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Embracing Wikipedia as a teaching and learning tool benefits health professional schools and the populations they serve

Author

Amin Azzam[1*]

Abstract

To paraphrase Wikipedia cofounder Jimmy Wales, "Imagine a world where all people have access to high quality health information clearly written in their own language." Most health professional students likely endorse that goal, as do individuals who volunteer to contribute to Wikipedia's health-related content. Bringing these two communities together inspired our efforts: a course for medical students to earn academic credit for improving Wikipedia. Here I describe the evolution of that course between 2013 – 2017, during which 80 students completed the course. Collectively they edited 65 pages, adding over 93,100 words and 608 references. Impressively, these 65 Wikipedia pages were viewed 1,825,057 times during only the students' active editing days. The students' efforts were in partnership with communities outside of academia—namely Wikiproject Medicine, Translators Without Borders, and Wikipedia Zero. These collaborations align with health professional schools' local service missions, suggesting that embracing Wikipedia as a teaching and learning tool for tomorrow's health professionals may be globally generalizable. A network of health professional schools and students contributing to Wikipedia would accelerate fulfillment of Wikipedia's audacious aspirational goal—providing every single person on the planet free access to the sum of all human knowledge.

Keywords

medical education; medical communication; Wikipedia

Introduction

"Imagine a world in which every single person on the planet is given free access to the sum of all human knowledge. That's what we're doing."[1]

Some might consider this audacious statement a naïve dreamer's fantasy. Yet even at 16 years old, Wikipedia continues to rank amongst the top 10 most heavily trafficked websites on the planet.[2] Clearly this unfulfilled vision is shared by millions. In health and

[1] University of California, San Francisco, School of Medicine, Department of Psychiatry

[*] Email: Amin.Azzam@ucsf.edu

Amin Azzam orcid.org/0000-0002-7024-7450

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health care specifically, one might similarly aspire: "Imagine a world where all people have access to high quality health information clearly written in their own language." Collaboration across communities is necessary to fulfill that vision. Beginning in 2013, my team at the University of California, San Francisco School of Medicine partnered with Wikiproject Medicine, Translators Without Borders, and Wikipedia Zero in offering a fourth-year medical school elective course dedicated exclusively to improving Wikipedia. Here I describe the evolution of that course between 2013 – 2017, and reflect on my experiences embracing Wikipedia as a medical educator. I conclude by speculating on potential implications for the future of health professional education globally.

Background

The majority of medical students use Wikipedia.[3-5] Most health professional faculty actively dissuade students from using or reading Wikipedia, citing lack of editorial control as a risk that the content will be unreliable or inaccurate. But students will continue balking at those faculty admonitions because Wikipedia is written in an understandable tone that novices and learners love. In 2012, I was inspired by the wisdom of one of my medical students to join the Wikipedia movement by creating our course at the University of California, San Francisco (UCSF) School of Medicine. The primary course goal was for students to use information technologies to appraise, assimilate, and apply high-quality evidence to the improvement of Wikipedia articles. We also hoped students' participation would indirectly improve their patient communication abilities. Anticipating that final year students would feel sufficiently knowledgeable to be able to improve Wikipedia, we designed an immersion (full-time) elective month-long course. This adhered to an existing "rotation-style" footprint common amongst US medical schools. Though we have continuously iterated the course through 7 cycles over 4 academic years, we have maintained the overall duration and structure. Similarly, beginning in 2014, faculty at the Sackler School of Medicine in Tel Aviv designed a semester-long course focusing on contributing to Hebrew Wikipedia.[6] As a complementary model to these approaches, beginning in 2014 the UCSF School of Pharmacy introduced Wikipedia editing as a course assignment to an existing required Health Policy course.[7] In all of our courses, all students are expected to select existing Wikipedia health-related articles and improve them as much as feasible, often in collaborative student teams. Rather than edit Wikipedia anonymously, all students are expected to create Wikipedia usernames. Students are also expected to peer review each other's work. Summaries of both the UCSF medical and pharmacy school courses are publicly available on Wikipedia.[7]

Student lessons learned

Near universally, our students have enjoyed giving back specifically to Wikipedia. Most quickly discover the task is more challenging, rigorous, and complex than they initially anticipate. They struggle with finding an appropriate balance between making articles more comprehensive while maintaining ease of comprehension. One of Wikipedia's pillars is to "be bold" in contributing. Embracing this mantra can be challenging - especially for health professional students who are used to perfecting their school assignments before turning them into the critique of faculty members. Finding appropriate reference sources depends on their university's library collections and subscriptions to often closed-access digital materials.

