Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020

William J. Murphy, Thais C. Morata, Alexandre A.P. Montilha, and John P. Sadowski

ARTICLES YOU MAY BE INTERESTED IN

Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020
The Journal of the Acoustical Society of America **146**, 2907 (2019); https://doi.org/10.1121/1.5137087

Numerical method for prediction of duct break out sound power
Proceedings of Meetings on Acoustics **39**, 022001 (2019); https://doi.org/10.1121/2.0001205

National occupational research agenda for Hearing Loss Prevention
Proceedings of Meetings on Acoustics **36**, 040003 (2019); https://doi.org/10.1121/2.0001218

Don't cite it, write it. Raising awareness of acoustics through Wikipedia
The Journal of the Acoustical Society of America **141**, 3555 (2017); https://doi.org/10.1121/1.4987537

An investigation into the performance limitations of active acoustic cloaking using an acoustic quiet-zone
Proceedings of Meetings on Acoustics **39**, 055002 (2019); https://doi.org/10.1121/2.0001190

Noise-induced hearing loss: Translating risk from animal models to real-world environments
The Journal of the Acoustical Society of America **146**, 3646 (2019); https://doi.org/10.1121/1.5133385

Proceedings of Meetings on Acoustics

Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020
--Manuscript Draft--

Manuscript Number:	POMA-D-20-00075
Full Title:	Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020
Article Type:	ASA Meeting Paper
Corresponding Author:	William J. Murphy, Ph.D. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health Cincinnati, OH UNITED STATES
Order of Authors:	William J. Murphy, Ph.D.
	Thais C Morata
	Alexandre A.P. Montilha
	John P. Sadowski
Abstract:	Wikipedia is an important mechanism to share science information with the public. The National Institute for Occupational Safety and Health (NIOSH) adopted a multi-component strategy to improve the health content on Wikipedia. For the International Year of Sound (IYS 2020), the Acoustical Society of America and NIOSH organized the online event Wiki4YearOfSound2020, to facilitate the improvement of Wikipedia content related to acoustics. IYS 2020 is a global initiative to highlight the importance of sound in all aspects of life and improve our understanding of sound-related issues at an international level. The Wiki4YearOfSound2020 platform (available in several languages) provides guidance to all who join. Ways to participate include promoting the project, suggesting a topic that should have a Wikipedia article, improving or translating existing articles, or writing new ones. Educational programs can take advantage of the easy-to-use platform and tools to train students to contribute high-quality content to Wikipedia as part of their class assignments. Throughout 2020 the Wikimedia outreach dashboard will allow anyone to monitor contributions and reach. This campaign is an opportunity to make acoustics one of the better-developed areas within Wikipedia, while providing quality information to everyone in the world – where they are actually looking for it.
Section/Category:	Education in Acoustics
Additional Information:	
Question	Response
Please provide the JASA Scitation DOI link to the published Meeting Abstract. (Published Abstracts can be accessed through the Journal of the Acoustical Society of America (JASA's) Scitation pg.- https://asa.scitation.org/journal/jas). Search by original title using the magnifier at the top right. An example DOI is - https://doi.org/10.1121/1.4805331. (Please copy and paste your DOI into the space provided.)	https://doi.org/10.1121/1.5137087
Provide the JASA Volume, Issue, and Year info. associated with this DOI link, e.g.,	Vol. 146, (4) (2019).

Vol. 144, (3) (2018).	

