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A Mixed-Integer Programming Approach for Managing Flow of Students in a Medium-Sized College

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Author's Note: Emmanuel des-Bordes recently graduated from the Department of Industrial, Systems and Manufacturing Engineering at Wichita State University and currently holds an Assistant Professor position in the Department of Mathematics at Blue Ridge College. Venkatesan Chakrapani holds a PhD in Physics is a faculty member at Blue Ridge College. The information and recommendations expressed in this paper are those of the authors and do not necessarily represent any official position of medium-sized colleges.

Abstract: Community colleges are considered an essential part of the United States higher education system, with over 30% of their students transferring to four-year colleges. For this reason, students' enrollment and retention are critical to their success. To attain this success, policy makers and administrators in community colleges have turned to several studies that involve student retention in their programs. In this study, we maximize the overall student enrollment by accounting for key parameters that impact retention and transfer rates along racial and residential lines under a limited budget over a multi-period planning horizon. We illustrate our model with computational experiments on a case study. By using this optimization tool, an institution can meet its goals to manage student enrollment and retention from admission to graduation, and design future intervention strategies.

Keywords: college, enrollment, optimization, retention, transfer, student