Narrative and Numerical

Bridging the Gap Between Quantitative & Qualitative Data through User-Centered Data System Design

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ABSTRACT

In this study, which is a small part of a larger research project, I examine the National Incident-Based Reporting System (NIBRS), one of the FBI's primary methods for collecting national crime data from local and state law enforcement. NIBRS is touted as an upgrade from the previous system in that it collects data with more context in order to provide a fuller picture of crime in the United States for stakeholders such as law enforcement, policy makers, academics, journalists, and the public. Using critical data studies frameworks and narrative methods, I unblackbox the data system to understand its construction and rhetorical grounding.

CCS CONCEPTS

• **Information systems** → Data management systems; • **Human-centered computing** → Visualization; Accessibility; • **Social and professional topics** → User characteristics.

KEYWORDS

Social justice, data, crime, NIBRS, UCR, FBI, data system, unblackboxing, data visualization

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1 INTRODUCTION

Technical and professional communication (TPC) scholars are paying attention to data in new ways. Specifically, we're seeing more work on data and information visualization [1-5], and big data, algorithms, and surveillance [6-8]. As we expand technical communication in accordance with the field's social justice turn [9], one of the questions we must ask is: how can we begin working to make public data more just?

In answer to that question, I argue that we as a field have an ethical obligation to study policing and crime as social justice and technical communication issues. Because policing and law enforcement disproportionately harm marginalized people, and particularly Black people, it is especially crucial that we as a field understand the systems by which these institutions create and distribute knowledge about who commits and who is victimized by crime in this country.

Part of a larger research project, this study examines the National Incident-Based Reporting System (NIBRS), one of the FBI's primary methods for collecting national crime data from local and state law enforcement. NIBRS is touted as an upgrade from the previous system in that it collects data with more context in order to provide a fuller picture of crime in the United States for stakeholders such as law enforcement, policy makers, academics, journalists, and the public. By combining critical data studies frameworks with narrative inquiry, I work to unblackbox the data system [10]: understand its construction and rhetorical grounding from the earliest stages, not just its effects.

2 BACKGROUND

The design process for data systems usually privileges quantitative inputs and standard visualization outputs. Researchers have shown that these visualizations are often difficult to use and understand for various users [11-12]; quantitative expertise becomes a prerequisite for interacting on a deep level with the data. Cairo argues that despite info- and data visualization's incredible persuasive effect on audiences, it's common for these visualizations to be misinterpreted or misunderstood, resulting in misinformation over time [13].

Technical and professional communication scholars have suggested, in line with Cairo's argument, that while data visualization is key in communicating complex information, it cannot do so without additional communicative support [14] that takes into account audiences' needs, reasoning processes and heuristics, and cultural contexts [15]. Additionally, because of the intense persuasive power of data visualizations and the difficulty in using them effectively and ethically, scholars have recognized the importance of invention in data: Wolfe argues that the choice of what data to visualize and how is highly rhetorical and cannot be ignored. Indeed, these elements of choice early on in the process of working and communicating with data, even before a user approaches the data or visualization, shape what users will eventually receive as validated, evidence-based knowledge about a given phenomenon [5].

Qualitative and narrative knowledge are often undervalued or decentralized in technical and professional contexts. However, story and narrative underlie a great deal of communication, including technical and professional communication. Scholars have long recognized that the act of sensemaking is one of organizing multiple

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flows of experience and information into a plausible story, and that in that organizational act, "order ... comes just as much from the subtle, the small, the relational, the oral, the particular, and the momentary as it does from the conspicuous, the large, the substantive, the written, the general, and the sustained" (p. 410) [16]. These types of personal, particular knowledges are often left out of design and development, which tend toward more dominant narratives of what users want and need, and indeed who those users even are. Our field's social justice work enables many users' needs to be part of the design process, especially those who are marginalized or multiply marginalized; as Jones argues, paying attention to which kinds of knowledges and whose knowledges are baked into design can help us identify opportunities for change [17]. Acknowledging and fostering narrative expertise in the context of data and data visualization can help us take steps toward user-centered design for data systems [17-18].