178th Meeting of the Acoustical Society of America

San Diego, CA

Dec 2-6, 2019

Noise: Paper 3aED1

Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020

William J. Murphy - National Institute for Occupational Safety and Health
Division of Field Studies and Engineering, Noise and Bioacoustics Team, Cincinnati, OH; wjm4@cdc.gov

Thais C. Morata - National Institute for Occupational Safety and Health
Division of Field Studies and Engineering, Noise and Bioacoustics Team, Cincinnati, OH; tmorata@cdc.gov

Alexandre A.P. Montilha - Universidade de São Paulo
Seção de Tecnologia Educacional, Faculdade de Odontologia de Bauru, São Paulo, Brasil; alexandre@fob.usp.br

John P. Sadowski - National Institute for Occupational Safety and Health
Office of the Director, Washington DC; jsadowski@cdc.gov

Wikipedia is an important mechanism to share science information with the public. The National Institute for Occupational Safety and Health (NIOSH) adopted a multi-component strategy to improve the health content on Wikipedia. For the International Year of Sound (IYS 2020), the Acoustical Society of America and NIOSH organized the online event Wiki4YearOfSound2020, to facilitate the improvement of Wikipedia content related to acoustics. IYS 2020 is a global initiative to highlight the importance of sound in all aspects of life and improve our understanding of sound-related issues at an international level. The Wiki4YearOfSound2020 platform (available in several languages) provides guidance to all who join. Ways to participate include promoting the project, suggesting a topic that should have a Wikipedia article, improving or translating existing articles, or writing new ones. Educational programs can take advantage of the easy-to-use platform and tools to train students to contribute high-quality content to Wikipedia as part of their class assignments. Throughout 2020 the Wikimedia outreach dashboard will allow anyone to monitor contributions and reach. This campaign is an opportunity to make acoustics one of the better-developed areas within Wikipedia, while providing quality information to everyone in the world – where they are *actually* looking for it.

Figure 1: The International Year of Sound 2020 logo.

1.   THE INTERNATIONAL YEAR OF SOUND 2020

On January 31, 2020, the International Commission for Acoustics held the inaugural ceremony kicking off the International Year of Sound (IYS 2020). The International Year of Sound is a global initiative to highlight the importance of sound and related sciences and technologies for all society. The Acoustical Society of America (ASA) will be promoting several events during IYS 2020, including a year-long effort to add sound-related content to the online encyclopedia, Wikipedia.

The National Institute for Occupational Safety and Health (NIOSH), part of the Centers for Disease Control and Prevention, took the lead in designing the online event Wiki4YearOfSound2020 `https://meta.wikimedia.org/wiki/Wiki4YearOfSound2020`. This effort is important not just for NIOSH and ASA's science communication efforts, but also to the global society.[2,3,5] Professional acousticians often have a wealth of knowledge accessible only in their personal libraries. What is missing is a means to make quality information available to people in a form that they can understand and utilize.

Because acousticians typically enter the field through the university-based education process, the standard practice of communication has been through the rigorous process of writing and publishing peer-reviewed papers in journals such as the Journal of the Acoustical Society of America (JASA). The academic community rewards professors based upon the quality and quantity of peer-reviewed papers they publish over the course of a career. The information in these papers is often highly technical, mathematically oriented, and – unfortunately – frequently incomprehensible to non-experts seeking information. These factors delay the implementation of scientific discoveries.

The ASA has improved its ability to make information available in a variety of ways. In the past several years, the JASA covers have been redesigned to include vibrant pictures or illustrations that capture the reader's attention. JASA has created open access collections of research on specific topics (i.e. noise-induced hearing loss, architectural acoustics, and other topic areas). ASA developed the electronic journal Proceedings of Meetings on Acoustics (POMA) with an aim to provide an archival reference of the many presentations that are given at the bi-annual meetings. The Acoustical Society's publicity staff have used the journal, the special collection issues, and POMA to promote acoustics research on social media platforms such as Facebook, Twitter, and Instagram.