Another pillar of Wikipedia is "no original research," preferring instead to rely on textbooks or secondary literature (i.e. systematic reviews, meta-analyses). Even after students begin utilizing these more appropriate sources, they must vigilantly guard against close paraphrasing. Lastly, we have also found that students can be reticent to delete or rewrite existing content on their selected pages.

Faculty lessons learned

One of the most essential factors in our courses' successes has been the active participation of our local university librarians. Students initially think they already know which sources to use in their Wikipedia editing. Very quickly they realize the value of our librarians' intimate knowledge of locally available resources, and expertise in information seeking & retrieval strategies. As such, in our courses the librarian component has expanded into a longer participatory workshop early in the course footprint. In more recent cycles, we have encouraged students

to work in teams. We have been impressed with the positive power of peer pressure on students' motivation and effort. We have not systematically assessed the optimal size of student teams, but believe it is likely to be no more than four per team, as larger teams permit some students to reduce their individual effort. However, we have also found that students who prefer working alone are certainly capable of doing substantive work when selecting articles they are enthused about.

Student peer review has been an additional essential course component. When timed sufficiently upstream of course completion, this has the added benefit of creating interim course deadlines that externally motivate students. While conducting peer reviews, students enjoy reading their classmates' work and comparing & contrasting their assigned articles. Furthermore, students learn the value of responding to their peers' reviews. This is an essential skill for any scholarship, but also applicable to continuous improvement for any health professional.

Much of the work seeking sources, writing, editing, and reviewing evolving Wikipedia pages can be isolating. Consequently, it is essential to build a culture of community at the beginning of the course or Wikipedia-editing assignment. We have found that regularly spaced face-to-face touchpoint sessions bolster this sense of community amongst students and faculty alike. While regular check in meetings can include remote participants, we have discovered that synchronous participation permits collective wisdom on emerging challenges students face.

Course outcomes

We have previously reported on the first 3 cycles of our course.[8] Notably, none of the edits of the first 28 graduated students (2013 – 2015) were vandalized or reversed, in some cases as long as two years after course completion. This suggests that wiki vandalism—at least in the health related content domain—may be an unsubstantiated or exaggerated fear. In the 2016 – 2017 academic year we offered the course two additional times—Nov-Dec 2016 and March 2017. In the Nov-Dec cycle, 22 students enrolled and graduated. They made 850 edits to 21 Wikipedia articles, adding 35,200 words, 5 images, and 191 references. These pages were viewed 185,107 times during the course. In the March 2017 cycle, 8 students enrolled and graduated. They made 235 edits to 7 Wikipedia articles, adding 12,000 words, 4 images, and 64 references. These pages were viewed 94,161 times during the course.

Between fall 2013 – spring 2017, a total of 80 medical students completed our course. Collectively they edited 65 pages, adding over 93,100 words and 608 references. Astonishingly, these 65 Wikipedia pages were viewed 1,825,057 times during only the students' active editing days. Between the end of students active editing assignments and March 23rd 2017 (an artificial end date), the pages edited by our medical students have been viewed 34,559,299 times. Similarly, between 2014 – 2016, a total of 360 UCSF Pharmacy students completed Wikipedia editing assignments. They made 4,277 edits to 177 medicines-related pages. During only the active editing days of the courses, these pages were viewed 2,310,704 times.

These numbers put into staggering context just how many individuals are reading Wikipedia for health information. All of this impact likely far surpasses the number of patients our students can individually care for. This suggests that preventing health mis-information on Wikipedia prior to direct patient care is a public health strategy with major benefit. Additionally, our students broaden their emerging sense of professional identity as they move from digital native consumers of the internet to future health professional contributors.

