TEACHER LESSON PLAN

Unit 2: Lesson 5 – Spread and Accuracy of Online Information: A Case Study Related to Vaccines

LESSON QUESTIONS

- How does vaccine-related information spread on social media?
- What type of vaccine information spreads more rapidly and why?
- How can online information be evaluated?
- How does the spread of information on social media affect science and medicine?

LESSON OBJECTIVES

- Describe the ways vaccine-related information spreads on social media.
- Identify the type of vaccine information that spreads more rapidly and explain why.
- List at least three actions for evaluating online information.
- Analyze how the spread of information on social media affects science and medicine.

OVERVIEW

Students learn the difference between types of information and examine the different ways that information spreads via social media networks. After learning about the types and spread of information, students focus on differentiating between accurate and inaccurate information as they practice assessing the validity of social media posts using the "evaluating information toolbox" introduced in the lesson. The lesson concludes by having students reflect on how the spread of information on social media impacts science and medicine. Optional extension activities offer opportunities for students to further consider the disinformation dilemma as they either debate whether platforms have a responsibility to oversee the spread of disinformation or role play as specific stakeholders representing the various responsibilities and considerations for addressing the spread of disinformation.

LENGTH

Four to five 45-minute sessions

GLOSSARY TERMS

assertion, assumption, confirmation bias, conspiracy theory, disinformation, infodemic, lateral reading, logical fallacy, misconception, misinformation, myth, vaccine

STANDARDS

The Next Generation Science Standards for this unit align with three dimensions of learning: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. Standards reference "NGSS Science and Engineering Practices" and NGSS matrices

including: “Connections to the Nature of Science,” “Crosscutting Concepts in NGSS,” “Connections to Engineering,” and “Technology and Applications of Science.”

- **Next Generation Science Standards**
    - Scientific Investigations Use a Variety of Methods
        - Science investigations use diverse methods and do not always use the same set of procedures to obtain data.
        - New technologies advance scientific knowledge.
        - Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings.
    - Scientific Knowledge is Based on Empirical Evidence
        - Science includes the process of coordinating patterns of evidence with current theory. Science arguments are strengthened by multiple lines of evidence supporting a single explanation.
    - Scientific Knowledge is Open to Revision in Light of New Evidence
        - Most scientific knowledge is quite durable but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence.
        - Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation.
    - Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
        - A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that has been repeatedly confirmed through observation and experiment, and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.
    - Science is a Way of Knowing
        - Science distinguishes itself from other ways of knowing through use of empirical standards, logical arguments, and skeptical review.
    - Science is a Human Endeavor
        - Technological advances have influenced the progress of science and science has influenced advances in technology. Science and engineering are influenced by society and society is influenced by science and engineering.

- Science Addresses Questions About the Natural and Material World
  - Not all questions can be answered by science. Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues.
  - Empirical evidence is needed to identify patterns
  - Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

- Science, Technology, Society and the Environment
  - Modern civilization depends on major technological systems, such as agriculture, health, water, energy, transportation, manufacturing, construction, and communications.
  - New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.

- Science and Engineering Practices
  - Select appropriate tools to collect, record, analyze, and evaluate data.
  - Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
  - Compare and evaluate competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues. Evaluate the claims, evidence, and/or reasoning behind currently accepted explanations or solutions to determine the merits of arguments.
  - Respectfully provide and/or receive critiques on scientific arguments by probing reasoning and evidence and challenging ideas and conclusions, responding thoughtfully to diverse perspectives, and determining what additional information is required to resolve contradictions.
  - Construct, use, and/or present an oral and written argument or counterarguments based on data and evidence.
  - Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
  - Gather, read, and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source.

- Evaluate the validity and reliability of and/or synthesize multiple claims, methods, and/or designs that appear in scientific and technical texts or media reports, verifying the data when possible.
- Communicate scientific and/or technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

- **Common Core State Standards**

  - RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

  - RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

  - RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

  - RST.11-12.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

  - RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

  - RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

  - WHST.11-12.1 Write arguments focused on discipline-specific content.

  - WHST.11-12.1.A Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

  - WHST.11-12.1.B Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

- WHST.11-12.1.E Provide a concluding statement or section that follows from or supports the argument presented.

- WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

- WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.