2.1 Data in Crime & Policing

Data is used in a number of different applications in policing to make decisions. These fall generally into two categories — algorithmic and statistical — where algorithmic data is pulled from programs like PredPol which "predict" where crime will occur and tell officers where to go, and where statistical data is drawn from reported crime counts and rates in a given area or of a given type. This statistical data similarly informs political rhetoric and action, because it's what legislators and lobbyists use to understand crime rates, make claims about safety and risk, allocate funding to law enforcement agencies, and create policy about how law enforcement should operate.

Technologies used by law enforcement such as PredPol (a predictive policing software which uses an agency's existing data to predict where crime will occur in future) and ShotSpotter (a noise detecting software that uses devices mounted in specific areas to pick up potential gunfire and alert law enforcement) fall into the algorithmic data category. These technologies suffer from the same algorithmic biases identified by scholars such as Noble [19] in that they disproportionately affect marginalized people [20]. While these algorithmic law enforcement technologies are important examples of harmful technology we in TPC should be studying and attempting to intervene in, in this study I focus on the statistical data of the Uniform Crime Report (UCR), the FBI's program which collects and publishes crime data nationwide.

2.2 National Incident-Based Reporting System (NIBRS)

Crime information is published via a number of different reports and collected via a network of interconnected programs and systems. The Uniform Crime Report (UCR) program collects information about crime from all agencies that report data to the FBI; the systems LEAs use to report that data are called the Summary Reporting System or SRS and the National Incident-Based Reporting System or NIBRS. The SRS is the older of the two systems, dating back to the first stages of the FBI's collection of data about crime in the US; NIBRS is newer, first appearing in the 1980s, and takes a different tack to reporting crime information to the FBI, using incidents as the base unit of information in order to collect more context about a crime, namely information about offenders, victims, circumstances, and each offense or type of crime committed during an "incident." NIBRS is worth paying attention to now because it will soon be the sole method for reporting crime data to the UCR program, as the SRS is being phased out as of January 1, 2021. The FBI's claim is that NIBRS allows for "greater specificity in reporting offenses," "more detailed information," and "greater analytic flexibility", while also helping "give context to specific crime problems" such as drug use and identity theft [21]. The FBI's documentation on this transition, aimed at law enforcement agencies on the state and local levels, frames the transition as one focused on sustainability of data and richness of data.

Data submitted to the UCR program via either of these two systems are then published in a few different locations: the Crime in the United States report or CIUS, which has published annual data from the UCR for decades; the Crime Data Explorer or CDE, which is an interactive front-end display for crime data plus bulk data download and API setup for users with programming expertise; and a set of national and state data tables and interactive map for each reporting system on the UCR's website.

2.3 Research Questions

To guide my study of this system transition, I ask the following research questions:

- How does the NIBRS transition affect sensemaking and decision making using this data?
- How can this transition help technical communicators design data systems with justice as their goal?

3 METHODS

I use "unblackboxing" as a methodology to rhetorically analyze data systems, referring to Latour's "blackboxing" to describe a process of making a technology's workings apparent and visible again after its success had made them fade into the background [10]. The study is designed to analyze not the data points themselves, but the cultural and material systems structuring that data, with the ultimate goal of determining what implicit rhetorical messages these systems are carrying and who counts as a user.

To begin examining this case and unblackboxing this data system, I focused on the system itself — NIBRS's construction and various outlets for publication (described further in section 4; for simplicity of explanation, those outlets are the CDE, the NIBRS map, and the NIBRS data tables). I examined what data elements specifically are collected when a law enforcement agency submits data via NIBRS, with special attention to how those elements are organized and have been iterated on recently. Especially important to unblackboxing is the idea of the encounter — to truly understand user experience, the researcher must be willing to engage with the data system as a whole and respond to the themes or issues that arise, rather than working only with highly controlled, strictly scientific experimentation [22]. In doing this work, I realized that parts of this system are only accessible to certain groups of the public (those with programming experience, for instance), so part of my unblackboxing became trying to assess what data is accessible to whom and how.

