Readersourcing an Accurate and Comprehensive Understanding of Health-related Information Represented by Media

Eun-Young Ko
KAIST
Daejeon, South Korea
eunyoungko@kaist.ac.kr

Ching Liu
National Tsing Hua University
Hsinchu, Taiwan
chingliu@gapp.nthu.edu.tw

Hyuntak Cha
Seoul National University
Seoul, South Korea
chaht01@gmail.com

Juho Kim
KAIST
Daejeon, South Korea
juhokim@kaist.ac.kr

ABSTRACT

Health news delivers findings from health-related research to the public. As the delivered information may affect the public's everyday decision or behavior, readers should get an accurate and comprehensive understanding of the research from articles they read. However, it is rarely achieved due to incomplete information delivered by the news stories and a lack of critical evaluation of readers. In this position paper, we propose a readersourcing approach, an idea of engaging readers in a critical reading activity while collecting valuable artifacts for future readers to acquire a more accurate and comprehensive understanding of health-related information. We discuss challenges, opportunities, and design considerations in the readersourcing approach. Then we present the initial design of a web-based news reading application that connects health news readers via questioning and answering tasks.

Sidebar 1: Sloppy journalism in health news

The media has long been criticized for providing oversimplified, sensational, inaccurate, or imbalanced information to its audience [3]. Facing the constraints in resources (e.g., time or experts), delivering scientific research in a comprehensible and accurate way is a painstaking work for journalists [12]. Sloppy journalism in health news, which is 'hurried, incomplete, poorly researched news, not necessarily with deceitful intent' said Gary Schwitzer, significantly limits the public's opportunity to get an accurate and comprehensive understanding of the health-related research [9].

Sidebar 2: Lack of critical reading amongst health news readers

Despite the prolonged efforts of science education in nurturing citizens' skills to evaluate scientific information and utilize it to make decisions [2], people rarely use their scientific evaluation skills in everyday context. Rather, people defer the judgments to scientific authorities (e.g., science journalists) or rely on their gut feelings [10].

[1] http://www.sciencemediacentre.org/

[2] https://www.sciline.org/

[3] https://www.healthnewsreview.org/

[4] https://www.factcheck.org/scicheck/

[5] HealthNewsReview.org stopped their periodical publication at the end of 2018.

INTRODUCTION

Media coverage of scientific research has been the primary source of scientific information for the general public [1, 7]. Health-related topics (e.g., medicine and nutrition) are among the most preferred topics by both journalists and the public. As findings from such research affect the public's everyday decision or behavior (e.g., whether to drink coffee or energy drink to stay awake or whether to support or oppose the anti-vaccine movement) [1], readers should get an accurate and comprehensive understanding of health-related information so that they can evaluate and correctly apply it to their everyday life. It requires readers to acquire (1) quality information and (2) critical perspectives on it. However, sloppy journalism in health news and lack of critical reading amongst health news readers make these two requirements rarely met in the real world.

Science journalists and watchdog journalists are putting their efforts to combat this problem. Science journalists aim for better production of science news by forming initiatives on journalistic practices or developing ways to reduce the resource required to write quality articles (e.g., Science Media Center [1] and SciLine [2]). On the other side, watchdog journalists try to achieve a better consumption of already-published news stories by adding expert evaluations and critical perspectives (e.g., HealthNewsReview.org[3] and SciCheck[4]). Whereas both approaches are effective in tackling the issue, limited expert resources make them hard to be scalable or even sustainable.[5]

In this position paper, we introduce a *readersourcing* approach, an idea of engaging news readers in a critical reading activity while collecting valuable artifacts for future readers to acquire a more accurate and comprehensive understanding of health-related information. We first discuss challenges, opportunities, and design considerations in the readersourcing approach. Then, we present a web-based news reading application that connects health news readers via questioning and answering tasks to enhance their understanding of the health-related research findings.

READERSOURCING APPROACH FOR AN ACCURATE AND COMPREHENSIVE UNDERSTANDING OF HEALTH-RELATED INFORMATION REPRESENTED BY MEDIA

We propose a readersourcing approach as a way to enhance readers' accurate and comprehensive understanding of health-related information. Unlike existing expert-driven approaches that try to solve the problem from the news producer's side, the readersourcing approach focuses on solving the problem from the news consumer's side. Compared to the expert-driven approaches that depend upon the limited expert resource, this readersourcing approach has its strength in scalability and accessibility in that it utilizes the resources of the readers at the moment they are reading.

A readersourcing task can be any type of reader contribution. It can be simple as commenting on the article or as complex as evaluating the news story based on the original research paper. The actual design of the readersourcing task and utilization of the collected artifacts are up to each researcher or

Sidebar 3: Readersourced artifacts as feedback to science journalists

Readersourced artifacts can also serve as feedback to journalists [8]. In our expert interview, one science journalist said that the reader reactions were helpful to figure out at which point miscommunication happened. It was also pointed out that sometimes she choose the topic for the next news story based on reader comments that illustrate their topic of interest and curiosity.

Sidebar 4: Connecting Readers from Multiple News Stories

Health-related research reaches the public through many different news stories. However, due to limited resources of journalists (e.g., time, expert network, or even readers literacy and attention span), the original research is delivered in a number of differently incomplete news stories. Based on the observation that information in these news stories can complement each other, our system connects readers reading different news stories so that they can find such information and collect it together.
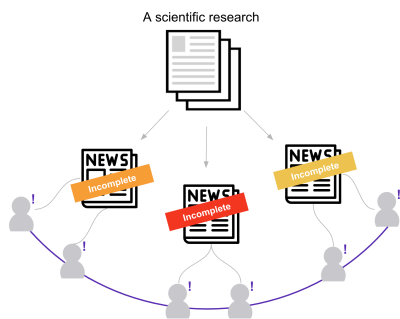
Figure 1: Illustration of connecting readers reading different news stories on the same health-related research.

system designer. In this section, we discuss challenges, opportunities, and design considerations in the readersourcing approach in general.

