Student Use of Set-Oriented Thinking in Combinatorial Problem Solving

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This study seeks to contribute to research on the teaching and learning of combinatorics at the undergraduate level. In particular, the authors draw upon a distinction characterized in combinatorial texts between set-oriented and process-oriented definitions of basic counting principles. The aim of the study is to situate the dichotomy of set-oriented versus process-oriented thinking within the domain-specific combinatorial problem-solving activity of students. The authors interviewed post-secondary students as they solved counting problems and examined alternative solutions. Data was analyzed using grounded theory, and a number of preliminary themes were developed. The primary theme reported in this study is that students showed a strong tendency to utilize set-oriented thinking during the problem-solving phase that Carlson & Bloom (2005) refer to as "checking," especially when they engaged in the evaluation of alternative solutions.