

**Wikipedia and Scholarpedia: A Comparative Case Study and
Its Implications for Information Literacy**

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Abstract

The free online Wikipedia receives increasing attention from academic librarians; however, its counterpart Scholarpedia seems neglected. This case study selected two articles bearing the same title Intentionality from Scholarpedia and Wikipedia and brought them under scrutiny of their microstructure and macrostructure. Both microstructure and macrostructure analysis indicated that the addressed readership of the two encyclopedic articles is understandably different in terms of readability and content. The comparative case study concluded that both online, free encyclopedias provide academic librarians with pedagogical instruments to help students engage in authentic knowledge construction.

Keywords: Wikipedia, Scholarpedia, microstructure, macrostructure, information literacy, instructional design, readability, constructivism, open pedagogy

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Introduction

Although Wikipedia is still subject to vandalism and fake information, academic librarians in general have started to harness the popularity of Wikipedia in various aspects of librarianship. They defended Wikipedia as open sources of knowledge (Murley, 2008; McCook, 2014; Scholz, 2016); incorporated Wikipedia into library information literacy instruction and public services as a pedagogical tool (Arnett and Forrestal, 2012; Choolhun, 2009; Dowell & Bridges, 2019, East, 2010; Gunnels & Sisson 2009); and took advantage of Wikipedia to increase the discoverability of library resources (Elder, Westbrook, & Reilly, 2012). Librarians, together with students and scholars, are considered as common but cautionary user groups of Wikipedia information (Okoli, Mesgari, Mehdi, Nielsen, & Lanamäki, 2014).

The counterpart of Wikipedia is Scholarpedia. Scholarpedia was created in 2006 by Dr. Eugene M. Izhikevich, a Senior Fellow in Theoretical Neurobiology at The Neurosciences Institute in San Diego, California. Empowered by the same program MediaWiki, Scholarpedia is a free, online, open-access encyclopedia, but peer-reviewed by experts in sciences, such as astrophysics, dynamical systems, computational neuroscience, computational intelligence, and physics (Colbert-Lewis, 2010). Each authored article in Scholarpedia is archived in a journal that bears an International Standard Serial Number (1941-6016) hence, Scholarpedia owns the equal position with other referred journals as creditable and citable academic source (“Wouldn’t You Like to Know?” [Editorial], 2008). In contrast to the soaring reputation of Wikipedia, Scholarpedia receives little public acknowledgement in the academic librarians’ community. Scholarpedia and Wikipedia coming together as research targets have not

been widely discussed at all in the literature of Library and Information Science. Therefore, to enrich the literature and raise academic librarians' attention to Scholarpedia, this case study compares Scholarpedia and Wikipedia through the evaluation of two selected articles under the same title. It is hoped that the variations between sampled resources could provide insights into academic librarians' work practice in information literacy.

Literature Review

Since its birth in 2001 Wikipedia has been established as a target in comparison with traditional, well-respected, creditable encyclopedias that carry historical, scholarly values and reputation (Giles, 2005; Messner & DiStaso, 2013; Perovic, 2011; Rector, 2008); emerging online databases with restricted access (Pender et.al, 2008; Rajagopalan et al., 2011; Thewall& Sud, 2018); or other resources that provide authoritative professional information (Kräenbring, et al., 2014). Without question, indicators canonized in and extracted from traditional, or emerging but authenticated resources, such as completeness, reliability, and accuracy of content, became a matter of concern in most of these comparative investigations. Overall, these studies produced varied results in terms of the knowledge disciplines involved. In some areas, Wikipedia and professionally-written resources demonstrated matching values, but in other areas, they lost the battle to each other.

In the past decade, a number of studies have been conducted regarding Wikipedia and Scholarpedia. Both Scholarpedia and Wikipedia are emerging, free, online encyclopedias. Wikipedia is featured by collectively but randomly creating and editing. Scholarpedia is safeguarded by a panel of editors with credentials where each article has

to go through the peer-review process. Therefore, it is fairly feasible to inquire whether or not the human effort originated from a big mass of Wikipedia editors will generate the quality results matching up to that by a few experts in Scholarpedia. Ouyang (2014) extracted 100 articles from Scholarpedia and Wikipedia and compared human involvement and the quality outcomes of editorship. The results in this study revealed that “the more experienced collaborative group in Scholarpedia have a much higher efficiency in making contributions of good quality than the groups in Wikipedia” (p. 105). In other words, producing the same amount of article quality as Scholarpedia requires a larger editorial effort on the Wikipedia side.

