Knology

PBS NewsHour: Health Literacy

Year 3 Evaluation Report

July 22, 2019

Jena Barchas-Lichtenstein, John Fraser, Nicole LaMarca, John Voiklis, Darcey Glasser & Uduak Thomas

The following publication was produced in 2019 under the original corporation name of New Knowledge Organization Ltd. On September 1, 2019, NewKnowledge became Knology.

Recommended Citation

Barchas-Lichtenstein, J., Fraser, J., LaMarca, N., Voiklis, J., Glasser, D., & Thomas, U. (2019). Year 3 Evaluation Report. NewKnowledge Publication #NIH.100.098.09. New York: New Knowledge Organization Ltd

First Date of Publication

July 22, 2019

Prepared for

Patti Parson & Leah Clapman
PBS NewsHour
3939 Campbell Avenue
Arlington, VA 22206

Cover photo by Brad Neathery on Unsplash.

Knology Ltd. is a non-profit collective of social scientists, writers, and educators dedicated to providing practical social science for a better world.

tel: (347) 766-3399
40 Exchange Pl. Suite 1403
New York, NY 10005

tel: (442) 222-8814
3630 Ocean Ranch Blvd.
Oceanside, CA 92056

NewKnowledge Publication

#NIH.100.098.09

Year 3 Evaluation Report

Project: **PBS NewsHour: Health Literacy**

#1R25OD0202212-01A1

July 22, 2019

For: Patti Parson and Leah Clapman
PBS NewsHour

By: Jena Barchas-Lichtenstein, John Fraser, Nicole LaMarca, John Voiklis, Darcey Glasser & Uduak Thomas

Correspondence: Nicole LaMarca, nlamarca@newknowledge.org

NewKnowledge Publication: #NIH.100.098.09

Executive Summary

The PBS NewsHour Health Literacy and Student Reporting Labs (SRL) project has two goals: increase awareness on public health matters by reporting stories on health, biomedicine, and behavioral health; and engage youth in health science journalism. In previous years, we evaluated qualitative and quantitative data collected from the US public, and SRL instructors and students using a sample set of health science news stories. In Year 3, we analyzed data from similar population types including responses to surveys, interviews, and pitch sheets.

Our analysis of broadcast audiences in Years 1 and 2 showed that the public viewed NewsHour as a reliable source of health science news. Consistent with our findings in previous years, Year 3 results showed that audiences found NewsHour content engaging. They also reported discussing stories with individuals in their social groups. In Year 3, we surveyed SRL participants retrospectively rather than prospectively as in previous years. This new approach allowed us to more accurately assess students' knowledge about health topics before and after participating in labs. As observed in prior years, Health SRL participants became more knowledgeable about health topics and were more interested in health communications careers as a result of their involvement. Interviews provided clear directives for Year 4 of the funding, including content-specific lesson plans and specialized instructions for new teachers.

tel: (347) 766-3399
40 Exchange Pl. Suite 1403
New York, NY 10005

tel: (442) 222-8814
3630 Ocean Ranch Blvd.
Oceanside, CA 92056

tel: (240) 639-1177
P.O. Box 30273
Bethesda, MD 20824

New Knowledge Organization Ltd.
Facing Society's Grand Challenges Head On

Introduction

In 2016, the National Institutes of Health funded the PBS NewsHour Health Literacy and Student Reporting Labs (SRL) initiative, a five-year project to increase public awareness of health topics and to train the next generation of science and health communicators. The specific project aims are to:

1. Provide critical health information to PBS NewsHour's broadcast and digital audiences so they can become knowledgeable advocates for their families and communities;

2.a. Create an innovative health science curriculum to support a more health science literate and motivated community of youth science communicators; and

2.b. Promote interest in careers in the health science workforce and help youth and the public understand the relevance to the quality of life issues in their communities.

PBS NewsHour is accomplishing these aims through two distinct programs. Its nightly news broadcast includes stories about trends and concerns in clinical, biomedical, and behavioral research, and explore the industries involved in promoting health. In addition to its broadcast audience, NewsHour has the potential for broad reach and active engagement through social media platforms and its web presence.

Through its SRL initiative, NewsHour prepares young people for careers as communicators. Currently operating in 150 schools in 40 states, this program trains middle and high school students to produce video reports from teenage perspectives. The Health Science SRL program, which is funded by the same grant, offers schools a health science reporting curriculum and connections to public media mentors. Teachers and mentors help participating students shape their stories, and discuss health science communication career ideas and opportunities. Each year, teachers in seven to nine schools create teams of five to ten students within their classrooms and guide them through the process of developing health science stories. Each team typically produces at least one story.

EVALUATION ACTIVITIES

We used a mixed methods approach to collect and evaluate data from the three audiences targeted by the project: the US public, SRL youth, and SRL educators. Since Year 1, NewKnowledge has coordinated ongoing formative evaluation using feedback data from quarterly surveys of a national panel of adults. Each survey solicits reactions to one NewsHour health science broadcast story about an emerging health issue. We continued our formative evaluation activities with this group in Year 3.

We continued to assess the impact of the SRL initiative in Year 3 with some adaptations to clarify aspects of the study. Specifically, we deployed retrospective-pre/post surveys to SRL participants and a control group at the end of the year instead of using a pre/post survey. We conducted small group interviews with video-conferencing software to document the experiences of student participants, and their perspectives on the benefits and challenges of creating health science news stories. We analyzed students' pitch sheets to get a sense of their baseline understanding at the start of their participation. And we interviewed teachers from the participating classes to get their perspectives on the story-production process and their feedback on the NewsHour curriculum and its implementation.

THIS REPORT

This report covers formative evaluation activities and findings from Year 3 of this project. We collected feedback from the public on six PBS NewsHour health science stories and data from participating SRL students and teachers through surveys and interviews. Each chapter has distinct headings for the evaluation of both broadcast audiences and SRL participants. In the discussion and conclusion, we have synthesized the findings across all activities to assess movement toward the project aims, and to provide recommendations for Year 4.

