

**NewsQ**

# **Improving Representativeness in Online News Ranking and Recommendation Systems for Local News**

## **Challenges, Considerations, and Recommendations**

**NewsQ Review Panels Series  
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**News Quality Initiative (NewsQ)**

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## Executive Summary

Throughout 2021, the News Quality Initiative (NewsQ) convened a series of panel discussions to discuss the challenge of improving the representation of cultural diversity in local news feeds. Made up of journalists, journalism educators, and journalism scholars from Los Angeles, California, and Albuquerque, New Mexico, the NewsQ 2021 Representativeness panel ultimately agreed that the multiple dimensions, fluidity, and context-dependent character of representativeness complicate the creation of specific metrics of representativeness that could be used as a measurement in online news ranking and recommendation systems.

According to the panelists, certain dimensions of representativeness, such as producing coverage that reflects the demographic diversity of the local community, are typically considered essential. However, the creation of a truly representative news feed must consider not only to the racial, ethnic, cultural, or demographic diversity of a place, but also consider how inclusive the coverage was of different neighborhoods, the recommendation of a wider variety of local news outlets, and the reporting of a more diverse mix of topics and voices of interest to people in a community.

During their discussions, panelists identified several structural challenges to achieving a representative local news feed. For example, the adequate volume of representative stories needed to populate feeds may simply not exist. This absence is due to several factors, including the economic challenges affecting local outlets, the ensuing proliferation of news deserts, and an overall lack of diversity in local news ecosystems.

NewsQ panelists agreed that an algorithmically generated newsfeed, even when curated lightly by humans, would not truly illustrate the dimensions of representativeness as identified by panelists. Panelists also recognized that focusing on actively curating available local stories cannot solve the deeper, enduring problems of representativeness that have plagued local news coverage for decades.

Despite the challenges, panelists identified several measures to improve local news feeds. First, producers of news platform products should create systems that can identify actual local news. This requires more dialogue between local newsrooms and technologists. Second, since the lack of representation in the news

is a legacy issue in journalism, the panelists saw the problem of representativeness in news feeds as a new opportunity to advance the goal of diversification by bringing together a variety of stakeholders — e.g., journalists, newsroom management, professional organizations, journalism schools, computer scientists, technologists, community groups, and audiences — to address the issue in the current context of news recommendation systems.

## Introduction

U.S. journalism has long struggled to represent and reflect the cultural diversity of local communities. One challenge to representativeness is attributed to the actual demographics of journalistic institutions and newsrooms, which remain dramatically out of step with the more varied, and more diverse demographics of the local populaces they aim to cover.<sup>1</sup> This means that even when diversification of content is pursued as an organizational goal, journalistic coverage may struggle to fairly represent the local communities it covers. These challenges have only been further complicated as algorithmically ranked and recommended news feeds play a larger role in how audiences consume news.<sup>2</sup> Questions about the complexities of representing diverse peoples, communities, and perspectives are no longer exclusive to journalists, news outlets, scholars, and social critics. These questions have now travelled downstream to the news aggregators developed by technology platforms, where the issue is further muddied.

The use of algorithms and recommendation systems in news feeds has become a central feature of a profound transformation in journalism, as automation of news production shapes the ways in which stories are produced, distributed, and consumed.<sup>3</sup> These technological developments are raising questions for reflection, debate, and research on the impact of computational journalism on the representativeness of cultural diversity in news feeds.<sup>4</sup>

At a time when news readers face the growing influence of computation and search engines on news delivery, the exchange of ideas among journalists, computer scientists, software developers, news managers, journalism educators, citizens, and media and data activists is an imperative for a healthy civil, democratic society. At issue is how to safeguard the public good through representativeness, inclusiveness, and equity in journalism within the limitations of a technological structure driven by the commercial interests of advertisers and the concentration of power

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<sup>1</sup> Gabriel Arana, “Decades of Failure,” *Columbia Journalism Review*, Fall 2018, [https://www.cjr.org/special\\_report/race-ethnicity-newsrooms-data.php/](https://www.cjr.org/special_report/race-ethnicity-newsrooms-data.php/).

<sup>2</sup> Amy Mitchell and Tom Rosenstiel, “Navigating News Online,” Pew Research Center’s Journalism Project (blog), May 9, 2011, <https://www.pewresearch.org/journalism/2011/05/09/navigating-news-online/>.

<sup>3</sup> Nicholas Diakopoulos, “The Journalistic Newsfeed: Editorial Values and Algorithms - *Columbia Journalism Review*,” *cjr.com*, October 13, 2019, [https://www.cjr.org/tow\\_center/journalism-newsfeeds-ai-artificial-intelligence.php](https://www.cjr.org/tow_center/journalism-newsfeeds-ai-artificial-intelligence.php).

<sup>4</sup> Sarah Cohen, James T. Hamilton, and Fred Turner, “Computational Journalism,” *Communications of the ACM* 54, no. 10 (October 1, 2011): 66–71, <https://doi.org/10.1145/2001269.2001288>.

among a few giant information technology businesses including Google, Facebook, Twitter, Microsoft, and others.

The difficulty of addressing the specific issue of ensuring representativeness, inclusiveness, and equity in journalism is amplified by the economic challenges affecting local newsrooms as well as the technical complexity around algorithmically ranking and recommending quality local news at scale.<sup>5</sup>

## Overview of NewsQ Panels

How representativeness could be expressed in a news feed was the central focus of discussion for a group of journalists and journalism educators who participated in the NewsQ 2021 panel on representativeness in the local online news ecosystem. The previous year, in 2020, NewsQ had focused on the question of how quality news can be elevated online. Towards that end, NewsQ has convened an annual series of review panels, composed of journalists, academics and technologists, to develop guidance or principles regarding quality journalism that are interpretable by both machines and journalists.

The 2021 panel once again brought together journalists and media scholars from Albuquerque, New Mexico, and Los Angeles, California, as well as a platform news product representative to explore what representativeness means for the panelists in each city and how it might be expressed in a news feed. Albuquerque and Los Angeles were chosen because they are cities with, respectively, both large and smaller media ecosystems serving diverse populations and thus pose unique challenges when it comes to improving the quality of representative news feeds.

Nielsen's 2021 ranking of 210 "designated market areas" of media consumption (DMA), measured by number of local television homes, designated Los Angeles as the second largest DMA, after New York. Albuquerque-Santa Fe was ranked 48th.<sup>6</sup>

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<sup>5</sup> Lauren Harris, "Measuring the Local News Landscape: A Q&A with Penny Abernathy," *Columbia Journalism Review*, accessed September 14, 2021, [https://www.cjr.org/business\\_of\\_news/local-news-landscape-penny-abernathy.php](https://www.cjr.org/business_of_news/local-news-landscape-penny-abernathy.php).

<sup>6</sup> AdeptPlus, "Nielsen DMA 2021 Rankings," *MediaTracks Communications*, accessed September 16, 2021, <https://mediatracks.com/resources/nielsen-dma-rankings-2021/>.

