss the Analytical Engine or Lovelace in general, it allowed me to see the context in which they were influenced. Therefore, I was able to provide an analyzation of romanticism and industrialization in my context page.

Memoirs

Babbage, Charles, and Martin Campbell-Kelly. *Passages from the Life of a Philosopher*. New Brunswick, NJ: Rutgers UP, 1994. Print.

In his biography, Babbage explains the functions of the Analytical Engine. He details how the cards, modeled after those of the Jacquard loom, could be programmed into limitless possibilities. The cards were the essence of Lovelace's program. Although no words from his biography were used in my website, it helped me understand the context surrounding Babbage and his Analytical Engine.

Morgan, Augustus De. "Memoir of Augustus De Morgan." *Archive*. N.p., n.d. Web. 14 Nov. 2015.

Augustus de Morgan was one of Lovelace's mentors. In this primary account, de Morgan recounts when he saw Lovelace meet the Analytical Engine. De Morgan recalled how excited Lovelace was compared to other men and women at the event. Even from the beginning,

Lovelace saw the engine's calculating potential. A picture of de Morgan's retellings was used in my website to show the readers another dimension of the relationship Lovelace had with the Analytical Engine.

Letters

Babbage, Charles. "Letter 1520." Letter to Michael Faraday. 9 Sept. 1843. *The Correspondence of Michael Faraday, Volume 3: 1841-1848*. Vol. 3. N.p.: n.p., n.d. 16465. Google Books. Institution of Electrical Engineers. Web. 14 Oct. 2015.

This letter from Charles Babbage to another scientist Michael Faraday revealed Babbage's thoughts on Lovelace. Although I did not include this in my website, it helped me understand the relationship between Lovelace and Babbage.

Lovelace, Ada. "Ada Works 'like the Devil' for Charles Babbage." Letter to Charles Babbage. N.d. *BBC*. BBC, 14 Sept. 2015. Web. 29 Dec. 2015.

This website included an audio file of one of Lovelace's letter, some of which was quoted in my website. It revealed Lovelace's thoughts behind the creation of the first computer program.

Scientific Articles

Lovelace, Augusta Ada. "Notes." *Sketch of The Analytical Engine*. Fourmilab, n.d. Web. 18 May 2016

Attached to Menabrea's *Sketch of Invented by Charles Babbage* are these *Notes*. In these *Notes*, Lovelace wrote her the first computer program. The mathematics of this paper were hard to understand. However, this was definitely the most important source I read. I was able to see first-hand the ideas of art and sciences that Lovelace intertwined and the first computer program in the world.

Menabrea, L.F. "Sketch of Invented by Charles Babbage." Sketch of The Analytical Engine. Trans. Lovelace Ada Augusta. Bibliothèque Universelle De Genève, n.d. Web. 22 Nov. 2015.

This source was the very core of my website. This scientific paper was the one that Lovelace translated from French to English. Lovelace appended her own notes titled "Notes" which included the first computer program.

Journal Articles

Statistical Society of London. "The President's Inaugural Address, Session 18711872." Journal of the Royal Statistical Society 34 (1871): 41415. Google Books. Web. 14 Oct. 2015.

The Statistical Society of London critiques Menabrea's and Lovelace's published work on the Analytical Engine. Menabrea wrote a paper based on a lecture that Babbage gave on the Analytical Engine. When Lovelace translated it, she added her own "Notes" which were longer than the original paper.

Essays

Babbage, Major General H. P. "The Analytical Engine." The Analytical Engine. The British Association, n.d. Web. 22 Nov. 2015.

In this article, Babbage details some of the capabilities of the Analytical Engine. Reading this helped me synthesize the information that I wanted to present about the technical aspect of the Analytical Engine in my website.

Liverati, Carlos Ernesto. Ricordi Del Terzo Congresso Scientifico Italiano, Ossieno, Ritratti Di Trentasei Fra I Suoi Componenti. N.p.: n.p., 1842. N. pag. Print.

Babbage was the inventor of the Analytical Engine, and I discussed his work while I was setting the context of my website. The portrait of Babbage also adds aesthetic appeal and user interactivity to my website.

Laws

"Equal Pay Act 1970." *Legislation.gov.uk*. The National Archives, n.d. Web. 9 Feb. 2016.

I came across the *Equal Pay Act 1970* while searching for a British law similar to that of America's *Title IX*. This document helped me understand the differences between the rights of women in the 19th century and then after the act. If Lovelace had been alive after the enactment of this law, she would have been able to publish her work under her own name without the fear of social repercussions.

