

USING A LITERAL LENS TO INVESTIGATE MIDDLE SCHOOL STUDENTS' UNDERSTANDING OF A PROBABILITY EXPERIMENT

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This poster presentation highlights a selection of posters constructed by urban middle school students to justify their solutions to a set of probability investigations using data from computer simulations, and the students' written comparisons and critiques of each others' justifications. In this study, ten students, working in pairs, analyzed the fairness of dice. The students simulated the tossing of each die, supposedly produced by different companies, on computers using Probability Explorer (Probability Explorer (c) Hollylynne Stohl Lee, 1999-2005), a software tool that provides graphic and table representations of the data as the die is "tossed" for any given sample size requested by the students. Each company's die had been weighted by the computer program with the actual weights hidden from the students.

The authors studied the inscriptions, symbolic - graphic - linguistic that the students chose to include on their posters and the conclusions they made about the data, as well as the evidence they used in comparing the various solutions and agreeing or disagreeing with other students' conclusions. Of particular interest, was the evidence documenting the students' reasoning about the importance of sample size and their understanding of fairness. Subsequent interviews with these students gave further insight into their reasons for selecting a graph or table to constitute evidence. Some students indicated that there might be different definitions of fairness, and that a claim is valid as long as evidence supports it.

The framework for this study is guided by research on the development of representations (Davis & Maher, 1997). Students today are expected to be able to read, analyze, synthesize, write and discuss solutions to mathematical problems (NCTM, 2000). Their ability to solve mathematical problems depends also on their ability to connect with the natural language of the classroom. This research analyzes the students' posters and critiques through a lens that focuses on graphic, symbolic and written inscriptions as evidence of the students' mathematical thinking carried out in their urban context.

This research is part of a study on representations and reasoning from data that is one component of the "Informal Mathematical Learning" Project, a three year research project focusing on the mathematical thinking of urban, middle school students as they engage voluntarily in open-ended investigations in after school sessions and summer institutes, supported by the National Science Foundation (ROLE Grant REC0309062, directed by Carolyn Maher, Arthur Powell and Keith Weber).

References

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