**Table 1. Comparing Albuquerque and Los Angeles**

Albuquerque <sup>7</sup>	Los Angeles <sup>8</sup>
Population: 560,513	Population: 3,979,576
Median household income (2019): \$52,911	Median household income (2019): \$62,142
49.2% Latino or Hispanic	48.5% Latino or Hispanic
38.9% White	28.5% White
2.9% Asian	11.6% Asian
3.3% Black or African American	8.9% Black or African American
4.7% American Indian or Alaska Native	0.7% American Indian or Alaska Native
0.1% Native Hawaiian or Pacific Islander	0.2% Native Hawaiian or Pacific Islander

In order to explore news feed representation in these two locales, the 2021 panelists were chosen to represent a range of national, local and statewide organizations and media outlets. Panelists were also chosen for their breadth of experience and knowledge about the local media landscape in their respective cities, and they have a minimum of 10 years of professional journalism experience.

Panelists included (in alphabetical order):

- **Amara Aguilar** is an associate professor of professional practice in digital journalism at USC Annenberg School for Communication and Journalism. She is responsible for creating USC's first Latinx-focused student news team, *Dímelo*.
- **Matt Ballinger** leads The LA Times' utility journalism team. His section is responsible for connecting LA residents with stories and information to help people solve problems, answer questions, and make decisions about life in and around Los Angeles.
- **Russell Contreras** is the race and justice reporter at Axios and previously was the president of UNITY Journalists for Diversity.

<sup>7</sup> U.S. Census Bureau, "U.S. Census Bureau QuickFacts: Albuquerque City, New Mexico," accessed September 16, 2021, <https://www.census.gov/quickfacts/fact/table/albuquerquecitynewmexico/PST045219>.

<sup>8</sup> U.S. Census Bureau, "U.S. Census Bureau QuickFacts: Los Angeles City, California," accessed September 16, 2021, <https://www.census.gov/quickfacts/losangelescitycalifornia>.

- **Megan Garvey** is executive editor at LAist and KPCC. Her newsroom takes a hands-on approach to community engagement, and actively invites local community members to share questions and concerns.
- **Shaun Griswold** has worked in a variety of newsrooms in New Mexico with special focus on the Native American population in Albuquerque.
- **Sarah Gustavus Lim** manages a national reporting initiative on economic mobility for the Solutions Journalism Network and is the founder and co-director of the New Mexico Local News Fund. She worked in public radio and television for more than 15 years, including a decade in New Mexico.
- **Ilia Rodríguez** is an associate professor at the University of New Mexico. Her research background focuses on how media create, reproduce, or challenge particular discourses on race, ethnic, gender, class, postcolonial, and other positions of difference.
- **Gabriella Schwarz** is head of news curation at Facebook, where she oversees a team of journalists that help power Facebook News and other news destinations across the platform. Prior to Facebook, she was the Global Head of Content at Flipboard.

## Approach to Research

In order to generate discussion on the issue, panelists were first asked to discuss their own definitions of representativeness, and to identify specific considerations that could be used as guidelines for a news ranking and recommendation systems. The group also analyzed and critiqued current local Los Angeles and Albuquerque news feeds recommended by Facebook and Google through the lens of representativeness. The sample local news feeds were collected over the course of two days, on May 12 and May 17, 2021, in order to generate two different samples from two separate weeks. Panelists were shown screenshots of news feeds from both cities showing the top 18–20 stories.

The sample news feeds were not meant to be exhaustive examples of the news product outputs, but rather acted as a jumping-off point for discussions into the topic of representativeness.

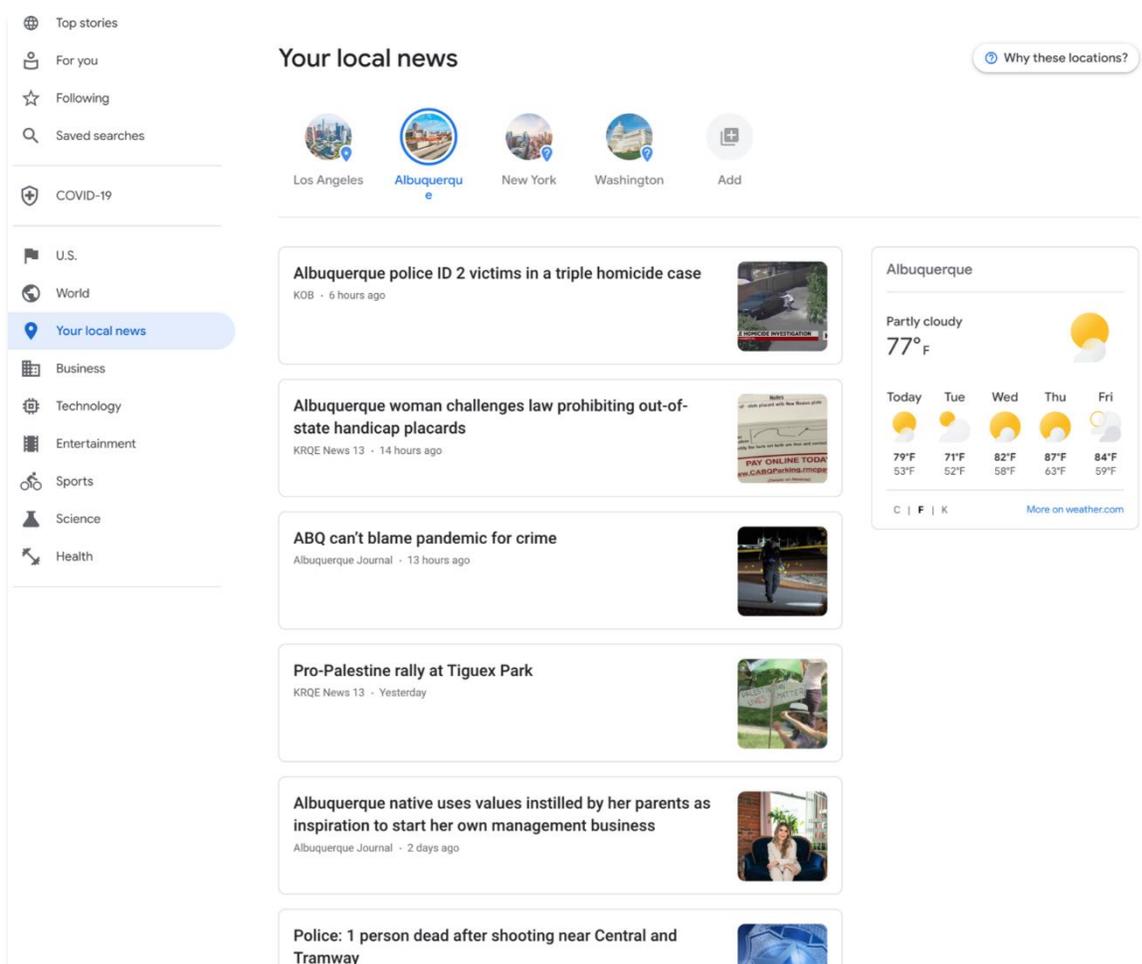


Figure 1. 'An Example of a Sample News Feed from Google News Albuquerque.' Sample local news feeds were collected over the course of two days, on May 12 and May 17, 2021. Screenshot collected on May 17, 2021.