"Sex Discrimination Act 1975." *Legislation.gov.uk*. The National Archives, n.d. Web. 9

Feb. 2016.

This is another document that I found while searching for a British equivalent of the United States' *Title IX*. Arguably, the biggest reason that Lovelace vanished from the public eye was the fact that during her life, being a woman accomplished in science or math grated against social expectations. Perhaps if this act had been enacted earlier, her accomplishments would have been more widely known and appreciated.

"Title IX, Education Amendments of 1972." *Title IX, Education Amendments of 1972*. U.S. Department of Labor, n.d. Web. 15 Feb. 2016.

When Lovelace lived in Great Britain, women had very few legal rights. Although Title IX is American, it was helpful to read about the progress that was made for women in the last century. While researching Title IX, it occurred to me that Great Britain probably had a similar law.

Documentaries

Cosmic Polymath. "Charles Babbage's Analytical Engine." *YouTube*. YouTube, 12 Aug. 2012.

Web. 31 Dec. 2015.

I categorized this video as a primary source because it contains footage of one of the only parts of the Analytical Engine that was built. I used it in my website give readers a better understanding of what the Analytical Engine did and why it was important. I only included a part of the video, but the rest of it emphasizes what a big influence the Jacquard loom was on Babbage just like it was on Lovelace.

Lectures

Peters, Dana. "Steve Jobs: Technology & Liberal Arts." YouTube. YouTube, 6 Oct. 2011. Web.

30 Nov. 2015.

Steve Jobs was a technology visionary and entrepreneur whose work was heavily influenced by the idea that liberal arts and technology should meet to produce the best products. Lovelace in her "Notes" also spoke about this importance. The presentation Jobs gives exemplifies Lovelace's legacy.

Toynbee, Arnold, and Benjamin Jowett. *Lectures on the Industrial Revolution of the 18th Century in England; Popular Addresses, Notes and Other Fragments*. London: Longmans, Green, 1896. *Google Books*. Google. Web. 28 Dec. 2015.

This primary source was a compilation of lectures about the industrial revolution, and it discussed the best inventions of the time and their pros and cons. Reading this helped me understand the ambiance of inventions and machinery of the industrial revolution.

Articles

Smith, Megan, and Jo Handelsman. "The Untold Stories of Women in Science and Technology: Let's Write Them Permanently into History." *The White House*. The White House, 11 Dec. 2014. Web. 15 Feb. 2016.

This article is written by two successful female scientists. They discuss how some women explorers and innovators were unfortunately overlooked by the public. I classified it as a primary source because they discuss how they view this issue personally. They mention how they see Lovelace as the their computer science founder.

Websites

Aurora, Valerie Anita. "Valerie Aurora." *Valerie Aurora*. N.p., n.d. Web. 14 Jan. 2016.

From this personal website, I used the author's biography and picture in my "Student Interviews" page to show my website's readers the relevant qualifications of Valerie Aurora, whom I interviewed. I classified Aurora's blog as a primary source because it provided credible, primary information about herself.

Charman-Anderson, Suw. "About Me." *Suw Charman-Anderson*. N.p., n.d. Web. 14 Jan. 2016.

From this personal website, I used the author's biography and picture in my "Student Interviews" page to show my website's readers the relevant qualifications of Suw Charman-Anderson, whom I interviewed. I classified Charman-Anderson's autobiography as a primary source because it provided credible, primary information about qualifications.

"My Bio." Web log post. *JCG*. John Graham-Cumming, 11 Mar. 2011. Web. 14 Jan. 2016.

From this personal blog, I used the author's biography in my "Student Interviews" page to show my website's readers the relevant qualifications of John Graham-Cumming, whom I interviewed through email. I classified his self-written biography as a primary source because it provided credible, primary information about him.

Wade, Mary Dodson. "Mary Dodson Wade." *Mary Dodson Wade*. N.p., n.d. Web. 14 Jan. 2016.

From this personal website, I used the author's picture in my "Student Interviews" page to show my website's readers the relevant qualifications of Mary Wade, whom I interviewed through phone.

"Women Coders Presents Free Web Development Workshop: Intro to Ruby on Rails." Eventbrite.

Eventbrite, n.d. Web. 30 Nov. 2015.

