UNDERSTANDING PASCAL'S TRIANGLE

Elizabeth B. Uptegrove
Rutgers University Graduate School of Education

This paper investigates the growth of mathematical understanding of a group of students who, as part of a long-term longitudinal study, conducted in-depth investigations of various combinatorics problems. In relating their earlier ideas to Pascal's Triangle, these students developed the addition rule for Pascal's Triangle in a generalized standard form.

This paper describes the work of five students in the 11th year of a long-term longitudinal study of students' development of mathematical ideas (described in Maher, 2002). One strand of this study was combinatorial reasoning; throughout the study, these students investigated many counting problems. In the early grades, they built models and drew pictures to generate answers to these problems. Later, they related these answers to entries in Pascal's Triangle, using the knowledge they gained from working particular examples to give meaning to the addition rule for Pascal's Triangle. Finally, they produced a standard form of the addition rule, based on their generalizations. This paper examines how this remarkable achievement came about and what their achievement can tell us about the nature and growth of mathematical understanding. This builds on other work (e.g. Maher & Speiser, 1997) that examined how these and other students used their representations and models to build abstract ideas in earlier years. The Pirie-Kieren model of the growth of mathematical understanding (Pirie & Kieren, 1994) is used as a framework.

References

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