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## Wikipedia in the Spotlight

Wikipedia founder Jimmy “Jimbo” Wales took pride in the success of his experiment but knew the credit should be spread around, as Wikipedia’s entries were written entirely by volunteers. After all, Wikipedia was a wiki, an open-source project aimed at facilitating collaborative development of content.

A flurry of press attention in 2008 and 2009 put the spotlight on Wikipedia’s operations. In March 2008 Wikipedia executive director Sue Gardner was widely quoted as saying, “It’s time for us to grow up a little bit.” Her top priority was to “get the house in order.”<sup>1</sup>

As the largest wiki ever, Wikipedia faced operational questions that no site had faced before: Could the site accommodate a skyrocketing number of participants? Could growth occur if nothing about Wikipedia changed, or would Wales and his board need to initiate actions that would enable more growth?

### The Encyclopedia

Wikipedia was an online encyclopedia that was entirely written and edited through user contributions. It had grown rapidly since its founding in 2001. But was Wikipedia truly an encyclopedia? Most of its contributors and users, when polled, agreed with Wikipedia’s position that it was “the free encyclopedia that anyone can edit.” To those who had been in the reference-book industry decades earlier, however, the answer was less clear.

The first encyclopedia was written in 1728. It was a comprehensive, multivolume general knowledge source. Since then dozens of companies had published scores of editions of this type of reference in print form. These compendiums had a typical form: usually experts in their fields contributed articles while a robust professional review process ensured quality. For most of the twentieth century, *Encyclopædia Britannica* dominated the English-language encyclopedia market.

Britannica’s dominance had eroded recently. When personal computers began to penetrate homes in the early 1990s, the printed encyclopedia faced a market challenge. A multimedia encyclopedia in CD-ROM form, launched by Microsoft under the name Encarta, took the dominant spot in the reference sector. The Internet accelerated the decline, eventually compelling

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<sup>1</sup> Alana Semuels, “Wikipedia Experiencing Growing Pains,” *Seattle Times*, March 17, 2008.

Encarta to move online as well, where it remained the most popular reference site for several years.

Wikipedia surpassed Encarta as the Internet's most popular research site in 2005, a position that it held thereafter.<sup>2</sup> According to Web-traffic monitoring site Alexa.com, for most of 2009 Wikipedia ranked in the top seven or eight most visited Web sites in the world. Moreover, Encarta's market share declined dramatically, and in March 2009 Microsoft announced Encarta's retirement.<sup>3</sup>

Wikipedia was owned and administered by the Wikimedia Foundation, a not-for-profit group set up in mid-2003 to manage the operations behind the Wikipedia Web site and related efforts. The stated goal of the foundation was "to develop and maintain open-content, wiki-based projects and to provide the content of those projects free of charge."<sup>4</sup> The not-for-profit status of the organization was a feature of Wikipedia that Wales and the board had no intention of ever changing, an opinion that the vast majority of contributors heartily seconded. The Wikimedia Foundation was governed by a five-member board. It included Wales and elected representatives from the Wikipedia community.

For many years Wikipedia had only two paid employees, a small office in Florida, and few other regular expenses aside from its servers (more than one hundred in 2005).<sup>5</sup> But the board had voted the next year to expand to accommodate more anticipated growth. In 2007 the foundation moved to new headquarters in San Francisco and hired professional management. In the beginning of 2009 the organization maintained more than three hundred servers worldwide,<sup>6</sup> and twenty-five employees performing a variety of functions.<sup>7</sup>

Wikipedia had never accepted advertising, nor did it sell access to its content. When it was a small operation it had funded itself on donations, which had been more than sufficient to cover expenses.<sup>8</sup> Its attempts to grow had increased its budget into the millions, however, and this meant the organization faced the prospect of raising millions of dollars each year indefinitely. In January 2009 the Wikimedia Foundation announced it had raised \$6.2 million, most of which would go to cover the \$4.6 million annual budget.<sup>9</sup>

## Wikipedia's Origins

The story of Wikipedia's founding was well known. It was an experiment that had gone far better than expected.

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<sup>2</sup> Elizabeth Corcoran, "The Answer Man: Jimmy Wales," *Forbes*, September 5, 2005.

<sup>3</sup> All Encarta Internet sites were to be shuttered by the end of October 2009. Murad Ahmed, "Microsoft Accepts Defeat to Wikipedia and Kills off Encarta," *Times Online*, March 31, 2009.

<sup>4</sup> [http://en.wikipedia.org/wiki/Wikimedia\\_Foundation](http://en.wikipedia.org/wiki/Wikimedia_Foundation).

<sup>5</sup> *Ibid*.

<sup>6</sup> Semuels, "Wikipedia Experiencing Growing Pains."

<sup>7</sup> Giles Hattersley, "Wikipedia Bolts Its Open Door," *Times Online*, February 9, 2009.

<sup>8</sup> Jimmy Wales, private correspondence, August 28, 2006.

<sup>9</sup> Semuels, "Wikipedia Experiencing Growing Pains."

In 2000 Jimbo Wales created a peer-reviewed, closed-content encyclopedia called Nupedia.com and hired Larry Sanger to be its editor. They intended to produce Nupedia in a variant of the traditional peer-review process, but that format eventually proved costly and burdensome. In light of the perception that the experiment was failing, in early 2001 Nupedia was altered to a “wiki” format, which gave editing power to any user with access to the site and would, in principle, speed content development. Wikipedia was the result. Within weeks, Wikipedia became so popular that the Nupedia project was shuttered.

Wikipedia was very successful very quickly; between 2001 and 2004, 450,000 articles were written by Internet contributors on the English-language site. By the summer of 2006 1.3 million articles in English had been published. By the summer of 2009 the number of English entries approached three million. The number of German entries approached one million, and the number of entries in every other language in the top ten—that is, French, Chinese, Polish, Italian, Dutch, Spanish, Portuguese, and Russian—exceeded half a million.<sup>10</sup>

In comparison, the English-language version of *Encyclopædia Britannica* had 120,000 entries in its most comprehensive edition.<sup>11</sup> This comparison cannot be made without criticism, since Wikipedia had suggested that contributors limit articles to 32 Kb—less than 6,000–10,000 words at most—before splitting the article into multiple postings. Other formats could tolerate much longer presentations.