Drawing on professional values and personal experiences, panelists went further by proposing their own curated lists of stories that they felt were more representative of the local communities in their cities according to the specific considerations detailed at the beginning of the panel process.

## Panel Observations and Conclusions

This paper reports panelist perceptions, experiences, and recommendations with the goal of contributing to the public dialogue on how to improve representativeness in news feeds:

- Part I of the paper summarizes the panelists' visions of **what constitutes representativeness** in news coverage.
- Part II presents two main challenges to representativeness discussed by the panelists: **economic challenges facing journalism organizations** and **challenges posed by algorithmic formulas** applied to news work.
- The last section offers the main **conclusions** and some **recommendations** discussed by the participants.

Ultimately, the goal of the panel was to identify what representativeness in journalism means in the context of these two cities, and how (or if) the journalism experts feel it is possible for machine learning models to create quality representative news feeds at the local level.

## Part I: Defining Representativeness and Dimensions of Representative Coverage

Panelists agreed that, while improving the issue of representativeness in journalism and news ranking and recommendation systems is difficult, it is of critical importance. Panelists emphasized that it was likely impossible for them to quantify the entirety of such a broad and context-dependent topic; however, there was an obvious general consensus among panelists on some specific dimensions of representativeness.

Panelists agreed that a representative news feed should represent not only the racial, ethnic, cultural, or demographic diversity of a place, but also the different neighborhoods, local news outlets, and mix of issues and topics that are of interest to many people in a community.

### Three Dimensions for Considering Representation

The panel was able to identify three main dimensions for consideration of representativeness in journalism on the whole as well as any potential representative news feed:

#### 1. Audience Demographics

Representation of the diverse demographics of the local audience being served along the categories of race, gender, age, class and urban and rural communities

#### 2. Newsroom Demographics

Representation of diverse demographics in the newsrooms serving local audiences

#### 3. Media Diet

Representation of a diverse media diet — or a variety of topics and sources — including type of media and high-quality enterprise reporting

While the discussions centered on how representativeness may be applied to news ranking and recommendation systems, the panelists acknowledged that the dimensions were applicable to the journalism industry itself. They emphasized that, despite being critical of news platform products, they recognize that many of the issues, with regard to representativeness, are not new to journalism

but they are being exacerbated and worsened by the popularity of these products.

The discussion below provides more details about each consideration and how the panelists perceive and define the concept of representativeness in their own work, the journalism industry, and potential representative news feeds.

## 1. Audience Demographics

The dimension of audience demographics was one of the principal areas of focus for the panelists as they considered representativeness in journalism as well as a potentially representative news feed. Panelists thought that highlighting stories that applied to a broader audience could be representative of a wider local community, especially when those stories centered on topics that affected the city as a whole such as:

- City-wide elections
- Infrastructure changes
- Education policy
- Public health regulations
- Weather and disaster situations

However, while the group felt that elevating these topics was important in terms of service journalism, panelists agreed that limiting a news feed to general audience coverage did not take into consideration the different information needs of the diverse audiences in their respective cities. In fact, a majority of the panelists were critical of the general audience category as failing to offer more nuanced coverage to diverse communities.

The potential lack of representation of voices across generational groups also surfaced in the discussions. One educator shared that most students, a younger demographic, are not using Facebook, a social media platform that is increasingly seen as appealing more to an older audience. More information may need to be gathered to understand how the algorithms on platforms like Snapchat, TikTok, and Instagram are delivering news and potentially local news and information to younger news consumers.

The panelists discussed specific demographic categories that were of particular importance for their own considerations of representativeness. The first was race and ethnicity, specifically minority groups in local areas that are historically left out of coverage. Discussions also focused on age as a category of

representativeness, with panelists recognizing that the information needs of older community members need to be addressed in different ways than the information needs of younger populations. Of particular interest for representatives from Albuquerque were considerations for rural and urban populations, the former often being overshadowed by stories that only really applied to urban areas. Class was mentioned by the group because of concerns that the needs of working-class families were often not being addressed by the journalism industry as a whole.

Finally, panelists also highlighted the importance for newsrooms to slow down and reassess who makes up the audience they want to serve, and what needs the audience might have. As one panelist said, “It’s important to think of who the stories are for and have someone in mind to be able to write with authority and give someone a sense of belonging.”

## 2. Newsroom Demographics

Panelists also agreed that newsroom demographics must be examined when considering and identifying representativeness. The lack of racial and gender parity in the journalism industry is also crucial for understanding why there is a lack of representativeness in local news.

In effect, achieving racial and gender diversification of staff in U.S. newsrooms remains an elusive goal at a time when 39.3 percent of the US population identify with a minoritized ethnic and racial group.<sup>9</sup> According to the Radio Television Digital News Association (RTDNA), only 27.7 percent of the local TV workforce identified as people of color. The 2021 RTNDA report noted that measure of representation is rising slowly along with the number of news directors who identify as non-white.<sup>10</sup> In print and online news sites combined, minorities made up only 17 percent of staff and 13 percent of leadership in 2018.<sup>11</sup> Such levels of representation have remained relatively steady since 2000.<sup>12</sup>

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<sup>9</sup> “U.S. Census Bureau QuickFacts: United States,” accessed October 4, 2021, <https://www.census.gov/quickfacts/fact/table/US/PST045219>.

<sup>10</sup> RTDNA, “Research: Local News Diversity Reaches Records, but Representation Gap Shrinks Slowly,” accessed September 14, 2021, [https://www.rtdna.org/article/research\\_local\\_news\\_diversity\\_reaches\\_records\\_but\\_representation\\_gap\\_shrinks\\_slowly](https://www.rtdna.org/article/research_local_news_diversity_reaches_records_but_representation_gap_shrinks_slowly).

<sup>11</sup> Arana, “Decades of Failure.”

<sup>12</sup> Tal Abbady, “The Modern Newsroom Is Stuck Behind the Gender and Color Line,” NPR, May 1, 2017, <https://www.npr.org/sections/codeswitch/2017/05/01/492982066/the-modern-newsroom-is-stuck-behind-the-gender-and-color-line>.

In addition to representation, pay equity across gender and race is another significant problem. Studies have shown that white men earned the most of any demographic while women of color made the least. Reports have also noted that pay disparities in many newsrooms “boil down to management granting larger optional raises to men and whites than women and people of color.”<sup>13</sup>

The panel discussed how the industry is more aware of how communities of color have been excluded from local news, but several panelists noted that newsrooms have changed little in how top leadership — the decision-makers — define what is news and whose story is newsworthy.

During the discussion series, several panelists noted the lack of diversity in the news agenda, and the sameness in coverage when some of the top stories in the news feeds were covered by multiple outlets, with little distinguishing information from one story to the next.