In addition to the comparison focusing on the editorship model and the quality of articles, sources of references in Scholarpedia and Wikipedia came into researchers’ view, as well. Stankus & Spiegel (2010a) compared books cited from 47 entries’ reference lists in brain and behavioral science from Wikipedia and Scholarpedia. The results showed both encyclopedias present impressive citation of both books from reputable publishers. Scholarpedia authors and editors tend to cite more university presses or more old books to trace the development of the concerned matter to demonstrate a scholarly understanding, while Wikipedia authors and editors include more books references to beginning undergraduates or college-educated laypersons. In the continued study that investigated cited journals in the same sample entries, Stankus & Spiegel (2010b) showed that, although both encyclopedias cite reputable scholarly and professional journals, Scholarpedia had higher number of cited journals than Wikipedia. Meanwhile, in most of the investigated disciplines, Scholarpedia authors and editors gave more and stronger preference in citing articles from the most highly ranked journals.

Stankus & Spiegel (2010a) noted that their studies were propelled by the observation that no articles about Scholarpedia had been published in journals indexed in Library and Information Science, in spite of its promising development for academic librarians (p. 147). Ten years have already passed since Stankus & Spiegel accomplished their prominent studies. However, the situation has not been significantly changed. Almost no published research from the academic librarians' community has been added to the literature regarding Scholarpedia and Wikipedia. Snyder (2013) notes that "Librarians, as public guides to the information highway, need to understand the types of resources available to the public online, and need to understand the pros and cons of these resources, to better assist their patrons in becoming information literate" (p. 156). Therefore, there is a natural, crucial call for continued research effort from academic librarians to constructively engage both Scholarpedia and Wikipedia in the concerning aspects of librarianship to increase and enhance the understanding of the dynamics of both resources.

The existing, comparative studies that analyzed Scholarpedia and Wikipedia articles gave more attention to the extraction and utilization of a considerably large number of samples. Such an approach has achieved substantial success in addressing the overall quality of content of both encyclopedias. At the same time, it leaves some room for a methodological possibility that adopts case studies to compare both resources based on a limited, selected number of samples. Such in-depth, thorough appraisal of both selected samples will add ingredients that assist academic librarians in gaining and exercising independent judgment in their professional utilization and dissemination of both resources, particularly when Wikipedia and other professionally-written resources

like Scholarpedia are incorporated into information literacy classes as part of a creative instructional design. Thus, this research adopted case study as the method in an attempt to provide an in-depth analysis of two sample articles from both resources. Specifically speaking, this research focused on the question of how two articles with the same title are approached differently by Scholarpedia and Wikipedia in their own individual managing models, and what implications for the practicing of information literacy can be drawn from the results of such a comparison.

Article Selection

The title term initially chosen for this study was one of the buzzwords: “Machine Learning.” The researchers assumed that there was a large probability that articles entitled “Machine Learning” had been created in both online encyclopedias since Wikipedia has a comprehensive coverage of universal knowledge and Scholarpedia has a focus on computational sciences. However, a search of this term in Scholarpedia did not bring out the exact entry as the researchers expected. Only Wikipedia had one article on “Machine Learning.” Therefore, the researchers needed to identify another term.

On the result list in Scholarpedia, “Intentionality” came to researchers’ view, appearing as a more proper term because of its ambivalent, multidisciplinary outlook. The search for “Intentionality” was performed in both encyclopedias and two articles, “Intentionality” (Scholarpedia) and “Intentionality” (Wikipedia), were selected as research samples. Both articles were copied and pasted in Microsoft Word on June 9, 2020. Due to the dynamic nature of Wikipedia, any revision added after that recorded date was not taken into the consideration in the text analysis in this comparative case study. For the purpose of convenience and differentiation, these two articles thereafter are

refereed as Scholarpedia Intentionality and Wikipedia Intentionality.