Wikipedia contained many articles that did not differ from those in a printed encyclopedia, such as entries devoted to historical questions or to basic science. It also had many entries for general topics in geography and politics. Yet many Wikipedia entries did not neatly fit into a single category. Some entries discussed the history of famous companies; others were devoted to famous writers or actors; still others contained current events, celebrity biographies, summaries of fictitious novels, or hundreds of thousands of topics considered too obscure for attention in a traditional encyclopedia.

Wikipedia was everything its contributors wanted it to be. If the Wikipedia community thought a topic deserved attention, then it received an entry. Therefore, the size and quality of the entries depended on the level of attention contributors devoted to the topic.

The site also acted as a “reference desk” on many standardized topics, as any encyclopedia would. It was more interactive, however, because it also allowed visitors to submit research questions to Wikipedia volunteers (with the caveat that the site should not be used for students wishing to have other people write their school papers for them).

Wikipedia also acted as a community portal where all site news, updates, and chats were posted. The site also had multitudes of “to-do lists,” or “stubs,” where volunteers posted pages that needed to be categorized, linked, completed, and referenced, ready for any eager contributor.

These features inspired intense loyalty among contributors and many repeat visits by users who liked the site’s accessibility and diverse set of topics. With Wikipedia’s increasing spotlight, it also inspired criticism from outside the community of contributors and users.

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<sup>10</sup> As of July 2009.

<sup>11</sup> Stacy Schiff, “Know it All: Can Wikipedia Conquer Expertise?” *The New Yorker*, July 31, 2006.

In the view of critics, Wikipedia's coverage was subject to the whims of its contributors, which tended to reflect "geek priorities," such as an inordinate interest in all things having to do with *Star Trek*. The article on actor Patrick Stewart, for example, included a lengthy description of the career of Stewart himself. However, in a separate entry one also could find a (fictional) biography of the character he portrayed on the television series *Star Trek: The Next Generation*, Captain Jean-Luc Picard, with scores of links to related details from the series. The entries were written by extremely enthusiastic fans. Who else would have gone to the trouble of entering passages devoted to a fictional character, his crew, his ship, and many related adventures?

By comparison, the July 2009 site for an actual space explorer, John Huchra, Harvard astronomy professor and discoverer of the Great Wall (the second largest super-structure in the universe), had an entry of fewer than one hundred words. The entry also had a link to Huchra's Web site as well as to several other relevant entries on the Great Wall. Users could follow the links and find out more about these topics if they desired.

The site had grown well beyond this particular obsession, but critics argued that it emphasized surprising, amusing, or curious details, as found in popular magazine writing. To a reader with a strong preference for the tone and topic selection found in the traditional printed encyclopedias, this feature produced dissatisfaction.<sup>12</sup>

A number of observers had pointed out that the sites for pop stars Britney Spears and Michael Jackson ranked among the most frequently edited entries on the site in 2006.<sup>13</sup> The attention within Wikipedia was correlated with their status as pop figures whose actions generated controversy and attention in other media.

Wikipedia had one particular feature that critics found especially unsettling: it was never finished. More to the point, it was always changing somewhere. Any entry could change if a contributor thought it needed it. To a critic, this feature undermined the site's authority.

Critics also complained that many entries did not improve quickly enough, noting that only a few articles received a significant amount of attention; most received little attention and therefore improved slowly, if at all.<sup>14</sup> Still others worried that self-interested editing rendered many inaccurate articles about prominent firms.<sup>15</sup>

Even Larry Sanger joined in the criticism. He had disliked Wales's approach, which was part of the reason he no longer worked at Wikipedia after 2002.<sup>16</sup> Said Sanger in a 2009 interview, "The quality of a given Wikipedia article will do a random walk around the highest level of quality permitted by the most persistent and aggressive people who follow an article."<sup>17</sup> Years later Sanger founded Citizendium (The Citizen's Compendium), a new Nupedia edited by experts in their subjects of expertise.<sup>18</sup>

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<sup>12</sup> Roy Rosenzweig, "Can History be Open Source? Wikipedia and the Future of the Past," *Journal of American History* 93, no. 1 (June 2006): 117–146, reprinted at <http://chnm.gmu.edu/resources/essays/d/42> (accessed August 2006).

<sup>13</sup> Marshall Poe, "The Hive," *Atlantic Monthly*, September 2006.

<sup>14</sup> Jonathan Margolis, "Wicked-Pedia! Millions Trust Its Every Word," *Daily Mail*, February 15, 2009.

<sup>15</sup> Katie Hafner, "Seeing Corporate Fingerprints in Wikipedia Edits," *New York Times*, August 8, 2007.

<sup>16</sup> Poe, "The Hive."

<sup>17</sup> Brock Read, "What Does Wikipedia Mean for the Future of Expertise?" *Chronicle of Higher Education*, February 20, 2009.

<sup>18</sup> Stephen Foley, "Is Wikipedia Cracking Up?" *New Zealand Herald*, February 24, 2009.

Wikipedia's contributors and loyalists had developed an array of counterarguments to these criticisms. There was also an active and lively debate within Wikipedia about what types of entries fit with its identity, and about the processes that led to the most ideal outcomes.

## The Open-Source Model and the Wiki

Wikis were often compared to other organizations with collaborative user-generated content, known as open-source organizations. At a broad level, wiki sites shared one major feature with open-source projects: they were collaborative in nature. Upon close examination, however, there were many differences.

Open source is an organizational model that grew around a novel form of intellectual property, specifically a copyright license that made collaborative software easier to produce. There was no single format for the license used by every open-source project; each organization could design one for its own purposes. The most common form was the general purpose license (or GPL). Differences emerged, depending on whether the organizers intended to prohibit or nurture the use of the software code for commercial purposes.<sup>19</sup>

One important model for an open-source project was Linux, a computer operating system. It was developed by Linus Torvald in the early 1990s as a derivative, or "fix," to Unix, a widely used and ever-improving operating system that others had implemented in a variety of distinct ways over two decades. In the Linux community the code was shared, and many programmers contributed additional pieces. By 2009 Torvald and others were formally employed by an organization to which many computer companies made contributions.

Apache was another model of a successful open-source project. It was founded to support and create fixes for the HTTPD Web server written by the National Center for Supercomputing Applications (NCSA). By 2009 more than 65 percent of Web sites in the world were powered by the Apache HTTPD Web server.<sup>20</sup> Apache differed from many other open-source organizations in that participation was restricted. Contributors "earned" the right to access the code by demonstrating technical expertise.