NIOSH was one of the first US federal agencies to collaborate with the Wikimedia organizations and it is doing so by actively contributing data and the latest research to help improve the health of the population. NIOSH's efforts include examining mechanisms to help make sure that

the occupational safety and health information reaching Wikipedia's millions of readers is current and accurate. The traditional model of publishing research in academic journals does not reach the broader audience that could benefit from NIOSH's research. The typical worker trying to figure out what to do about some problem is far more likely to search the internet for information. Relying solely on an academically-oriented dissemination model is a barrier to conveying useful information to other important audiences, such as employers and employees. When NIOSH analyzed the source of referrals to its web pages, redirects from Wikipedia were consistently the second most common source after OSHA.gov (excluding the major search engines Google, Bing, and Yahoo). In discussing NIOSH's strategy, Dr. John Howard, Director of NIOSH, stated:

> *"Our challenge at NIOSH is to put our research into practice . . . As we know from our experience that people are turning to Wikipedia for information, we want to make sure that the information there is complete, up to date, and free of error."*

Since 2012, NIOSH has employed Wikipedians-in-Residence as contractors. One of their main activities is to create and improve Wikipedia articles on occupational safety and health topics. One example is the page on Health and Safety Hazards of Nanomaterials. Wikipedians-in-Residence also:

- Coordinate with NIOSH staff to identify priorities and contribute to strategic planning of the activities geared to improving occupational safety and health content into Wikimedia.

- Contribute data, public domain training materials and videos to Wikidata and Wikimedia Commons, which provides a collection of over 50 million freely usable media files.

- Provide training and support, so staff researchers and interns can edit articles or create new pages such as the Occupational exposure banding page.

- Create and manage WikiProject_Occupational_Safety_and_Health, an organization of Wikipedians established to identify goals and track activities relating to occupational safety and health content. Wikiprojects often include tables with links to pages tagged for a topic and track their quality and importance ratings. Anyone can join, add to the task list, contribute towards answering the identified requests, or just follow the activities and discussions.

- Connect Wikipedians with NIOSH resources and organize events on specific topics. For example, in 2017, NIOSH hosted an Edit-a-Thon in honor of National Nanotechnology Day. Wikipedians from across the Midwest gathered to work with NIOSH scientists to expand and improve Wikipedia articles about the emerging workplace safety and health issues of nanotechnology, advanced materials, and additive manufacturing; see more detailed information on global event described in Section 2.

- Support the development of articles related to occupational safety and health. Since 2016, NIOSH and partner university graduate and training programs have adopted the platform developed by the Wiki Education Foundation so that students are assigned to add content to Wikipedia specific to the subject matter of the course they are taking; see Section 3.

2.   WORLD HEARING DAY 2019

NIOSH, in collaboration with the World Health Organization (WHO), organized a campaign for World Hearing Day, Wiki4WorldHearingDay2019, to improve the Wikipedia content related to hearing, hearing health services, hearing testing, and interventions for prevention and treatment. The platform, (`https://meta.wikimedia.org/wiki/Wiki4WorldHearingDay2019`), available in 15 languages, provided guidance, and invited anyone with access to a computer and the internet to join the campaign. Information was provided on how to improve Wikipedia articles including a list of existing Wikipedia articles pertaining to hearing. Information was also available on how to translate Wikipedia articles with suggestions for articles to be translated. In addition, NIOSH organized a hands-on training event in Cincinnati, Ohio in cooperation with the Cincinnati Children's Hospital Medical Center and HEAR-in Cincinnati (a collaboration of hearing researchers in the greater Cincinnati area). The event included presentations related to the campaign, resources on where to find freely licensed sources of hearing information, and basic training on how to edit Wikipedia (`https://en.wikipedia.org/wiki/Wikipedia:Meetup/Cincinnati/NIOSH_2019`). Remote participants included 17 groups located in the United States, Brazil, and Canada.

This effort tracked the contributions of participants during January and February 2019 in order to highlight these activities for the WHO report on World Hearing Day.[4] A few of the highlights were the development of an expanded article on tinnitus and information about hearing protection fit testing. A total of 90 articles were edited, seven new articles were created, and 66 persons/groups participated in the 2-month online event. These articles, collectively, were viewed more than 2.8 million times. The metrics for this event can be accessed at Edit-aThon for World Hearing Day Dashboard.

