SciDataCon 2025



Contribution ID: 9 Contribution code: Pres Session 9

Type: Presentation

## The Effect of Data Journalism Knowledge to the Good Graphing Practice in Indonesian Media

Thursday 16 October 2025 11:00 (11 minutes)

The availability of more data in the public sphere has driven the rise of data journalism practices in media worldwide, including in Asia (Mutsvairo, 2019). Consequently, audiences are now more exposed to data-based products when consuming news. Data journalism serves several functions, from explaining to the audience more accurately because they are presented with numbers and data to helping the audience save time from reading too many words (Wang &Li, 2019). Meanwhile, journalists believe that using data journalism can improve the quality of their products and the journalists themselves (Heravi & Lorenz, 2020). Through data journalism, journalists collect, clean, analyze, visualize, and narrate data in addition to reporting and publishing their stories, rather than just traditional reporting. To undertake these data-driven steps, journalists are beginning to produce new technologies such as applications and interactive journalistic products where users can gain insights from the data (Howard, 2017).

Among the data journalism practices found in media, we can see data visualization emerging as a component of this practice. Data visualization, as a product of data journalism, transforms sorted and analyzed data into graphic form. Graphics become a communication tool for the eye that has the function to 'store, understand, and communicate' useful information. Cairo (2013) explains that graphics refer to the "aggregate of data" and help us find many patterns among the data. The shift from data to visual representation aims to enhance cognitive capabilities (Card, S. et al., Mackinlay, J. & Shneiderman, B., 1999). This enhancement includes "improving memory and processing resources available to users", saving time in searching for information, increasing the ability to detect patterns, "enabling perceptual inference operations", applying mechanisms related to perceptual attention to monitor something, and encoding information.

Despite having benefits in transforming complex data into simple and easily understood visual information, data visualization still has the potential to mislead. Inaccurate graphics found during pandemic reporting and going viral, for example, have caused misinformation among the public. Cairo (2019) mentions inadequate design and labeling, exaggerated perspectives of scale and proportion, biased data visualization, vague and incomplete data, as some factors contributing to the inaccuracy of graphics. Misleading graphics can then lead to the manipulation of truth or that graphics can lie (Cairo, A., 2019).

The fact is not all these misleading graphics are made intentionally; rather, they are poorly executed (Crisan, A., 2022). In other words, literacy about data and visualization is needed to increase knowledge to detect miscalculated and deceptive graphics. Research conducted by Lee et al. (2021) mentions that literacy in data visualization is related to the ability to understand and interpret graphics. The definition of visual literacy, as stated in previous research 'VLAT: Development of a Visualization Literacy Assessment Test' has almost the same meaning as it refers to the ability to 'read and interpret' data visualizations and obtain information from data visualizations. Besides the ability to understand graphics, literacy also refers to the ability where graphic creators and designers have good graphic creation practices, including data integrity. Data integrity, coined by Jacques Bertin, occurs when the graphics are 'clear, simple, and easy to understand' (Olande, O., 2013). Having good graphic creation practices is crucial because journalism ethics and graphic design mention that both hiding the truth (about data and graphics) and portraying graphics in twisted truth are 'highly unacceptable' (Cairo, 2020).

Given the above phenomena, this research attempts to identify the effect of data journalism knowledge among Indonesian journalists to the good graphing practices in Indonesian media. Using a mixed- methods approach, we are going to examine data visualization products collected from the submissions of participants for the Indonesian Data Journalism Award (IDJA) over two consecutive years (2023 and 2024). IDJA, as quoted from its website, is the first data journalism competition held in Indonesia by the nonprofit journalism organization Indonesian Data Journalism Network (IDJN) and was created in 2023. This competition is joined by hundreds of media in Indonesia, both local and national, as narrated in an interview with the Executive Director of the organization, Wan Ulfa Nur Zuhra (2023).

To measure the level of good graphic creation practices, the researchers will use an index measured from a set of criteria combining several theories related to statistics, graphics, design, and ethics from experts in the field and applying this set of good graphic creation criteria to the IDJA data visualization submissions to determine the level of good graphic creation practices. Meanwhile, to measure the level of data journalism knowledge among Indonesian journalists, the researcher will distribute survey to journalists who participate in the IDJA award (2023 and 2024). At last, the researcher will use Pearson correlation method to measure the relationship and effect between data journalism literacy towards the good graphing practice among Indonesian journalists.

Furthermore, to understand the data more comprehensively, this study will take a qualitative approach by interviewing data journalists and graphic designers as follow-up to help answer 'the why and the how' of the analysed quantitative data.

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**Session Classification:** Presentations Session 9: Empowering the global data community for impact, equity, and inclusion / Education

**Track Classification:** SciDataCon2025 Specific Themes: Empowering the global data community for impact, equity, and inclusion