"WikiWiki" is Hawaiian for "quick" or "hurry." The label was applied to user-changeable content because wiki sites can be made available in a quick and uncomplicated way. The first wiki was developed in 1995 by Ward Cunningham, a software engineer from Portland, Oregon. Wikis were first developed and intended for software development. Says Cunningham, "The subject I had in mind was the knowledge necessary to write good computer code, but I realized it would have broader implications. It's a medium that allows people to collaborate more easily than they could in systems that are modeled after the pre-computer world, like e-mail."<sup>21</sup>

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<sup>19</sup> Sandeep Krishnamurthy, "A Managerial Overview of Open Source Software," *Business Horizons*, September–October 2003.

<sup>20</sup> Apache Software Foundation, <http://www.apache.org/foundation/how-it-works.html> (accessed July 2009).

<sup>21</sup> Quoted in Robert Levine, "New Web Sites Seeking Profit in Wiki Model," *New York Times*, September 4, 2006.

By 2009 wikis had been used in many applications. In the case of Wikipedia, the format was applied to the development of multimedia content displayed on the Internet. There were hundreds of other wikis on the Internet differing in focus, design, and profit/nonprofit status.<sup>22</sup>

Wikipedia started with generic wiki software but as it had grown it began operating on its own custom-built software. This accommodated the scale of the site and differing levels of participation. Wikis could be used in a closed work group or without restrictions on the contributors. Wikipedia started with almost no contribution restrictions, and as it grew it developed a few restricted privileges to facilitate administration of the site.

Wikipedia did share one thing with other open-source projects: the use of open-source licensing. Most images and other content in Wikipedia were covered by the GNU free documentation license (GFDL), a variant on the more popular GPL. With the latter, contributions remained the property of their creators, whereas the GFDL license ensured the content would remain freely distributable and reproducible.<sup>23</sup> Copies could be sold commercially, but if produced in larger quantities than the original document or source code had to be made available. The license was designed for manuals, textbooks, and reference materials, in addition to software code documentation. As of 2009 Wikipedia was the largest project using the license.

Evolution of a wiki differed from traditional software production in a number of ways. First, wiki server technology allowed the creation of associative hypertexts with nonlinear navigation structures. Each page contained a series of cross-links to other pages. The reader decided how to navigate through the site. Even if the wiki had a hierarchical navigation structure, this hierarchy was secondary to the nonlinear navigation model embedded in the wiki. Second, contributing to a wiki was easy because the contributor did not need specialized knowledge of programming. Entering and formatting text usually required only a few simple rules; for example, sentences could be formatted into lists by placing a star or dash in front of them.

Wiki functions had a few common characteristics:

- Editing was an important feature of wikis.
- Each wiki article could be linked by association.
- Wikis usually contained history pages, which saved all previous versions or modifications to a page. The history page allowed a user to open a previous version and save that version again, called “rollback.”
- RecentChanges pages provided an overview of recent modifications (usually within a specific timeframe) to wiki pages. This page was produced automatically and could not be changed by users.
- A SandBox page taught new users how to use wikis and acted as a sort of instructional guide.
- Most wikis had a simple search function.

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<sup>22</sup> <http://c2.com/cgi/wiki?WikiEngines> (accessed July 2009).

<sup>23</sup> <http://en.wikipedia.org/wiki/Wikipedia:About> (accessed July 2009).

As with any collaborative open-source project, Wikipedia relied on users to generate suggestions for changes. To understand how that worked in practice, it is important to understand the community that operated Wikipedia, a group that called themselves Wikipedians.

## Consensus among the Community of Wikipedians

In general, any Internet user, whether registered on the site or not, could make an addition, edit, or deletion to an article. By mid-2006 the English version of Wikipedia had more than 200,000 registered users, about 33,000 of whom were considered active volunteers in the editing and creation of articles for the encyclopedia.<sup>24</sup> These 33,000 were responsible for about 70 percent of the work.<sup>25</sup> A smaller number of writers (about 1,000) controlled the bulk of editing on the site. According to Wales, “A lot of people think of Wikipedia as being 10 million people, each adding one sentence. But really the vast majority of work is done by this small core community [of about 1,000].”<sup>26</sup>

Wales was referring to an elite group of “Wikipedians,” who were allowed to delete, restore, and protect pages as well as block users for violating policy. Often these Wikipedians were called “admins,” which is short for administrators.<sup>27</sup> They obtained this status by gaining the trust of other admins through experience editing on the site. In 2008 the number of admins was estimated to be close to 1,500;<sup>28</sup> in a February 2009 interview, Wales said that number had grown to about 3,000.<sup>29</sup>

Content was generated by a combination of dedicated contributors and a diverse group of users. As stated by one Wikipedian who tested a number of articles:

*An outsider makes one edit to add a chunk of information, then insiders make several edits tweaking and reformatting it. In addition, insiders rack up thousands of edits doing things like changing the name of a category across the entire site—the kind of thing only insiders deeply care about. As a result, insiders account for the vast majority of the edits. But it’s the outsiders who provide nearly all of the content.*<sup>30</sup>

Wikipedians were bound by a common desire to explain a topic and to have some authority or control over its presentation on the site. In addition, many contributors liked interacting with each other and felt a bond with others who were committed to the goal of making information accessible to any Internet user. These community members were “strongly compelled to lay it all down when tinkering with the ‘sum of Human knowledge,’”<sup>31</sup> whether author, historian, scientist, teacher, or teenager. The importance of the community aspect of Wikipedia was exemplified through this statement on its Web site:

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<sup>24</sup> Josh Hyatt, “The Wonder of Wikipedia: How to Motivate—and Control—An Army of 30,000 Volunteer Workers,” *Fortune*, June 12, 2006.

<sup>25</sup> Schiff, “Know it All.”

<sup>26</sup> Katie Hafner, “Growing Wikipedia Revises Its ‘Anyone Can Edit’ Policy,” *New York Times*, June 17, 2006.

<sup>27</sup> Schiff, “Know it All.”

<sup>28</sup> Alana Semuels, “Wikipedia’s Tin-Cup Approach Wears Thin,” *Los Angeles Times*, March 10, 2008.

<sup>29</sup> Hattersley, “Wikipedia Bolts Its Open Door.”

<sup>30</sup> Aaron Swartz, “Who Writes Wikipedia?” <http://www.aaronsw.com/weblog/whowriteswikipedia> (accessed October 2006).

<sup>31</sup> [http://meta.wikimedia.org/wiki/The\\_Wikipedia\\_Community](http://meta.wikimedia.org/wiki/The_Wikipedia_Community) (accessed July 2006).