It is important to realize that in addition to adding original content, existing articles can be translated and adapted for languages besides English. University programs in the United States, Canada, United Kingdom, Brazil, and South Africa contributed expert content to Wikipedia articles in English, Portuguese, French, Spanish, Italian, and Swedish. Wikipedia is an international platform that serves the entire world. If you have the ability to write in a different language, then there is a need for your skill.

3.   TEACHING WITH WIKIPEDIA

Another component of NIOSH's Wikipedia strategy is to partner with university and training programs in the use of the platform developed by the Wiki Education Foundation. Wikipedia editing can be incorporated into course assignments. The Wiki Education Foundation provides instructors the necessary tools to learn how to contribute and to train others in the process of writing for Wikipedia at no cost.

Writing for Wikipedia exercises many of the same skills used when writing scientific journal articles: using neutral language, citing of bona-fide sources, maintaining an objective perspective, avoiding plagiarism. Students will benefit by developing these skills. Unlike a typical term paper that is read just by the student and the instructor, Wikipedia articles are read by millions of people. Once students realize that their contributions to Wikipedia are going to be read, they become more engaged in the assignment.[3]

The use of the platform does not require instructors to become Wikipedia editors themselves and does not add much time to the instructors' work load. Instructors can remain focused on the subject matter of their course, and rely on the resources and staff of the Wiki Education Foundation to help students with the mechanics of writing for Wikipedia. Available resources include:

- Instructional design consultation;

- Assignment management software;

- Tutorials about how to contribute to Wikipedia; and

- Staff guidance.

Several of the Wikimedia platforms offer more detailed metrics with results of NIOSH communication initiatives than can obtained elsewhere; see NIOSH Science Blog from July 30, 2018, *The Powerhouse: Students' contributions towards expanding and improving occupational safety and health content in Wikipedia*. Information on a wide range of occupational health topics were covered through these activities. Beyond the number of views (see Table 1), one can access exactly which Wikipedia articles were edited, and review the extent and the text of the edit. One can also observe whether others engaged to further develop the page. Topics that were of interest to students as well as the general public can be identified. Wikipedia articles related to hearing and acoustics have been expanded and improved by students in courses administered since 2016, including:

- University of Cincinnati (Occupational Epidemiology course in 2016 and Noise and Hearing, in 2019);

- University of Northern Colorado (Hearing Loss Prevention course in 2016 and 2017);

- University of Nebraska (Hearing Conservation courses in 2017 and 2018).

Table 1 lists several of the most viewed Wiki4WorldHearingDay2019 articles that were contributed or edited by participants during the course of the campaign. Additional statistics can be found on the Edit-a-Thon for World Hearing Day Dashboard.

Table 1: Article views from the #Wiki4WorldHearingDay2019 Campaign

Wikipedia article	Number of views during course
Tinnitus	331,402
Noise-induced hearing loss	328,364
Health effects of noise	310,759
Ototoxicity	290,805
Sound level meter	255,686

