Sputnik's Reappraisal of American STEM Education

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The inspirations of American technical endeavors have always found their roots in a robust STEM education. I structured the thesis around the discussion of educational improvement in American history, finding it meaningful to select a topic that remained relevant in current society. While researching for a specific topic, I was surprised to find that the initial American response to the USSR's Sputnik launch was one of complacency and ignorance. The discovery challenged my assumptions of the Space Race and offered a powerful narrative describing the impetus of STEM education in American identity.

To achieve this goal, I conducted extensive research and organized my findings into a synthesis matrix in Excel. I began by analyzing the sociopolitical pressures needed to justify completely remodeling current education systems. I then parsed citation information by category, sorting by relevance, restating each reference, and revealing the growing demand for rigorous science education. I proposed research questions for each class to inspire a more cohesive writing objective revolving around the reactions of Eisenhower and the American people as they grappled with their disadvantages. I also documented the massive funding of organizations and scholarship programs for graduates under Eisenhower, supporting the idea that Sputnik caused a prioritization of sciences at an unprecedented speed. Multiple perspectives demonstrated the turmoil in legislative decisions, from private meetings to anthropology polls and news articles to presidential speeches.

The final outline of my thesis was a chronological walkthrough of the Sputnik Crisis. The paper offers insightful perspectives from the eyes of the influential as well, such as Eisenhower's warning of Sputnik's psychological impact through meetings and advice. The creation and reinforcement of national defense programs showed the value Americans began to place upon

STEM education at more baseline levels. The National Defense Education Act (NDEA) and the National Science Fund (NSF) were just a few entities contributing to inducting millions of college degrees and keeping democracy afloat during the Cold War. Mass funding of the school infrastructure and associating local education with national security would allow the United States to become technologically superior to its Eastern counterparts.

The impact of Sputnik's launch spread across the country, from classrooms to laboratories to the highest levels of government. It was a wake-up call that demanded action and mobilized the nation to invest heavily in scientific research and education. Emphasizing the need for education to be more than just a means to an end, but a lifelong pursuit of knowledge and personal growth, renewing a focus on talent and international cooperation. The 1957 Sputnik launch unlocked sciences' critical roles in driving future progress, setting in motion a wave of innovation and improvement that continues to shape our world today. The paradigm shift of the USSR's satellite in America sparked the programs, funding, and legislation that bolstered the frontiers of higher-level STEM education for the first time in American history.

Introduction

The sound could be heard everywhere in the world. Every minute, eighty beeps from a small metal sphere unknowingly etched the fate of United States STEM education in stone. The Soviet-launched Sputnik satellite hurtled around the world at 18,000 miles per hour. As the sun rose on American soil on October 4, 1957, the stability of national defense lay in the balance. The country had begun to lose the technological race against its Soviet adversaries. Cacophonies of horror and outrage gradually fueled U.S. society against its leadership. With America jeopardized and threatened from above, Eisenhower stimulated a national interest in science education for the first time in American history. The launch of Sputnik exacerbated the growing fears of U.S. national security and lack of technological innovation, marking the beginning of the U.S. imperative to subsidize STEM education.

The Sputnik Crisis

The bounds at which the United States grew to rival Russian STEM education seem immediate in retrospect. However, sentiment toward this competitive state of affairs remained relatively low in the days following the launch. Social anthropology polls revealed that Americans were complacent in the success of Sputnik's launch and viewed it as a broad achievement under humanity itself.[1] Interviews in the next half-year exposed that 40% of American adults believed that Sputnik was a dismissable occurrence.[2] Astonishingly, this downplaying also occurred at the highest levels of national administration, with Eisenhower himself. Hailing Russia for an admirable achievement, the White House continued to appear satisfied even as Sputnik made its rounds overhead.[3] Inversely, not Eisenhower's acceptance of

[1] Roger D. Launius, *Reaching for the Moon: A Short History of the Space Race* (New Haven: Yale University Press, 2019), 28.
[2] Oliver Gale to Neil McElroy, April 14, 1958.
[3] Associated Press, "Story at a Glance on Soviet Satellite," Evening Star, October 6, 1957.