*The Wikipedia Community is personal . . . Wikipedians define themselves within the context of the project through their interests and goals. This brings both benefits and complications—Wikipedia takes advantage of personal qualities like trust, insight, imagination, idiosyncrasy, and empathy which bureaucratic institutions cannot; but it cannot do so without also having some of the downsides, including confusion, bias, mistakes, and hurt feelings. A healthy community doesn't eliminate the problems, but it understands how to deal with them.*<sup>32</sup>

The statement also embodied the essence of Wikipedia: mistakes were anticipated and in due time dealt with by the community. The site was organized in a way that presumed all errors would be corrected given enough eyes. This was a shared assumption among all Wikipedians. Wikipedia was simply following Linus' Law as formulated by Eric Raymond in his open-source essay "The Cathedral and the Bazaar": "Given enough eyeballs, all bugs are shallow."<sup>33</sup>

Critics raised questions about whether that mantra could apply to text as well as it does to code. The ultimate test of good code is whether it works well. What was the ultimate test for a passage of text? There were several different ways to answer that question. Ask a Wikipedian and the answer usually emphasized the editing process; that is, it came back to believing in the power of an open revision process that enabled multiple users to edit any passage.

On Wikipedia's own page about who contributes articles to the site, it reads, "Many users of Wikipedia consult the page history<sup>34</sup> of an article in order to assess the number of people who have contributed to the article. An article can be considered more likely to be accurate when it has been edited by many different people (since most edits make constructive changes, not destructive ones)."<sup>35</sup>

Wales reiterated the idea in his public comments: "I think the day will come in the future when people will look at an article in Britannica and say, 'This was written by one person and reviewed by two or three more? That's not sufficient. I need an article that's been reviewed by hundreds of people.'"<sup>36</sup>

The reliability of an entry was a subject of constant debate. Wikipedia had three main policies in place to encourage the emergence of reliable content from all its contributors. Contributors that violated these policies could be banned indefinitely. Admins also could lock articles from further editing if they judged it necessary.

First, all articles had to be written or edited with a "neutral point of view," representing views fairly and without bias. Conflicting opinions were supposed to be presented alongside one another, not asserted in a way that was meant to be convincing. All significant points of view had to be represented in the article. In Wikipedia speak, this boiled down to the principle that

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<sup>32</sup> Ibid.

<sup>33</sup> See Eric Raymond, "The Cathedral and the Bazaar," *First Monday*, [http://www.firstmonday.org/issues/issue3\\_3/raymond](http://www.firstmonday.org/issues/issue3_3/raymond) (accessed August 2006), Rule No. 8. The law, stated more formally, is: "Given a large enough beta-tester and co-developer base, almost every problem will be characterized quickly and the fix obvious to someone."

<sup>34</sup> All entries have page histories, allowing a reader to trace the history of changes in reverse chronological order.

<sup>35</sup> [http://en.wikipedia.org/wiki/Wikipedia:Who\\_writes\\_Wikipedia](http://en.wikipedia.org/wiki/Wikipedia:Who_writes_Wikipedia) (accessed August 2006).

<sup>36</sup> NPR: Talk of the Nation, "Analysis: Wikipedia, Open Source, and the Future of the Web," transcript, November 2, 2005.

Wikipedians were instructed to “assert facts, including facts about opinions—but do not assert the opinions themselves.”<sup>37</sup> According to Wales:

*If a viewpoint is held by an extremely small (or vastly limited) minority, it does not belong in Wikipedia regardless of whether it is true or not and regardless of whether you can prove it or not.*<sup>38</sup>

Verifiability was the second principle governing entries. Any reader of an article had to be able to check its contents and verify it with a reliable source. Editors had to be able to cite these reliable sources in their articles and provide links if possible. Editors understood that verifiability was not equivalent to truth; the editor was not responsible for determining whether a newspaper article he or she cited was true, as long as the newspaper was a reliable, peer-reviewed source.

Finally, Wikipedians were not permitted to submit original research. All material must have been previously published by a reputable source. Alternatively, a reasonable adult should understand the concept (i.e., “vegetable” does not need to be published by a reliable source to be permitted an article in Wikipedia). This policy was put in place in order to avoid a “novel narrative or historical interpretation” of a subject.<sup>39</sup>

It is one thing to state policies and quite another to do so succinctly. Critics and newcomers to the site found its policies somewhat bewildering. The Wikipedia “Policies and Guidelines” page links to dozens of others, including “General Guidelines,” “Behavioral Guidelines,” “Content Guidelines,” “Style Guidelines,” and “Conventions.”<sup>40</sup>

Enforcing these policies also involved many challenges. Over time the site had adopted a design that made it simple for contributors to monitor each other. Wikipedians could subscribe to follow (or “watchlist”) articles to check if they were changed. “Being very transparent encourages good behavior,” Wales said.<sup>41</sup> Furthermore:

*Everything is very carefully monitored by a core community who is constantly watching the site, constantly discussing, reviewing changes that are coming in . . . if [a user] is something of an outsider to the community, his changes when they come in will be noticed as, oh, well, this is somebody we don’t know and we’ll check it over and if it seems fine, it’ll stand. Otherwise, it can be removed very quickly.*<sup>42</sup>

Enforcing a neutral point of view became the focal point for discussion by those constructing entries in Wikipedia. Many of the back-channel conversations on Wikipedia-dedicated IRC channels<sup>43</sup> concerned whether particular passages reflected this principle. In general, the vast majority of entries settled on approaches that the wide community of contributors agreed to, either because it reflected a consensus or because those with minority opinions got the passage they wanted or because a dissident gave up.

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<sup>37</sup> [http://en.wikipedia.org/wiki/Wikipedia:Neutral\\_point\\_of\\_view](http://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view) (accessed July 2009).

<sup>38</sup> Ibid.

<sup>39</sup> Jimmy Wales, private correspondence, August 28, 2006.

<sup>40</sup> Rosenzweig, “Can History be Open Source?”

<sup>41</sup> Hyatt, “The Wonder of Wikipedia.”

<sup>42</sup> NPR: Talk of the Nation, “Analysis: Wikipedia, Open Source, and the Future of the Web.”

<sup>43</sup> IRC, or Internet relay chat, is the equivalent of a “party line” over a computer network, where people can hold conversations with others, generally with minimal delay.