Although this could be blamed on media consolidation or fewer reporters in local newsrooms, ingrained practices of conventional journalism styles were also deemed at fault. One panelist said “[journalists overall] are still going after the same stories,” and another noted that the stories in general were reliant on older formulas of reporting, “either really heavy on the problems or it’s the heroic story of beating the odds.”

The panel also discussed how standards, routines, and values of traditional journalism have alienated some community members and the need to build new relationships with potential audiences that goes beyond only sourcing more people from the community or covering local events.

### 3. Media Diet

In terms of topics represented in the news feeds, panelists generally agreed there was an overrepresentation of crime in the local feeds examined for both Albuquerque and Los Angeles, and that a more nuanced collection of stories would better represent the unique cultures of both places. Panelists noted that crime coverage was primarily from local TV news and major metro dailies.

Some panel members also noted missing editorial elements in most of the stories reviewed, which undermined the quality of reporting.

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<sup>13</sup> Karen K. Ho, “Women and Minorities Are Paid the Least in Newsrooms: Report,” *Columbia Journalism Review*, August 18, 2018, [https://www.cjr.org/business\\_of\\_news/women-minorities-salary-newsrooms.php](https://www.cjr.org/business_of_news/women-minorities-salary-newsrooms.php).

Panelists discussed the lack of contextualization and historical grounding in the reporting of the stories surfaced in the sample feeds and the missed opportunities to reflect the wider cultural diversity of the cities.

In the discussion of representativeness of news outlets, panelists noted that commercial television news was also over-represented in the Los Angeles and Albuquerque news feeds for the samples discussed during the panel. Possible reasons for this overrepresentation mentioned in the discussion include: use of SEO keywords, more reporters at some broadcast outlets can produce a greater volume of stories each day, and other factors.

In addition, major metro newspapers were often represented in the media diet of sample news feeds and in the examples that panelists gathered for discussions on representativeness.

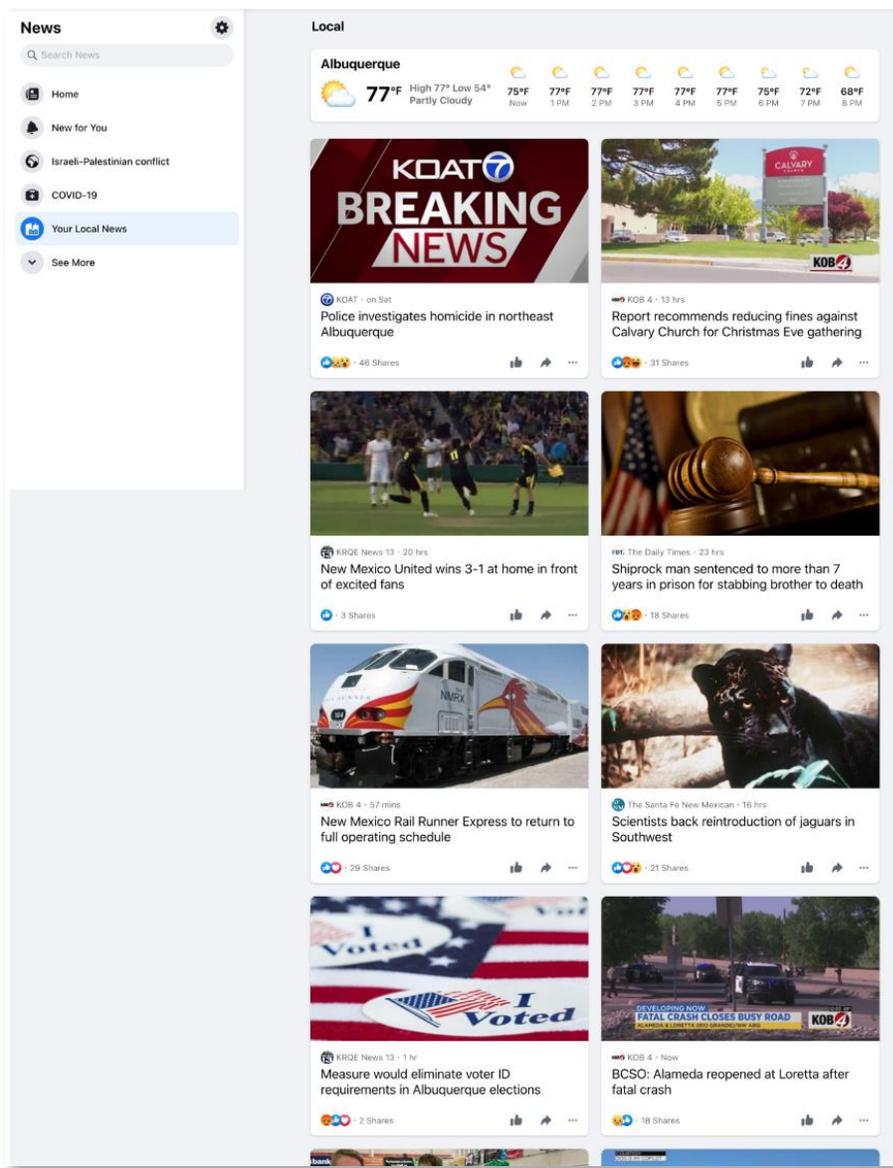


Figure 2. 'Screenshot of the First 10 Articles in a Facebook News Feed for Albuquerque.' From Facebook News captured, on May 17, 2021. Of the first 10 articles in the feed, seven are from broadcast outlets

Hyperlocal sources, including newsletters and sites that cover a single neighborhood, minority-produced media, and independent sites were not as visible in the sample news feeds that the panel reviewed. During discussions about how a news feed might be restructured to be more representative, one panelist suggested an example from a hyperlocal email newsletter — Downtown Albuquerque News. Two other panelists mentioned local college

and youth media outlets as potential sources that are typically underrepresented in news feeds.

In terms of sourcing, the panels also discussed how the demand of daily journalism often leads to more coverage of people in power. “We end up platforming people with power because they have the ability to call a press conference,” said a panelist.

Additionally, the New Mexico panel noted that news feeds that prioritize local stories for urban communities likely do not serve rural audiences. Albuquerque, with a population of over 560,000, is by far the largest community in the state. Rural residents made up close to 23 percent of New Mexico’s population in 2010.<sup>14</sup> For their news diet, many rural residents turn to Albuquerque outlets for news about statewide issues. “In New Mexico, there is often pushback from rural areas about the prevalence of crime stories because they didn’t feel relevant,” said one panelist when talking about how rural readers react to crime stories that get attention in Albuquerque.

Lastly, the inclusion of topics, sources, and outlets related to gender and gender issues were not discussed in depth but could be an interesting area to explore in seeking to create a more representative news feed and news diet. In Albuquerque, there is at least one local radio program, Women’s Focus on KUNM, that covers women in the news and women’s issues. Most of the recent topics centered on national stories but the hosts also cover local women in political races and contextualize national issues with local leaders for the KUNM audience in central and northern New Mexico. KUNM is based in Albuquerque and licensed to the University of New Mexico.

