

# Media Literacy for Justice

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LESSONS FOR CHANGING  
THE WORLD

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CHICAGO :: 2022

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## REFLECTION

### Algorithms: Decoding Bias in Messages

by Ansh Chandnani and Denise E. Agosto

At its core, media literacy is about decoding messages. Identifying the bias encoded in media messages is key to a future world vision of social justice in information. The algorithms that drive much of the media we encounter online are prime examples of the inherent bias of today's media.

Computer algorithms are simply "sets of commands that determine the process or rules a computer follows to achieve a certain goal" (Institute for Public Policy Research 2019). Computer algorithms are inherently biased because they "reflect the values, perspectives, and biases of the humans who design and shape them" (Institute for Public Policy Research 2019). Whether or not the data themselves are biased, the ways that computer algorithms process them embody human biases.

As proponents of media literacy are well aware, the Information Age is characterized by an overwhelming reliance on data for much of our daily activity. Data when organized creates information, and information when analyzed creates knowledge. Most of us rely on data and computing algorithms for almost everything today, from navigation systems for driving to work, to pre-ordering a book that piques our interest from an online bookseller, to monitoring daily weather alerts. With such a significant share of our livelihood and civilization revolving around digital information, it becomes crucial to ensure the reliability of the data we use and the way we use it. Similar to how we wouldn't rely on a child to do our taxes, we simply cannot rely on partial or inaccurate data to guide us in our day-to-day activities. However, the underlying systems that produce digital information are inherently biased in a number of different ways.

The word *bias* often has a negative connotation that is associated with certain social and political contexts. For the purpose of this discussion, however, it is crucial to strip the word of any preexisting symbolic connotations and look at bias from a more objective perspective. Put concisely, *bias* merely refers to a notable deviation from an accepted standard. That is, bias is a disproportionate amount of weightage either for or against an idea, concept, or thing in such a way that appears prejudiced or unfair.

Most data in the world is retrieved, analyzed, and managed by set systems and computers. Programmers and developers usually write the computer code that dictates how various types of data should be handled, analyzed, and presented. An algorithm, therefore, is a finite set of well-defined, computer-executable instructions typically written by a programmer/developer to perform a certain required function. A programmed algorithm has no deviations, improvisations, or caveats as

compared to a human being's functioning. For example, given the task of multiplying the numbers 17 and 98, a human being could perform the computation in multiple ways, depending on the resources available and the person's educational background. A computer, on the other hand, could use only the predefined algorithm that a human programmer had loaded it with to solve the problem.

Algorithms play a critical role in computational devices, and lay the foundation for operations where we humans would typically be prone to error, inefficiency, or fatigue. As Danks (2017) explained: "a self-driving vehicle cannot fall asleep at the wheel, or become distracted by background music." Algorithms are also capable of processing a larger quantity of inputs and analyzing more factors than humans can to make decisions. From customized shopping recommendations to personalized search results, algorithms enable computers to make faster, more precise decisions than a human performing the same tasks manually. Thus, they are ideal for automating repetitive tasks and point to a future of ever-increasing amounts of available information.

Despite the multitude of advantages that algorithms and modern computations provide for us, they are prone to biases and unfair deviations from acceptable social standards. In order to preserve the reliability of our systems and data, it becomes crucial to understand the nature of algorithmic biases, what causes them, how they might impact us, and what we can do as media literacy proponents to mitigate their negative effects on society.

These "negative effects" can be collectively called "algorithmic bias." Algorithmic bias in the context of information systems can be thought of as systematic and repeatable errors that create unfair or prejudiced outcomes. Again, it is the human design aspect that lies at the root of most algorithmic bias:

Because algorithms simply present the results of calculations defined by humans using data that may be provided by humans, machines, or a combination of the two (at some point during the process), they often inadvertently pick up the human biases that are incorporated when the algorithm is programmed, or when humans interact with that algorithm. Moreover, algorithms simply grind out their results, and it is up to humans to review and address how that data is presented to users, to ensure the proper context and application. (Kirkpatrick 2016)

Algorithmic bias may be any of the following five types:

1. *Algorithmic data bias*: Algorithmic data bias arises due to incomplete or skewed data. For example, if a self-driving car were only trained within the city of Chicago, it would only be accustomed to the traffic norms and customs in that city, and the self-driving utility wouldn't be as reliable in a different city or in rural areas.
2. *Algorithmic focus bias*: If an algorithm ought not to use certain data points for ethical or legal reasons, the use of such variables may cause a focus bias. For example, a driving map's routing algorithm could favor routes past businesses that paid for inclusion in the routes, leading to less traffic in lower-income areas and reduced patronage of locally owned businesses in those areas.
3. *Algorithmic processing bias*: Processing bias occurs when the algorithm uses a partial method of evaluation such as a biased estimator formula. A simple example would be evaluating the value of the following mathematical expression: " $8 \div 2(2 + 2)$ ". The order in which the machine performed the functions in the equation would impact the answer. If it performed the division function first, the resulting answer would be 16. If it performed the addition within the parentheses first, the resulting answer would be 1. As such, the algorithms themselves might have certain limitations that lead to skewed results.