“Wiki etiquette” ideally governed the determination of consensus. There were three points to it: good faith, civility, and discussion. Good faith encompassed the working assumption of contributors that others were trying to improve the site, not deliberately sabotage it, until evidence suggested otherwise. Civility meant text-based communication was done with respect, not with belittling attacks on each other’s ideas. Finally, there would be civil and good faith efforts to resolve all disputes through discussion before any other means.<sup>44</sup>

In practice, admins frequently removed new entries, after much discussion with other Wikipedians, if they deemed the topic unsuitable for an encyclopedia. These debates were particularly common for biographical entries. Some were simply vanity entries from teenagers trying to enter information about themselves or friends, while others were entries from someone with an interest in, for example, an obscure historical figure or a musical group with a cult following. Admins had to decide if the person was of sufficient “renown” or had achieved “notoriety for their involvement in newsworthy events.”<sup>45</sup>

Consensus did not reign on all entries, however, nor would anyone expect it to among such a large group of contributors. Some disputes continued indefinitely; one side would change a passage and then the other would change it back. When the natural course of editing and discussion did not settle such disputes, contributors could take them to an arbitration committee. Before it reached this committee, it had to pass through a mediation committee.<sup>46</sup> Jimbo Wales tried to emphasize the positive in his public comments:

*Well, one of the things that we do is that we have a very strong neutrality policy that actually works very well. It turns out most people are quite reasonable, even people who come from interest groups. They really understand that you can’t put in a one-sided rant because it won’t survive very long in Wikipedia.*<sup>47</sup>

These statements reflected a broader philosophical principle behind Wikipedia. Wales had been hands-off, preferring to let the community of contributors reach consensus about setting agendas. Contributors and admins defined a neutral point of view in any given instance and resolved disputes between versions. This was no small matter, as it had led to another feature of the site’s culture that outsiders found bewildering: the contributors to Wikipedia largely governed themselves, reaching consensus as often as possible, seemingly not taking direction from anyone.

The harshest critics focused on the lack of a mechanism to assign authority to an expert, calling it democracy trampling expertise, or collaborative mob rule.<sup>48</sup> Wales responded to such critics in an April 2009 interview:

*The system has strengths and weaknesses. The strength is, we don’t do anything randomly, without lots and lots of discussion. The downside is we don’t get anything done unless we actually come to a conclusion.*<sup>49</sup>

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<sup>44</sup> <http://meta.wikimedia.org/wiki/Etiquette>.

<sup>45</sup> Noam Cohen, “Giving the Heave-Ho in an Online Who’s Who,” *New York Times*, October 8, 2006.

<sup>46</sup> Schiff, “Know it All.”

<sup>47</sup> NPR: Talk of the Nation, “Analysis: Wikipedia, Open Source, and the Future of the Web.”

<sup>48</sup> Rosenzweig, “Can History be Open Source?”

<sup>49</sup> Brian Bergstein, “Wikipedia Questions Paths to More Money,” *USA Today*, April 14, 2009.

There was little middle ground on the importance of consensus. Wikipedians celebrated the culture.<sup>50</sup> Wales, the mediation and arbitration committees, and many Wikipedians with admin status took pride in this approach.

## Reliable and Authoritative Information

Questions about reliability and authority had been raised about Wikipedia in the past. The media spotlight seemed to magnify the importance of these questions, especially when the site contained errors.

During the Obama presidential inauguration, for example, Senator Edward Kennedy was taken to the hospital after fainting. Wikipedia reported he was dead when in fact he was not. Wales saw that television reports were uncertain and concluded that the entry should be changed.

*I thought: somebody's jumped the gun here. So I went to edit it out of the page but it was already being used so I couldn't get on there . . . It was extremely frustrating. This was a very high-profile biography on a very high-profile day and it would have been pretty straightforward to have stopped that.*<sup>51</sup>

These questions and concerns were magnified by several well-publicized examples of people submitting factually inaccurate information on Wikipedia that was not corrected in a timely manner. For example, the entry for former Assistant Attorney General John Seigenthaler, Sr. was vandalized, and it went 132 days before it was corrected.<sup>52</sup>

There were also well-publicized examples of people editing passages with the intent of polishing them for self-centered gains. For example, staffers for several members of Congress were caught deleting objectionable material from the site's entries about their bosses.<sup>53</sup>

Wikipedia also fought a never-ending battle with vandals and prank contributors, who inserted profanity or destroyed existing text. For example, at one point the entry for Margaret Thatcher stated that she was a "fictional character." During Bruce Springsteen's Super Bowl concert his biography began with "This guy kind of sucks."<sup>54</sup>

Bots constantly searched the site for the most obvious vandals, and other mechanisms caught the most recent problems. Admins frequently restored text after such incidents.

Perhaps no recent incident had garnered more attention than a widely publicized stunt by Steven Colbert, comedian on the television show *The Colbert Report*. In the summer of 2006 he tried to demonstrate how easily entries on Wikipedia were altered, which cast doubt on their truth. During his broadcast, he altered the entry on elephants and asked viewers to enter facts they

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<sup>50</sup> See the many entries on [http://en.wikipedia.org/wiki/Category:Wikipedia\\_culture](http://en.wikipedia.org/wiki/Category:Wikipedia_culture).

<sup>51</sup> Hattersley, "Wikipedia Bolts Its Open Door."

<sup>52</sup> "Wikipedia Tightens Rules for Posting," *CMP TechWeb*, December 5, 2005.

<sup>53</sup> Aaron Blake, "Wikipedia Site Attempts to Make Politics Healthier," *The Hill*, <http://www.thehill.com/thehill/export/TheHill/News/Campaign/071106.html> (accessed July 2006).

<sup>54</sup> Hattersley, "Wikipedia Bolts Its Open Door."

knew to be inaccurate. Wikipedia had to lock twenty sites related to elephants and also locked Colbert's user account.

