Audience in Science Research Papers

Historically, scientific reports and journals have been widely inaccessible to the public. Among the reasons, subscription cost was once the chief complaint. However, even as access to free research reports becomes the standard, the largest barrier in public engagement remains: inadequate understanding. The modern scientific journal, the main destination of research papers, is an unforgiving medium in contrast with public sensational articles and news posts. Written by scientists, the scholarly journals such as *Cell*, *Cancer*, and *Nature* are directed towards other members of the scientific community. Even mini-review articles are often written for other members of the scientific community. Recently, scientists have been attempting to summarize research findings in more accessible formats to bridge the gap between science and public. However, it is important to understand the stark differences between scientific writing and the average news article. Comparative analysis of the scientific report "Plasmodium Infection Promotes Genomic Instability and AID Dependent B Cell Lymphoma" and its respective summary "The link between malaria and blood cancer" by Rhea Longley reveals this contrast in intended audience through use of content, format, and diction.

The inclusion of advanced scientific content in the report is a major barrier impeding accessibility of research finding to the public. The authors of the research paper assume advanced education in molecular scientific concepts and types of cancer. An understanding of "Burkitt's Lymphoma" is necessary for even a basal understanding of the paper and its practicality. The explanation of this cancer immediately requires an understanding of immunology through its definition "a mature B cell cancer." Immunological understanding is further required throughout the paper with its frequent references to "GC B cells" and "germinal centers." Contrastly, Longley introduces the lymphoma as a "childhood blood cancer." Although she assumes a basal understanding of cancer, Longley's decision to expunge references to B cells and germinal centers is indicative of the change in audience. In addition to immunology, molecular biology and genetics is emphasized in the research paper. The specific "t(8:14) chromosome translocations" and mechanisms of DNA mutation such as "somatic hypermutation (SHM) and class switch recombination (CSR)" are particular concepts discussed in upper-level genetics courses. Longley reduces this entire discussion to "DNA mutations" and does not assume such knowledge attained in college-level biology education. Discussion of the particular gene names such as "p53" or "c-myc" are completely omitted from the review article, as are much information about chemical techniques such as "western blot analysis." The overall effect is an unassuming article which captures similar information without the necessity of complicated conceptual knowledge.

Beyond the most disparities in content, the structural format of the scientific paper follows the standard scientific magazine format, which often poses a challenge to many readers. The classic magazine report follows a rather rigid template: Summary/Abstract, Introduction, Methods, Results, Discussion, Conclusion. With the exception of a methods section, this scientific magazine entry follows this format. Although the subheadings make the format much more obvious, other factors discourage the accessibility of the underlying content to public audiences. The first page of the report is filled with authors names, affiliations, and small 10 point font; for scientists, the intended audience of the report, this information and format is expected. In contrast, the review article begins with a captivating image of a mosquito and continues with larger font. For the average person perusing the internet, the image with 12 point

accompanying text is often the expected. In tandem with this, the choice of in-text citation style often interrupts text with parentheticals, creating a less fluid reading pattern. Researchers reading such an article are informed by this inclusion. Despite this, the discontinuous flow of information discourages the public reader, as he or she stops to read each parenthetical "(Author et. al. 2017)." In addition, the report's placement of thesis/topic sentence is several sentences later than the review article's placement. Even though an introduction of the topic is essential for a scholarly journal, the delayed thesis affects the captivation of audience. The sensational review article states the topic within the first sentence of the piece. For one who has no direct obligation to read a news article, captivation of audience is often crucial; all parts of visual formatting play a psychological role in this crucial aspect of writing. Consequently, the review article is comparatively more effective in public audience appeal.

The dissimilarity in diction is between the two works is a defining feature which emphasizes the difference in audience awareness. In the scholarly journal report, scientific jargon and common scientific phrases reflect the authors' intended audience. Just within the first paragraph, the words "epidemiologically" "lymphomagenesis" are used without definition or elaboration. While this assumes content understanding, these words are also within standard protocol for oncologists and even scientists in general. These nine and six syllable words, respectively, are not nearly as common outside of the science or medical sphere. Rather than use only jargon, the review article uses circumlocution to define "lymphomagenesis" as "the development of...lymphoma." Although the review article does not avoid the use of technical names and terms such as "Burkitt's lymphoma" or "activation-induced cytidine deaminase," it does explain all terms such as these and avoids the excessive use of unnecessarily complex words. In addition, the report makes frequent use of abbreviations such as "GC B cells," "eBL" and "EBV" in consideration of magazine space. The review article uses only one abbreviation, "AID" and writes out other phrases in their entirety. The unintended effect of abbreviation is the accumulation of numerous labels in addition to the mentioned gene names, molecular techniques, and jargon. Although a scientist in this field might be accustomed to these abbreviations, it is substantially more arduous for anyone else. Diction, although unintended, emphasizes the already distinct audiences of the two pieces.

Overall, the intended audiences of these papers lead to completely different reading experiences. Although content is a large barrier for the public, format, diction, and writing style further widens the gap between scientist and public. Despite these differences, many scientists are capable of conveying information to the public. The deeper problem lies in the current mediums and their tailored design towards a specific audience. Incentivizing scientists to write or convey information with the public in mind is one way to increase the access of information to the public.

Works Cited

1. Longley, Rhea. "The link between malaria and blood cancer." Medium.com. *STM Digest*, 14 Oct. 2015.

2. Robbiani, D. F. *et al.* Plasmodium Infection Promotes Genomic Instability and AID-Dependent B Cell Lymphoma. *Cell* **162,** 727–737. 2015.