This event on Eventbrite was a workshop for female coders in the Houston area. Lovelace's authorship of the "Notes" was doubted, sometimes even today, mainly due to her gender.

However, even though Lovelace encountered much social criticism for joining the scientific community as a woman, she continued her work and laid the foundation for modern programming. This picture of modern women programmers is a product of the inspiration that historical women in STEM like Lovelace have provided.

Images

"Ada Lovelace's Letters and Work on Display at Oxford Library - BBC News." *BBC News*. BBC, 13 Oct. 2013. Web. 29 Dec. 2015.

This article contained two photographs I only saw once throughout all of my research: a recently released portrait collection photograph of Lovelace and one of her letters to a scientist. Although the writing of the letter was not legible, I used the picture of the letter in my website to represent all the discussions she had with mentors about furthering her understanding of mathematics.

Gessler, Nicholas. "Jacquard Mechanism and Cards." *Jacquard Loom, Cards and Head*. Duke University, 1 Oct. 2002. Web. 25 Nov. 2015.

The Jacquard loom was one of the biggest influences on Babbage and Lovelace in regards

to the functioning of the Analytical Engine. I wanted to include these pictures in my website so that the audience got to see what a Jacquard loom was. Among these Jacquard loom pictures are pictures of the punch cards used to program the loom.

"Romanticism". Encyclopædia Britannica. Encyclopædia Britannica Online. Encyclopædia Britannica Inc., 2015. Web. 14 Nov. 2015

Although this article is a secondary source, the most important part of it was the collection of Romantic paintings, which are primary sources. These paintings reflect the emphasis on emotion and imagination during this era, which shaped how Lovelace thought of the Analytical Engine as the beginnings of a general computer.

Secondary Sources

Interviews

Aurora, Valerie. "Valerie Aurora on Lovelace NHD." Telephone interview. Dec. 2015.

Aurora co-founded the *Ada Initiative* which supports women in technology. Aurora brought up a different perspective on why people do not want to credit Lovelace for her work in computer programming. She made many interesting connections, and I quoted her to support my analysis.

Charman-Anderson, Suw. "Lovelace Interview NHD." E-mail interview. Dec. 2015.

Suw Charman-Anderson is the founder of *Ada Lovelace Day*, and I interviewed her through an email after watching one of her videos that discussed the importance of the relationship Lovelace created between the humanities and sciences. She brought up the fact that Lovelace's legacy is two fold. Lovelace has a legacy in joining the humanities and sciences and in becoming a figurehead for young female scientists and mathematicians.

Engineering & Technology. "Ada Lovelace Day: Celebrating Ada Lovelace, Michael Faraday and Charles Babbage." YouTube. YouTube, 23 Mar. 2010. Web. 27 Nov. 2015.

I used two segments from this interview. The founder of Ada Lovelace Day discusses the aspect that made Lovelace a technology visionary: her ability to connect the arts and the sciences. Another interviewee, an author, discusses the same idea. I was able to use these segments in "Ada's Education" and "At the intersection of liberal arts and technology" webpages.

Sixty Symbols. "Ada Lovelace's Tomb Sixty Symbols." YouTube. YouTube, 13 Oct. 2015.

Web. 22 Nov. 2015.

This interview with theoretical physicists brings up the fact that one of the only reasons that Lovelace is relatively well known today is because of her high status, accessibility to education and people, and her social mobility. It is very well known that women during that time did not have equal rights to men and lower class women were even less privileged than upper class women. Although Lovelace's work is authentic, it might have never been produced if Lovelace had not been Lord Byron's daughter.

Wade, Mary Dodson. "Mary Wade on Lovelace NHD." Telephone interview. Dec. 2015.

I read Wade's book on Lovelace, and the back cover of the book mentioned that she lived in Houston. I emailed Wade to try to secure an in-person interview, but we settled for a phone interview. I used some of Wade's words in my website to emphasize the significance of Lovelace's accomplishments.

World Science Festival. "Ada Lovelace: The First Digital Innovator in the 1800's." YouTube. YouTube, 13 Oct. 2015. Web. 27 Nov. 2015.

This interview with Walter Isaacson, the author of *Innovators*, focuses on the exchange of liberal arts and technological ideas within the work of Ada Lovelace. I use a segment from the interview in my "At the Intersection of Liberal Arts and Technology" webpage.

Books

Bradley, Michael J. *The Foundations of Mathematics: 1800 to 1900*. New York: Chelsea

House, 2006. Print.