Methods

Our evaluation collected data about health science news from three target audiences: the US public, SRL youth, and SRL educators. In Year 3, we tested six broadcast stories with the public and collected data from SRL students and teachers at seven schools. We asked both open-ended and closed-ended questions to assess the project and provide recommendations for the future. Specific activities are described below.

HEALTH SCIENCE BROADCAST STORIES

NewKnowledge used Amazon Mechanical Turk (MTurk) and TurkPrime (Litman, Robinson, & Abberbock, 2017) to deploy six surveys (Appendix A) to a national panel of adults between December 2019 and April 2019. While samples recruited through Amazon's Mechanical Turk and TurkPrime are not fully representative, respondents are as or more diverse than typical internet samples (Buhrmeister, Kwang, & Gosling, 2011).

Each survey tested reactions to one health science broadcast story (Table 1) and the likelihood that respondents would share the story or seek out additional information. Most stories were initially developed for broadcast except in two instances; one was an article written for the NewsHour website, and one included both an article and a short accompanying video. All of these stories were also available for online consumption. Detailed results from the first four surveys are available in a separate report (Barchas-Lichtenstein, LaMarca, Feuerstein-Mendik, Voiklis, & Glasser, 2019).

Demographics collected for each survey indicate that all MTurk panels were similar with respect to respondent age range, political affiliation, education level, and race. Most of the respondents to every story self-described as men who were 30-39 years old, Democrat, college-educated, and White, consistent with overall MTurk demographics (Huff & Tingley, 2015). For demographic breakdowns of each survey panel, see Appendix B.

Table 1. Stories tested in Year 3 and number of people surveyed.

Story Title	Air Date	Length	*N*
Urban **Wildfires** Bring Lingering Worries About What's in the Air	Sep.11, 2018	9:13	100
Why Do **Pregnant Women** Get Confusing Guidance About Alcohol?	July 24, 2018	7:59	100
Forget the Crash Diet. These 6 **New Year's Resolutions** Are Better for Your Health	Jan. 1, 2019	~2000 words	97
Racing to Understand the Polio-Like Illness Paralyzing Kids — Acute Flaccid Myelitis (**AFM**)	Jan. 2, 2019	8:16	100
How Long do Cold and Flu **Viruses** Stay Contagious on Public Surfaces?	Dec. 17, 2018	3:24 & ~1500 words	99
The Stunning Truth about **Asbestos** Use in the U.S.	March 13, 2019	10:06	96

Notes. *N* here includes only complete responses. In several cases, researchers removed respondents who did not sufficiently answer content questions designed as a check on attention. These 592 responses were collected from 398 unique respondents.

Analysis

We used descriptive statistics to characterize responses to the rating-scale and other close-ended survey questions. For open-ended questions, we reviewed responses to identify themes. For one series of open-ended questions about willingness to describe stories to others, we considered each respondent's answers holistically rather than dividing them up by question. Multiple themes were possible within a single respondent's answer. If respondents provided multiple answers that fell in the same thematic category, we counted the responses one time only.

STUDENT REPORTING LABS

Site Selection

In summer 2018, the SRL team selected ten Student Reporting Labs to participate in the Health SRL program for the next school year. Seven of these sites participated in evaluation. These experimental sites were distributed across the contiguous US states and included public middle and high schools, vocational schools, and one afterschool program. For the most part, Health Labs were part of journalism, media, and video production classes.

SRL Activities

At the beginning of the school year, instructors received the Health SRL curriculum, which included activities, worksheets, and prompts. The health-specific prompts were "Achieving our Goals" and "Where do students turn in times of need?". The first prompt asked students to learn about the legwork involved to set up a health research project or intervention, and the second prompt focused on mental health service providers. For each story, the labs shared story pitches with the SRL project team to receive feedback in an iterative fashion.

Control students were present in the same classrooms, but they developed pitches and stories for other SRL prompts not specifically related to health topics, including "Youth Vote," "Opportunity in America," and "Sights and Sounds of Public Art".

Research & Evaluation Activities

Based on Year 2 results and discussions with the SRL team, we altered the evaluation plan in two ways to better understand the effects of Health SRL on student learning. First, we focused more heavily on reflective dialogues that offered students and teachers opportunities to identify specific learning moments and to connect these moments to the broader topic of health. Second, we revised the student survey with a retrospective pre- / post- design to account for shifts in students' conceptual understanding of the subject matter. The previous evaluation plan and instruments are described in detail in the Year 2 report (Fraser et al., 2018).

Interviews with Students & Teachers

Survey methods require students to think abstractly about concepts. In contrast, methods like interviews that use reflective dialogue can provide more insight into concrete moments of learning. All small-group student interviews (Appendix C) and facilitator interviews (Appendix D) followed a semi-structured protocol that allowed researchers to follow up on key points.

Student Small-Group Interviews

We conducted small-group interviews with five of the teams that worked on health science stories. In these interviews, we focused on specific knowledge gains, and ways in which the story production process differed from student expectations. We also collected data from the pitch sheets that students created when their stories were approved. This enabled us to compare student knowledge before and after completing the stories.

Facilitator Interviews

We interviewed the facilitator at each of the seven sites that worked on health science stories. These interviews gave the educators a chance to reflect on moments of growth, as well as differences between students who worked on health science stories and those who did not.

Retrospective Pre- / Post- Surveys with Students

Evidence from students and teachers in Year 2 suggests that student understanding of the concept of *health science* may shift considerably during the SRL program. Health concepts are more immediately accessible since everyone has experience with illness. As a result, it may take longer for students to recognize the complexity that underlies topics in this area. This realization challenges the use of traditional pre- and post- assessments since students may systematically over-report pre-program knowledge and interest. To mitigate this challenge, we developed a retrospective pre- / post-survey for students. At the end of the school year, we asked students to rate both their pre-program interest and knowledge and their current interest and knowledge.

This survey (Appendix E) and the quasi-experimental research approach used were designed to measure progress

toward project aims, and particular changes in student knowledge and attitudes. The **health literacy scale** was based loosely on the All Aspects of Health Literacy Scale or AAHLS (Chinn & McCarthy, 2013), while the **health sharing** and **health sharing empowerment** scales were adapted from a scale originally developed to evaluate an interactive museum program (Shane-Simpson, Fraser, Hannah, & Kong, 2017), which in turn was based on a pre-validated scale (Gupta, Shane-Simpson, Rank, Hannah, & Fraser, 2014).