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<sup>14</sup> Suzan Reagan, “How Rural Is New Mexico? – Bureau of Business & Economic Research Blog,” October 9, 2016, <https://bber.unm.edu/blog/how-rural-is-new-mexico/>.

## Part II: Enduring Challenges to Improving Representativeness

Although the panel was able to identify and define important aspects of representativeness, the group highlighted the many challenges affecting the journalism industry (and local news in particular) that introduce obstacles to publishing truly representative coverage and designing a more representative news feed. These discussions focused principally on the economic challenges faced by local news providers, and the technical limitations of algorithmic news ranking and recommendation systems.

### The Challenging Economics of the Local News Ecosystem

Echoing current research on industry trends, the panelists observed that the deep, fundamental challenges to improving representativeness are not going to be easily overcome because of the complexity of the topic. Journalistic organizations have experienced significant changes in recent decades: newsroom employment in the US has fallen by 26 percent since 2008, according to a report from Pew Research.<sup>15</sup> According to the same Pew study, more jobs were lost in newspapers than television stations. Between 2008 and 2020, newspaper newsroom employment fell more dramatically (by 57 percent), and radio broadcasting lost 26 percent.

The panelists noted that shrinking newsrooms mean that fewer reporters are asked to produce greater volumes of stories, often working on tight deadlines and with lower pay.<sup>16</sup> A panelist said, “Because some newsrooms have cut back so much, reporters have to do 2-3 stories a day.”

The panelists extensively discussed how layoffs in local media have impacted news organizations and the stories available for curation in news feeds. The Los Angeles panelists noted that, for example, there are news deserts — locales where there are no longer any local media outlets — in central California.<sup>17</sup> Similarly, one panelist

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<sup>15</sup> Mason Walker, “U.S. Newsroom Employment Has Fallen 26% Since 2008,” Pew Research Center (blog), July 13, 2021, <https://www.pewresearch.org/fact-tank/2021/07/13/u-s-newsroom-employment-has-fallen-26-since-2008/>.

<sup>16</sup> Elizabeth Grieco, “10 Charts about America’s Newsrooms,” Pew Research Center (blog), April 28, 2020, <https://www.pewresearch.org/fact-tank/2020/04/28/10-charts-about-americas-newsrooms/>.

<sup>17</sup> Harris, “Measuring the Local News Landscape.”

in New Mexico noted that the content on the feeds was limited, but many times recommendation systems may have little news content as inputs to select from. The lack of content is the result of the cuts in the industry due to consolidations and closures that have heavily impacted local news outlets, and have reduced the overall volume and variety of news stories.

Research has also shown that the geographic concentration of employment in news outlets further dramatizes how closings and layoffs create news deserts that impact local news and representativeness. About one-in-five newsroom employees (22 percent) live in three metro areas — New York, Los Angeles, and Washington, DC.<sup>18</sup>

Given these economic trends, the panelists unsurprisingly found that smaller outlets were not equally represented in news feeds. “When looking at a news feed for my area, I feel that the local papers are underrepresented,” said one panelist. “Bigger outlets, broadcast outlets are dominating news feeds.”

The panelists’ sense of underrepresentation of smaller, local outlets is in fact a trend documented by researchers. In a 2018 study of the effect of news recommendations in Google News during the 2016 election, Nechushtai and Lewis found that users with different political views were recommended very similar news stories, challenging the assumption that algorithms necessarily create echo chambers or filter bubbles.<sup>19</sup> In addition, the findings of the 2018 study revealed a high degree of homogenization and concentration in the diversity of news outlets recommended: 69 percent of all recommendations referred to only five news organizations.<sup>20</sup>

The two researchers also noted that out of 14 organizations that emerged across the different searches, only three were born-digital. Similarly, in a different study, also conducted in 2018, Haim, Graefe, and Brosius examined the effect of personalized content in recommender systems on source diversity of Google News and found a general bias toward the overrepresentation of certain news outlets (primarily national, mainstream sources).<sup>21</sup>

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<sup>18</sup> Grieco, “10 Charts about America’s Newsrooms.”

<sup>19</sup> Efrat Nechushtai and Seth Lewis, “What Kind of News Gatekeepers Do We Want Machines to Be? Filter Bubbles, Fragmentation, and the Normative Dimensions of Algorithmic Recommendations,” *Computers in Human Behavior* 90 (August 1, 2018), <https://doi.org/10.1016/j.chb.2018.07.043>.

<sup>20</sup> Nechushtai and Lewis, “What Kind of News Gatekeepers Do We Want Machines to Be?”

<sup>21</sup> Mario Haim, Andreas Graefe, and Hans-Bernd Brosius, “Burst of the Filter Bubble?” *Digital Journalism* 6, no. 3 (March 16, 2018): 330–43, <https://doi.org/10.1080/21670811.2017.1338145>.

According to a panelist from New Mexico, local broadcast outlets are represented more often because they turn out more stories — volume of stories appears to be a key factor for appearing in news feeds. Local broadcast outlets in New Mexico in turn are able to produce more stories that show up in news feeds because there are more of them. Yet, the same panelist noted that many of those newsrooms often hire reporters from outside of the state whose reports don't appear to fully reflect the diversity of New Mexico.

Another challenge discussed by panelists is how news outlets that use analytics and other tools to track audience engagement with stories often report that people spend more time on stories that they say they are not necessarily interested in.

“What people say they want versus what they click on are very different things,” said one panelist. “We do user research that shows people click on the crime stories even when they say they want something else.”

Appropriately analyzing and acting on audience engagement metrics is a persistent challenge for newsroom leaders. Across the country, news outlets are experimenting with engagement efforts that go beyond clicks and time on page to gain a better understanding of how they can ensure local content is in line with what their audience is looking for when it comes to local news.

## Identifying the Limitations of Employing Algorithms to Improve Representativeness in Local Newsfeeds

The panelists indicated concerns that the algorithms used to create local news feeds aren't nuanced enough to meet the needs of a diverse news reading population. Panelists concluded that humans, and journalists in particular, would need to play a significant role in creating and curating a more representative news feed.<sup>22</sup>

A call for more human involvement does not mean that human judgement is not without its issues: panel participants recognized that both algorithms and humans are biased. Panelists felt that people who design algorithms and news producers who make decisions about what is newsworthy all bring their own perspectives and subconscious prejudices to the news making

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<sup>22</sup> Robin Good, “Table of Contents,” Content Curation Official Guide (blog), February 12, 2018, <https://medium.com/content-curation-official-guide/table-of-contents-introduction-19ebe8f400c9>.

process. Participants generally agreed that there is work to be done in both areas.

A concern with algorithmic biases, lack of transparency in public knowledge of how algorithms work, and low media literacy among citizens were issues that surfaced in panel discussions.