the launch but his ignorance of its implications led to disregarding the satellite. Believing that America was not "psychologically vulnerable," Eisenhower saw the launch as both inevitable yet trivial, perhaps in disbelief of the thought that Russia had ousted the most powerful nation on the planet.[4]

Only intense public outcry and extensive reports of the country's quandaries led to a change of heart within these next four days. During those 96 hours, the President underwent several briefings, the first of which only further exhibited his incomprehension. World–renowned scientists and physicists had gathered at the White House to deliberate on America's best choice of action, if any at all.[5] Secretary Goodpaster documented that Eisenhower's only information about science education came from NSF research brochures read minutes before meetings.[6] At that point, American schools were only receiving a tenth of the funding of Russia in STEM fields.[7] The resulting rigor of Soviet coursework in comparison to the United States was disparaging at the very least.[8] The average high school graduate in Russia had already taken "five years of physics, four years of chemistry, one year of astronomy, five years of biology, ten years of mathematics through trigonometry, and five years of a foreign language."[9] In America, only one out of every twenty-four American students took a single physics class.[10] However, deliberating against Ike was no easy feat, especially in discussing government funding of education. As unwilling as Eisenhower was to suggest a technological race publicly, he was even

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[4] Robert A. Divine, *The Sputnik Challenge* (New York: Oxford University Press, 1993), 16.
[5] A.J. Goodpaster to Dwight Eisenhower, October 15, 1957.
[6] ibid.
[7] Robert A. Divine, *The Sputnik Challenge*, 15.
[8] Dwight D. Eisenhower, "Our Future Society." (speech, Oklahoma City, November 13, 1957), Eisenhower Presidential Library, https://www.eisenhowerlibrary.gov/sites/default/files/research/online-documents/sputnik/11-13-57.pdf, 7.
[9] Dwight D. Eisenhower, "Our Future Society," 7.
[10] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology* (Cambridge: The MIT Press, 1977) 191.

more so begrudging towards any actions that "excused" federal involvement in local affairs.[11] As expected, a sizable barrier formed in the funding and education of a national engineering movement.

Nobel Prize physicists such as Isidor Rabi and Hans Bethe were just a few of the dozens of experts who voiced their warnings of Russian educational prowess. Dr. Rabi, the current science advisor to Eisenhower, would quickly take charge, noting to the board how Soviets saw STEM research as a form of enjoyment.[12] They presented this mentality to the President as something that differed exceptionally from American culture and allowed them to gain the upper hand. Rabi also asked for the appointment of someone as "Special Assistant to the President for Science and Technology," a position he felt was necessary to develop these traits directly within the national government.[13] Meanwhile, negative opinions began pouring in from even the highest-ranking military officials. Admiral Rickover, the father of the nuclear submarine, demanded a nationwide restructuring of a "soft" curriculum.[14] Edward Teller, the godfather of the hydrogen bomb, saw the Russian technological gap as a disaster worse in magnitude than Pearl Harbor.[15] Eisenhower would finally begin to comprehend the educational hurdles America needed to overcome.

By October 15, these conferences showed great value in establishing STEM's importance at the federal level. Eisenhower humbly agreed with the scientists, admitting that their advice had proven to outweigh the extent of his own beliefs.[16] The President had also appointed James Killian to provide himself guidance to any proposals or projects in the realm of STEM. Valued

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[11] Michael Gallagher, *Changing Course: The Source of Strategic Adjustment* (Washington, D.C.: Georgetown University Press, December 14, 2015), 250.
[12] A.J. Goodpaster to Dwight Eisenhower, October 15, 1957.
[13] ibid.
[14] Robert A. Divine, *The Sputnik Challenge*, 53.
[15] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, 7.
[16] A.J. Goodpaster to Dwight Eisenhower, October 15, 1957.

not only as the president of MIT but in his expertise regarding ICBMs and other crewless aeronautical vehicles, Killian's comprehension of both higher-level education and rocketry made for a perfect candidate.[17] Upon initiation, he immediately expressed the country's need for academic funding to Eisenhower. Crucially, James's understanding of how the education systems could *change* allowed the advisor and advisee to orient learning environments around STEM education.

