Workforce Planning During COVID: Mathematical Modeling for Employee Assignment

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Abstract: The global pandemic that is COVID-19 has altered our world as we know it. Educational systems have been seriously affected, businesses – whether "essential" or not – have been severely stressed, how people socialize has, perhaps forever, been changed, and telecommuting is the new norm. This conference, having been moved to a completely online format is but one of practically infinite cases in point. The purpose of this presentation is to discuss a situation wherein a company was having difficulty in scheduling their in-person office staffing in a move to allow rotational schedules for their employees to decongest their office when an entirely telecommuting operation was not possible. Due to the different types of employees, their various work-related constraints, and the need to minimize the number of bodies in the office while addressing minimum coverage necessary to perform the company's daily activities, an obvious solution to their scheduling/assignment needs was not obvious or trivially obtained. As such, mathematical models, specifically, integer programming assignment models, were developed and solved by CPLEX to address their scheduling needs. This presentation will describe the constraints faced by the company and the models developed to solve their tricky assignment problem.

Keywords: COVID, workforce planning, assignment model, integer programming