Comparison Framework

Comparing Scholarpedia Intentionality and Wikipedia Intentionality in nature is the analysis of two texts. Therefore, microstructure and macrostructure in text analysis were adopted as the comparison framework to conduct this research. There are three basic text structures commonly known in text analysis: microstructure, macrostructure, and superstructure (Sanders & Schiperoord, 2006, p. 387). These three levels of structures were proposed by Teun A. van Dijk, an internationally renowned Dutch scholar in text analysis, in analyzing news articles in 1970s, and later adopted and interpreted by linguists as a framework to study the discourse of various writings in existing and emerging research fields.

Microstructure examines lexical-grammar level of the concerned articles and deals with the local structure of words, clauses, and sentences of text. This leads to counting occurrences, calculating syllables, and determining grammar complexity, lexical diversity, or readability. In contrast to microstructure, macrostructure basically points to the analysis of logics and relationships among text blocks that provides a conceptual meaning of organizational structure or abstract representation. Analysis of both microstructure and macrostructure helps to gain a better understanding of a text by revealing detailed information between text units and the overall organization structure (Olagunju, 2019). Superstructure is assigned to describe a story, a narrative, or a plot of text. Van Dijk and Kintsch (1983) noted that superstructure “provides a kind of overall functional syntax for the semantic macrostructure” (p. 242). Superstructure is also intimately associated with narrative writing, such as novels and speeches. Considering

the genre of the selected encyclopedic articles and the purpose of this comparative study, superstructure was not taken into consideration to compare these two articles. Therefore, both microstructure and macrostructure were selected as the comparison framework.

Text Preparation and Analysis Tool Selection

To prepare text corpora for microstructure analysis, irrelevant information was removed from both articles, including table of contents, references, see also, external links, and categories. Then the remaining texts, including titles, headings, and main bodies were copied and pasted into separate Notepads. By so doing, two Word files were converted into pure text files, which helped filter format tags and styles for further analysis. Various free web-based text analysis tools, such as Voyant (available at <https://voyant-tools.org/>), have been examined to identify one proper text analysis instrument. Irrespective of the fact that some tools offer appealing text visualization, including word clouds, charts, and graphics, Text Analyzer (available at <http://www.online-utility.org/>) was chosen because it not only provides lexical analysis, but also includes comprehensive calculations of text readability by using a variety of computational models.

Microstructure

Words, Syllables and Sentences

As is shown in Table One, Scholarpedia Intentionality is comprised of 16,140 numbers of characters, 2,916 numbers of words, and 121 numbers of sentences; Wikipedia Intentionality constitutes 11,266 numbers of characters, 2,069 numbers of words, and 108 numbers of sentences. Therefore, Scholarpedia Intentionality demonstrates considerably longer text with more involvement of characters, words, and

sentences. In terms of the average number of syllables per word, Scholarpedia Intentionality is slightly lower than that of Wikipedia Intentionality as is indicated by the ratio of 1.89/1.90. However, in terms of average number of words per sentence, Scholarpedia Intentionality surpasses Wikipedia Intentionality with a ratio of 24.10/19.16, demonstrating the tendency of using longer sentences to compose the writing.

Table One. *Readability Calculations*

| | Wikipedia Intentionality | Scholarpedia Intentionality |
|---|--------------------------|-----------------------------|
| Number of characters (without spaces) | 11,266.00 | 16,140.00 |
| Number of words | 2,069.00 | 2,916.00 |
| Number of sentences | 108.00 | 121.00 |
| Average number of characters per word | 5.45 | 5.53 |
| Average of number of syllables per word | 1.90 | 1.89 |
| Average number of words per sentence | 19.16 | 24.10 |
| Gunning Fog Index | 16.50 | 18.41 |
| Flesch Reading Ease | 26.57 | 22.08 |
| Coleman Liau Index | 14.71 | 15.56 |
| Flesch Kincaid Grade Level | 14.31 | 16.17 |
| ARI (Automated Readability Index) | 13.80 | 16.69 |
| SMOG | 15.16 | 16.72 |
| Number of sentences suggested for improvement | 33 | 37 |

It is interesting to note that, if the title word “intentionality” and its variation “intentional,” are excluded from further analysis, each article embraces its own “favorite” words (See Table Two). The occurrences of top ten words exhibit the preference of vocabularies from article contributors, which points to the distinct theme that each article serves. Scholarpedia Intentionality focuses on neurobiology and, therefore, has more usage of “action,” “brain,” “body,” “pattern,” and “sensory.” Seeing intentionality as a

philosophical topic, Wikipedia Intentionality gives more preference to “mental,” “state,” “consciousness,” “physical,” “language,” and “object,” just to name a few.