Not all the news was bad. In a widely read article in the journal *Nature*, a reporter interviewed experts to ascertain the accuracy of some scientific entries. The article reported 162 errors in a group of scientific articles on Wikipedia and a comparable number (123) in the most recent edition of *Encyclopædia Britannica*. Hence, on average, Wikipedia articles had four mistakes, while Britannica articles had three.<sup>55</sup>

Britannica objected strongly to the article, claiming it exaggerated errors in Britannica and focused on the wrong features. The company's response read, in part, "Britannica has never claimed to be error-free. We have a reputation not for unattainable perfection but for strong scholarship, sound judgment, and disciplined editorial review."<sup>56</sup> In contrast, Wales was concerned that simple contests fostered superficial impressions, which was a double-edged sword. He thought the article had portrayed Wikipedia's accuracy in the areas where they were strongest: scientific and technical topics. The site might have fared worse in areas where the community of contributors was small and the articles were undergoing change at a slower rate.<sup>57</sup>

The test also did not emphasize the speed for updating articles. "You could go and write an article on someone you didn't like," explains Wikipedia press team member Mark Pellegrini. "But it's probable that someone else will come along and modify or revert the edits you made. [For example,] the George W. Bush entry is edited hundreds of times per day."<sup>58</sup> In August 2005, when one self-appointed expert amended the entry on President Bush to include "George W. Bush is the worst president to sleep in the White House," the post lasted only six minutes.<sup>59</sup>

Chris Anderson, editor-in-chief of *Wired Magazine*, summed up the positive views of these incidents with the following comment:

*You will certainly find examples of really terrible entries, just completely biased or ignorant or wrong. And, you know, rather than sort of throw your hands up and say, "See? You know, Wikipedia doesn't work," what's delightful is that often people improve them. When they see a bad entry, they don't dismiss Wikipedia, they improve the entry. And that sort of—you know, it's almost counterintuitive that most people when given a resource like Wikipedia aim to improve it, not to destroy it, which sort of runs counter to our notion that vandals will run riot.*<sup>60</sup>

Yet many new users had arrived after the media spotlight had focused on Wikipedia. Critics wondered if every Web user of such a popular site understood the subtleties of Wikipedia's origins or how it functioned. That raised concerns that other users would employ Wikipedia in inappropriate ways. Many Wikipedians also were well aware of the pros and cons of the wiki model and made an effort to help users understand its strengths and weaknesses (**Exhibit 1**).

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<sup>55</sup> Jim Giles, "Internet Encyclopedias Go Head to Head," *Nature*, December 15, 2005, 900–901.

<sup>56</sup> Quoted in Schiff, "Know it All."

<sup>57</sup> Jimmy Wales, private communication, August 28, 2006.

<sup>58</sup> "Wikipedia: Friend or Foe on the Net?" *PR Week*, February 24, 2006.

<sup>59</sup> Corcoran, "The Answer Man: Jimmy Wales."

<sup>60</sup> NPR: Talk of the Nation, "Analysis: Wikipedia, Open Source, and the Future of the Web."

As it gained popularity, Wikipedia faced questions about its core policies, especially those encouraging a neutral point of view. Wikipedia could not escape an escalating edit war between opposing views on some topics. Religious issues were particularly subject to endless editing and re-editing by contributors with different views. For example, the entries for Jesus, Islam, Christianity, and Pope Benedict XVI all received hundreds of edits a week, ranking them among the top twenty edited entries.<sup>61</sup> Other topics in the top twenty included those on political leaders, such as President George W. Bush, John Kerry, and Bill Clinton. Similar issues surrounded the entries regarding current international conflicts, such as the Israeli-Palestinian conflict. Historically controversial topics also received many edits, such as the description of the Armenian genocide or World War II, as well as the biography of Adolf Hitler.<sup>62</sup>

Could a neutral point of view ever exist on any of these topics? Wikipedians pointed to the triumph of civility on even the most controversial topics, arguing that the results displayed a more neutral view than any printed entry. In comparison with a traditional encyclopedia, this process took multiple views into account, achieving something the traditional encyclopedias did not do as well by relying on a single author.

Related issues motivated several proactive steps in the Wikipedia community. Among them, admins began requesting that contributors add more references to notable sources outside Wikipedia, avoiding blogs, personal Web sites, MySpace, and Facebook.<sup>63</sup> These bolstered the credibility of claims within articles and gave readers the option to search for more opinions. When such verification was not readily available on controversial articles, some admins began to designate controversial articles as under dispute or in need of further editing or verification.

In a few cases, some particularly contentious articles became locked frequently, slowing down the rapid revise and revert cycle between opposing sides. Experienced Wikipedians generally did not prefer this approach; it was a sign that good faith and civility had broken down.

Researchers and a broad array of contributors began to introduce tools to help judge the accuracy of the information in the articles. Wikidashboard, the brainchild of Ed Chi, a senior research scientist at the Palo Alto Research Center, showed users how many times each subject page had been edited and which editors had contributed the most to a page.<sup>64</sup> Virgil Griffith, a grad student at Cal Tech, developed the WikiScanner, which identified the organization that owned the IP addresses of anonymous Wikipedia editors, thus exposing instances of self-aggrandizing page editing.<sup>65</sup> Luca de Alfaro and colleagues at the University of California at Santa Cruz developed a color-coded scheme that overlays on entries; the different colors indicate whether the information is doubtful or from a trusted source.<sup>66</sup> In addition, Firefox users can add on the Smarter Wikipedia feature, which displays articles related to the one the user is reading at the moment.<sup>67</sup>

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<sup>61</sup> Poe, "The Hive."

<sup>62</sup> Schiff, "Know it All."

<sup>63</sup> Gordon Crovitz, "Wikipedia's Old-Fashioned Revolution," *Wall Street Journal*, April 6, 2009.

<sup>64</sup> Erica Naone, "Who's Messing with Wikipedia?" *Technology Review*, February 6, 2009; Rosalie Marshall, "Wikipedia Editing Made Transparent," February 9, 2009, <http://www.v3.co.uk/vnunet/news/2236090/wikipedia-editing-given> (accessed July 2009).

<sup>65</sup> <http://wikiscanner.virgil.gr>.

<sup>66</sup> Brian Bergstein, "New Online Tool Unmasks Wikipedia Edits," *International Herald Tribune*, August 15, 2007.

<sup>67</sup> Kevin Purdy, "Smarter Wikipedia Adds Relevant Links to Wikipedia," February 25, 2009, <http://lifehacker.com/5160121/smarter-wikipedia-adds-relevant-links-to-wikipedia> (accessed July 2009).

Wales had further waded into this debate with a radical proposal after the Kennedy incident. He proposed that biographies for controversial living subjects be mediated by admins.<sup>68</sup> Revisions by lesser known users—and particularly anonymous users—would be “flagged,” to be approved later by a moderator, usually an admin.<sup>69</sup>

## Managing the Virtuous Cycle

Wikipedia’s success depended on the participation and growth of a collaborative community. Why did contributors become involved in such collaboration?