- SL.11-12.2
  Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

- SL.11-12.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

MATERIALS

- Student worksheet: https://vaccinemakers.org/sites/default/files/lessons/HS.student_worksheet.unit2_.lesson5_Final.pdf
- Activity sheet- Compare and Contrast Social Media Posts (Activity 1): https://vaccinemakers.org/sites/default/files/lessons/HS.activity1_Compare%26Contrast_SM_Posts.unit2_.lesson5_Final.pdf
- Computer with internet access
- Figure 1 from the paper, "The Visual Vaccine Debate on Twitter: A Social Network Analysis" by Milani and colleagues (for use in Engage section of lesson): https://www.cogitatiopress.com/mediaandcommunication/article/view/2847/2847
- Executive Summary (page 5) from the report, "The Disinformation Dozen," The Center for Countering Digital Hate (for use in Explain 2 section of lesson): https://www.counterhate.com/disinformationdozen

BACKGROUND FOR TEACHER

Since the mid-twentieth century, vaccines have been a widely accepted, scientifically-based method to safely and efficiently prevent serious childhood diseases. Indeed, significant drops in the incidence of once-common childhood illnesses such as measles, mumps, and chickenpox are directly attributable to widespread vaccination programs. Vaccine technology helped to eradicate smallpox, and polio is now practically unknown in developed countries. More recently, vaccination allowed communities to gain protection

from COVID-19 and emerge from restrictions aimed at mitigating the spread of coronavirus. While vaccines have dramatically reduced human mortality and diminished the costs of treatment and care associated with vaccine-preventable diseases, public concerns about vaccine safety have been ever-present, even growing in recent years. Increased access to vast amounts of information, content creation of variable quality by numerous sources, and new channels and methods for information sharing have all contributed to social, political, and ideological issues associated with the spread of misinformation and disinformation (information that is intentionally misleading). Everyone now requires skills for discerning accurate from inaccurate information.

Unfortunately, assessing the difference between knowledge gained through scientific means and personal beliefs or anecdotal evidence sometimes also gets lost:

- Cases or incidents cited by activists tend to be anecdotal.
- Valid scientific studies are either misunderstood, deliberately distorted or taken out of context.
- Activists often refute valid scientific data using logical fallacies, such as suggesting biases or conspiracies, using circular arguments, or intentionally presenting information in a misleading manner, among others.

The result can be real harm as individuals make decisions based on misinformation or disinformation. In the case of vaccines, this may cause them to forgo vaccinations for themselves or family members. During COVID-19, choices not to wear masks or get vaccinated were sometimes the direct result of misinformation or disinformation.

In this lesson, students will learn about the different types of information and how it spreads on social media. The activities will require them to critically evaluate the validity of social media posts related to vaccines, the sources of the information, and possible motivations for the posts. The lesson concludes with an analysis that takes into consideration how the spread of information on social media can impact decision-making about scientific and medical issues.

TEACHER NOTES

The activities in this lesson are designed to help students learn to evaluate the quality of information found online, especially on social media platforms, and to become familiar with how information, especially disinformation, spreads. Students can become more proficient at information assessment by practicing critical thinking and using the components of the evaluating information toolkit introduced in this lesson. The skills and tools utilized in this lesson can also be applied to other topics, allowing students to develop and hone what has become a critical life skill. The first portion of the lesson provides students with a "big picture" look at the spread of misinformation while also having them consider the pros and cons from both a personal point of view as well as through the identification and summarization of an article. The latter part of the lesson has students take a more detailed look at vaccine-related misinformation by comparing and contrasting pro- and anti-vaccine tweets, learning about the small number of people to which a large

majority of vaccine misinformation can be traced, considering how this could negatively impact a family's health and contemplating how to address it.

LESSON RESOURCES

- Lesson glossary: https://vaccinemakers.org/sites/default/files/resources/HS.student_glossary.unit2_.lesson5_Final.pdf