Student Survey Participants

The Student Survey yielded complete data for 51 students spread across five schools. A demographic analysis of these small numbers of schools and students would make it difficult to maintain confidentiality for participants. Instead we created two aggregate variables that are intended to capture two types of privilege – male privilege and white privilege – that the SRL program is working to overcome. That is, we compared students who identified as "boys" with all other students for gender, and students who identified exclusively as "White or Caucasian" with all other students for race and ethnicity. The data included 33 students who did not explicitly identify as "boys" and 32 students who did not exclusively identify as "White or Caucasian."

Analysis

Rather than comparing teachers to teachers and students to students, we took the class as the unit of analysis. To do so, we triangulated between teacher interviews and student group interviews from the same lab to gain a more complete picture of each lab and how labs differ. We reviewed open-ended responses (in both interviews and surveys) to identify themes. Multiple themes were possible within a single respondent's answer. If respondents provided multiple answers that fell in the same thematic category, we counted the responses one time only.

We used descriptive statistics to characterize responses to rating-scale and other close-ended survey questions. Given that students rated their current attitudes and retrospectively rated their prior attitudes, we were especially interested in the amount of change they indicated.

Scale Reliability

We assessed scale reliability by calculating Cronbach's alpha, a measure used for assessing how reliable a set of scale or test items are, for each module. Given that students rated both current and prior attitudes at the same time, we calculated only the overall reliability score for each module. We judged a module to be reliable if the standardized Cronbach's alpha value was greater than .70 (Nunnally & Bernstein, 1994) and all modules exceeded this threshold. We combined the modules by first calculating the change in rating from the start and end of the SRL class (subtracting the pre-SRL item ratings from the post-SRL item ratings). Next, we used the arithmetic mean to calculate the combined change-in-rating scores for each of the seven scales.

Model Building

Many factors can influence changes in the knowledge, attitudes, and perceptions of SRL participants. In addition to the experimental manipulations used in this study, these factors also include individual and demographic differences among participants. For this study, we built statistical models of the change-in-rating scores, controlling for multiple factors and testing the effect of the experimental condition. In the Results section, we present an overall model of the effects across modules, and the underlying models for individual modules. We also report the effect sizes for each factor. Full details of the model are provided in Fraser et al. (2018).

Results

SUPPORTING BROADCAST & DIGITAL AUDIENCES

Information about audiences' engagement with news and reactions to specific stories will help NewsHour continue to support the needs of audiences on various platforms. Our analysis suggests that PBS NewsHour consistently produces health science stories that its audiences find relevant and worthy of discussion. Additionally, our findings suggest that these stories seem to pique audience interest in further learning.

News Consumption & Sharing

All modules were consistent both within and across news stories. This allowed us to summarize them with composite variables rather than represent each item individually.

Critical Health Literacy

In general, respondents had moderate critical health literacy scores across all six news stories (Figure 1). We define "critical health literacy" as the ability to assess incoming health information critically (cf. Chinn & McCarthy, 2013).

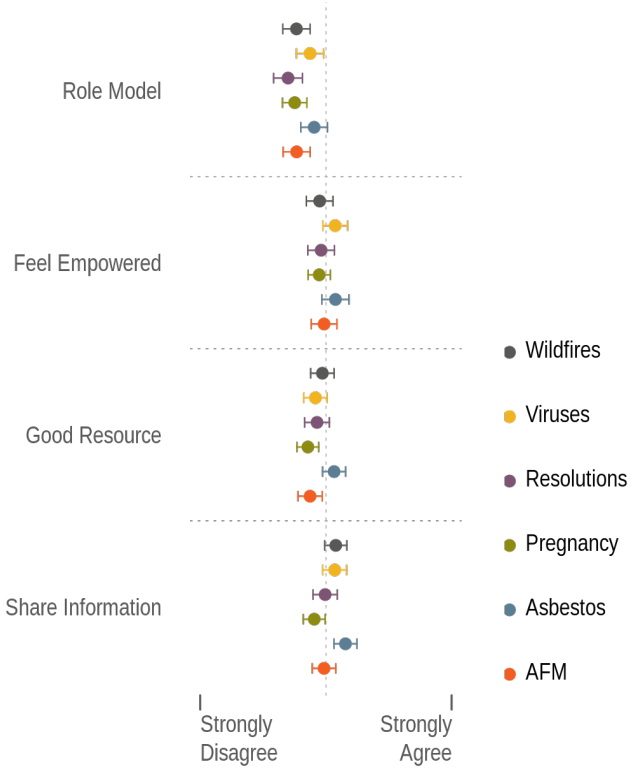

Figure 1. Summary of responses to critical health literacy scales, by story.

Notes: The points show the mean ratings by story, and the whiskers show the 95% confidence interval around the mean.

Willingness to Share Health Science Stories

Consistently across all six stories, respondents said that they were mostly likely to describe a story, then to share it on social media, and finally to email it to third parties (Figure 2). Differences between likelihood to share on social media and to email did not exceed chance.

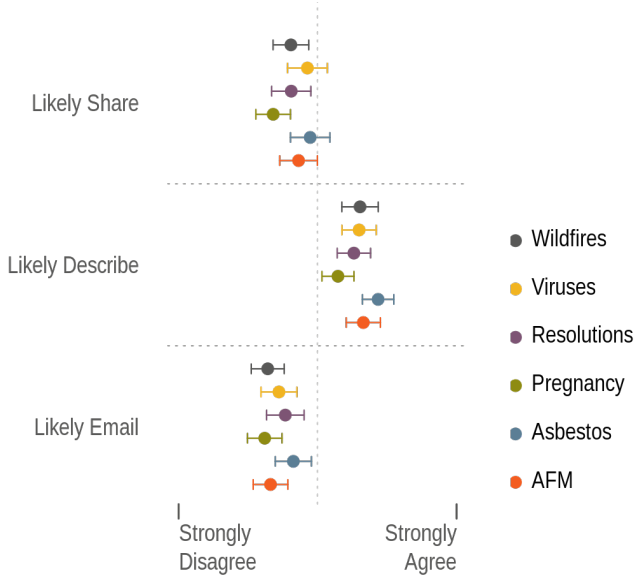

Figure 2. Summary of responses to dissemination scales, by story.