Since this particular system involves so many varied ways to encounter "the data," each of them with different affordances, I tested each with information seeking tasks to understand what questions could be answered by which part of the system. Because this research is early work in a larger study, I used a relatively loose think aloud process, but in future iterations of this work I would conduct more specific usability tests with participants. Additionally, I was heavily interested in comparing what aspects of the data were *not* present from one part of the system to another, since those differences seem to have implications for access and transparency.

Because unblackboxing focuses on understanding the cultural and material systems that structure data, I also needed to investigate how the FBI *stories* the NIBRS — what narratives do they tell about it, and to whom? In this case, most of the documentation around the data system is found in reports, FBI websites and adjacent pages, and news updates. I also included a section of the NIBRS user manual which focuses on the history of the UCR program, because it works to historicize both the UCR and NIBRS for the benefit of law enforcement agencies considering making the switch. Most of the narratives embedded in this documentation were not traditional narratives as such, but they did involve Clandinin's narrative commonplaces (temporality, sociality, place) [23], and I used that framework as a heuristic to analyze the implicit narratives present.

4 FINDINGS

NIBRS has been a data submission option for law enforcement since the 1980s, and the FBI has continued to iterate on this system over time as both more LEAs used the system and as the landscape of law enforcement, crime, and society have changed over time. Some key changes that have appeared in NIBRS over the past few years are the change to the new rape definition that's more inclusive, the recognition of same gender relationships rather than marking them as acquaintances, and in 2019 the addition of a specific category for domestic and family violence that addresses specific areas of the database ("lovers' quarrel" was changed to "domestic violence" in reasons for murder, and there is now a value for ex-relationships to help specify relationships between abusers and victims in this category).

4.1 NIBRS Design and Interface

NIBRS collects up to 53 data elements for each incident, divided into segments: administrative, offense, property, victim, offender, and arrestee. Each segment breaks down includes the relevant elements: administrative elements give the incident a number and match it with its agency; offense elements identify the various offenses in an incident such as arson or assault; property elements identify the type and value of property involved; victim elements give demographic information about each victim involved; offender elements give demographic information about each offender involved, if known; arrestee elements give demographic information about people arrested for each incident, with specific linkage to the offenses named in the arrest. Some crimes, such as driving under the influence (DUI) are classed in a different group (Group B) and for these crimes, only arrest data is submitted.

However, this wealth of data elements is largely off-limits to the public; master files for NIBRS, divided by year, are available for free download on the Crime Data Explorer but are encoded such that data can only be extracted by those with programming experience. Similarly, NIBRS data can be accessed via an API with a freely available (via emailing the appropriate office at the FBI) API key; but again, any user wanting to do this would need the requisite experience. Instead, the public is invited to use a set of published tables presenting parts of the NIBRS data, an interactive map presenting NIBRS data, or the Crime Data Explorer, which is "the FBI's Uniform Crime Reporting (UCR) Program's dynamic solution to presenting crime data in a more immediate venue that reflects the constant change in the nation's crime circumstance."

The tables cut the data in a number of different ways and attempt to anticipate questions users might have; this is further evidenced by their framing in one section of the NIBRS site, where the site posits questions about the data under the heading 'What NIBRS, 2019, can tell us'. Each question is a link leading directly to the relevant table; in this way the NIBRS site suggests insights users might glean from the data and where those insights might be found. But in the tables themselves there is little in the way of context regarding data collection, which areas submitted data, etc.