As the first actual Presidential Science Assistant, Killian's position significantly influenced Eisenhower's cognition in response to Sputnik. Mirroring Rabi's beliefs, Killian emphasized the promotion of passion in science education, not just the support of the subject.[18] Even with what Killian described as "less-quality education," he admits that the Soviet Union had encouraged the sheer output of engineers that had catalyzed their successes.[19] Killian blamed himself for America's seemingly lackadaisical pedagogy. Consequently, he advocated for a system of education that transcended the anti-intellectual notions of the current culture.[20] Suggesting an "education balance" between the sciences and humanities, he argued that envisioning force behind any creation must involve some form of individuality.[21]

Public Opinion

Anti-national ideology burst forth after Sputnik united nationalists and activists against what many saw as a regressive culture run by inactive leadership.[22] Much of the country finally began grappling with the weight of Sputnik in the context of the Cold War. Unfortunately,

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[17] Everett Gleason, *U.S. Objectives in Space Exploration and Scienc*e (Washington, D.C., March 6, 1958), 8.
[18] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, 8.
[19] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology,* 191.
[20] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books Inc., 1985), 147.
[21] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology,* 250.
[22] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 210.

Eisenhower's original misunderstanding fully encompassed his oversight of what made Sputnik dangerous: its ability to cause dread. The implication that Russians could deploy weapons of mass destruction anywhere in the world gradually undermined the American spirit.[23] Experts and commoners alike became outraged at the de-emphasis of Sputnik, which generated civilian panic and distrust.[24] A D.C. high school science director fumed over the inadequacies of American education, stating that "[the Russians] turn out high school graduates with five times the training required for admittance into Massachusetts Institute of Technology."[25] White House manager Charles Jackson stated in a fiery letter that disrupting *Russian* technology might lie as the only logical chance of keeping up with the Soviets.[26] Losing confidence in their superiority, Americans started turning their backs on the dubious leadership.

With confidence in technology and leadership evaporating, the Eisenhower Administration decided that the best course of action was to create a launch program of their own. Under the advice of the Science Advisory Committee, Eisenhower finally began to invest in missile and STEM programs.[27] Proposals to expedite the invention of rockets that could transport larger and larger payloads into orbit rained down in the conference rooms of the White House for months.[28] Preventing the Soviets from an organized monopoly of the heavens seemed increasingly hopeless with every passing second. Attempting to reestablish its influence on technology, the United States began work on "Project Vanguard" to express American rocketry's

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[23] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology,* 7.
[24] George Kistiakowski, *A Scientist at the White House: The Private Diary of President Eisenhower's Special Assistant for Science and Technology* (Cambridge: Harvard University Press, 1976), xxxvii.
[25] Martin S. Hayden, "Eisenhower Seen Acting to Spur Science Studies," Evening Star, November 10, 1957.
[26] Charles Jackson to Henry Luce, October 8. 1957.
[27] Roger D. Launius, *Reaching for the Moon: A Short History of the Space Race*, 31.
[28] Gleason, *U.S. Objectives in Space*, 8.

prowess. Hastily organized, however, the December launch of the Vanguard I rocket ended in a fiery explosion a mere four feet off of the launchpad.[29]

Such a disaster did not go unnoticed by the public eye; for some, it is all but expected. Publicity of the launch once again turned against the Eisenhower Administration, and many news outlets relayed a story of sound defeat in the technological landscape.[30] The New York Times quickly reported an uncertain fate for the survival of national security.[31] Anger towards blatant complacency during the crisis compiled against ignorant leadership, stemming from the fact that the U.S. was already well aware of Soviet aspirations to achieve orbit four years prior.[32] Most envisioned a safer country under alternative command and, more importantly, alternative education. In the months following, approval of the Eisenhower Administration would fall by 30%.[33]

This newfound civilian concern in STEM caused Eisenhower to target what many believed to be the most significant risk to national security: emotional confidence in America's technology[34] He finally tolerated the concept that localized education inherently went hand-in-hand with technological output and international defense. Eisenhower sought to initiate the programs, funding, and legislation required to improve STEM comprehension in America. However, he remained fearful of international cooperation in scientific operations due to previous leaks of American intelligence during the making of the atomic bomb.[35] Only after an entire nine months after the launch of Sputnik does the President publicly declare that "the USSR