Wiki Education Foundation

"Does editing Wikipedia change a student's life?"[9]

The nonprofit Wiki Education Foundation asks the audacious question above. The foundation serves as the bridge between Wikipedia and academia.[10] And while most educators aspire to change their students' lives for the better, Wiki Ed is beginning to aggregate data supporting their claim. Their mission is to partner with faculty at universities in North America to replace existing course assignments with Wikipedia editing. The foundation provides resources to assist faculty, such as print handouts and on line tutorials about editing Wikipedia (e.g. plagiarism, style guidelines, citing sources, etc.). An instructor dashboard makes it easy to assign students specific

articles, track adherence to course expectations, and monitor student contributions. We believe the Wiki Ed suite of tools and resources drastically reduces the entry barrier to embracing Wikipedia editing within all of higher education. Since 2010 and until the time of this writing, over 22,000 students across over 400 universities have edited over 37,000 Wikipedia articles, contributing 24.4 million words to pages viewed over 147 million times.[11] For schools and universities outside of North America, the Wikipedia Education Program can provide similar resources on a country and case specific basis.[12]

Wikiproject Medicine

An additional important partnership within the Wikipedia community is Wikiproject Medicine. All wikiprojects are a collection of individuals dedicated to particular areas of Wikipedia's content. Examples include Wikiproject Mountains,[13] Wikiproject Mathematics,[14] and Wikiproject Physics.[15] Within Wikiproject Medicine, project members are dedicated to "providing the sum of all medical knowledge to all people in their own language".[16] Approximately 250 individuals

WikiProject Medicine assessment statistics

Medicine articles by quality and importance							
Quality	Importance						
	Top	High	Mid	Low	NA	???	Total
FA	10	17	19	19			65
FL		3	2	6			11
FM					42		42
GA	26	31	68	86			211
B	40	352	871	785			2,048
C	16	307	1,946	2,292			4,561
Start		258	3,754	9,138		9	13,159
Stub		6	2,231	7,358		5	9,600
List		22	265	292			579
Book					26		26
Category				2	3,027		3,029
Disambig			1	1	148		150
File					166		166
Portal		1			9		10
Project					43		43
Redirect				3	3,761		3,764
Template					875		875
Assessed	92	997	9,157	19,982	8,125	14	38,367
Draft					28		28
Unassessed						26	26
Total	92	997	9,157	19,982	8,125	40	38,393
WikiWork factors (?)	ω = 148,236				Ω = 5.00		

worklist • log • category

Figure 1. WikiProject Medicine assessment statistics.[20]

are active contributors to Wikiproject Medicine. While some individuals are trained healthcare professionals, many are not. The project has rank ordered the nearly 37,000 health-related English language Wikipedia articles by importance. These rankings incorporate two complementary factors: 1) number of individuals reading the pages, and 2) global burden of disease. Examples of the top 100 most important articles include Diabetes mellitus, Tuberculosis, and Vaccination.[17]

Additionally, all Wikipedia pages are graded for quality using a community created grading rubric. Generally, all articles start as "Stub" quality. As each article grows it progresses from "Stub" to "Start" quality, then "C" quality and "B" quality grades. Some wikiprojects use "A" quality, while others use "Good article." Regardless, the highest quality ranking for all Wikipedia pages is "Featured Article." At the time of this writing, there are 4,926 "Featured Articles" in English Wikipedia.[18] Amongst those, 64 are articles within Wikiproject Medicine.[19]

Wikiproject Medicine's importance scale can be combined with Wikipedia's grading scale to stratify health-related articles by both quality and importance. The resulting table (see Figure 1) – publicly available on Wikiproject Medicine's Wikipedia page[20] – has been extremely helpful when our students select their preferred pages to edit during our courses.

All Wikipedia projects, as well as all Wikipedia pages themselves have associated "talk" pages. This is where Wikipedia article grades are viewable, as well as the location for active discussion between project members, readers, and anyone interested in engaging on the specific Wikipedia topic. Our students engage with Wikiproject Medicine volunteers through the talk pages. As evidenced by the discussions on these talk pages, there remain significant gaps and inconsistencies in the health-related content of Wikipedia. But by partnering with Wikiproject Medicine volunteers and Wikipedians, our students join a movement to improve that content, one article at a time. Given the inherent challenge of trying to dissuade the general public from using Wikipedia for health information, our students' efforts carry disproportionately more impact than any of their other school assignments.

Translators Without Borders, Wikipedia Zero, and offline access

In addition to being one of the most heavily trafficked websites, Wikipedia is also one of the most multilingual parts of the internet.[21] It's intuitive that the quality of health-related information on various language Wikipedias is widely variable. Fortunately, the nonprofit Translators Without Borders (TWB) collaborates with Wikiproject Medicine.[22] After articles on English Wikipedia achieve a "B" quality grade, TWB volunteers then translate the content to non-English Wikipedias. As of the time of this writing, TWB had translated over 1900 articles into 90 different languages.[22] This includes articles that our UCSF medical and pharmacy students have improved.