The interactive NIBRS map provides a relatively simple way to find crime counts within a certain area, via physically looking in the relevant part of the map or using filters to help narrow agencies down. The map is the only NIBRS publication that visualizes the data geographically, allowing users to look at state and city data where available; it's also easy to see where data is not available, whether because agencies in those areas submitted via a different reporting system or not at all. Some filtering options on the map allow users to look for information on specific crimes or types of crime. However, this map doesn't include any of the contextual demographic, location type, weapon, or co-occurring offense data that the CDE provides — which is supposed to be the benefit of NIBRS data over the previous submission system. As shown in Figure 1 (below), clicking on the point for any agency on the map will pull up some information about the agency (in this case, South Bend, Indiana), the population served, and the counts of offenses, crime types, and specific crimes reported to NIBRS for 2019. It's possible to calculate rates for all these crimes or crime types from this information, but none of this is visualized for the user; they'd have to do it themselves.

The Crime Data Explorer [CDE] (https://crime-data-explorer.app.cloud.gov/pages/home) begins with a location and date selector — the user determines from the start of their investigation where and in which year they're looking. Unlike the tables & map, the CDE presents some trend visualizations, beginning with an interactive crime rate over time graph that allows the user to zero in on certain date ranges and select the specific crime or crime type they're interested in (violent or property). This trend is measured by population (offenses per 100,000 people). But despite a detailed methodology explaining the estimation processes used for partially-reporting and non-reporting agencies, as well as the conversion process to simplify NIBRS data into SRS data for reporting purposes (since about half of reporting agencies still used the SRS instead of NIBRS in 2019), it's unclear how much data is estimated for this

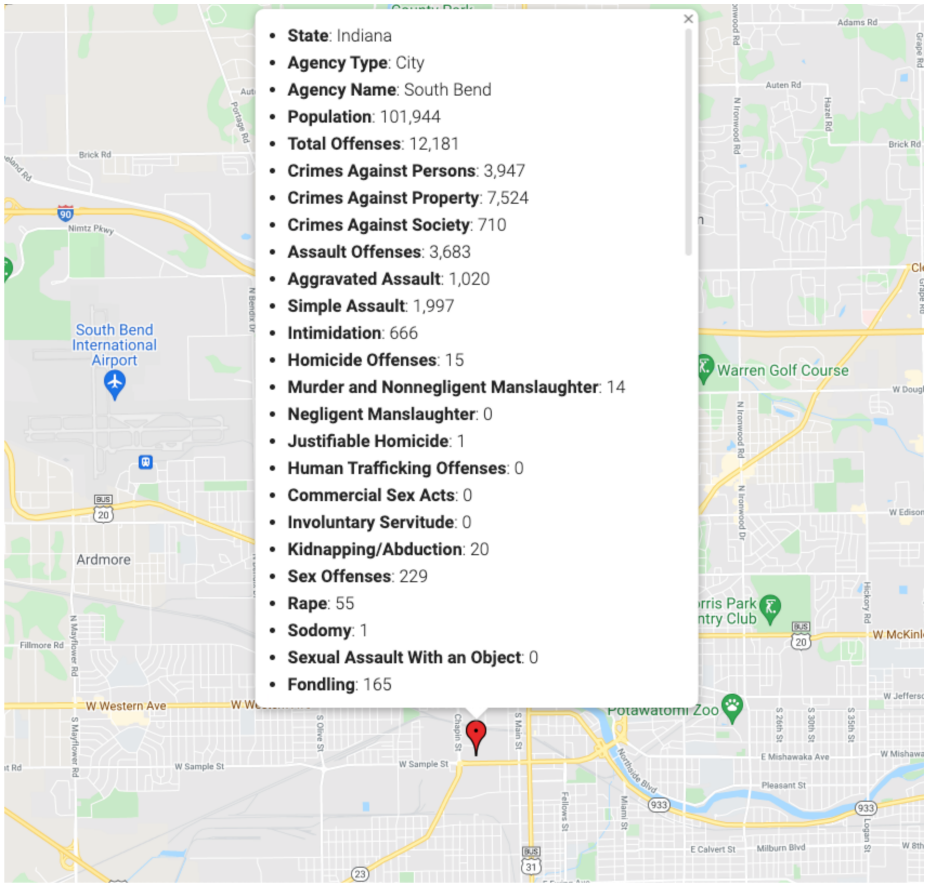

Figure 1: Screenshot of the NIBRS 2019 map with South Bend, Indiana's police department selected. The tooltip shows location names, population, total offenses, and counts for crime types and crimes collected through NIBRS in 2019.