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[29] Roger D. Launius, *Reaching for the Moon: A Short History of the Space Race*, 31.
[30] Rip Bulkeley, *The Sputnik Crisis and Early U.S. Space Policy: A Critique of the Historiography of Space* (Indianapolis: Indiana University Press, 1991), 5.
[31] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology,* 8.
[32] Michael Gallagher, *Changing Course: The Source of Strategic Adjustment*, 246.
[33] ibid.
[34] George Kistiakowski, *A Scientist at the White House: The Private Diary of President Eisenhower's Special Assistant for Science and Technology,* 97.
[35] A.J. Goodpaster to Dwight Eisenhower, October 15, 1957.

has surpassed the United States and the free world in scientific and technological accomplishments in outer space."[36]

Funding STEM Endeavors

Eisenhower initiated a flurry of programs to "revitalize the [youth's] attitude towards science," attempting to establish a "constructive result" from Sputnik's fears of national defense.[37] Turning his back on his Republican ideals, the President proposed funding for STEM endeavors between local and federal divisions. Stating that a "critical reexamination of [national defense]" was needed, the president requested a large portion of the federal budget be set aside to prevent a "Soviet breakthrough."[38] Orienting the bulk of American sentiment around stifling Communist progression, he justified sudden government funding of schools by labeling them as institutions of "national defense."[39] Solutions involved a balanced budget and promotion to reassure taxpayers in the light of a seemingly untrustworthy government.[40] He also worked closely with Killian, seeking to prevent adverse social militarism, or, as he liked to put it, "technocracy," from forming as a result of idolizing education.[41]

A nationwide talent search transpired to find engineers that could compete against the Soviets and produce a working model of a hapless successor.[42] Eisenhower established the Advanced Research Projects Agency (ARPA) in February 1958 to carry out developments in STEM graduate students.[43] Students were allowed to use JPL and APL facilities overtime to facilitate summer mentorships in physics, which created a golden era of government-university

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[36] James Lay Jr., *National Security Council: U.S. Policy on Outer Space* (Note to: National Security Council, June 20, 1958), 1.
[37] Michael Gallagher, *Changing Course: The Source of Strategic Adjustment*, 278.
[38] Dwight D. Eisenhower, "Our Future Society," 3.
[39] Dwight D. Eisenhower, "Our Future Society," 7.
[40] Oliver Gale to Neil McElroy, April 14, 1958.
[41] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 162.
[42] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 384.
[43] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, 204.

cooperation.[44] Under extreme guidance, Vanguard I successfully launched in March of 1958. Breaking barriers in all regards, its trajectory, determined by female mathematicians, continues to orbit to this very day.[45] Proving not only the existence of the Van Allen radiation belts in Earth's magnetosphere but also America's ability to rival Russia, Vanguard I acted as a crucial boost in morale to the American people.[46] After generalizing a solid understanding of scientific advancement as it related to the national interest, Eisenhower gave in to suggestions and created international connections to aid in the Space Race.[47]

To inspire coordinated effort in chaotic progress, the newly-sponsored National Aeronautics and Space Administration (NASA) began reorganizing national resources to prioritize manned spaceflight in the summer of 1958.[48] Rice University partially donated 1,600 acres of land to the U.S. government to create a Mission Control Room for the up-and-coming entity. Another first, local education took up federal responsibilities in sponsoring private agencies. While the agency remained underfunded due to its largely-intangible return on investment, its advances in topography and data transmission remained invaluable in maintaining a long-term military advantage.[49]

Eisenhower acknowledged that America's greatest weapon was its education; he promised federal subsidies to schools under the leadership of the National Science Fund (NSF) and thousands of student scholarships.[50] He began to sign other STEM legislation into effect, most notably the National Defense Education Act (NDEA), on September 2, 1958. Enormously influential, the bill masterfully dodged the roadblocks preventing local education from garnering

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[44] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 397.
[45] NASA, "Pickering, Van Allen, Von Braun Holding Up Explorer 1 Model at News Conference," 1958, JPL-Caltech, mix.msfc.nasa.gov/abstracts.php?p=268.
[46] ibid.
[47] McCurdy and Roger D. Launius, *NASA Spaceflight: A History of Innovation* (Berlin: Spring Nature, 2018), 40.
[48] ibid.
[49] Eugene Emme, *Historical Origins of NASA* (Montgomery: Air Force Historical Foundation, January 1963), 22.
[50] Michael Gallagher, *Changing Course: The Source of Strategic Adjustment*, 282.