Table Two. *The Occurrences of Top 10 Words*

| Wikipedia Intentionality | | Scholarpedia Intentionality | |
|--------------------------|----------------------------|-----------------------------|--|
| Occurrences | Words | Occurrences | Words |
| 32 | intentionality | 27 | intentionality |
| 29 | intentional | 25 | action |
| 13 | mental, state | 18 | brain, term |
| 12 | consciousness | 14 | conceive |
| 11 | physical, Brentano | 12 | body, pattern, sensory |
| 10 | object, language | 11 | object |
| 9 | dennett, principle | 10 | state, intentional |
| 8 | phenomena, system | 9 | self |
| 7 | existence, concept, belief | 8 | activity, call, concept, contractor, subject |
| 6 | divide, thesis, idiom | 7 | reflex, neutral, environment, century, problem, perception |

Readability

Six indices are provided by Text Analyzer to calculate readability: Gunning Fog Index (FOG), Coleman-Liau Index, Flesch-Kincaid Grade Level (F-K), Automated Readability Index (ARI), Simple Measure of Gobbledygook (SMOG), and Flesch Reading Ease (FRE) (See Table One for indices). Syllables per word play a critical role in the computational formula in FOG, F-K, SMOG, and FRE; however, ARI and Coleman-Liau Index rely on the calculation of characters per word. The result of FOG suggests years of formal education required to comprehend the text with ease; FRE score indicate a scale from 0 as the hardest to 100 as the easiest; the rest of the indices predicate the approximate grade level that readers in the United States should achieve to understand the text. Specifically, in comparison to Wikipedia Intentionality, Scholarpedia Internationality generates significantly higher FOG score, with a ratio of 18.41/16.50. That means comprehending Scholarpedia Intentionality requires at least 18 years of

formal education but 16 years for Wikipedia Intentionality.

In terms of FRE, both encyclopedia article numbers fall in the last range of “0-29,” which indicates readers as “College Graduate” and reading level as “Very Difficult” (Spadaro, Robinson & Smith, 1980). The remaining indices suggest that Scholarpedia Intentionality requires 15 to 17 grade level, Wikipedia Intentionality 14 to 16 grade level, should be achieved to understand the text. Therefore, college level education is the minimum threshold that one has to accomplish to read both articles. However, comparatively speaking, Scholarpedia Intentionality better suits college graduates or postgraduates.

Overall, the microstructure analysis implies that the addressed readership of two encyclopedic articles is understandably different. In general, both articles are not prepared for “common readers.” Comprehending both texts requires at least a college level education to be accomplished by readers, who possess the upper level of reading skills. Particularly, in terms of characters per word, number of sentences, and number of words per sentence, Scholarpedia Intentionality demonstrates more syntactic sophistication and semantic complexity, which leads to higher readability scores and the requirement of longer educational duration. Scholarpedia Intentionality expects readers to have a postgraduate educational background or expert knowledge in the related fields. In addition, 37 sentences at the end of Scholarpedia Intentionality are suggested for improvement so as to decrease the reading difficulty level. As for Wikipedia Intentionality, 33 recommended sentences merit Wikipedia contributors’ attention because Wikipedia, as a popular resource, offers a representation of universal knowledge and faces a broad range of readership. Otherwise, the tough outlook of Scholarpedia

Intentionality scares away common readers.

Macrostructure

At the macrostructure level, this study examined the textual organizational structure of Scholarpedia Intentionality and Wikipedia Intentionality. In this aspect, this study focused on title, definition, statement of responsibility, headings and content, and references, which are shared in common by both articles and indicated in the table of content. Metadata categories, cross references and external links, which are not closely tied to the text, were not considered in the analysis.

Title

Although the titles from both articles are identical, they carry different, hidden values. Titles of Wikipedia entries are randomly created by contributors, but they are descriptive entities that indicate what articles are about (Wikipedia: Articles Titles, 2020). Like any other titles in Wikipedia, Wikipedia Intentionality gives preference to the linguistic requirement: indicative and distinguishable. The author first proposes a title for the Scholarpedia articles and then it is sponsored by an existing curator who possesses expert knowledge in the field (Help: Authors, 2020). Hence, being short and encyclopedic, Wikipedia Intentionality shows contributors' freedom in deciding what to write, but Scholarpedia Intentionality is not a free choice made by authors. The screening process enunciates unsaid scholarly discretion that safeguards the quality of written work at the very beginning.