visualization, and even how the population is calculated. Additionally this trend line can appear far more dramatic than it actually is because of the adaptive scaling; rather than starting at 0, the graph places the lowest point (2014, 361.6 violent crime offenses per 100,000 people) near the axis, so the scale starts at 360. Opening up the window for the trend to all the data available (1986-2019, at time of writing) shows the massive downward trend in the violent crime rate after the spike of the early 1990s, with the small rise from 2014-16 represented as a small bump; however, the graph's default 2009-2019 window zooms in on these small shifts such that they appear drastic.

Overall national data and data for some states focuses on giving information about who offenders and victims are, demographically, what crimes are being committed (and reported to police), where those crimes are being committed, with what weapons when applicable, and in conjunction with what other offenses. This data is visualized interactively, such that users can choose how they'd like to sort information (by value, high to low, or by key, A-Z) and view information (in numerals or in percentages). Visualizations are simple, consisting largely of bars but also including a pie chart representing offender & victim sex and a line graph showing crime rate trends over time. Users can also filter these visualizations by crime type or specific crime. Graphs like the one shown in Fig 2 allow users to compare crime rates, filterable by crime or crime type, between national and state or local levels. Again, however, the scaling of the y-axis on these trend graphs creates visual comparisons that don't match the actual data — for instance, Figure 2 compares the homicide rate in Illinois with that of the US. By the numbers (8.3 and 4.9 per 100,000 people, respectively), Illinois's 2016 homicide rate was under double the national rate, but visually on the graph, it appears to be almost triple the national rate, because the y-axis scale starts at 4 rather than 0. The comparison between the two rates is similarly outsized over the ten year range shown in Figure 2

However, attempting to drill down through this data to specific localities begins to show where the system breaks down. Because reporting varies so widely by agency, and NIBRS is only employed by just under 50% of law enforcement agencies reporting data to the FBI, trying to find that deeper NIBRS context becomes difficult on city and county levels. Some states, such as Delaware and Kansas, show results for their state as normal; others, such as Illinois, appear to show results as normal, but then show NIBRS data from just one agency representing 1% of the state population — which agency, there's no way to tell. And some states' data just doesn't exist on the