Challenges *Lack of expertise* of readers is one of the biggest challenges [6]. As in other crowdsourcing tasks, limited expertise of participants can threaten the quality of collected artifacts. When those artifacts are shown to others, it may induce inappropriate transfer and processing of information. Another major challenge is *motivating readers to engage in the tasks*. As critical reading is mentally demanding, online readers with limited attention span rarely engage in the process voluntarily [10].

Opportunities Previous research showed that *the public can successfully engage in critical reading activities* when appropriately instructed [4]. People can identify missing information that is needed to understand, evaluate, and apply the research findings and determine how each part of the news story gives different values to the readers. It is also shown that a large number of readers can generate *diverse perspectives* on science news [5]. This indicates there is a great opportunity to leverage such diverse perspectives in the readersourcing approach.

Design Considerations The motivation and process of scientific reasoning highly depend on readers' traits such as perception on science and media, preference for rational thinking, or prior belief related to the topic [10]. Therefore, researchers can design effective readersourcing tasks by *leveraging the personal traits of readers*. In addition, researchers can enhance the quality of collected artifacts by *utilizing expert-generated resources in the readersourcing workflow*. It can also reduce the reader's burden of providing quality information on their own. For example, in a task that asks readers to provide valuable information on a topic, one can raise the quality of the artifact while reducing readers' burden by collecting existing news stories on the topic and providing them to readers.

READERSOURCING QUESTIONS AND ANSWERS FOR AN ACCURATE AND COMPREHENSIVE UNDERSTANDING OF HEALTH-RELATED INFORMATION

In this section, we present a web-based news reading application that engages health news readers in questioning and answering tasks. The idea of using questioning and answering to promote reader's critical reading is borrowed from the science education area [11]. In this application, readers raise questions and answer others' questions while they are reading a news story. Our system serves readers reading different news articles of the same research so that they can contribute to the shared artifact with complementary information (see Sidebar 4 and Figure 1 for detail).

Benefits of questioning and answering Questioning before reading helps readers to utilize their prior knowledge and set their expectation of the contents, while raising questions during reading lets readers self-monitor their comprehension and check their predictions [11]. By reading and answering others' question, readers can improve their understanding of information and evaluation [4].

Benefits of collected questions and answers Collected question-answer pairs can constitute a shared knowledge base for each health-related research. This can serve as a point of reference

Sidebar 5: Reader Tasks

- Raise questions on what they want to read from the news story after reading the title.
- Raise questions on what they want to know based on the news story while reading the main content.
- Answer questions raised by other readers based on the news story that they read.

(a)

(b)

Figure 2: Interface for (a) questioning and (b) answering steps.

for future readers to evaluate news stories and get quality information. Collected questions, not necessarily answered, can be shown to future readers to trigger their curiosity and critical reading process. Collected questions and answers also can benefit science journalists by serving as feedback to or even (indirect) assessment of their work.

CONCLUSION

This position paper proposes a readersourcing approach for an accurate and comprehensive understanding of health news. We discussed challenges, opportunities, and design considerations in the approach. We also presented the initial design of a web-based readersourcing application that connects readers reading different news stories on the same topic via questioning and answering tasks. We plan to iterate on the design of the readersourcing workflow and conduct a controlled experiment to verify whether this approach can improve readers' understanding of health-related information.

ACKNOWLEDGMENTS

REFERENCES

[1] Pew Research Center. 2017. Science News and Information Today.
[2] National Research Council et al. 1996. *National science education standards*. National Academies Press.
[3] Anthony Dudo. 2015. Scientists, the media, and the public communication of science. *Sociology Compass* 9, 9 (2015).
[4] Paul Elliott. 2006. Reviewing newspaper articles as a technique for enhancing the scientific literacy of student-teachers. *International Journal of Science Education* 28, 11 (2006), 1245–1265.
[5] Connie A Korpan, Gay L Bisanz, Jeffrey Bisanz, and John M Henderson. 1997. Assessing literacy in science: Evaluation of scientific news briefs. *Science Education* 81, 5 (1997), 515–532.
[6] Billy McClune and Ruth Jarman. 2010. Critical Reading of Science-Based News Reports: Establishing a knowledge, skills and attitudes framework. *International Journal of Science Education* 32, 6 (2010), 727–752.
[7] Marianne G Pellechia. 1997. Trends in science coverage: A content analysis of three US newspapers. *Public Understanding of Science* 6, 1 (1997), 49–68.
[8] Mary Elizabeth Schaefer. 2014. *US Science Journalists' Views and Uses of Online Reader Comments: A Qualitative Study*. Ph.D. Dissertation.
[9] Gary Schwitzer. 2017. Pollution of health news.
[10] Priti Shah, Audrey Michal, Amira Ibrahim, Rebecca Rhodes, and Fernando Rodriguez. 2017. What Makes Everyday Scientific Reasoning So Challenging? In *Psychology of Learning and Motivation*. Vol. 66. Elsevier, 251–299.
[11] Harry Singer and Dan Donlan. 1982. Active comprehension: Problem-solving schema with question generation for comprehension of complex short stories. *Reading Research Quarterly* (1982), 166–186.
[12] C Smith, Xinyi Wang, Raghav Pavan Karumur, and Haiyi Zhu. 2018. [Un] breaking News: Design Opportunities for Enhancing Collaboration in Scientific Media Production. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. ACM, 381.