Some of the panelists' concerns with algorithm bias have been documented in scholarly research on the power algorithms to reproduce racial, gender, class, and other forms of discrimination across areas of social and institutional decision-making. These biases can be reproduced in news and information searches, employment, health care, higher education, housing, photo-recognition software, policing and criminal justice, credit scores or home loans.<sup>23</sup> Some critical scholars have exposed how embedded biases in algorithms result in racist and sexist representations and discriminatory practices with material consequences, primarily for people of color, women, low-income and other marginalized and vulnerable communities.<sup>24</sup> Much as with the problem of newsrooms, this may be the result of a lack of diversity within engineering positions in high tech industries.<sup>25</sup> Noble, a media scholar, argues in addition that when the goal is to produce clicks for advertisers, rather than promoting the public good, Google's dominance in the information ecosystem further marginalizes the groups already marginalized.<sup>26</sup>

During the panels, participants also raised the problem of transparency and representation. They wanted more information about how platforms define the boundaries of local news and how those limits might differ from how local residents see their own community. This concern with transparency echoes scholarly research that has called for guidelines to ensure algorithmic

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<sup>23</sup> Safiya Noble, "Algorithms of Oppression," NYU Press (blog), February 2018, <https://nyupress.org/9781479837243/algorithms-of-oppression>; Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, 1st edition (New York: Crown, 2016); N. Lee, "Detecting Racial Bias in Algorithms and Machine Learning," *J. Inf. Commun. Ethics Society*, 2018, <https://doi.org/10.1108/JICES-06-2018-0056>; David Theo Goldberg, "Coding Time," *Critical Times* 2, no. 3 (December 1, 2019): 353–69, <https://doi.org/10.1215/26410478-7862517>.

<sup>24</sup> Megan Garcia, "Racist in the Machine: The Disturbing Implications of Algorithmic Bias," *World Policy Journal* 33 (January 1, 2016): 111–17, <https://doi.org/10.1215/07402775-3813015>.

<sup>25</sup> Heidi Ledford, "Millions of Black People Affected by Racial Bias in Health-Care Algorithms," *Nature* 574, no. 7780 (October 24, 2019): 608–9, <https://doi.org/10.1038/d41586-019-03228-6>; Matt J. Kusner and Joshua R. Loftus, "The Long Road to Fairer Algorithms," *Nature* 578, no. 7793 (February 2020): 34–36, <https://doi.org/10.1038/d41586-020-00274-3>; Kyle Wiggers, "Study Finds Diversity in Data Science Teams Is Key in Reducing Algorithmic Bias," *VentureBeat*, October 9, 2020, <https://venturebeat.com/2020/12/09/columbia-researchers-find-white-men-are-the-worst-at-reducing-ai-bias/>; Will Knight, "Biased Algorithms Are Everywhere, and No One Seems to Care," *IMDiversity*, July 12, 2017, <https://imdiversity.com/diversity-news/biased-algorithms-are-everywhere-and-no-one-seems-to-care/>.

<sup>26</sup> Noble, "Algorithms of Oppression." 35–48.

transparency as a tenet of ethical journalism. Diakopoulos and Koliska, for example, identify multiple mechanisms that can be used to disclose information algorithms across data, interface, and models.<sup>27</sup>

The perceptions and opinions of the panelists overall echo the results of academic research about automation in journalism organizations: algorithms are causing deep transformations in the practice of reading and writing news.

Researchers have provided insights on how the use of algorithms is transforming routine news work while exposing tensions posed by the conflicting logics of journalism and computational thinking.<sup>28</sup> For example, Linden's study of The Associated Press, ProPublica, and Local Labs suggests that new routines, loss of jobs, and the transformation of professional ideologies driven by automation seem to be an accepted reality among professional journalists who, simultaneously, resist or try to navigate tensions.<sup>29</sup> Likewise, when Milosavljević and Vobič compared the views of editors in the United Kingdom and Germany on how algorithms are re-articulating the ideals of journalism, they found that editors perceived their professional ideology as one in a state of flux. Their attitudes toward automation were neither "euphoric nor dystopian" and reflected an understanding that journalists are balancing the civic-oriented normative aims with the profit-oriented goals of a business that seeks to minimize that cost of labor. This leads the researchers to envision a long-term scenario where "both humans and machines will define the production and ideologisation of professional journalism."<sup>30</sup>

Similarly, the panelists were not completely against the use of algorithms to rank and recommend news. Rather, panelists unanimously felt that journalists need to be a major part of shaping parameters for machine learning models, and any news feed would

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<sup>27</sup> Nicholas Diakopoulos and Michael Koliska, "Algorithmic Transparency in the News Media," *Digital Journalism*, July 27, 2016, 1–20, <https://doi.org/10.1080/21670811.2016.1208053>.

<sup>28</sup> Arjen van Dalen, "The Algorithms Behind the Headlines," *Journalism Practice* 6, no. 5–6 (October 1, 2012): 648–58, <https://doi.org/10.1080/17512786.2012.667268>; Diakopoulos, "The Journalistic Newsfeed: Editorial Values and Algorithms," *Columbia Journalism Review*, December 13, 2019, [https://www.cjr.org/tow\\_center/journalism-newsfeeds-ai-artificial-intelligence.php](https://www.cjr.org/tow_center/journalism-newsfeeds-ai-artificial-intelligence.php).

<sup>29</sup> Carl-Gustav Lindén, "Algorithms for Journalism: The Future of News Work," *The Journal of Media Innovations* 4, no. 1 (January 12, 2017): 60–76, <https://doi.org/10.5617/jmi.v4i1.2420>.

<sup>30</sup> Marko Milosavljević and Igor Vobič, "Human Still in the Loop: Editors Reconsider the Ideals of Professional Journalism Through Automation," *Digital Journalism* 7 (May 15, 2019): 1–19, <https://doi.org/10.1080/21670811.2019.1601576>.

need involvement from human curators to ensure quality with regard to representativeness.

The panelists' sentiments again echoed broader research into the evolving workflow of journalists who have adopted different forms of automation, and who are favoring human curation in addition to the design of "journalistic algorithms" responsive to normative editorial values and priorities. In a study of public media websites in Europe, Sørensen examined how values like diversity of viewpoints, fairness and transparency were upheld under recommender system technologies and how journalists favored human curation systems on top of recommender systems with the goal of re-installing journalism values, ethics and principles.<sup>31</sup>

Ultimately, panelists agreed that reporting algorithms should help journalists play their watchdog role, facilitate investigative reporting, maintain ethical commitments, and create a more democratic system of news recommenders.

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<sup>31</sup> Jannick Kirk Sørensen, "The Shortcomings of the Diversity Diet: Public Service Media, Algorithms and the Multiple Dimensions of Diversity," *Algorithmic Distribution of the News: Policy Responses*, July 2, 2021, <https://vbn.aau.dk/en/publications/the-shortcomings-of-the-diversity-diet-public-service-media-algor>.

## Conclusions

The panel agreed that an algorithmically curated news feed would not do justice to the multiple dimensions of representativeness identified by the group, even with the help of human curators. This was due to a number of factors, identified below.