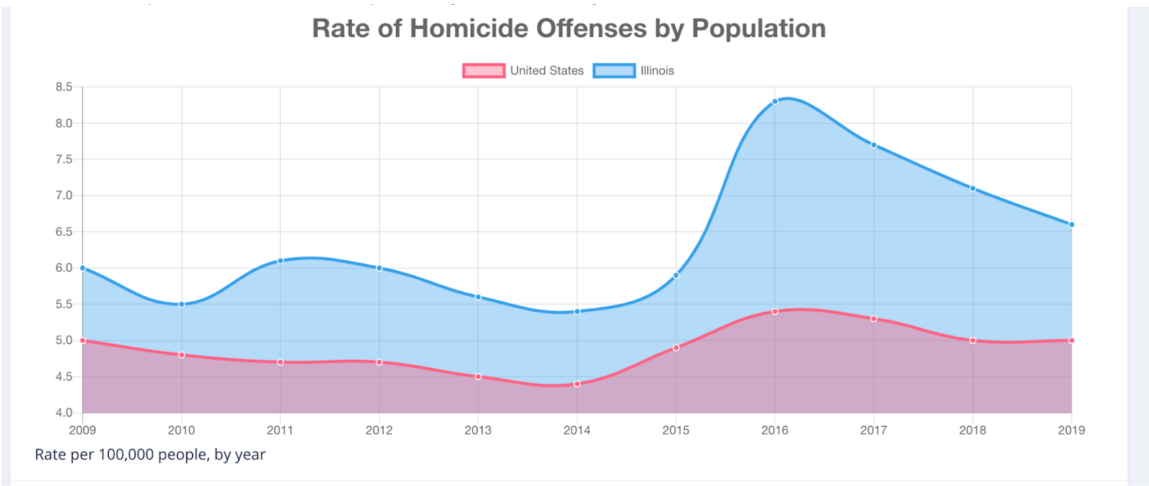

Figure 2: Screenshot of a line graph in the Crime Data Explorer showing the rate of homicide offenses by population in the United States and in Illinois per 100,000 people per year. Because the scale on the y-axis begins at 4 rather than 0, the visual comparison between the two rates is outsized.

Table 1: Affordances and Constraints of NIBRS Access Points

	Data Vis Type	Access Guidance	Uses NIBRS contextual data?	Interactive?
Complete ("raw") data download	N/A (spreadsheets); must be user-generated	API key access and user manual available; requires programming experience	Yes	According to user capability (facility with data science)
NIBRS Map & Data Tables	Searchable, filterable map; tables	Map: limited instructions; Tables: data declaration in separate file; some example user questions link to tables	Map does not; tables do	Map is; tables are not (data is pre-cut into different combinations for the user)
Crime Data Explorer (CDE)	Various graph types, tables	Glossary of terms, linked resources with information about the data, key caveats to data and cautions against comparison; no explicit instructions on interacting with Explorer interface	Yes, when available	Yes, though data and interface limitations prevent some operations; similar to tables above, data is cut in predetermined ways

CDE: for instance, looking for information on how the crime rate in Indiana compares to the United States appears to yield some results (the Explorer zooms in on Indiana on a map, and gives the number of Indiana LEAs that reported data in 2019), but then usually just reports the same national level results as are shown in the default US report. I was able to make a line graph showing the violent crime rates of the US and Indiana show up one time, by clicking between various states on the Explorer's dropdown menu, but that report showed blanks of the other NIBRS contextual data and I was never able to get that graph to show up again.

Table 1 summarizes the findings from the NIBRS information-seeking tasks I performed as I worked with the system. The resulting picture is one of a system that makes gestures towards interactivity and access for users with varying needs and concerns, but which does not always fulfill those promises. Each of the access points that do not require programming experience (the map, data tables, and CDE) assume users will want to investigate crime in a particular location or of a particular type, and that all users will want that data rendered in the same way.

4.2 NIBRS Transition Narratives

In studying the stories around the NIBRS transition, I analyzed documents published or linked on the NIBRS site, including a range of types from news stories to the 2019 NIBRS user manual and methodology documentation. I looked for narrative commonplaces: temporality, sociality, and place [23]. Overwhelmingly, I found that

the narrative of NIBRS is one of "better data" that will make "police more effective and communities safer" [21]. When the FBI stories NIBRS data, it's almost exclusively in an attempt to persuade law enforcement agencies to convert to using that reporting system rather than the older SRS, with policy makers, journalists, researchers, and the public as more distant and less important stakeholders. This focus is clear from both the language and the overwhelming reliance on sociality as the prevailing narrative commonplace in the documents I analyzed — and specifically sociality between and among law enforcement agencies.

Similar to social advertising on streaming platforms ("see what your friends are watching"), online shopping sites ("John S. in Springfield, IL just added this to their cart"), and even fast food menus ("local favorites"), the NIBRS narratives emphasize the proportion of law enforcement agencies who already use NIBRS and who are expected to begin using NIBRS in the near future. Perhaps most pointedly, one November 2020 news story described NIBRS submitters as "most of the country," even though as of October 2020, less than half the LEAs submitting to the UCR were using NIBRS and those LEAs represented less than half the national population. While 43 states were certified for NIBRS use, meaning their records systems were technically advanced enough to work with NIBRS, claiming that "most of the country has already transitioned to NIBRS" is certainly a stretch — and one that functions rhetorically to persuade LEAs that it's worth the trouble to make the switch as soon as possible, or risk being left behind.