federal assistance and became responsible for the induction of at least four million college graduate degrees.[51] In the end, many of these scholarships were replaced with student loan reserves and financial packages, as Eisenhower realigned with Republican ideology to garner political acceptance.[52] Providing an additional 280 million dollars for STEM facilitation equipment and nearly 60 million for post-graduate research fellowships, the NDEA cemented America's route to a robust STEM expertise.[53] Notably, the bill acted as one of the first explicit correlations between the sciences and national security.[54]

The government poured its reserves into STEM-driven systems of education. From 1958 to 1959, the National Science Fund provided an additional 86 million dollars for science education, moving the annual budget from 50 to 136 million USD.[55] The NSF ended up raising six million dollars for the Educational Developmental Center, a program that introduced experimentation and theory education across the world.[56] Where a request of 400 million dollars to fund the construction of schools fell flat in 1957, Eisenhower's 1958 appeal of the movement of one billion dollars to the education and scientific research sector flew through Congress.[57] He additionally requested a fivefold increase in NSF funding.[58] Many of these steps were a safeguard that secured a talented workforce to meet defense and mobilization needs.[59]

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[51] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, 196.
[52] Michael Gallagher, *Changing Course: The Source of Strategic Adjustment,* 283.
[53] ibid.
[54] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the FirstSpecial Assistant to the President for Science and Technology*, 196.
[55] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the FirstSpecial Assistant to the President for Science and Technology*, 193.
[56] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the FirstSpecial Assistant to the President for Science and Technology*, 199.
[57] Robert A. Divine, *The Sputnik Challenge,* 81.
[58] ibid.
[59] U.S. President's Committee on Scientists and Engineers, *National Science Youth Month termed 'Answer to Sputnik',* (October 5, 1958), 3.

Importantly, grant monies began to be diversified as additional legislation passed, providing for school construction and improved teaching materials.[60] The PSAC founded "National Science Youth Month" to grow talents in STEM fields at as early an age as possible.[61] Agreeing with Killian's belief in a required passion for success, the Month created sentiments within their participants emphasizing the rewards of scientific adventure.[62] Incentives for STEM ingenuity became an American ideology, leading to the creation of the NMSQT, the first federally-issued scholarship.[63] National Science Clubs of America, promotional meetings, and the Science Talent Search all coalesced to inspire a well-rounded in-school and extra-curricular experience in the sciences.[64]

Conclusion

By the 1960s, STEM education was now a part of the American motif. Science itself was consolidated, with 1.2 million articles of international scientific discovery translated into a single generalized English library.[65] All things taken into account, the US had spent one percent of the country's entire GDP on space-related projects by 1964. Government R&D rose to an eighth of allowable federal spending annually, from 9.3 billion to nearly 14.7 billion dollars.[66] Vice President Lyndon B. Johnson publicly revealed the inspirations Sputnik provided for the country's funding of almost two million college educations.[67] His conviction that the frontiers of

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[60] Robert B. Anderson, *Minutes of the Cabinet Meeting Concerning Improvements in Science and Mathematics Education, December 2, 1957* (Washington D.C., 1957), 1.
[61] U.S. President's Committee on Scientists and Engineers, *National Science Youth Month termed 'Answer to Sputnik'*, 1.
[62] Joseph Turner, *National Science Youth Month* (Washington D.C.: American Association for the Advancement of Science, 1957), 1.
[63] James R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, 195.
[64] U.S. President's Committee on Scientists and Engineers, *National Science Youth Month termed 'Answer to Sputnik'*, 4.
[65] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 201.
[66] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 383.
[67] Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age*, 407.

space held opportunities to create international superiority eventually directed Kennedy's Space Race toward the moon itself.[68]

The shock of Sputnik unified America and formed the groundwork of education today. Through fear, an explosion of programs, funding, and legislation for STEM comprehension permeated American society. Eisenhower's establishment of the first federally-subsidized student loans and fellowships produced a growth in automation that secured the country's place as a superpower. Without the launch of Sputnik in 1957, the frontiers of the American educational endeavor would never have come to pass. Miles above, the small, resonant ball of metal exposed the facades of national security and superiority, bolstering the STEM initiatives of American education for the very first time.