Note: The points show the mean ratings by story, and the whiskers show the 95% confidence interval around the mean.

Follow-up questions focused on respondents who said they were even minimally likely to describe a story to others. Across all stories, comparable numbers of respondents said they'd be likely to describe it to a spouse or partner; a friend, colleague, or roommate; or a family member (Appendix F).

Across all six stories, respondents generally had one of two overarching reasons to talk about the stories. First, they were interested in discussing **stories that contained specific information others could act on**. For example, one respondent who said they would describe the story about AFM to someone *"if I notice them having any flu like symptoms."* Specifically, the respondent said that they would *"explain that there is no cure but warn the person to be cautious about their symptoms they are experiencing and to seek medical help if they notice anything is really wrong."* Another person said they would discuss the asbestos piece *"to inform people so they are aware of what they buy or even a job they work to avoid potential consequences."*

Second, many respondents noted that **talking about news items was an important part of certain social relationships**. For example, one respondent said they would tell their partner about the Pregnant Women story *"because I talk about a lot of interesting things with her,"* while another said they would tell their wife *"just for general banter about health topics."*

Reactions to Health Science Stories

Four of the six stories primarily evoked negative emotions (sadness, concern, and anger) while two primarily evoked happier ones (interest, positivity, and feeling informed). The two stories that evoked positive feelings largely focused on proactive steps people can take to improve their health or lower their risks. The other four stories focused on those risks. Table 2 shows the top two adjective categories for each story.

Table 2. Most frequent adjective categories.

Story	Most common adjective	Second most common
Wildfires	Concerned	Interested
Pregnant Women	Sad	Concerned
New Year's Resolutions	Interested / Positive	Informed
AFM	Sad	Concerned
Viruses	Informed	Interested
Asbestos	Sad	Angry

Note: A full table of all adjective categories is available in Appendix G.

In general, respondents found all six stories to be both reliable and fair (Figure 3).

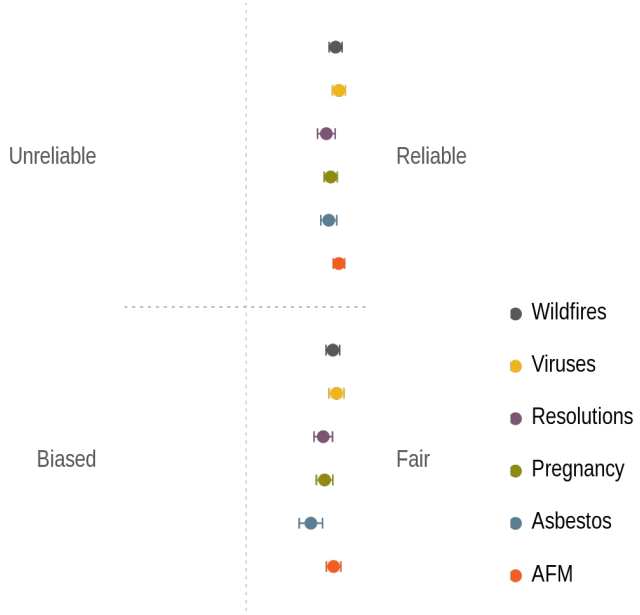

Figure 3. Summary of responses to trust scales, by story.

Note: The points show the mean ratings by story, and the whiskers show the 95% confidence interval around the mean.

Respondents also generally found the stories visually appealing, significant, and absorbing (Figure 4). However, the AFM story was considered less visually appealing than many of the others, and the New Year's Resolutions story was considered less significant.

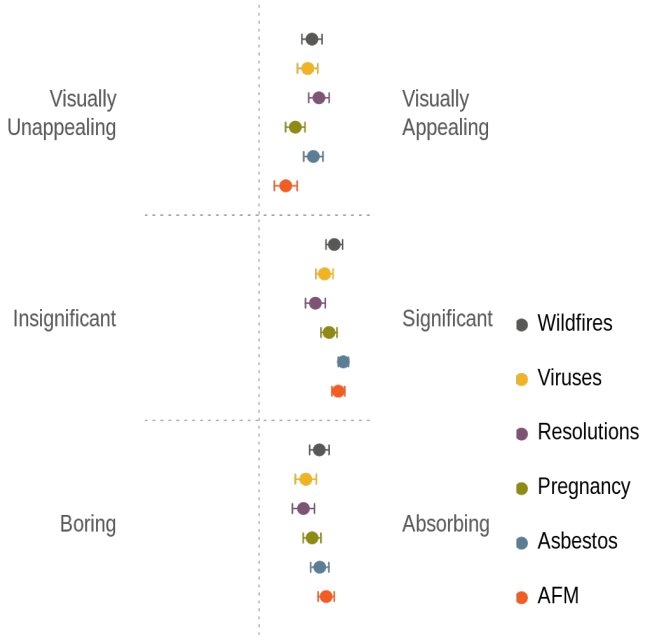

Figure 4. Summary of responses to reactions scales, by story.

Note: The points show the mean ratings by story, and the whiskers show the 95% confidence interval around the mean.

Across stories, participants interpreted and responded to questions about their favorite and least favorite story elements in different ways. Some focused on their own emotional reactions, others focused on information they learned, and still others focused on technical aspects of the stories (Appendix H).

When prompted to think about their favorite aspects of the stories, respondents frequently pointed out specific useful and applicable tips and information. For example, the accessible and digestible scientific information that was featured in the stories was appreciated, along with the personal stories and testimonials by people affected. However, other respondents were concerned by the general lack of scientific knowledge about the topic, and some noted that the stories themselves could have contained more scientific or biomedical content.