The feedback received from partners, including both faculty and students has been consistently positive. Faculty members found that using the WikiEducation platform did not add extra time to
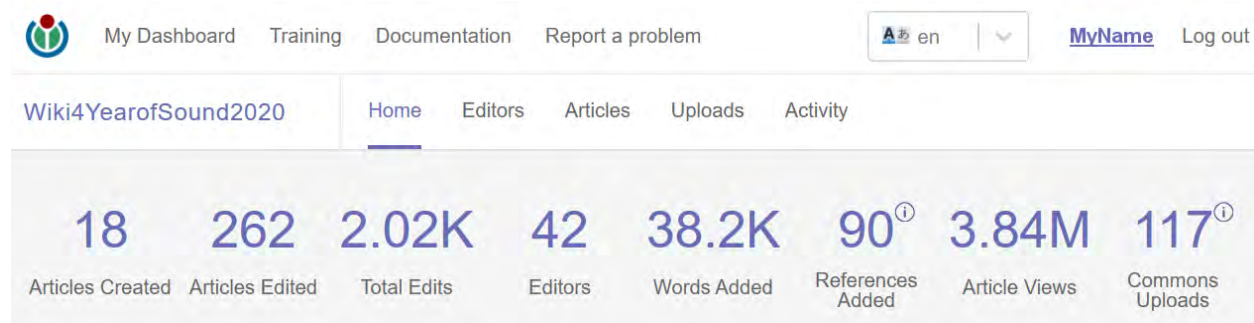
their preparation for the class and some indicated that the tools decreased preparation time. NIOSH researchers and Wikipedians-in-Residence offered faculty and students an extra layer of support with articles on occupational safety and health. Students who needed help selecting topics found plenty of suggestions at the WikiProject on Occupational Safety and Health, which was originally developed by a NIOSH Wikipedian. NIOSH staff not only provided suggestions and additional training, but also followed up with the students as needed. NIOSH staff were able to coordinate the development of a Wikipedia article across course offerings at one or more universities. One of our partners reported that NIOSH's involvement "*gave students a sense that their work was valued, worth their time, and needed by the community.*" This probably explained their enthusiasm towards the project, along with the perception that their article would showcase their science communication skills. A common response among students was that they enjoyed writing "*to be read*" and not just "*to be graded*" (see the article by Farič and Potts for specific quotations from students[1]). Overall, everyone involved viewed the project as a success.

4.   WIKI4YEAROFSOUND2020

Given the success of prior Wikipedia events organized by NIOSH and others, this global event has been developed and coordinated by NIOSH, the Acoustical Society of America and several other supporting organizations. The event is officially a part of the International Year of Sound 2020 initiative `http://sound2020.org/`. The campaign is intended to increase the awareness about sound, to educate the public, and to make acoustics-related information more accessible. The WIKI4YearofSound2020 website was created with the MetaWiki tools available at Wiki4YearOfSound2020. It contains information of how individuals or groups can participate and gives a range of alternatives for involvement. The page is available in several languages. Existing Wikipedia articles with acoustics-related content are ranked by their quality and will be monitored by the WikiProject Physics Taskforce in Acoustics.

The dashboard shown in Figure 2 illustrates some of the tracking information that has been accessed. As of February 10, 2020, 228 existing Wikipedia articles have been improved, nine

Figure 2: Wiki4YearOfSound2020 Dashboard as of February 10, 2020.

new articles and have been created and 113 media files have been donated to the open access repository on WikiCommons. University programs and individuals in the United States and Brazil have contributed expert content to Wikipedia articles in English and Portuguese. Together, they have been viewed more than 2 million times. The leading article in number of views at the moment

of this writing was the Speed of Sound `https://en.wikipedia.org/wiki/Speed_of_sound`, with 125,377 views.

The platform was officially launched at the 178th Meeting of the Acoustical Society of America held in San Diego in December 2019.[5] Other hands-on workshops are planned at the Annual Meeting of the National Hearing Conservation Association (Destin FL, February 20, 2020) and at the at the 179th Meeting of the Acoustical Society of America to be held in Chicago, Illinois, 11-15 May 2020.

Other groups are encouraged to organize free, half-day, in-person events in different venues. These events can consist of having an expert Wikipedia editor and a subject matter expert as hosts to facilitate the process. Reliable internet access is necessary. Local Wikimedia chapters might be able to sponsor events on a case-by-case basis.

To summarize, one can participate both as an individual or in a group setting. The lowest level of involvement is promoting an event. One can register on the Wikipedia website and help organize an event. If you are an educator, then the WikiEducation platform provides the tools to incorporate Wikipedia assignments into the curriculum and to engage students.