Statement of Responsibility

Wikipedia articles are contributed and constantly edited by volunteers worldwide. It is difficult to clearly identify who is chiefly, partially, or trivially responsible for the

intellectual creation of one particular entry. Or such identification is totally useless because Wikipedia itself in nature is “an immense pot-luck dinner.” (Wikipedia: Author of Wikipedia, 2020). Hence, in Wikipedia Intentionality, the statement of responsibility simply says, “From Wikipedia, the free encyclopedia.” On the contrary, Scholarpedia Intentionality bears a clear statement of responsibility, which follows the pattern of an academic journal. The statement of responsibility articulates the author’s name, Scholarpedia volume numbers and issues, doi, and the author’s affiliation and profile pages in Scholarpedia.

Definition

Both encyclopedic articles in this case study begin with a definition about “Intentionality.” The definition provides an elaborative description of what the topic is about, and establishes a boundary that separates the title itself from other similar terms. The definition in Wikipedia Intentionality briefly describes how the term historically evolves and then concentrates on its metaphysical and philosophical meaning. The definition in Scholarpedia Intentionality is scientifically oriented, which summarizes the circular process of how the brain achieves the understanding of surroundings through learning cognition. Therefore, the definitions from both encyclopedias set up separate tones: one facing a general audience and the other catering to viewers with scientific knowledge background.

Content

The structures of both articles are outlined with pointed headings in the similar format: introduction/overview, main bodies, references, cross references, and external links. Additionally, Wikipedia Intentionality includes “Further reading,” a list of sources

for readers to seek further information or for concerned contributors to use them to enhance the article.

The overview of Wikipedia Intentionality, which is comprised of eight paragraphs, includes multiple direct quotations, and cites at least 10 authors' perspectives from Scholastics in the Middle age to contemporary artificial intelligence and philosophy. The introduction of Scholarpedia Intentionality has one paragraph, which outlines the rationale how the topic is going to be approached historically, neurobiologically, and philosophically in computational neuroscience.

The main body of Wikipedia Intentionality is structured by three main headings, the third of which has one subheading (See Table Three). The numbered list has a strong indication that this section has not been finished completely and subsequent subheadings could be added in the future. The first two main headings make clear statements targeting to two individual philosopher's theories about intentionality: Dennett's taxonomy and Le Mortan's basic types. Viewers who read the headings could believe that the subordinate section would focus on elaborating Dennett's and Le Mortan's theories respectively. However, further analysis demonstrates that Wikipedia contributors actually made Dennett lose his voice to the other 20 scholars' arguments cited by Wikipedia contributors, which suggests a big discrepancy between what the headings propose to provide and what is actually written underneath. What follows is Le Mortan's basic intentionality types ends within one paragraph, which seems fairly brief in contrast to preceding section. The main body of Scholarpedia Intentionality is shaped by four headings: the history, contemporary meanings, the neurobiology, and the philosophy of intentionality, that focus on a distinctive, conceptual subject discipline. The

contemporary meanings of intentionality utilize a figure to illustrate the implementation of intentional behavior. Under each heading, multiple scholars' arguments are cited and coherently serve the discourse that the heading articulates.

Table Three. *Comparison of Macrostructure*

| | Wikipedia Intentionality | Scholarpedia Intentionality |
|-----------------------------|--|--|
| Statement of responsibility | From Wikipedia, the free encyclopedia | Walter J. Freeman (2007), Scholarpedia, 2(2):1337. doi:10.4249/scholarpedia.1337. Dr. Walter J. Freeman, University of California, Berkeley, California (link to Dr. Walter's Scholarpedia profile page). revision #123821 [link to/cite this article] |
| Definition | <p>This article is about the philosophical ability of the mind to form representations. For the related logical or semantic concept, see Intension. For the idea of doing something with a goal, see Intention.</p> <p>Intentionality is a philosophical concept defined as "the power of minds to be about, to represent, or to stand for, things, properties and states of affairs". The idea fell out of discussion with the end of the medieval scholastic period, but in recent times was resurrected by Franz Brentano and later adopted by Edmund Husserl. Today, intentionality is a live concern among philosophers of mind and language. The earliest theory of intentionality is associated with St. Anselm's ontological argument for the existence of God, and with his tenets distinguishing between objects that exist in the understanding and objects that exist in reality.</p> | Intentionality is the circular process of generalization/abstraction of input and specification/concretization of output by which brains achieve understanding of their environments through the cycle of prediction, action, sensation, perception, and assimilation by learning. |