Viewers also reported enjoying hopeful and optimistic outcomes to the stories, such as stories of recovery or

continued research and advocacy around the topic. Some respondents appreciated certain elements of the reporting style such as showing doctors and scientists speaking in their own words, and the animations featured in some videos.

Meanwhile, many individuals said their least favorite aspect of a story was seeing other people suffer or their fear of something in the story happening to them. Others disliked production decisions or technical aspects of the stories, including the length and wording of written articles.

Personal Relevance

Respondents varied in their responses to questions regarding their perceptions of story relevance. More than 85% of respondents stated that two reports (Viruses and New Year's Resolutions) were relevant but only about one of three indicated that another report (Pregnant Women) was relevant (Table 3).

Table 3. Perceived relevance of stories.

Story	Yes	No	Not Sure
Wildfires	45	45	10
Pregnant Women	35	52	13
New Year's Resolutions	85	8	4
AFM	46	44	10
Viruses	89	7	3
Asbestos	63	20	13

The reasons respondents gave for judgments of (ir)relevance varied by the story (Table 4). In general, the most common justifications typically focused on the respondents' individual experience, while less common justifications pointed out the (ir)relevance of the story to other people in those respondents' lives.

Table 4. Most common justifications for perceived (ir)relevance.

Story	Most common justification
Wildfires	Location
Pregnant Women	(Not) having or wanting children
New Year's Resolutions	Interest in health, especially weight, dieting, or nutrition
AFM	(Not) having or wanting children of the relevant age
Viruses	Preventing illness from spreading
Asbestos	(Not) being exposed or possibly exposed to asbestos

Having or wanting children came up frequently in responses to two stories: Pregnant Women and AFM. Comparable numbers of men and women reported that the story about pregnant women was relevant. However, women were much more likely than men to say that they found the AFM story relevant: 21 of 35 women said this story was relevant, while only 25 out of 65 men did.

TRAINING YOUTH HEALTH SCIENCE COMMUNICATORS

In general, students and teachers from the same school expressed similar sentiments regarding the program benefits and challenges. Our evaluation of the data suggests that overall Health SRL was a positive learning experience for all involved. In addition to learning about health news reporting and production, the process offered opportunities for students to cultivate life skills.

For example, students got better at managing their time. They also become more skilled in communicating about sensitive topics over time. Some of these skills grew out of having to deal with logistical challenges including navigating networking opportunities, finding available resources in their area, transportation and scheduling issues, and poor communication or support from school administrators.

Story Creation Process

Teachers told us they used varied approaches to implement the Health SRL program in their classrooms. Their choices

were based on curricular requirements, available resources, and scheduling constraints.

None of the teachers in the program had a direct background in health, and reported varying levels of comfort with the topics included. Some teachers struggled with specific aspects of the program. For example, one teacher described the selected topics as both open and restrictive, and stated that they had difficulty motivating their students during the story creation process. This teacher further stated that the format and process was too formalized to accommodate the diversity of their students. However, that perspective was not shared across the board. Others felt that the topics were appropriate to their students. One teacher remarked that Health SRL gives students the opportunity to *"dig deeper"* into topics that feel directly pertinent. In terms of feedback, one teacher suggested sharing story prompts sooner as some students, particularly seniors, become less motivated by the end of the school year.

Many students said that they chose teen-focused stories that were relevant either to them or to someone they are close to. Story topics often covered issues in their community that aren't getting the attention students believe they should, or may be taboo and not publicly spoken about. Students hoped to start a conversation with their project, as well as provide solutions to these problems through their stories. Students' ideas included letting people know where to go for help or sharing what their options are in dealing with a particular topic. Some students reported having to change their story topics in the middle of the year because organizations stopped responding or they had difficulty getting hold of relevant people to interview.

Roles, Tasks, & Teamwork

Labs were most effective when students worked independently of the teacher, and each student had a designated role in their group. After brainstorming ideas with the whole class, most teachers divided their classes into smaller groups that worked together and met often without direct supervision. Newer teachers took longer to find the most effective group structures for their class, and said that they had to try multiple approaches to identify the best fit.

Many teachers were deliberate in selecting which students worked on health stories, because they recognized that students would be held to a very high standard. Students who worked on health stories were often selected based on teacher recommendations or previous broadcast experience. Because these students were already familiar with the technology and video production process, they were free to focus on creating the content. This made story creation smoother and enabled students to meet deadlines.

Students learned valuable professional skills when they communicated directly with SRL staff, mentors, sources, and story subjects. This communication included scheduling interviews and meetings and soliciting feedback about their work. Teachers who managed all communications on their own found this task time-consuming.

Mentorship & Feedback

Of the schools who mentioned their mentors, most of those teachers and students described mentorship as critical to their learning. They said that working with experienced videographers and producers added a lot to their stories. Across our case studies, several classes relied more heavily on SRL staff than their local media mentors.

Three out of the seven schools interviewed said that they used their local PBS mentor. These local mentors assisted with feedback, archival footage access, script drafting, filming, and access to working broadcast stations. They also helped with finding and reaching out to sources, conducting practice interviews, and ran students through the process of getting B-roll. Being physically located close to the schools allowed these mentors to help in ways that long-distance mentors could not. One lab said they did not have a local mentor, one teacher who used to be a journalist did not feel the need for local mentors, and two labs relied heavily on SRL staff.

SRL Resources

In general, students who had previously participated in SRL found it easier to adjust to being in the health iteration of the program. They were familiar with the production process as well as working with the SRL team and mentors. In terms of the resources provided, students enjoyed the Level Up

tutorials as well as the interactive sites for transcripts and video editing where they could receive direct feedback on their work. Overall, students found the story prompts rewarding but vague because they left room for multiple interpretations.

In addition to the Level Up tutorials, teachers said that the brainstorming activities were the most widely used resources. Moreover, teachers with previous SRL experience described the Health SRL materials as helpful but said that they also wanted more content-specific support.

Not all of the feedback on SRL resources was positive. Some teachers thought that some materials, particularly the worksheets, were not advanced enough for use with high school students. Other teachers found some SRL materials redundant because their schools already offered production courses or they had already incorporated similar activities like brainstorming into their regular curriculum.