There were numerous reasons contributors participated in writing, editing, and revising entries, including a fundamental tenet of the open-source movement: a belief in the power of “many eyeballs” for the accumulation and presentation of knowledge.<sup>70</sup> Many Wikipedians also thrived on the challenge of translating complex topics into accessible material. Still others thrived on making the agenda for the topic, as well as deciding what areas were emphasized. Many contributors thrived on the transparent process performed in an extremely flexible setting, bringing them into contact with a diverse group of topics and other collaborators.<sup>71</sup>

However, mere personal satisfaction does not describe how Wikipedia sustained its success. Success on one project usually shaped success on another. This continual success involved a virtuous cycle and could be described as the process that kept Wikipedia growing over time.

A healthy virtuous cycle is one that reinforces itself. It arises as improvements are made. A prototype is developed and submitted to users (reviewers). The users find errors in the prototype, improve upon it, and return it for resubmission to the owner of the project or to a newly generated next user. At that point the person repurposes the project to the wider audience. This leads to more attention, which leads to further improvements and edits, which generate more users to edit and improve the project, and so on.

This editing and revising did not take place in an environment lacking human spirit, humor, or foibles. A satisfying collaborative process has a way of generating bonds that go beyond mere familiarity with each other’s writing style. Wikipedians often struck up friendships and developed camaraderie and mutual respect. This bond could carry over into other projects on other passages, migrating to new projects and spawning development.

Those bonds of friendship could be quite strong, surviving the inevitable frustrations of editing a never-ending project. Those who edit are often passionate about their topic, striving for a better-than-ever-before, defect-free creation. Aspirations for perfection often clashed with the reality of continuing improvement. Yet because of the virtuous cycle, authors of the original text enjoyed the improvements to their original work and the back-and-forth process of generating entries.

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<sup>68</sup> Hattersley, “Wikipedia Bolts Its Open Door.”

<sup>69</sup> Juliet Grant, “Wikipedia Proposes Moderator-Approved Editing,” *Edinburgh Journal*, March 4, 2009.

<sup>70</sup> For elaboration of these principles, see Raymond, “The Cathedral and the Bazaar.”

<sup>71</sup> See Anja Ebersbach, Markus Glaser, and Richard Heigl, *Wiki: Web Collaboration* (Berlin; New York: Springer, 2006), ch. 1.

The virtuous cycle puzzled observers familiar with the operations behind the printed encyclopedia. The editor-in-chief and staff provided a guiding hand in that process, whereas there was no single person who took on that role in Wikipedia. A guiding hand was there by consensus, and thus was shared by many Wikipedians. Wales had special status, but he generally did not use it often on specific entries. Outsiders found this feature frustrating, as it seemed to assign authority to any single individual who self-selected the role, irrespective of whether he or she had sufficient expertise.

No open-source project had managed a community as large as Wikipedia's, so clearly something had gone well. Yet there were new challenges inherent in the site's ever-increasing size. Successful growth depended on the cycle operating in the future as it had in the past. Such operation depended on retaining contributors who wanted to take on the guiding hand role and attracting new contributors as well.

Would the guiding hand continue to emerge as Wikipedia grew larger? New contributors were interested in new topics and that would generate new issues. How could new users with good intentions learn from the experience of others?

## **Growth, Competition, and the Future**

Perhaps no area of Wikipedia produced more misunderstanding with outsiders than the nature of competition with alleged rivals. While it was undeniable that Internet users compared Wikipedia to an array of other sites that vied for attention, it was unclear whether this competition had much influence on most Wikipedians' behavior.

Nobody in Wikipedia focused on increasing market share, as in a profit-oriented site. The site had already met any reasonable pragmatic goal, far exceeded any number of visitors needed to help convince contributors that their efforts would be read.

Wikipedia also had the fortune of good timing. It had no marketing strategy to draw traffic when it was founded, but the rise of Google had helped tremendously. Google displayed results from a keyword search in the order of page rank. If a search matched an entry in Wikipedia, then it naturally received a high ranking (due to Wikipedia's many links). By 2009 it could be taken for granted that Wikipedia's entries would display first or very high in the list of Google's results. In short, Wikipedia received easily what many other sites only got with more effort and cost.

Wikipedia also differed from other sites because it did not accept advertising. Hence, the usual logic for a profit-oriented Internet site did not apply; there was no need or desire to generate extra revenue, so the question seemed irrelevant to Wikipedians. What would advertising do to the enthusiasm of the core base of Wikipedians? It would certainly hurt it. Did the site have enough resources to accomplish its primary missions? Yes, it did. Accepting advertising would damage what had been accomplished and what might be accomplished in the future, only to generate revenue for which the site had no immediate need.

Wikipedia's phenomenal success also made it indifferent to other wikis. Did Wikipedians care that other startups were trying to profit using the wiki model? Not especially. Wikipedia was an encyclopedia, and that left plenty of room for other topics and subjects.<sup>72</sup>

## Moving Forward

Wikipedia had become a focal point for a substantial community of contributors and users, and that status would not disappear any time soon. This gave the Wikimedia Foundation a great deal of freedom to pursue a range of ambitions.

By 2004 Wikipedia had launched several of what it called "sister projects." This included—in English and many different languages, depending on the age of the project and the size of the contributing community—separate wikis for species classification, a dictionary, language translation, textbook contents, quotes, news sources, and images and sounds.<sup>73</sup>

The foundation also began initiating projects to raise money for itself. In a great irony, Wikipedia made a deal with Bertelsmann AG to release a one-volume printed encyclopedia which, at 992 pages, would contain the site's 50,000 most popular articles (after a bit of fact checking).<sup>74</sup> Another company, Lightning Source, was retained to produce print-on-demand encyclopedias for any user in French, Italian, Spanish, Polish, Dutch, Portuguese, and English.<sup>75</sup>

The foundation now faced questions about its priorities for the future. What did the organization need to do in order to, as Sue Gardner said, "grow up a little bit"?

The answers were not straightforward. Existing contributors did not want the community expansion to remove features they found most enjoyable. At the same time, the existing community had to find quick and easy ways to welcome new users. How should the community train new contributors in wiki etiquette and allow them to contribute in new ways, accommodating scores of languages and cultural norms for collaboration?

A virtual community of this scale raised novel questions. What did Wikipedia's board need to invent anew for a virtual organization of this size? What type of money-making activities could generate sufficient revenue while remaining consistent with the mission of the organization? Other questions were quite basic; for example, what was the role for nonvirtual meetings or conventions? How often should conventions occur and where should the gatherings occur?