- Evaluating Information Toolbox:
  - "Dissecting Social Media: What You Should Know," Parents PACK article, Vaccine Education Center at Children's Hospital of Philadelphia, https://vaccinemakers.org/sites/default/files/resources/vaccine-education-center-dissecting-social-media_PP_8.2020.pdf
  - Logical Fallacies and Vaccines: What You Should Know (Q & A sheet), Vaccine Education Center at Children's Hospital of Philadelphia, https://vaccinemakers.org/sites/default/files/resources/vaccine-education-center-logical-fallacies_0.pdf
  - Evaluating Information: What You Should Know (Q & A sheet), Vaccine Education Center at Children's Hospital of Philadelphia, https://vaccinemakers.org/sites/default/files/resources/vaccine-education-center-evaluating-info-qa.pdf
  - Website Evaluation Cards - Two-sided, 3" x 4" printable cards are offered by the Vaccine Education Center at Children's Hospital of Philadelphia (VEC). The cards display website evaluation criteria developed by the World Health Organization's Vaccine Safety Net program.
    - Print-ready PDF file: https://vaccinemakers.org/sites/default/files/resources/Website%20evaluation%20cards_.pdf
    - Laminated cards can be ordered in sets of 10 or 50 from the VEC website (fee): https://vaccinefamilyorder.chop.edu/website-evaluation-cards-set-of-10
  - Lateral Reading resources:
    - "What 'Reading Laterally' Means," book chapter, Web Literacy for Student Fact-Checkers, Pressbooks: https://webliteracy.pressbooks.com/chapter/what-reading-laterally-means/
    - "Sort Fact from Fiction Online with Lateral Reading," video, Stanford History Education Group, https://www.youtube.com/watch?v=SHNprb2hgzU
    - "Check Yourself with Lateral Reading: Crash Course Navigating Digital Information #3," video, CrashCourse, https://www.youtube.com/watch?v=GoQG6Tin-1E

- Additional resources that may be helpful:
  - Digital Investigation Recipes, article series, First Draft, https://firstdraftnews.org/long-form-article/digitalrecipes/
  - Evaluating Internet Health Information: A Tutorial from the National Library of Medicine (16-minute online tutorial), U.S. National Library of Medicine, https://medlineplus.gov/webeval/intro1.html
  - "Policy: Twenty tips for interpreting scientific claims," article, Nature, https://www.nature.com/news/policy-twenty-tips-for-interpreting-scientific-claims-1.14183
  - Vaccine Science: Evaluating Scientific Information and Studies, webpage, Vaccine Education Center at Children's Hospital of Philadelphia, http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-science/evaluating-scientific-information-and-studies
  - "Vaccine Safety and Your Child: Separating Fact from Fiction," booklet, Vaccine Education Center at Children's Hospital of Philadelphia, http://media.chop.edu/data/files/pdfs/vaccine-education-center-vaccine-safety-eng.pdf
  - "How to know what to trust: Seven steps," article and downloadable infographic, The News Literacy Project, https://newslit.org/updates/how-to-know-what-to-trust-seven-steps/
  - Resisting Scientific Misinformation: One-week unit for grades 6-12 created in conjunction with WGBH's NOVA, https://tumblehomebooks.org/services/resisting-scientific-misinformation/
  - Civic Online Reasoning: Website and curriculum introducing students to the evaluation methods used by fact checkers, created by The Stanford History Education Group (SHEG), a research and development group based in Stanford's Graduate School of Education, https://cor.stanford.edu
  - Vaccine Safety Net: A global network of websites providing reliable information on vaccine safety established by the World Health Organization, https://www.vaccinesafetynet.org
  - "Fact Checking in an Era of Fake News," article, National Science Teaching Association, https://www.nsta.org/connected-science-learning/connected-science-learning-may-june-2021/fact-checking-era-fake-news
  - Surgeon General's Community Toolkit for Addressing Health Misinformation: https://www.hhs.gov/surgeongeneral/reports-and-publications/health-misinformation/index.html#community-toolkit
  - Surgeon General's 7 Common Types of Health Misinformation (infographic), https://pbs.twimg.com/media/FFn_TtHXoAUxnqH?format=jpg&name=large
  - "Cyberbullying: Handling Online Conflict and Aggression," article, Children's Hospital of Philadelphia, https://www.chop.edu/news/health_tip/understanding-preventing-and-responding-bullying
  - "8 Experts Share Tips on Helping Students Through Social Media Mistakes," article, Smart Social, https://smartsocial.com/post/students-social-media-mistakes

- Tips for Teachers: Cyberbullying, webpage, Stopbullying.gov, https://www.stopbullying.gov/cyberbullying/tips-for-teachers
- Cyberbullying in School: Prevention and Support, webpage, Accredited Schools Online, https://www.accreditedschoolsonline.org/resources/cyberbullying-prevention-and-support/

ENGAGE

1. Without describing what is being demonstrated, show students Figure 1 from the paper, "The Visual Vaccine Debate on Twitter: A Social Network Analysis" by Milani and colleagues: https://www.cogitatiopress.com/mediaandcommunication/article/view/2847/2847. Be sure not to show the description under the figure at first. Use the think-pair-share strategy to have students describe what they think the figure demonstrates. If appropriate, you can provide direction by asking what students think the dots and arrows represent and what the color coding may mean.
2. Once students have shared, display the figure description and discuss the figure as a class, making sure that by the end of the discussion, students understand that this is a visual representation of communication on a social media network showing pro-vaccine and anti-vaccine conversations as well as what the dots, arrows and color coding indicate.