| | | |
|---------|--|--|
| Content | <ol style="list-style-type: none"> 1. Overview 2. Dennett's taxonomy of current theories about intentionality 3. Basic intentionality types according to Le Morvan 4. Mental states without intentionality <ol style="list-style-type: none"> 4.1 Intentionality and self-consciousness 5. See also 6. References 7. Further reading 8. External links | <ol style="list-style-type: none"> 1. Introduction 2. The history of intentionality 3. Contemporary meanings of intentionality 4. The neurobiology of intentionality 5. The philosophy of intentionality 6. References 7. External links 8. See also |
|---------|--|--|

Both online encyclopedias provide a list of cited resources (See Table Four).

Wikipedia Intentionality has 8 instances of books, 3 journals, 7 encyclopedias, and 3 web resources; Scholarpedia Intentionality cites 8 books, 7 journals, and 1 web resource. In addition, Scholarpedia Intentionality includes a list of internal references (9 instances of articles from Scholarpedia); Wikipedia Intentionality provides a list of further reading, which constitutes 13 books, 6 book chapters, and 2 journals (See Table Five).

Table Four. Comparison of References

| | Book | Journal | Encyclopedia | Web resource |
|--------------|------|---------|--------------|--------------|
| Wikipedia | 9 | 3 | 7 | 3 |
| Scholarpedia | 8 | 7 | 9 | 1 |

Table Five. Further Reading in Wikipedia Intentionality

| | Book | Book chapter | Journal | Web resource |
|-----------------|------|--------------|---------|--------------|
| Further reading | 13 | 6 | 2 | 3 |

In summary, the macrostructure analysis suggests that Wikipedia Intentionality is a half-baked product, which is in the process of becoming mature. That means a lot of work is left for the future spontaneous, participatory effort to improve its content and structure, which is going to put the quality of the article in uncertainty for a considerably

long time. Perhaps, the phenomenon of “becoming” in the content and structure is a typical feature that most Wikipedia articles bear. In its nature, Wikipedia is a user-lead, chatty mass media relying on ongoing social participation and construction. Wikipedia Intentionality evidences Rector (2008)’s research that longer Wikipedia articles tend to display inconsistent voices and discordinated literary flow due to numerous contributors with various experience and educational background. On the contrary, Scholarpedia Intentionality is a well-structured, well-written, scholarly work, which makes it ready to use as a quality source. The coherence between sentences and the structure among paragraphs are not an arbitrary choice made by the contributors, but an output of mindset based on years of academic writing experience.

Implications for Information Literacy

This comparative case study echoed Ouyang’s (2014) argument that experienced Scholarpedia authors achieved higher efficiency, and produced better quality of articles than a massive number of loosely-organized Wikipedia contributors. However, the goal of this research is not to just evaluate Scholarpedia Intentionality and Wikipedia Intentionality, and then determine which article is possibly better than the other. Instead, this comparative case study attempts to add additional value to the enhancement of sensitivity of academic librarians at the time that they are planning to introduce scholarly resources like Scholarpedia and Wikipedia into information literacy classrooms as part of instructional design. Academic librarians see the comparison of academic resources and Wikipedia as an active, experimental application that can engage students in critical inquiry, and assist them in constructing new knowledge in information literacy class. For instance, McClellan (2016) incorporated Wikipedia, Google and scholarly journal articles

into course-embedded online modules to facilitate students in constructing notions of reliability and credibility of information.

