Oral Defense Announcement
University of Missouri – St. Louis Graduate School

An oral examination in defense of the dissertation for the degree
Doctor of Philosophy in Business with an emphasis in Logistics and Supply Chain Management

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Task-Based Estimation and Planning for Application Development Projects and Resources:
Models, Methods and Applications

Date: November 22nd, 2019
Time: 10:00 a.m. to 11:30 a.m.
Place: 202 ABH

Abstract
This dissertation takes a new approach to software development effort estimation from the perspective of design patterns at an organization. A new estimating tool is developed to provide bottom up estimates based on the design patterns of the organization. The research also offers guidelines for extracting the unique design patterns specific to an organization that are used to obtain baseline task level estimates in the Estimating Tool. In addition, the tool provides a suite of seven estimates using predictive analytics to estimate the labor hours required for a project using historical data, a bottom-up estimate that is rooted in the design patterns of the organization, a recommended estimate, plus four other estimates that are based on the function point count. The four estimates include a predictive model to estimate the project cost based on the function point count and three estimates are variants of the early design Construction Cost Model II (COCOMO II). Direct benefits of the tool include reduction of process variability thereby resulting in consistency of estimates across teams in an organization.

In Agile IT Project Management, there is an important need to better plan project timelines and to make better scheduling and resource allocation decisions to facilitate on-time and on-budget project deliveries. This research thus also addresses the prescriptive aspect of the application, by making better resource allocation decisions via a new mixed-integer linear programming (MILP) optimization model. The model provides data-driven decision-support for companies looking to make a transition from the waterfall to the agile paradigm with a structured approach to focus on skills development at the organization. A real-world application of the use of the new Estimating Tool and the proposed models at a large firm is showcased as part of the research. A comprehensive sensitivity analysis was conducted as part of a set of computational experiments to obtain managerial insights.

Defense of Dissertation Committee
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