[68] Lyndon B. Johnson to President John F. Kennedy, April 28, 1962.

Appendix A

Dr. William H. Pickering (left), Dr. James A. van Allen (center), and Dr. Wernher von Braun (right) triumphantly raised a model of the Explorer I satellite after its successful launch. The satellite detected the Van Allen radiation belts for the first time.

NASA, "Pickering, Van Allen, Von Braun Holding Up Explorer 1 Model at News Conference," February 1, 1958, JPL-Caltech, mix.msfc.nasa.gov/abstracts.php?p=268.

Annotated Bibliography

Primary Sources

Anderson, Robert B. "Minutes of the Cabinet Meeting Concerning Improvements in Science and Mathematics Education, December 2, 1957" Washington D.C., 1957.

Discussing race with Soviet education, Anderson exposes the implications of the current materialistic American society. The dynamic shows that, even as they ponder the funds necessary to stimulate educational growth, the severity of Sputnik's is left unrealized by the country's leaders.

Eisenhower, Dwight D. "Our Future Society." Speech, Oklahoma City, November 13, 1957. Eisenhower Presidential Library. https://www.eisenhowerlibrary.gov/sites/default/files/research/online-documents/sputnik/11-13-57.pdf.

This speech was one of the first public addresses dedicated solely to discussing the future of technology by Eisenhower. It is also one of the first instances of him publicly admitting that the United States has fallen behind the Soviets regarding education. This honesty might be due to Eisenhower's regressing approval, where even sugarcoating might face extreme scrutiny from an agitated country.

Gale, Oliver. *Memorandum for Mr. McElroy*. Washington, D.C., April 14, 1958.

Gale's memorandum critiques the lack of balance in funding between civil and federal infrastructure; this offers my paper the perspective of an everyday citizen who would not necessarily be enamored with the educational progress spent by tax dollars.

Gleason, Everett. *U.S. Objectives in Space Exploration and Science.* Washington, D.C., March 6th, 1958.

This source is essential in defining the United States' goals due to Sputnik. Their goals in aerospace programs or the first suggestions of a crewed rocket show the flexibility of a Cabinet that includes educational figures such as James Killian. Killian makes several appearances in the novel for his importance in describing the best advice for education management to Eisenhower.

Goodpaster, A.J. A.J. Goodpaster to President Dwight Eisenhower, Washington, D.C., October 15, 1957.

This memorandum's extreme proximity to the date of the Sputnik launch displays Eisenhower's STEM misconceptions. The logs indicate that Eisenhower is, for a time, incompetent and unknowing in handling STEM-related issues at the federal level.

Jackson, Charles. Charles Jackson to Henry Luce, Washington, D.C., October 8, 1957.

Jackson's fiery document raving at those who downplayed Sputnik exposed more extremist sentiments of Sputnik: the only chance Jackson believes America has in stopping the Soviets is by spying on them. The memorandum incorporates the looming tensions of the Cold War's Eastern Bloc with the internal struggles of the United States previously discussed.

Johnson, Lyndon B. Lyndon Johnson to President John Kennedy, Washington, D.C., April 28, 1962.

Johnson's memorandum to Kennedy suggests that STEM education, research, and automation have become invaluable to the United States' function in less than four years.

Killian Jr., James R. *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*. Cambridge: The MIT Press, 1977.

President of MIT and an expert in ICBM technology, Killian's complex journey as a Science Advisor to the President led to a biography filled with dynamic moments and study and his opinions as a citizen during that time. These sentiments can be used in tandem with the previous point that education should come first.

Kistiakowski, George. *A Scientist at the White House: The Private Diary of President Eisenhower's Special Assistant for Science and Technology*. Cambridge: Harvard University Press, 1976.

Kistiakowski supports Killian's claims and credibility while further adding to the concept of education through governance.

NASA. Pickering, Van Allen, Von Braun Holding Up Explorer 1 Model at News Conference. 1958. Photograph. JPL-Caltech, mix.msfc.nasa.gov/abstracts.php?p=268.