The innovative library instructional designs alike with the involvement of analyzing existing Wikipedia articles paired with scholarly creations in related topics requires library instructors to select appropriate articles as samples from both resources. Such appropriateness embodies a matching point between the readability level of materials and students' literacy competence. Providing students with appropriate reading materials determines whether the information literacy instruction can be conducted effectively or not. If the selected reading materials are too easy, students' potential will not be challenged; if too difficult, a big load of unfamiliar vocabulary and numerous lengthy and complicated sentences would impede students' motivation and classroom interaction. Therefore, it is essentially important that library instructors should keep their awareness active so that students with considerably low literacy skills will not become frustrated by the confusing and complex nature of selected reading materials. In particular, nowadays the classroom setting is becoming culturally and linguistically diversified. This comparative study suggests that library instructors should take advantage of existing quantitative evaluation tools, and identify sample articles thoughtfully so as to select the fit ones that better serve pedagogical objectives.

In terms of content, scholarly resources like Scholarpedia articles have been scrutinized by peer scholars already, and hence their content, supported by logic text structure and coherent relationship among sentences, are not subject to arbitrary and random editing. In other words, from the viewpoint of library instructors, scholarly resources like Scholarpedia are mature, established, ready-to-use materials and do not

offer library instructors a variety of options to choose. However, Wikipedia articles are in the process of making, which includes both half-baked ones, such as Wikipedia Intentionality, and the best articles preserved on the featured list. Therefore, on the basis of pedagogical goals, Wikipedia articles in the making provide library instructors a variety of options to choose.

The flexibility in the selection of mature or immature Wikipedia articles depends on the instructional needs and pedagogical goals. Van Hoeck and Hoffmann (2013) introduced underdeveloped Wikipedia articles in comparison to traditional encyclopedia in maritime and engineering fields in information literacy classes. Students in their final projects chose to either create a new Wikipedia article or improve existing ones. They reversed their roles of learning from consumer of content to creators and editors and gained critical understanding of the concepts of audience, authorship and authority.

Constructing authentic knowledge through comparison cannot only happen between Wikipedia and traditional encyclopedias, but also among Wikipedia articles themselves. Foster-Kaufman (2019) encouraged students to examine the leading paragraph of Wikipedia biographies about people of color in contrast to ones of whites. The distinction between race as a qualifier in the colored people's biographies, and white as predetermined identity triggered students' debate about cultural and racial marginalization and the necessity of demographic identifications. Thus, the sensitivity in making intentional selection of articles is important to students' motivation and classroom engagement. In addition to content, engaging students in examining and comparing materials cited in Wikipedia articles and ones referenced in scholarly resources can be a constructive learning activity, too. Guiding students to navigate cited

materials from both resources will offer students the opportunity to build authentic knowledge about academic integrity and ethics. This could lead them to gain a deep understanding of the significance of the peer-review process and the downside of social editing.

Broadly speaking, bringing scholarly resources like Scholarpedia in comparison to Wikipedia into information literacy classrooms as part of instructional design is an application of constructivism theory in a library setting. In constructivists' view, learning happens in a context in which learners interact with the environment and construct knowledge out of a new experience (Grassian & Kaplowitz, 2001, p. 32). *The Framework for Information Literacy for Higher Education* (2016) adopted by Association of College and Research Libraries (ACRL) defines that authority of information is constructed in various communities and contextualized in the information needs. It further notes that learners need to master the basic standards, such as publication types and creator's credentials, to evaluate the authority of information, and determine if the authoritative content is formal or informal. In light of the constructivist's view and the framework developed by ACRL, engaging students in the activity of comparing Wikipedia articles in relation to scholarly resources provides them with an authentic learning environment in which students construct their perspective of authority and discover their own journey of knowledge acquisition through seeking origins, and investigating context and examining credibility. This intentional instructional design requires academic librarians to prepare proper reading materials with scrutiny in advance to make sure their readability and content align with student cohorts and pedagogical goals. This requirement makes implications of the comparative case study even more practical and instrumental.

Conclusion

This case study compared two free, online encyclopedia articles: Wikipedia Intentionality and Scholarpedia, under the lens of microstructure and macrostructure. Although both articles bear the same title, they differ significantly in terms of readability and content. Empirical implications conclude that the variation between Wikipedia in the process of making and Scholarpedia ready to use offer academic librarians a promising pedagogical tool in information literacy classrooms. This will give voices to students in authentic learning environment and activate their autonomous knowledge creation. If academic librarians embrace Scholarpedia as much as Wikipedia, then one more valuable gift will be added into the basket of open pedagogy that advocates free access to resources and practices as fundamental to learning and teaching. The potential is there, but the required effort is more.

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