<sup>72</sup> Robert Levine, "New Web Sites Seeking Profit in Wiki Model," *New York Times*, September 4, 2006.

<sup>73</sup> See Wikimedia projects, [http://en.wikipedia.org/wiki/Wikimedia\\_Foundation](http://en.wikipedia.org/wiki/Wikimedia_Foundation) (accessed August 2006).

<sup>74</sup> Carolyn Said, "Wikipedia Planning to Roll out Print Version," *San Francisco Chronicle*, April 24, 2008.

<sup>75</sup> Victoria Gallagher, "Print Your Own Wikipedia Launched," February 24, 2009, <http://www.thebookseller.com/news/78239-print-your-own-wikipedia-launched.html.rss> (accessed July 2009).



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## Exhibit 1: Using Wikipedia as a Research Tool<sup>76</sup>

As a wiki, articles are never complete. They are continually edited and improved over time. In general, this results in an upward trend of quality and a growing consensus over a fair and balanced representation of information.

Users should be aware that not all articles are of encyclopedic quality from the start: they may contain false or debatable information. Indeed, many articles start their lives as partisan; and, after a long process of discussion, debate, and argument, they gradually take on a neutral point of view reached through consensus. Others may, for a while, become caught up in a heavily unbalanced viewpoint which can take some time—months perhaps—to achieve better balanced coverage of their subject. In part, this is because editors often contribute content in which they have a particular interest and do not attempt to make each article that they edit comprehensive. However, eventually, additional editors expand and contribute to articles and strive to achieve balanced and comprehensive coverage. In addition, Wikipedia operates a number of internal resolution processes that can assist when editors disagree on content and approach. Usually, the editors eventually reach a consensus on ways to improve the article.

The *ideal* Wikipedia article is well-written, balanced, neutral, and encyclopedic, containing comprehensive, notable, verifiable knowledge. An increasing number of articles reach this standard over time, and many already have. Our best articles are called Featured Articles (and display a small star in the upper right corner of the article), and our second best tier of articles are designated Good Articles. However, this is a process and can take months or years to be achieved, as each user adds their contribution in turn. Some articles contain statements which have not yet been fully cited. Others will later be augmented with new sections. Some information will be considered by later contributors to be insufficiently founded and, therefore, may be removed or expounded.

While the overall trend is toward improvement, it is important to use Wikipedia carefully if it is intended to be used as a research source, since individual articles will, by their nature, vary in quality and maturity. Guidelines and information pages are available to help users and researchers do this effectively, as is an article that summarizes third-party studies and assessments of the reliability of Wikipedia.

### STRENGTHS, WEAKNESSES, AND ARTICLE QUALITY IN WIKIPEDIA

Wikipedia's greatest strengths, weaknesses, and differences all arise because it is open to anyone, it has a large contributor base, and its articles are written by consensus, according to editorial guidelines and policies.

- Wikipedia is *open to a large contributor base*, drawing a large number of editors from diverse backgrounds. This allows Wikipedia to significantly reduce regional and cultural bias found in many other publications, and makes it very difficult for any group to censor and impose bias. A large, diverse editor base also provides access and breadth on subject matter that is otherwise inaccessible or little documented. A large number of editors contributing at any moment also means that Wikipedia can produce excellent encyclopedic articles and resources covering newsworthy events within hours or days of their occurrence. It also means that like any publication, Wikipedia may reflect the

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<sup>76</sup> [http://en.wikipedia.org/wiki/About\\_Wikipedia](http://en.wikipedia.org/wiki/About_Wikipedia) (accessed July 2009).

cultural, age, socio-economic, and other biases of its contributors. There is no systematic process to make sure that “obviously important” topics are written about, so Wikipedia may contain unexpected oversights and omissions. While most articles may be altered by anyone, in practice editing will be performed by a certain demographic (younger rather than older, male rather than female, rich enough to afford a computer rather than poor, et cetera) and may, therefore, show some bias. Some topics may not be covered well, while others may be covered in great depth.

- Allowing *anyone to edit* Wikipedia means that it is more easily vandalized or susceptible to unchecked information, which requires removal. While blatant vandalism is usually easily spotted and rapidly corrected, Wikipedia is more subject to subtle viewpoint promotion than a typical reference work. However, bias that would be unchallenged in a traditional reference work is likely to be ultimately challenged or considered on Wikipedia. While Wikipedia articles generally attain a good standard after editing, it is important to note that fledgling articles and those monitored less well may be susceptible to vandalism and insertion of false information. Wikipedia’s radical openness also means that any given article may be, at any given moment, in a bad state, such as in the middle of a large edit, or a controversial rewrite. Many contributors do not yet comply fully with key policies, or may add information without citable sources. Wikipedia’s open approach tremendously increases the chances that any particular factual error or misleading statement will be relatively promptly corrected. Numerous editors at any given time are monitoring recent changes and edits to articles on their watchlist.
- Wikipedia is *written by open and transparent consensus*—an approach that has its pros and cons. Censorship or imposing “official” points of view is extremely difficult to achieve and usually fails after a time. Eventually for most articles, all notable views become fairly described and a neutral point of view reached. In reality, the process of reaching consensus may be long and drawn-out, with articles fluid or changeable for a long time while they find their “neutral approach” that all sides can agree on. Reaching neutrality is occasionally made harder by extreme-viewpoint contributors. Wikipedia operates a full editorial dispute resolution process, one that allows time for discussion and resolution in depth, but one that also permits disagreements to last for months before poor-quality or biased edits are removed.

That said, articles and subject areas sometimes suffer from significant omissions, and while misinformation and vandalism are usually corrected quickly, this does not always happen. (See for example this incident in which a person inserted a fake biography linking a prominent journalist to the Kennedy assassinations and Soviet Russia as a joke on a co-worker which went undetected for four months, saying afterwards he “didn’t know Wikipedia was used as a serious reference tool.”) Therefore, a common conclusion is that it is a valuable resource and provides a good reference point on its subjects.

The MediaWiki software that runs Wikipedia retains a history of all edits and changes, thus information added to Wikipedia never “vanishes.” Discussion pages are an important resource on contentious topics. Therefore, serious researchers can often find a wide range of vigorously or thoughtfully advocated viewpoints not present in the consensus article. Like any source, information should be checked. A 2005 editorial by a BBC technology writer comments that these debates are probably symptomatic of new cultural learnings that are happening across all sources of information (including search engines and the media), namely “a better sense of how to evaluate information sources.”