Students' Favorite & Least Favorite Activities

Students enjoyed learning how to conduct interviews, tell stories in a new way, and film various situations on site. According to the students, the most frustrating parts of the process were narrowing down their topic and reaching out to organizations for interviews. One student noted that participating in the program was particularly challenging in smaller towns or rural areas because all potential stories were a considerable distance away.

Teacher Constraints

While most school administrators saw the value of SRL and were open to their teachers and students participating, they left the management and implementation of the program up to the teachers. Most schools either did not or could not expend additional resources to support their SRL program.

SRL teachers taught between one and seven classes, and some were responsible for additional operations or technical services at their schools. As a result, they varied in the amount of time they were able to dedicate to SRL. In interviews, teachers specifically stated that they felt it was difficult to integrate all the SRL resources and curriculum into their teaching because of time constraints and other class requirements.

Student Health & Media Communication Skills

Both students and teachers said that students' media communication skills improved over the course of making stories. Specifically, students reported feeling more comfortable conducting interviews, coordinating with organizations, and reaching out to local mentors and the SRL team for assistance as the labs progressed. Students also said that experts were much easier to connect with than they had anticipated, and were encouraged that these adults generally cared about their work.

Both teachers and students noted that the sensitive nature of health topics meant that students needed to develop new listening skills. For students, learning "how to listen" helped them better connect with interviewees, and to their stories. Many students felt more empowered after learning how to use the equipment, and enjoyed the process of producing a story that mattered to them. Even newer SRL students with less experience felt equipped to take the lead in finding, directing, recording, and editing stories.

Student Critical Health & STEM Literacy

Several teachers noted that Health SRL required their students to do more research and dive deeper into their topics than the regular SRL program. The data gleaned from retrospective surveys of participants and controls suggests that the students' knowledge of health topics grew as a result of this deeper engagement.

Specifically, on average, students reported positive change on all measured dimensions (Table 5), and all but one dimension (Health Sharing) varied from chance. In other words, students said that their interest in STEM, interest in STEM careers, and their ability to act as health role models had increased over the school year.

Table 5. Average ratings and change in ratings, by scale

	Pre	Post	Change
STEM Interest	4.14	4.52	0.38
STEM Careers	2.62	2.94	0.32
Health Literacy	3.22	3.35	0.12
Health Sharing	2.99	3.01	0.02
Health Resource	2.50	2.66	0.16
Health Empowerment	2.81	2.93	0.12
Health Role Model	2.61	2.87	0.26

We also tested the overall effect of experimental condition on all ratings across scales. We used a Multivariate Analysis of Variance (MANOVA) on the ratings with Condition as a between-subjects factor, while controlling for cognitive development, privilege, and prior SRL experience. The results of the MANOVA are provided below (Table 6).

Table 6. Overall test (MANOVA) of change in scale ratings by Condition, while controlling for cognitive development, privilege, and prior SRL experience.

	DF	Approx. *F*	*p*	η^2
Mother's Education	1	0.81	0.59	0.17
Grade	1	1.58	0.18	0.29
Male Privilege	1	0.63	0.72	0.14
White Privilege	1	2.24	0.06	0.37
SRL Experience	1	0.64	0.69	0.15
Condition	1	3.25	0.01	0.46

The MANOVA results demonstrate that the stories students worked on (the experimental vs. control condition) explain 46% ($\eta^2 = 0.46$) of the variance in the overall ratings after accounting for the effects of other factors. This effect exceeds chance occurrence ($p = 0.01$).

In the sections that follow, we use data from student and teacher interviews to explore program outcomes, particularly in three areas where students indicated in the survey that they had changed most over time: Health Role Model, STEM Interest, and STEM Careers.

Health Literacy

In group interviews, students talked about gaining critical awareness of how news stories can manipulate information about health topics. One student said they learned *"how common certain things are or the severity of the issues, and I think we overlook that a lot because we see one side of the story whenever we see the news."* Thus, it is important *"not [to] believe everything you can see from the news and television."*

Students demonstrated increased understanding or at least a greater appreciation for health and mental health topics as the labs progressed. This was true even for students who did not express an initial interest in health-related topics. Most students claimed during interviews that they were overwhelmed by the topics included in the labs at first, but gradually gained confidence and literacy over the course of their participation. Several students felt intimidated initially, claiming a lack of knowledge about health or medicine. By the end of the process, most students agreed that they had learned a lot about health and felt more comfortable with the topic.

Survey responses showed that following their participation in their program, students were more likely to see themselves as health role models. None of the factors we tested could explain this pattern.

During their interviews, teachers reported observing positive growth in their students' awareness of health and mental health issues. A teacher stated that the experience helped students become more critical of what they see on the news. A few teachers said participating in a Health SRL affected their students' interest in STEM topics. However, none of the teachers considered health a component of STEM. Our data revealed that both teachers and students perceived STEM and health as separate subject areas. This suggests that (1) understanding Health as part of STEM may not be necessary for student learning and growth, and (2) if growth in STEM interest is desired, it may be beneficial for NewsHour to provide bridging materials that may help teachers and students make the connection.

Interest in Health & STEM Topics

Many students were already interested in health topics prior to participating in SRL. In fact, some students were already in science-related academic trajectories or enrolled in STEM programs. Student responses indicated that families were key to cultivating this early interest. For example, one student stated that their mother works as a nurse, while another talked about their family's health history. Many students also had personal experiences with mental illness which may have influenced their interest in health. A number of students disclosed intimate details about these experiences during interviews.

Nearly all students reported greater interest in learning about health topics and issues as a result of their participation in the SRL labs. Students were more comfortable with communicating information about health topics and more aware about using charged and biased language in stories. For example, one student said they were now more likely to talk to family members about health issues. Another student was inspired to learn more about their school's mental health offerings. Many students wanted to do more to help people struggling with mental health challenges, based on what they had learned about these conditions. One student was less interested in mental health after the labs, and was uncomfortable with the level of emotions displayed in by sources for the story, but this reaction was uncommon.