4. *Transfer context bias*: This type of bias occurs when an algorithm is used to perform tasks outside of its intended scope. For example, we wouldn't use the same algorithms to control a robotic arm in a car factory and a robotic arm in an operating theater.
5. *Interpretation bias*: Interpretation bias arises when there is a misinterpretation or misrepresentation of the data evaluated by the algorithm. For example, if the representation confuses percentile and percentage within sample student populations, it could lead to misleading results and possibly further disadvantage students in disadvantaged school systems for purposes such as college admission decisions.

In each of these ways, bias can be consciously or unconsciously built into the systems that we use to access and design media. The definitional differences among these types of algorithmic biases might seem small, but their potential effects on society can be massive. Computer algorithms run the search engines that frame and limit how we navigate the digital world (Noble 2018), and they even drive the bots that write some of the news we read (Peiser 2019). All too often these algorithmic biases lead to inequities of representation that affect people of color, the socioeconomically disadvantaged, and other marginalized social groups.

As we work toward greater social justice through increased media literacy, we can position libraries as spaces for the empowerment of marginalized social groups. The U.S. professional narrative has long characterized libraries—especially public libraries—as social equalizers, but we must recognize that privilege, racism, and segregation have been significant forces throughout the history of librarianship (Harris 2019–20). Just as computing algorithms embody human biases, so do our libraries. Libraries and library services are the products of the biased social structures into which they are born.

Still, libraries are ideal institutions for introducing media literacy concepts to diverse social groups and for bringing about widespread understanding of the inherent biases in information systems. Libraries—not just school libraries, but libraries in government, corporate, university, and nonprofit organizations as well—are fundamentally educational organizations (Agosto 2018). To reach the ideal of information-based “justice for all,” library workers can teach their community members not only to identify bias in media systems and resources, but to challenge the existing power structures that give rise to biases in the underlying data and computing algorithms.

This idea is well-known to many professionals familiar with the core concepts of media literacy, but challenging existing power structures through professional practice is a less common mindset in libraries. Library staff have traditionally viewed information provision and intellectual freedom as the main drivers of library services (Seiter 2019–20). This is particularly true in U.S. public libraries, where staff often hesitate to impress their personal opinions or political agendas on their user communities, working instead to maintain politically neutral professional stances.

Furthermore, the prevailing approach in U.S. libraries tends to value neutrality as a core component of intellectual freedom, “giving equal weight to all information and viewpoints regardless of the power structures behind them” (Seiter 2019–20, 109). In light of the discussion above, it becomes clear that professional neutrality is unrealistic because the data and algorithms that underlie most information sources are inherently biased.

Media literacy can provide library workers with a justification for moving away from unrealistic ideas of professional neutrality and toward teaching information users to consider which societal groups have the power to frame the most influential media narratives, and which groups are largely left out of the discussion. *Media literacy for greater social justice therefore means dismantling the social systems that embody unfair concepts and practices and lead to the creation of biased algorithms and information media.*

The Urban Libraries Council's 2019 "Statement on Race and Social Equity" offers an actionable framework for taking a more active role in promoting information justice through library services. It expresses the commitment of more than 200 North American public libraries to work toward achieving greater social equity in their communities by:

- Eliminating racial and social equity barriers in library programs, services, policies and practices
- Creating and maintaining an environment of diversity, inclusion and respect both in our library systems and in all aspects of our community role
- Ensuring that we are reaching and engaging disenfranchised people in the community and helping them express their voice
- Serving as a convener and facilitator of conversations and partnerships to address community challenges
- Being forthright on tough issues that are important to our communities. (Urban Libraries Council, n.d.)

As our reliance on data and computing algorithms continues to grow in the future, uncovering embedded biases will become an increasingly important life skill. Libraries can play a critical role in helping move us toward a greater realization of social justice in our information-driven world—but only if library workers and other community stakeholders first recognize that understanding algorithmic bias is key to reducing the biases inherent in our information systems.

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