The panel participants identified the dimensions of representativeness as a starting point to understand how to approach the needs of the local audiences they serve. However, they acknowledged that these dimensions were not intended to be a comprehensive definition of representativeness, and instead emphasized the context-dependent nature of the concept. Representativeness is therefore heavily dependent on organizational, economic, and ideological commitments of news organizations, and thus not easily codified into measurable signals for ranking and recommendation systems.

Panelists also pointed out the existing challenges facing the journalism industry itself and how these challenges may lead to additional obstacles to the creation of a representative news feed. For example, the group discussed that for decades — before automation entered the picture — diversity has been undermined by enduring economic pressures that result in the closing or downsizing of news outlets, heavier reliance on audience analytics to make editorial decisions, and inconsistent leadership in predominantly white newsrooms to hire and retain journalists of color.

In addition, panelists identified some of the ways that a lack of diversity is being manifested and amplified by the algorithm-driven systems of news recommendations. In the sample news feeds discussed during the panel, the group noted the similarity of stories covered across news outlets represented in news feeds. They discussed the overrepresentation of stories such as crime stories and commodity news, official sources, and of major commercial television stations and newspapers in their cities. They also discussed the general underrepresentation of the following components including smaller community news outlets and hyperlocal news sources and diverse voices from the community.

Ultimately, the economic challenges facing local news outlets and challenges posed when using algorithms to create local news feeds led panelists to conclude that algorithms alone could not increase representativeness. Most panelists viewed human curation in addition to algorithms as a minimal, necessary recourse within a

media ecosystem that is not driven primarily by journalists' editorial values but by the economic interests of major news organizations and dominant big data and information businesses. However, the group emphasized that both human curation and algorithms have biases and limitations.

## Potential Future Explorations of Representativeness

Panelists agreed that improving the issue of representativeness in journalism is difficult and yet of critical importance. Despite deciding that automated processes could not improve representativeness fundamentally in ranking and recommendation systems, panelists also acknowledged that the journalism industry has not adequately addressed this issue either. Panel discussions centered on the fact that many of the challenges to representativeness in journalism have existed previous to the popularity of automated ranking and recommendation systems. The responsibility, thus, lies with both journalists and technologists to improve, not just the ways that algorithms rank and recommend news, but also how journalists and news organizations approach representativeness in their own work.

The panelists identified opportunities for improvements in the realm of representativeness, while also emphasizing that this topic is nuanced and complicated and requires more input and communication between both technologists and journalism communities.

## Suggestions for Identifying Local News

A more representative news feed would start with greater understanding of the communities that actually live in the city or locale/area in question. It is important to keep in mind that identities are incredibly complex, and people identify in ways that may seem counterintuitive to someone on the outside. That being said, panelists agreed that three essential elements to consider when thinking about representativeness in news feeds for a city include: the demographics of the audiences being served; the demographics of the reporters writing and editing local stories; and the demographics of the local sources being cited in articles.

Part of the reason the panelists were so skeptical of algorithmic curation and its current potential to rank and recommend using a complex metric like representativeness in local news, is because they felt that the algorithms were still unable to identify what local news is. An obvious metric of a successful local news feed is the

incorporation of actual local news. This is complicated by the fact that a city is not only about geography but also about community, as mentioned above.

While not comprehensive, the panel agreed that the following markers were helpful in their own considerations of what local means for the audiences they serve:

- Zip codes
- Neighborhood names
- Prominent community groups, coalitions and relevant non-profits
- School districts
- Local government institutions (school boards, city councils, etc.)
- Spheres of influence (i.e., City Hall in one place, but has impacts throughout the city)
- Notable citizens (celebrities, athletes, artists, etc.)
- Issues affecting specific demographics (poverty, housing markets)
- Landmarks
- Elected officials

How these markers could be used as signals for identifying what local means in a news feed would require further exploration and discussion between local newsmakers and technologists.

### **Improving Representation: Considerations for Newsrooms and Journalism Institutions**

The burden of responsibility for improving representativeness in journalism does not fall solely on the platform news products. As the panel discussed throughout each session, some of the challenges to improving representativeness in the local news feeds were long-standing diversity issues affecting the journalism industry.

Many journalism schools, news outlets, and professional industry associations have already been working towards improving their approach to representativeness.

Some of the ways the journalism community can continue to improve include:

- Journalism schools need to maintain and innovate in their commitment to teaching prospective reporters to engage with diverse community members.
- Professional journalism organizations, newsrooms and J-school researchers need to come together to publicly share resources, best practices and successful processes for improving on representativeness in journalism so newer, less funded outlets don't have to "reinvent the wheel" and waste precious resources in order to develop strategies that already exist.
- Create more opportunities for recent graduates from local communities to find jobs in local media. For example, NM Local News Fund currently partners with the University of New Mexico and New Mexico State University in recent years to place early career fellows in local newsrooms.<sup>32</sup> The fellowships are paid full-time positions with support from UNM faculty. The newsrooms also receive funding and support when they host fellows. The program was created to address several needs identified in mapping the local news ecosystem in 2018 to address three needs:
  - Effective school-to-career pathway for diverse student journalists
  - Expanded journalistic capacity in local public-service newsrooms
  - Innovation, collaboration and community engagement in the state's local news ecosystem
- Journalists and newsrooms can also continue to engage in analysis of how the standards for journalism in recent decades contributed to exclusion of some communities.

On this last point, one panelist shared, for example, "One thing I've enjoyed working on with Latinx media at USC is that they try to pitch what they feel is important and useful to them. On our desk we've never turned a pitch down because the stories end up being very personal and genuine to that demographic. This helps to think about what is best for them and what represents them."

In addition to the need for journalists and technologists to work together to assess opportunities for creating more representative

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<sup>32</sup> "Local News Fellowship Program – New Mexico Local News Fund." n.d. Accessed September 14, 2021. <https://www.nmlocalnews.org/unm-pilot-program/>.

algorithms, there could also be a role for the audience. Surveys or focus groups with community members could also contribute to the continued evolution of algorithms that more accurately reflect how people define the boundaries of their local community and the information they need to understand what's most important in their lives.

A more representative news feed is possible but must be approached as a shared goal of both platforms and journalists with input from local communities wherever possible.