Interest in STEM & Health Careers

Students who were already interested in STEM or pursuing STEM careers maintained their pre-existing interest in related careers and appreciated the opportunity to learn more about mental health. One student voiced their desire to become a psychiatrist as a result of this project. While student group interviews did not reveal increased interest in STEM topics or careers, surveys showed that working on the Health story predicted growth in interest in STEM or Health careers (Table 7).

Table 7. Regression of STEM Careers scale ratings on Condition, while controlling for cognitive development, privilege, and prior SRL experience.

	Est.	Std. Error	*t*	*p*
(Intercept)	1.01	0.61	1.64	0.11
Mother's Education	-0.01	0.05	-0.19	0.85
Grade	-0.12	0.08	-1.48	0.15
Male Privilege	-0.12	0.17	-0.73	0.47
White Privilege	0.00	0.17	0.00	1.00
SRL Experience	0.07	0.19	0.36	0.72
Condition	0.74	0.19	3.93	< 0.001

On average, working on a Health story amplified changes in the STEM Careers scale ratings by almost a whole point (0.74). This means that those students were more likely to imagine a future in Health/STEM after completing the program. This effect exceeds chance occurrence (p<0.001).

Connections between Health & STEM

Conversations with both teachers and students indicated that they do not view social sciences or health sciences as part of STEM. Students discussed topics from psychology and psychiatry in several group interviews and the pieces they produced. However, they did not appear to connect these disciplines to STEM.

Community & Social Network Engagement

Most teachers felt that students greatly benefited from doing the work of reaching out to community members or organizations. We attribute this result to students finding themselves in a position where they had to make decisions on the fly and handle unexpected challenges such as last-minute changes in interviews. Teachers also observed that working outside the school environment offered students an opportunity to develop valuable professional skills.

Reaching the Community

Students selected story topics for meaningful and personal reasons. For example, one school had recently experienced a student suicide, and decided to learn more about the topic to create a positive story about recovery. Other stories focused

on social anxiety, eating disorders, support for LGBTQ students who are kicked out of their homes, and racial equality in health care.

Students could relate to the health issues covered in their stories. For example, students who worked on a story about suicide and peer-to-peer counseling talked openly about their own experiences with mental health. In one case, students were able to work with their administration to develop new student outreach services on their campus. Meanwhile, students who focused on racial equality in health care discussed the paucity of services for minorities and women in their own communities.

At some sites, students engaged with the broader off-campus community through mentor relationships. Students at two schools visited broadcast stations, aired original content on local channels, spoke with professionals in the field, and learned new production techniques such as drone filming.

Discussion, Recommendations & Conclusion

DISCUSSION

Our results highlight the ways two initiatives from PBS NewsHour are helping to foster a more health-literate public. For simplicity, we break out the discussion of our findings and recommendations for next steps by public audience and Health SRL participants. In both cases, we highlight key themes and offer suggestions for deepening engagement and supporting specific needs.

Broadcast & Digital Audiences

NewsHour has a large nightly broadcast audience and the potential for broader reach and active engagement through various digital platforms. Our evaluation revealed some consistent themes in this population and these drive the focus of our ensuing discussion and recommendations.

Overall, this group preferred **more positive stories** and found them somewhat more relevant compared to more negative news. Across stories, many respondents noted that portions of news stories that they enjoyed the most focused on specific actionable tips, while watching others suffer or worrying that they might suffer in similar ways was often their least favorite part. Specifically, participants were least likely to find two sad stories relevant: a story on pregnant women and alcohol, and one focused on understanding cases of Acute Flaccid Myelitis (AFM).

We tested a wider range of topics this year than in previous years, and correspondingly, we saw a wider range of responses than in the prior years. Audiences found the stories used in the evaluation **relevant** to varying degrees. At one extreme, only about one-third of viewers found the pregnancy story relevant, and just over half found it irrelevant. At the other extreme, nine-tenths of viewers found the virus story relevant.

In earlier years, people reported being more interested in **discussing health stories in person** rather than sharing them by email or social media. This proved true in the populations sampled this year. We also gathered information about who people talk to, how they talk to them, and why. In general, people talk about news with the types of people they talk to the most on a daily basis, including romantic partners, friends, colleagues, and family members.

We found evidence of differing motivations for discussing these stories with others. In some instances, respondents were \motivated by a need to pass on what these individuals perceived as valuable information to people that they felt needed it. In other instances, they discussed these stories to maintain social relationships. This is in keeping with research observations on the 'ritual' value of news (e.g. Carey 2009). Moving forward, attempts to deepen NewsHour's engagement with its audience may benefit from thinking about ways to support these kinds of in-person discussion and dissemination of news content. We offer some suggestions for trying to achieve this in the recommendations section of this report.

SRL Participants

The methodological changes made to the study to better assess health literacy rates among Health SRL participants were largely effective. We showed that students became more knowledgeable about health topics as a result of their engagement with health concepts through the SRL program. Based on qualitative information about processes and growth described by students and teachers, we surfaced some important themes that are discussed in greater depth in this section.

Most students found at least one topic that was highly relevant to them and their concerns. Several students selected topics that had personal resonance, and could articulate why these stories mattered. Several students described greater sensitivity and awareness around specific issues because of their participation, and they were interested in advocacy efforts in their communities.

Teachers and students highlighted research and critical inquiry as essential for reporting on healthcare stories compared to reporting on other kinds of topics. Both groups

noted that this same kind of rigorous inquiry is important in the context of STEM subjects. Interestingly, neither the students nor the teachers perceived health as a STEM field. Future research studies could explore the underlying reasons for this observation as well as where students and teachers see health fitting into the disciplinary landscape.

Teachers and students saw video production skills as an important prerequisite for crafting their stories. They also noted that learning these skills while learning to write health news stories is challenging. This is because compared to other kinds of news, health stories require considerable interpersonal sensitivity, in addition to research skills. that may not be possible for some students to cultivate during the lab. Based on these observations, we suggest the following adjustments to the program which may help address some of the challenges:

1. Reorganize the program so that it is specifically for more advanced students who have prior experience with SRL;
2. Provide resources and curricula for mixed groups so that students with more video experience can scaffold students with less;
3. Offer additional curriculum options that target students with multiple skill levels; and/or
4. Increase or diversify mentor involvement.