Mary Fairfax Somerville was another of Lovelace's mathematics mentors. Somerville was one of the only prominent female mathematicians during the 19th century. A detailed rendering of Somerville from this book was used in my website.

Essinger, James. "Ada's Algorithm: How Lord Byron's Daughter Ada Lovelace Launched the Digital Age." N.p.: n.p., n.d. Print.

The most important segment from this book was the excerpt "The Little Engines that Could've." I used in my webpage "Questioning Her Credibility." Lovelace's authorship was constantly questioned because she was a woman. The author of "The Little Engines that Could've" doubts Lovelace's academic skills and claims that Lovelace is one of the most "overrated" figures in history.

Isaacson, Walter. *The Innovators: How A Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*. N.p.: n.p., 2014. Print.

This book was the most influential to my project. The main theme of this book is how the liberal arts and technology connect to create great, effective technology. It also discusses how Lovelace made this a central factor in her "Notes" and the future of the Analytical Engine. After reading this book, I could clearly see the exchange between the liberal arts and technology that occurred in Lovelace's work.

Padua, Sydney. *The Thrilling Adventures of Lovelace and Babbage: With Interesting & Curious Anecdotes of Celebrated and Distinguished Characters: Fully Illustrating a Variety of Instructive and Amusing Scenes; as Performed within and without the Remarkable Difference Engine*. London: Particular an Imprint of Penguin, 2015. Print.

This comic book was one of the most valuable sources. Although I didn't no read many primary sources directly, many events and conversations that happened in Lovelace's life were drawn by Sydney Padua, the author. I was able to use many of the cartoons throughout my website to support my analysis and the quotes I chose.

Stein, Dorothy. *Ada, A Life and a Legacy*. Cambridge, MA: MIT, 1985. Print.

This biography included many, many primary letters. Sometimes the letters exchanged were consecutive, and I was excited to see a timeline of certain advancements with Lovelace's "Notes" on the Analytical Engine. Because the book covered Lovelace's entire life, it helped me place events into context and understand some of Lovelace's motivations throughout her life.

Swaby, Rachel. *Headstrong: 52 Women Who Changed Science and the World*. New York: Broadway, 2015. Print.

"What began as a simple translation, became the most important paper in the history of digital computing before the modern times." This quote illustrates the significance of Lovelace's contribution. Her "Notes" were almost three times as long as the work she translated. This showed just how knowledgeable she was about the Analytical Engine. I placed the quote in the "'Notes' by A.A.L." webpage.

Wade, Mary Dodson. *Ada Byron Lovelace: The Lady and the Computer*. New York: Dillon, 1994. Print.

This book uses many primary letters and accounts to support its argument. To support the fact that females had little access to education, the author analyzes the fact that Lovelace's mother, an intellectual, and one of her mother's academic friends had a conversation in which they discussed that they did not approve of education for their daughter's. They only educated them to keep them docile and entertained.

Lectures

Graham Cumming, John. "The Greatest Machine That Never Was." TED. TED, Mar. 2012. Web. 01 Oct. 2015.

The lecturer of this TED Talk emphasizes that besides the computer program that Lovelace wrote, another novel idea was the idea of a general computer. At the time, this was inconceivable. However, because Lovelace had learned to connect the arts and the sciences she was able to see the future of the Analytical Engine.

Isaacson, Walter. "Walter Isaacson Lecture: "The Intersection of the Humanities and the Sciences""

Walter Isaacson Lecture National Endowment for the Humanities. National Endowment for the Humanities, 2014. Web. 28 Nov. 2015.

This lecture helped me draw a conclusion for the *exchange* aspect of my website. The exchange that occurred was between the liberal arts and technology within Lovelace's "Notes" Isaacson connected Lovelace's accomplishments with the effects of her work that are felt today in the technology world.

Articles

Arnett, George. "How Well Are Women Represented in UK Science?" *The Guardian*. Guardian News and Media, 13 June 2015. Web. 09 Feb. 2016.

Despite the legal advancements for women in Great Britain and the United States, there are still many advancements to be made. For example, only 12.8% of the STEM workforce are women. The recent surge of female STEM role models will hopefully encourage more girls to join STEM.

"Deleting Ada Lovelace from the History of Computing." Ada Initiative. N.p., 24 Aug. 2013. Web. 11 Nov. 2015.

This article was the most outspoken article I read about Lovelace during my research. The article defends Lovelace's against critics who claim that she did not write the "Notes" and was indeed quite incompetent. The author discusses how many double standards have been erected against female scientists. I quoted this article several time throughout my website as it made very insightful comments.

