

Statistical Literacy of College Students in a Simulation-Based Introductory Statistics Course

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The news media is the primary source of information about social and scientific issues for most adults (Bissonnette et al., 2021). Statistical and mathematical products in the news take on many forms, requiring multiple inter-related skills to appropriately comprehend and evaluate (Gal & Geiger, 2022). Additionally, messages in the news are often shaped by political, commercial, or other agendas contributing to inaccurate, misleading, or intentionally manipulative messages (Mehta & Guzmán, 2018). As such, increasing emphasis exists in the literature regarding the need to develop students' critical capabilities in understanding how mathematics and statistics are used (Gal & Geiger, 2022). Hence, this qualitative pilot study investigated the question: what, if any, statistical concepts do students in an introductory statistics course utilizing a simulation-based curriculum apply when critiquing statistics in the news media?

Current trends in statistics education include the use of technology to provide students with dynamic, interactive simulations and the importance of attending to risk, critical literacy, and communication in contexts such as the media (Burrill & Pfannkuch, 2023). Previous studies have utilized media-based tasks to investigate student statistical literacy (e.g., Kaplan & Thorpe, 2010). Other studies found simulation-based curricula improve student outcomes on topics such as confidence intervals, significance testing, and data collection (e.g., Chance et al., 2022). This study extends existing research by investigating how a simulation-based curriculum prepares students to use critical questioning when engaging with news media.

The conceptual framework of this study draws from Watson and Callingham's (2003) six-level construct of statistical literacy. Gal's (2002) characterization of critical questioning, and Gal and Geiger's (2022) nine categories of statistical and mathematical products in the news informed the development of tasks. Five participants, who were enrolled in an introductory statistics course at a mid-sized university, completed task-based interviews during which they commented on three mock news headlines and accompanying articles. Interviews took place after the simulation-based inference topics were covered in class. Participant responses will be coded, after transcription, for the six levels of statistical literacy and how statistical concepts were utilized throughout the task.

Current analysis includes identification of themes in students' responses. Initial findings indicate participants mentioned sampling, study design, and hypothesis tests with additional themes including wanting more information, relying on non-statistical arguments, and struggling to connect statistical ideas to critical questions. During the poster session, further results of the pilot study will be shared and ideas for future directions and adjustments to tasks will be discussed.

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