The biggest constraint SRL participants articulated was time. Teachers often juggled multiple responsibilities and classes at their schools which had an effect on the amount of time they could dedicate to SRL programming and incorporating the materials into their curricula.

Newer teachers were limited by their inexperience and struggled to identify the best processes to run their labs smoothly. They also had some difficulty with the program software. During interviews, more experienced SRL educators discussed strategies that they use in their labs that may have been helpful for the newer teachers to know. These findings highlight the importance of inter-teacher contact and communication. We recommend that future iterations of the program include mechanisms through which teachers can share best practices for running labs.

RECOMMENDATIONS

PBS NewsHour's audience relies on its health reporting to stay current on clinical, biomedical, and behavioral research and innovations. Meanwhile, the SRL initiative teaches students the value of health reporting and is helping to cultivate interest in future health communication careers. Based on our evaluation of PBS NewsHour's efforts for both groups, we offer the following recommendations for supporting existing NewsHour audiences and improving Health SRL programming.

Broadcast

For broadcast audiences, we recommend that NewsHour:

- Continue to emphasize actionable steps in broadcast stories particular those focused on negative topics such as disease outbreaks;
- Consider providing talking points during news reports to foster in-person discussions. Depending on the story topic, these talking points could focus on both personal impact and ways people can connect with and support those who are navigating a particular challenge;
- Consider developing interactives to help audiences visualize and think about stories' subject matter and link it to their lives. This might include things like geographical maps showing effects of climate change on disease spread; and/or
- Provide online resources that offer easy access to additional content related to stories.

SRL Participants

To help students gain greater health literacy as well as grow the pipeline of future health communicators, we offer recommendations in three areas:

Video production

- Connect teachers to mentors early in the school year and set clear expectations and definitions of roles within the partnership;
- Encourage mentors to take on more of a leading role if they are working with teachers that have less experience; and/or

- Offer access to archived b-roll to provide students with concrete examples of shooting contextual footage for stories.

Expanded Health Science Curriculum:

- Offer more targeted prompts, content lessons, and health-reporting-specific curriculum;
- Provide bridging materials that connect stories to health science and STEM in general;
- Consider providing access to health mentors and domain experts; and/or
- Provide access to internally developed or partner content resources for students and teachers use. This could include things like videos and previously published articles. These pieces would need to be tagged by topic and keywords for easier search on the NewsHour website.

Logistics & Teacher Support

- Create a teacher exchange that provides a private, dedicated forum for teachers to communicate with one another and connect;
- Include resources on how to make travel for interviews, searching for contacts, and other program logistics less arduous for students;
- Offer resources for teachers on how to get mixed-level groups to work together better and encourage participation from younger and less experienced students;
- Consider offering differentiated resources for beginning and advanced students; and/or
- Provide curriculum materials and resources tailored for use in labs that run for a shorter time frame.

CONCLUSION

PBS NewsHour's Health Literacy and SRL initiative are increasing awareness and understanding of health and STEM-related topics in the general public and among SRL students. By offering clear explanations of research topics in the clinical and biomedical domains, NewsHour ensures that fact-based information grounded in research percolates into the public arena helping to combat misinformation about science and health.

Through Health SRL, NewsHour is expanding paths for future health communicators and equipping young people with tools to tell stories that resonate with their communities today. In addition to broader awareness about public health matters, this kind of community-driven reporting could open doors for engagement with groups of people who may not otherwise seek out relevant health information and resources for themselves.

REFERENCES

Barchas-Lichtenstein, J., LaMarca, N., Feuerstein-Mendik, M., Voiklis, J., & Glasser, D. (2019). *Topline report: Four health stories.* NewKnowledge Publication #NIH.100.098.08. New York: New Knowledge Organization Ltd.

Buhrmester, M, Kwang, T., & Gosling, S.D. (2011) Amazon's Mechanical Turk: a new source of inexpensive, yet high-quality, data. *Perspectives on Psychological Science* 6:3–5

Carey, J. W. (2009). "A Cultural Approach to Communication." *Communication as Culture*. New York: Routledge. pp. 11–28

Chinn, D., and C. McCarthy. (2013). All Aspects of Health Literacy Scale (AAHLS): Developing a tool to measure functional, communicative and critical health literacy in primary healthcare settings. *Patient Education and Counseling 90*: 247-253.

Fraser, J., Barchas-Lichtenstein, J., Danter, E., LaMarca, N., Switzer, T.F., Voiklis, J., & Field, S. (2018). *Year 2 Evaluation Report.* NewKnowledge Publication #NIH.100.098.07. New York: New Knowledge Organization Ltd.

Gupta, R., Shane-Simpson, C., Rank, S.J., Hannah, S. & Fraser, J. (2014). *TNC LEAF 2013-2014 Program impacts: interns, alumni, and educators. NewKnowledge Publication #PVT.87.135.11.* New York, NY: New Knowledge Organization Ltd.

Litman, L., Robinson, J., & Abberbock, T. (2017). TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behavior Research Methods, 49*(2), 433-442.

Shane-Simpson, C., Fraser, J., Hannah, H., & Kong, K. (2017). *MedLab Final Report, SIMLAB: Using patient simulation for student exploration of community health issues. NewKnowledge Publication #NIH.066.077.19.* New York, NY: New Knowledge Organization Ltd.

This material is based upon work supported by the National Institutes of Health under Grant No. R25od020212. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Institutes of Health.

New Knowledge Organization Ltd.

Facing Society's Grand Challenges Head On

tel: (347) 766-3399
40 Exchange Pl. Suite 1403
New York, NY 10005

tel: (442) 222-8814
3630 Ocean Ranch Blvd.
Oceanside, CA 92056

tel: (240) 639-1177
P.O. Box 30273
Bethesda, MD 20824

Knology

Behaviors

Biosphere

Culture

Media

Wellness

Systems

Knology.org
info@knology.org

tel: (442) 222-8814
3630 Ocean Ranch Blvd.
Oceanside, CA 92056

tel: (347) 766-3399
40 Exchange Pl. Suite 1403
New York, NY 10005