EBLUL Programming Languages. "Programming Languages A Discussion on Programming Languages." Programming Languages. Wordpress, 4 June 2014. Web. 30 Nov. 2015.

Since Lovelace's computer program, many others have evolved. In fact, Ada, a computer programming language was created by the U.S. government and named in Lovelace's honor. I chose to include a picture of the names of some of the many programming languages to show the audience the evolution that the field of computer programming has made since the conception of the first computer program in 1843.

Iqbal, Jawad. "The Women Whom Science Forgot - BBC News." *BBC News*. BBC, 19 June 2015. Web. 09 Feb. 2016.

Lovelace is not the only mathematician whose pioneering work has largely been forgotten. For example, Rosalind Franklin, a biologist, discovered the fact that DNA is shaped like a double helix. However, her male co-scientists were awarded the Nobel Prize without any mention of her.

Lee, Jane J. "6 Women Scientists Who Were Snubbed Due to Sexism." *National Geographic*. National Geographic Society, 19 May 2013. Web. 27 Dec. 2015.

I had heard Rosalind Franklin's name before, but I didn't know why she was important. If she had been male, I would probably know though. She was robbed of credit for her discovery of the structure of DNA. I was able to relate a lot what

happened to Lovelace to what happened to Franklin in the gender biased scientific community. Turk, Victoria. "Ada Lovelace Was the First Person to Understand the Real Potential of Computers." Motherboard. N.p., 13 Oct. 2015. Web. 13 Nov. 2015.

“In the male sphere, if you’re first to publish, you did it; you invented it,” the founder of Ada Lovelace Day said. “Apparently if you’re a woman, if you’re the first to publish, someone else did it first.” This article freely discussed the pervasiveness of sexism in science.

Podcasts

Stuff You Missed in History Class Podcast: Who Was the Enchantress of Numbers? HowStuffWorks, 2009 . Audio. Discovery Education. Web. 29 September 2015.

“At the time, nobody was particularly excited about women getting engaged in higher intellectual pursuits because you know ‘Their poor frail brains! What would happen? They might just overheat.’” This quote exemplifies the thoughts of society on women in the 19th century.

This social environment often tried to deter Lovelace, but she persevered. This quote was used in the context section of my website to provide readers with a sense of the society Lovelace lived and worked in.

BinarycoreMedia. "Computation History - Ada Lovelace: Enchantress Of Numbers". YouTube. N. p., 2016. Web. 29 Mar. 2016

This video was conducted in the form of a podcast. The most important section of this source described how Lovelace predicted the uses of modern computers for music and art in the 19th century. “She basically came up with what we use computers for now. And this was back in... the 1840s.” The source also described how her work is resurfacing because people realize how uncanny her conception of the interaction between the arts and sciences was.

Images

Adams, Colin. "File:Ada Lovelace.svg." Wikimedia Commons. Wikimedia Commons, 2011.

Web. 9 Nov. 2015.

I was able to find only a handful of pictures of Lovelace. This portrait was made only four years ago to commemorate the accomplishments of Ada Lovelace. I thought it would be the most appropriate to place it at the conclusion of my website.

"Augustus De Morgan". *Nndb.com*. Soylent Communications, 2016. Web. 31 Mar. 2016.

"Computer Programming Technology." Hinds Community College. Hinds Community College, n.d. Web. 30 Nov. 2015.

Computer programming had its beginnings in 19th century England with Lovelace. Since then, it has evolved into more sophisticated languages with more capable functions. I used a picture of modern computer programming in the "Significance" section of my website to have the audience realize the progress that computer programming has made.

"Walter Isaacson (@Walterisaacson) | Twitter". *Twitter.com*. N. p., 2016. Web. 29 Mar. 2016.

Cartoons

Padua, Sydney. "Lovelace– The Origin." *2D Goggles*. N.p., n.d. Web. 02 Jan. 2016.

This comic strip by Padua is a mini-biography. I did not find any new information in her comic, but I used parts of it to create the headers for my pages as the cartoons depicted the main idea of their respective pages very well.

Dictionary Entries

"Program." Merriam Webster. Merriam Webster, n.d. Web. 26 Nov. 2015.

“Program” is a technical word, and I wanted all the readers to understand what I was referring to when I said program throughout my website. I placed the definition within the context section of my website.