## Bibliography

- Abbady, Tal. "The Modern Newsroom Is Stuck Behind the Gender and Color Line." *NPR Code Switch*, May 1, 2017. <https://www.npr.org/sections/codeswitch/2017/05/01/492982066/the-modern-newsroom-is-stuck-behind-the-gender-and-color-line>.
- AdeptPlus. "Nielsen DMA 2021 Rankings." *MediaTracks Communications*. Accessed September 16, 2021. <https://mediatracks.com/resources/nielsen-dma-rankings-2021/>.
- Arana, Gabriel. "Decades of Failure." *Columbia Journalism Review*, Fall 2018. [https://www.cjr.org/special\\_report/race-ethnicity-newsrooms-data.php/](https://www.cjr.org/special_report/race-ethnicity-newsrooms-data.php/).
- Dalen, Arjen van. "The Algorithms Behind the Headlines." *Journalism Practice* 6, no. 5–6 (October 1, 2012): 648–58. <https://doi.org/10.1080/17512786.2012.667268>.
- Diakopoulos, Nicholas. "The Journalistic Newsfeed: Editorial Values and Algorithms." *Columbia Journalism Review*, October 13, 2019. [https://www.cjr.org/tow\\_center/journalism-newsfeeds-ai-artificial-intelligence.php](https://www.cjr.org/tow_center/journalism-newsfeeds-ai-artificial-intelligence.php).
- Diakopoulos, Nicholas, and Michael Koliska. "Algorithmic Transparency in the News Media." *Digital Journalism*, July 27, 2016, 1–20. <https://doi.org/10.1080/21670811.2016.1208053>.
- Garcia, Megan. "Racist in the Machine: The Disturbing Implications of Algorithmic Bias." *World Policy Journal* 33 (January 1, 2016): 111–17. <https://doi.org/10.1215/07402775-3813015>.
- Goldberg, David Theo. "Coding Time." *Critical Times* 2, no. 3 (December 1, 2019): 353–69. <https://doi.org/10.1215/26410478-7862517>.
- Good, Robin. "Content Curation Official Guide." *Medium* (blog), February 12, 2018. <https://medium.com/content-curation-official-guide/table-of-contents-introduction-19ebe8f400c9>.
- Grieco, Elizabeth. "10 Charts about America's Newsrooms." *Pew Research Center* (blog), April 28, 2020. <https://www.pewresearch.org/fact-tank/2020/04/28/10-charts-about-americas-newsrooms/>.
- Haim, Mario, Andreas Graefe, and Hans-Bernd Brosius. "Burst of the Filter Bubble?" *Digital Journalism* 6, no. 3 (March 16, 2018): 330–43. <https://doi.org/10.1080/21670811.2017.1338145>.
- Harris, Lauren. "Measuring the Local News Landscape: A Q&A with Penny Abernathy." *Columbia Journalism Review*. Accessed September 14, 2021. [https://www.cjr.org/business\\_of\\_news/local-news-landscape-penny-abernathy.php](https://www.cjr.org/business_of_news/local-news-landscape-penny-abernathy.php).
- Ho, Karen K. "Women and Minorities Are Paid the Least in Newsrooms: Report." *Columbia Journalism Review*. Accessed September 14, 2021. [https://www.cjr.org/business\\_of\\_news/women-minorities-salary-newsrooms.php](https://www.cjr.org/business_of_news/women-minorities-salary-newsrooms.php).

- Knight, Will. "Biased Algorithms Are Everywhere, and No One Seems to Care." *IMDiversity*, July 12, 2017. <https://imdiversity.com/diversity-news/biased-algorithms-are-everywhere-and-no-one-seems-to-care/>.
- Kusner, Matt J., and Joshua R. Loftus. "The Long Road to Fairer Algorithms." *Nature* 578, no. 7793 (February 2020): 34–36. <https://doi.org/10.1038/d41586-020-00274-3>.
- Ledford, Heidi. "Millions of Black People Affected by Racial Bias in Health-Care Algorithms." *Nature* 574, no. 7780 (October 24, 2019): 608–9. <https://doi.org/10.1038/d41586-019-03228-6>.
- Lee, N. "Detecting Racial Bias in Algorithms and Machine Learning." *J. Inf. Community Ethics Society*, 2018. <https://doi.org/10.1108/JICES-06-2018-0056>.
- Lindén, Carl-Gustav. "Algorithms for Journalism: The Future of News Work." *The Journal of Media Innovations* 4, no. 1 (January 12, 2017): 60–76. <https://doi.org/10.5617/jmi.v4i1.2420>.
- Milosavljević, Marko, and Igor Vobič. "Human Still in the Loop: Editors Reconsider the Ideals of Professional Journalism Through Automation." *Digital Journalism* 7 (May 15, 2019): 1–19. <https://doi.org/10.1080/21670811.2019.1601576>.
- Mitchell, Amy, and Tom Rosenstiel. "Navigating News Online." *Pew Research Center's Journalism Project* (blog), May 9, 2011. <https://www.pewresearch.org/journalism/2011/05/09/navigating-news-online/>.
- Nechushtai, Efrat, and Seth Lewis. "What Kind of News Gatekeepers Do We Want Machines to Be? Filter Bubbles, Fragmentation, and the Normative Dimensions of Algorithmic Recommendations." *Computers in Human Behavior* 90 (August 1, 2018). <https://doi.org/10.1016/j.chb.2018.07.043>.
- Noble, Safiya. "Algorithms of Oppression." *NYU Press* (blog), February 2018. <https://nyupress.org/9781479837243/algorithms-of-oppression>.
- O'Neil, Cathy. *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. 1st edition. New York: Crown, 2016.
- Reagan, Suzan. "How Rural Is New Mexico?" *Bureau of Business & Economic Research Blog*, October 9, 2016. <https://bber.unm.edu/blog/how-rural-is-new-mexico/>.
- RTDNA. "Research: Local News Diversity Reaches Records, but Representation Gap Shrinks Slowly." Accessed September 14, 2021. [https://www.rtdna.org/article/research\\_local\\_news\\_diversity\\_reaches\\_records\\_but\\_representation\\_gap\\_shrinks\\_slowly](https://www.rtdna.org/article/research_local_news_diversity_reaches_records_but_representation_gap_shrinks_slowly).
- Sørensen, Jannick Kirk. "The Shortcomings of the Diversity Diet: Public Service Media, Algorithms and the Multiple Dimensions of Diversity." *Algorithmic Distribution of the News: Policy Responses*, July 2, 2021. <https://vbn.aau.dk/en/publications/the-shortcomings-of-the-diversity-diet-public-service-media-algor>.

- Sarah Cohen, James T. Hamilton, Fred Turner. "Computational Journalism." *Communications of the ACM* 54, no. 10 (October 2011): 66–71. <https://doi.org/10.1145/2001269.2001288>.
- . "U.S. Census Bureau QuickFacts: Albuquerque City, New Mexico." Accessed September 16, 2021. <https://www.census.gov/quickfacts/fact/table/albuquerquecitynewmexico/PST045219>.
- . "U.S. Census Bureau QuickFacts: Los Angeles City, California." Accessed September 16, 2021. <https://www.census.gov/quickfacts/losangelescitycalifornia>.
- . "U.S. Census Bureau QuickFacts: United States." Accessed October 4, 2021. <https://www.census.gov/quickfacts/fact/table/US/PST045219>.
- Walker, Mason. "U.S. Newsroom Employment Has Fallen 26% since 2008." *Pew Research Center* (blog), July 13, 2021. <https://www.pewresearch.org/fact-tank/2021/07/13/u-s-newsroom-employment-has-fallen-26-since-2008/>.
- Wiggers, Kyle. "Study Finds Diversity in Data Science Teams Is Key in Reducing Algorithmic Bias." *VentureBeat*. Accessed October 9, 2020. <https://venturebeat.com/2020/12/09/columbia-researchers-find-white-men-are-the-worst-at-reducing-ai-bias/>.