If other law enforcement officers are the main audience for the FBI's storying of NIBRS, who gets left out of these narratives? While the FBI narrative does contain a claim of "safer communities," it remains unclear *whose* communities will be safer, *how* that change will occur based on this data, and *for whom* the increase in safety will take effect. The general public is ostensibly an audience of users for not only the NIBRS system itself, but also all of the FBI's messaging regarding NIBRS — the FBI is a governmental institution, after all — but the dominant narrative about NIBRS and the FBI's crime data transition lacks follow-through for and accountability toward this audience.

5 IMPLICATIONS

In this paper, I have discussed how data and data visualization privilege specialized knowledge and quantitative analysis, attempting objectivity. But for human issues such as crime and violence, we need human solutions, and that means acknowledging and leveraging narrative wherever we can. In the case of the FBI's NIBRS transition, data is collected with the stated goals of context, safety, and transparency. But these goals are attainable mostly only for specific types of users — users without programming experience or close involvement will struggle to navigate a fragmented system with multiple different outputs.

Part of the problem with the NIBRS transition is that it is just that — a program in transition. Attempting to reconcile different data sources and definitions from across the country, and comparing these different datasets is inherently difficult and was certainly the cause of some of the malfunctions I noted in this case. But perhaps more crucial and more instructive for technical communicators is the discrepancies between stated mission, intended audiences, and historical system design. Ultimately, because participation in the UCR is left to the discretion of individual LEAs, this system suffers flaws in transparency, accountability, and access from the earliest stages. Through unblackboxing this system and examining its stories, I came to understand that despite being touted as a tool for the public to understand crime in the United States and in their area, this system was not designed for such a wide user base and therefore cannot meet the needs of citizen or nonspecialist users without radical iteration.

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REFERENCES

[1] T. R. Amidon, A. C. Nielsen, E. H. Pflugfelder, D. P. Richards, and S. H. Stephens, "Visual Risk Literacy in 'Flatten the Curve' COVID-19 Visualizations," *Journal of Business and Technical Communication*, vol. 35, no. 1, pp. 101–109, Jan. 2021, doi: 10.1177/1050651920963439.

[2] R. Atherton, "'Missing/unspecified': Demographic data visualization during the COVID-19 pandemic," *Journal of Business and Technical Communication*, vol. 35, no. 1, pp. 80–87, Jan. 2021, doi: 10.1177/1050651920957982.

[3] S. Doan, "Misrepresenting COVID-19: Lying With Charts During the Second Golden Age of Data Design," *Journal of Business and Technical Communication*, vol. 35, no. 1, pp. 73–79, Jan. 2021, doi: 10.1177/1050651920958392.

[4] T. C. Overmyer, "UX methods in the data lab: arguing for validity," in *Proceedings of the 37th ACM International Conference on the Design of Communication - SIGDOC '19*, Portland, Oregon, 2019, pp. 1–6. doi: 10.1145/3328020.3353954.

[5] J. Wolfe, "Teaching students to focus on the data in data visualization," *Journal of Business and Technical Communication*, vol. 29, no. 3, pp. 344–359, Jul. 2015, doi: 10.1177/1050651915573944.

[6] M. C. Banville, "Resisting Surveillance: Responding to Wearable Device Privacy Policies," in *Proceedings of the 38th ACM International Conference on Design of Communication*, Denton TX USA, Oct. 2020, pp. 1–8. doi: 10.1145/3380851.3416764.

[7] J. Frith, "Big Data, Technical Communication, and the Smart City," *Journal of Business and Technical Communication*, vol. 31, no. 2, pp. 168–187, Apr. 2017, doi: 10.1177/1050651916682285.