This image drove Americans to compete with the Russians, redeeming the qualities of Eisenhower's push for education. Its successes are seen visually in Appendix A.

U.S. President's Committee on Scientists and Engineers, *National Science Youth Month termed 'Answer to Sputnik,'* October 5, 1958. https://www.eisenhower.archives.gov/research/online_documents/sputnik.html

This source shows one of the more significant events established in an attempt to foster STEM in children through science fairs and compensation.

Secondary Sources

Associated Press, "Story at a Glance on Soviet Satellite," Evening Star, October 6, 1957.

For a brief instant, the article mentions the White House's congratulations on the Russians for their Sputnik achievements, which starkly contrasts the air of unpredictability established in the previous paragraphs. Forty-eight hours since launch, Capitol Hill seems to continue being inactive.

Bulkeley, Rip. *The Sputnik Crisis and Early U.S. Space Policy: A Critique of the Historiography of Space.* Indianapolis: Indiana University Press, 1991.

Bulkeley discusses the direction of national interest toward discovery and creating and maintaining STEM programs. This critique would raise concerns about the safety of the country itself.

Divine, Robert A. *The Sputnik Challenge.* New York: Oxford University Press, 1993.

Eisenhower reports that the country is "psychologically vulnerable." However, the importance of discovery expressed by all indicates a growing unity based on education.

Emme, Eugene. *Historical Origins of NASA.* Montgomery: Air Force Historical Foundation, January 1963.

Emme finds NASA continuing to be underrated and ostracized for its apparent intangible product of discovery.

Gallagher, Michael. *Changing Course: The Source of Strategic Adjustment.* Washington, D.C.: Georgetown University Press, December 14th, 2015.

The history can be inferred as a slow set-up to the possibilities of catching up with their Soviet foes. The article offers a fascinating dynamic where the negative concept meets with a negative opinion, which shows why Eisenhower's passiveness in the first days of the situation was detrimental to his societal standings.

Hayden, Martin S, "Eisenhower Seen Acting to Spur Science Studies," Evening Star, November 10, 1957.

The article partially develops the narrative that many Americans despised the state of education within the country. Evening Star's publishing occurred directly within

Washington D.C., the heart of America and perhaps its mind. The opinions expressed in the column by a D.C. high school science director compliment the claim that experts abhorred the gap between the States and the Soviets.

Kerr-Tener, Janet. *Eisenhower and Federal Aid to Higher Education.* Montpelier: Capital City Press, 1987.

This article discusses Eisenhower's concern about bills and funding, especially in scholarships and National Merit.

Launius, Roger D. *Reaching for the Moon: A Short History of the Space Race.* New Haven: Yale University Press 2019.

This NASA historian's detailed descriptions of past events provide a trustworthy description of the extent that politics had permeated within the Sputnik Crisis.

Lay Jr., James. *National Security Council: U.S. Policy on Outer Space.* Note to: National Security Council, June 20, 1958.

James documents the first time in history that Eisenhower explicitly references that Russia is now ahead of the United States on every front. Sentiments such as these inspire the social panic referenced in the first half of the work.

McCurdy and Roger D. Launius. *NASA Spaceflight: A History of Innovation.* Berlin: Spring Nature, 2018.

This book mentions the joint programs, funding, and overall management of finances to sponsor expeditions in aerospace technologies. McCurdy provides a conduit to express the ventures' value in society then and their impact on the current day.

McDougall, Walter. *The Heavens and the Earth: A Political History of the Space Age.* New York: Basic Books Inc., 1985.

McDougall's book documents the mass amounts of programs funded by the federal government in the search for STEM talent and establishing higher education. This rapid subsidizing of other sectors in the quest for discovery is so rapid that it is seen as transcending the materialism of society during that age, showing the volatile actions of the United States.

Turner, Joseph. *National Science Youth Month.* Washington D.C.: American Association for the Advancement of Science, 1957.

Turner's article discusses the establishment and avid support of National Science Youth Month, a movement that attempts to reward community passions in STEM. This same phenomenon can be seen in the grants, scholarships, and other funding engaged by Eisenhower and the presidents succeeding him.