EXPLORE

1. Now that the idea of information spread on social media has been introduced, discuss student experiences with social networks and the benefits and drawbacks. Prompts may include asking what they personally like or dislike about social media. Lead the conversation to exploring their experiences with incorrect information or misinterpretation of information learned through social media.

   NOTE: This conversation may be upsetting for some students if they have personally experienced cyberbullying or other negative interactions on social media. The lesson can be adjusted to incorporate a secondary conversation regarding cyberbullying or this step can be skipped and you can begin the class discussion with step 2. Resources about identifying and addressing cyberbullying can be found in the additional resources section of the lesson plan.
2. Referring back to the original diagram and the idea that the spread of information can be visualized and studied, prompt students to consider and discuss why scientists would want to study online conversations and what they might be able to learn about social networks. Conclude the class discussion by sharing the focus of the lesson —how scientific information or misinformation can spread and what the effects might be.
3. Have students work in groups to discuss the glossary terms to ensure all students are familiar with them.
4. Have students identify and summarize an article about online misinformation.

EXPLAIN 1

1. Working individually, students evaluate two vaccine or science-related posts from influencer social media accounts using the activity sheet, "Compare and Contrast Social Media Posts (Activity 1)." Provide students with list A and list B (available in the rubric section of the lesson plan). Students should select one post from a person on list A (containing vaccine advocates) and one post from someone on list B (containing known antivaxxers, including some individuals from the "Disinformation Dozen" described by the Center for Countering Digital Hate (CCDH)). Students should not be told of the difference between the two lists prior to the activity. Have students compare the two posts using the activity sheet evaluation table, engagement rate calculation and questions. This item can be assigned as out of class work if time is limited.

EXPLAIN 2

1. Have students read the executive summary of the CCDH report, "The Disinformation Dozen," and answer the questions on the student worksheet.
2. Students engage in a class discussion about the information they gleaned from the executive summary. Additional discussion prompts could include:
   - Do you think the approaches recommended by the CCDH would be successful in curbing anti-vaccine misinformation? Why or why not?
   - Why do you think so few people contribute to such a large percentage of disinformation?

ELABORATE

1. Students choose one of the individuals they selected during "Explain 1" section and use both the "evaluating information toolbox" and lateral reading to determine whether the individual shares valid information. Have students complete the below statement and make a list of 3-5 pieces of evidence for their conclusion. If time allows, have groups (from vocabulary review) reorganize to compare their conclusions.

   Statement: I explored ___(person's name)___ and determined they share _(valid/invalid)_ information based on the following evidence:
   1.
   2.
   3.
   4.
   5.

EVALUATE

Teacher or student choice of activity:

1. Students write a passage reflecting on the question, "How does the spread of information on social media affect science and medicine?"
2. Students create a scientifically based vaccine social media campaign:
   Pretend you have been hired by an immunization coalition or physician's office. How would you create an effective, accurate, and engaging social media campaign about the positive impact of vaccines that people would want to share?

These items can be assigned as out of class work if time is limited.

EXTEND

Choose one of the following extension activity options:

Option 1

1. Students write a short passage outlining their position on whether social media platforms have a responsibility to oversee the spread of misinformation on their platforms.
2. Students hold a class discussion or debate explaining and defending their written position.

Option 2

1. Students choose (or are assigned) a stakeholder and create a video, play or report that represents that stakeholder's responsibility in controlling the spread of misinformation/disinformation on social media. Stakeholders can include social media companies, the federal government, healthcare professionals, non-social media companies (i.e., other businesses that may be affected by the misinformation or by changes to the platforms) or individual users.

RUBRIC – ACTIVITY 1: Compare and Contrast Social Media Posts

Students should select one science or vaccine-related social media post from a person on list A and one from a person on list B. NOTE: Due to account suspensions, some names may not be available; it is recommended to check the names before assigning to ensure a current presence on social media platforms.