[8] K. L. Walkup, "Disrupting Dominant Narratives: Mental Health, Early Warning Systems, and Threat Construction," in *Proceedings of the 38th ACM International Conference on Design of Communication*, Denton TX USA, Oct. 2020, pp. 1–2. doi: 10.1145/3380851.3418615.

[9] N. N. Jones, K. R. Moore, and R. Walton, "Disrupting the past to disrupt the future: An antenarrative of technical communication," *Technical Communication Quarterly*, vol. 25, no. 4, pp. 211–229, Oct. 2016, doi: 10.1080/10572252.2016.1224655.

[10] I. Dorpenyo, "'Unblackboxing' technology through the rhetoric of technical communication: Biometric technology and Ghana's election," Dissertation, Michigan Technological University, 2016. [Online]. Available: https://digitalcommons.mtu.edu/etdr/125

[11] C. Lauer and S. O'Brien, "How People Are Influenced by Deceptive Tactics in Everyday Charts and Graphs," *IEEE Transactions on Professional Communication*, vol. 63, no. 4, pp. 327–340, Dec. 2020, doi: 10.1109/TPC.2020.3032053.

[12] K. Börner, A. Bueckle, and M. Ginda, "Data visualization literacy: Definitions, conceptual frameworks, exercises, and assessments," *PNAS*, vol. 116, no. 6, pp. 1857–1864, Feb. 2019, doi: 10.1073/pnas.1807180116.

[13] A. Cairo, *How Charts Lie: Getting Smarter about Visual Information*, Illustrated edition. New York: W. W. Norton & Company, 2019.

[14] C. A. Lindgren, "Facts Upon Delivery: What Is Rhetorical About Visualized Models?," *Journal of Business and Technical Communication*, vol. 35, no. 1, pp. 65–72, Jan. 2021, doi: 10.1177/1050651920958499.

[15] J. Jones, "Information Graphics and Intuition: Heuristics as a Techne for Visualization," *Journal of Business and Technical Communication*, vol. 29, no. 3, pp. 284–313, Jul. 2015, doi: 10.1177/1050651915573943.

[16] K. E. Weick, K. M. Sutcliffe, and D. Obstfeld, "Organizing and the process of sensemaking," *Organization Science*, vol. 16, no. 4, p. 409+, 2005.

[17] N. N. Jones, "Narrative Inquiry in Human-Centered Design: Examining Silence and Voice to Promote Social Justice in Design Scenarios," *Journal of Technical Writing and Communication*, vol. 46, no. 4, pp. 471–492, Oct. 2016, doi: 10.1177/0047281616653489.

[18] N. N. Jones, "Rhetorical narratives of black entrepreneurs: The business of race, agency, and cultural empowerment," *Journal of Business and Technical Communication*, vol. 31, no. 3, pp. 319–349, Jul. 2017, doi: 10.1177/1050651917695540.

[19] S. U. Noble, *Algorithms of oppression: how search engines reinforce racism*. New York: University Press, 2018.
[20] K. Lum and W. Isaac, "To predict and serve?," *Significance*, vol. 13, no. 5, pp. 14–19, 2016, doi: 10.1111/j.1740-9713.2016.00960.x.
[21] FBI, "Five Things to Know About NIBRS," *Federal Bureau of Investigation*, Nov. 25, 2020. https://www.fbi.gov/news/stories/five-things-to-know-about-nibrs-112520 (accessed May 20, 2021).
[22] P. Sullivan, "Beckon, encounter, experience: The danger of control and the promise of encounters in the study of user experience," in *Rhetoric and experience architecture*, L. Potts and M. J. Salvo, Eds. Anderson, SC: Parlor Press, 2017, pp. 17–40.
[23] D. J. Clandinin, *Engaging in narrative inquiry*. New York, NY: Routledge, 2016.