5.   GENERAL PRINCIPLES FOR WRITING FOR WIKIPEDIA

Several things should be remembered when you are preparing to add to Wikipedia (see the policies, guidelines, and the training materials from the Wiki Education Foundation). Wikipedia is an encyclopedia and it has its own style. A Wikipedia article is not like a social media page; there is **no ownership of articles**. Because Wikipedia is not commercial, your writing should **avoid sounding promotional** or advocating a point of view. Articles should **use neutral language**. Wikipedia is not a primary source of information, rather it provides persons with more general information and should direct persons to reliable sources. **Review documents and guidance documents are useful** in assisting the reader to find credible information sources. **Public domain sources can be accessed** and reprinted without fear of violating copyright laws. However, the availability of a document in the public domain does not guarantee that it is readable or understandable. **Editing and summarizing the available information** is a crucial part of good technical writing.

As a Wikipedia author/editor, even small contributions can be valuable! It is not necessary to draft an entire article about the calibration of some new microphone measurement system. Adding a sentence, paragraph or citation can be a meaningful contribution to a Wikipedia article. Images, video, audio, and documents can be added to WikiCommons.

A.   CHOOSING A TOPIC

Someone once said, "The world is your oyster." The choice of topics that you can edit or write about is endless. Ask yourself, "What are the topics with which I am most familiar?" The reliability of high quality source material can be an important consideration. On the Talk tab for each Wikipedia article, suggestions for ways to improve that article are provided. The lack of citations is frequently cited as one way to improve articles. Another place to find potential topics is on the Wikiproject page for acoustics, `https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Physics/Taskforces/Acoustics`. Articles with a B or C grade need improvement. Articles with an A grade are ones that can be translated into other languages.

6.   CONCLUSION

While there are many avenues for researchers and academics to publish scientific writing professionally, despite our busy schedules, there are many reasons to take time to expand the scientific content into Wikipedia. These include the ability to 1) provide a public service, 2) contribute solid, verifiable knowledge about your field to the public, and 3) eliminate misinformation. Those who are interested in science communication will benefit from having access to metrics on the number of page views and the interaction with other Wikipedia editors. It is also rewarding to have outcome metrics reporting the reach of these efforts. By using the Wiki Education platform when teaching, instructors are also helping students to improve their science communication skills and digital literacy, tools which will equip them for their future careers. Furthermore, the transparency of the actions and editorial processes on Wikipedia make it easier for researchers to address any concerns they might have over participation.

The breadth and accuracy of the Wikipedia coverage of the sciences varies widely. This campaign is an opportunity to improve content in acoustics within Wikipedia and to provide quality information to everyone in the world – where they are actually looking for it.

Would you like to be part of this effort? Not sure where to start? Please send us a comment or question to learn more about it or to provide us with your feedback.

DISCLAIMER

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. Mention of any company or product does not constitute endorsement by the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites. All web addresses referenced in this document were accessible as of the publication date.

REFERENCES

[1] Farič N, Potts HW. (2014). Motivations for Contributing to Health-Related Articles on Wikipedia: An Interview Study, *J. Med. Internet. Res.*, **16(12)**: e260. doi: 10.2196/jmir.3569.

[2] Mathew ME, Joseph A, Heilman JM, Tharyan P. (2013). Cochrane and Wikipedia: the collaborative potential for a quantum leap in the dissemination and uptake of trusted evidence. *Cochrane Database Syst. Rev.*, **10**:ED000069. doi: 10.1002/14651858.ED000069.

[3] Morata TC, Lum M, Hare J, Fuks, L. (2017). Don't cite it, write it. Raising awareness of acoustics through Wikipedia (2017). *J. Acoust. Soc. Am.*, **141(5)**:3555. doi: 10.1121/1.4987537.

[4] Morata, TC., Chadha, S. (2019). Make Quality Hearing Health Information Available to All. *Hearing Journal*, **72(5)**:6. doi: 10.1097/01.HJ.0000559493.29061.35.

[5] Murphy WJ, Morata TC, Sadowski J. (2019). Using Wikipedia to promote acoustics knowledge for the International Year of Sound 2020. *J. Acoust. Soc. Am.*, **146(4)**:2907-2907. doi:10.1121/1.5137087.