It is estimated that 6 of 7 people on our planet have access to a mobile phone. In 2014, the International Telecommunication Union reported that "By end 2014, there will be almost as many mobile-cellular subscriptions (6.9 billion) as people on earth…"[23] Unfortunately, data access charges can be prohibitively high for many people in both the developing and developed worlds. Wikipedia Zero attempts to address this barrier. Through partnerships with 68 mobile carriers in 52 countries, approximately 309 million people have access to Wikipedia for free.[24] And in an attempt to address the "digital last mile," Wikiproject Medicine has created an offline app containing all health-related content of Wikipedia.[25] At the time of this writing, the app has been downloaded more than 100,000 times. Versions of the app are available in 10 languages and about 80% of downloads are from low and middle-income countries, despite some versions of the app being larger than 1 gigabyte.

Future/evolving trends

All of the above partnerships have been instrumental in motivating students enrolled in our courses. The author Daniel Pink has suggested people are most motivated when they feel a strong sense of autonomy, mastery and purpose.[26] We believe that health professional students fulfills all three of these domains. Students are given autonomy over which articles to edit; as articles improve students see their emerging mastery; and

contributing to an open encyclopedia provides a meaningful purpose. Amongst our students' other educational experiences, our Wikipedia-editing assignments have been transformative. Establishing partnerships with nontraditional organizations outside of academia has also been transformative to my own sense as a physician-educator. Within medicine, collaboration often begins across medical specialties in multidisciplinary teams. The interprofessional movement – including interprofessional education – is a broader collaboration in which students from two or more professions learn about, from, and with each other to enable effective collaboration.[27] There are even emerging inter-university collaborations to produce educational content across constituent student and faculty communities. For example, in 2013 the Robert Wood Johnson Foundation funded a collaboration across multiple medical schools to develop a core curriculum map for medical education.[28] Yet despite these widening circles of collaboration, initiatives within health professional education to further expand to include Wikipedia and Wikipedians remains a minority or fringe perspective.

Nevertheless, crowdsourcing for the creation of content has tremendous power—many hands do indeed make quick work. For example, CrowdMed is a San Francisco-based start-up company that is amassing the collective wisdom of a global, online medical community to provide patients with a clear path to their diagnosis and cure.[29] Another example is the Human Dx Project. A worldwide effort to map any health problem to its possible diagnoses, the Project aspires to empower anyone, anywhere, with the world's collective medical insight.[30] These initiatives begin challenging the historical role of physicians in society as final arbiters of content expertise. I speculate these forces may require clinicians to re-conceptualize themselves as collaborators in the health of increasingly empowered self-aware "patient-clients".[31-33]

Additionally, movements towards open access, open educational resources, and open scholarship are all gaining momentum.[34-35] One intriguing example in health professional education is Osmosis—a method of learning used by more than 100,000 people around the globe. Osmosis automatically pairs open educational resources, such as Wikipedia content, with formal curricular material, such as faculty-created presentation slides or syllabus materials. Additionally, Osmosis enables learners to create and share open educational resources. At the time of this writing, 3,750 student Osmosis subscribers had created 1.8 million formative questions and flashcards containing over 300,000 images and videos. These items had been answered more than 25 million times.

Our learners have all been born at a time in human history when these forces influence their expectations of information availability, access, and malleability. As such, it is a relatively short leap for them to embrace contributing to Wikipedia as the quintessential crowd-sourced global information resource. If we as their faculty bravely follow their lead, we can provide our students opportunities to genuinely make profound social contributions even before they become future professionals.

Conclusion

In this manuscript, I have outlined our experiences embracing Wikipedia as a teaching and learning tool in health professional education. I have highlighted partnerships with Wikiproject Medicine, the Wiki Education Foundation, Translators Without Borders, and Wikipedia Zero. And I have argued that embracing Wikipedia aligns with the local service missions of health professional schools. Through its truly global service mission, Wikipedia is perhaps the most viable mechanism to provide high quality health information to the world's population in their preferred language, using their preferred tools (mobile phones), and for free. Leveraging current and future health professional students in that effort is a large step towards fulfilling Wikipedia's aspirational vision. Can you imagine a world where all people have access to high quality health information clearly written in their own language?

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