LIST A	LIST B
Dr. Sanjay Gupta	Dr. Joseph Mercola
Dr. Tom Frieden	Sayer Ji
Dr. Leana Wen	Erin Elizabeth
Andy Slavitt	Robert F. Kennedy Jr.
Helen Branswell	Del Bigtree
Caitlin Rivers, PhD	Dr. Sherri Tenpenny
Atul Gawande	Christiane Northrup
Dr. Peter Hotez	Ty and Charlene Bollinger
Laurie Garrett	Rizza Islam
Eric Feigl-Ding	Dr. Ben Tapper
Dr. Craig Spencer	Dr. Rashid A Buttar
Marc Lipsitch	Kevin Jenkins
Tedros Adhanom Ghebreyesus	Dr. Kelly Brogan
Dr. Bob Wachter	Dr. Simone Gold
Dr. Mike Varshavski	James Lyons-Weiler
Jennifer Nuzzo, DrPH	Jon Rappoport
Dr. Megan Ranney	Forrest Maready
Dr. Nahid Bhadelia	Eileen Iorio

Students should record the information from the post as directed in the worksheet and complete the post comparison table, engagement rate calculation and post assessment questions. Calculations and post assessment observations will vary depending on the posts selected.

Students should calculate the engagement rates for each post using the following steps:

- Calculate the total engagement number (TE) by adding all reactions, comments and shares for the post. TE = R + C + S
- Calculate the engagement rate (ER) by dividing the total engagement by the total number of followers and multiplying by 100. ER = TE/total followers x 100
- Express the ER as a percent.

RUBRIC: STUDENT WORKSHEET (EXPLAIN 2)

Students read the executive summary of the Center for Countering Digital Hate (CCDH) study, “The Disinformation Dozen” and answer the following questions.

1. How did the CCDH determine which people to include in "The Disinformation Dozen?"

   - The CCDH selected people who had large numbers of followers, produced a high amount of anti-vaccine content, or who had rapid growth of their social media accounts in February and March of 2021.

2. Give two examples of what the CCDH found when they analyzed anti-vaccine content. Make sure at least one example includes a specific measure of how much of the content could be attributed to "The Disinformation Dozen."

   Answers will vary, but should include a reference to at least one of these measurement-related findings to help students focus on the methodologies used by CCDH:

   - Analysis of a sample of anti-vaccine content shared or posted on Facebook and Twitter a total of 812,000 times between February 1 and March 16, 2021 showed that 65 percent of anti-vaccine content was attributable to the Disinformation Dozen.

   - Analysis of anti-vaccine content posted to Facebook over 689,000 times between February 1 and March 16, 2021 showed that up to 73 percent of that content originated with members of the Disinformation Dozen.

   - Analysis of over 120,000 anti-vaccine tweets collected between February 1 and March 16, 2021 showed that up to 17 percent featured the Disinformation Dozen.

3. Give two examples of how the CCDH notes social media platforms are failing to control the spread of disinformation from "The Disinformation Dozen."
   Answers will vary but may include:

   - Several of the Disinformation Dozen remained on Facebook, Instagram and Twitter even after repeatedly violating the terms of service on all three platforms.

   - CCDH conducted research indicating that platforms failed to act on 95 percent of the Covid and vaccine misinformation reported to them in 2020.

   - CCDH found evidence that Instagram's algorithm actively recommended misinformation.

   - CCDH tracked 425 anti-vaccine accounts and showed that their total following across platforms stood at 59.2 million in December 2020, up 877,000 from June 2020.

4. List four recommendations that CCDH suggested to help counteract the spread of disinformation on social media platforms.

    - Highly visible repeat offenders, like "The Disinformation Dozen," should be removed from social media platforms, and the de-platforming should include any organizations they control or fund, as well as any backup accounts designed to circumvent removal.

    - Social media platforms should establish clear rules outlining when certain behavior will result in actions such as account restrictions or de-platforming.

    - Platforms should present users with warning screens when attempting to follow links to sites known to host vaccine misinformation, and users exposed to posts with misinformation should be alerted and shown corrections.

    - Facebook should not host private anti-vaccine groups on its platform.

5. Which recommendation do you think would be the most effective and why? If you don't think any will work, explain why.

    - Students should provide reasons as to why they believe certain strategies would be effective or ineffective.