Faculty and Researchers | Faculty and Researchers' Publications

2021

Quantifying, Visualizing, and Tracking Capability Gaps

Kamel, Magdi N.; Gallup, Shelley P.

Monterey, California: Naval Postgraduate School

http://hdl.handle.net/10945/69884

Quantifying, Visualizing, and Tracking Capability Gaps

NPS
PRAESTANTIA PER SCIENTIAM
1909

NAVAL
POSTGRADUATE
SCHOOL

Research Objectives

- Develop a hierarchical framework of factors for evaluating capability gaps based on DOD DOTMLPF framework

- Develop a methodology for calculating and visualizing a capability gap score at any given point in time to depict capability gap resolution progress

- Develop a dashboard to provide decision makers with an at-a-glance view of the status of each capability across time and elements of the framework
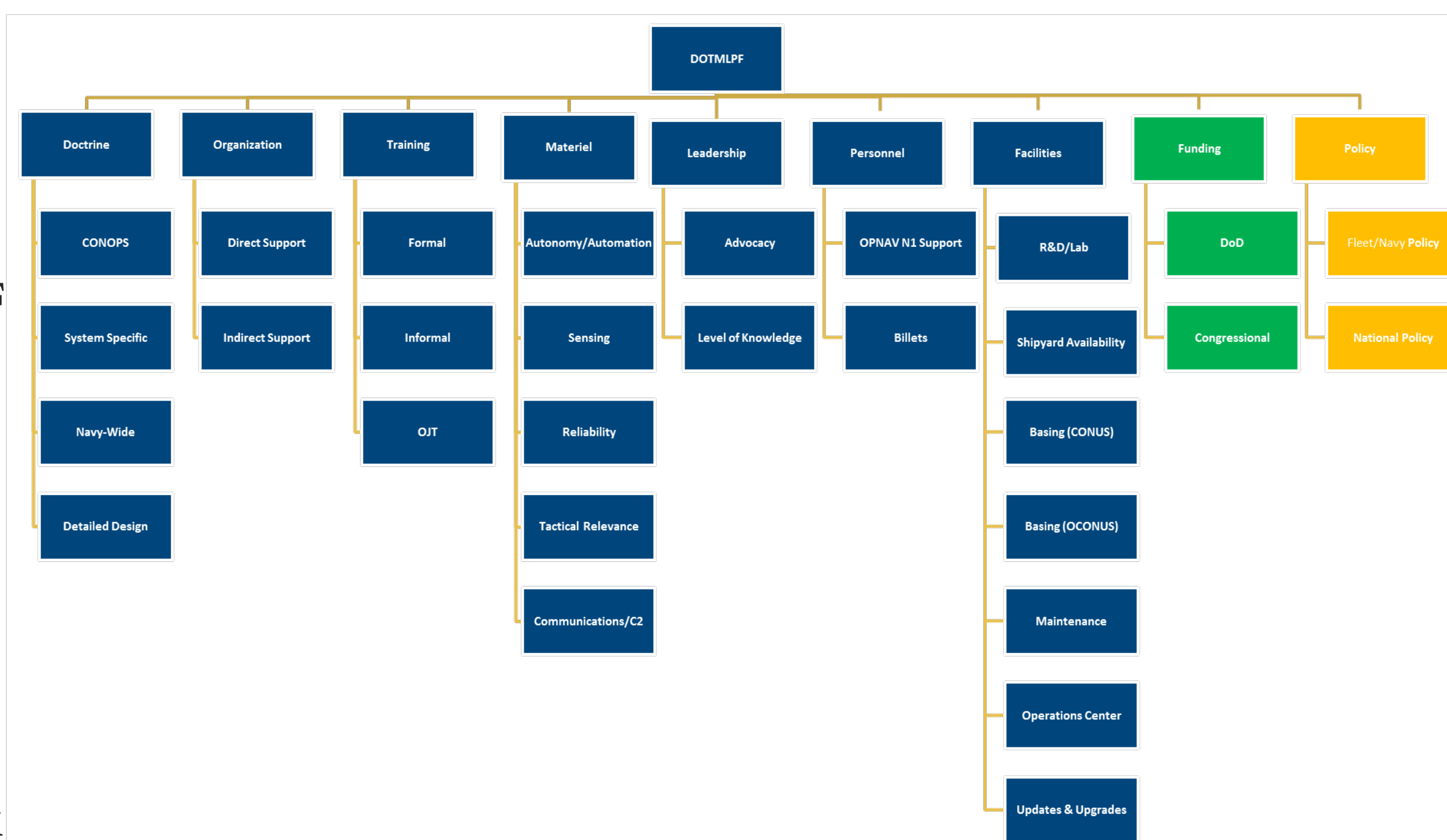
Expanded DOTMLPF Framework

$$A_i^{WSM\text{-score}^-} = \sum_{j=1}^{n} w_j \, a_{ij}$$

Weighted Sum Model

$$A_i^{WPM\text{-score}} = \prod_{j=1}^{n} x_{ij}^{w_j}$$

Weighted Product Model

$$A_i^{WASPAS\text{-score}} = \lambda A_i^{WSM\text{-score}} + (1 - \lambda) A_i^{WPM\text{-score}}$$

Weighted Aggregated Sum Product Assessment (WASPAS)

Proposed Methodology

- Identify factors that determine a capability gap

- Rate capabilities on identified factors

- Assign weights to identified factors

- Calculate a capability gap score using an appropriate model

- Conduct a sensitivity analysis

- Visualize capability score gap across time and factors

Data Visualization

- An IPCL dashboard provides at-a-glance view of capability gap scores by capability, year, quarter and factor

- Allows decision maker to monitor the progress of closing capability gaps by acting as a "progress report"
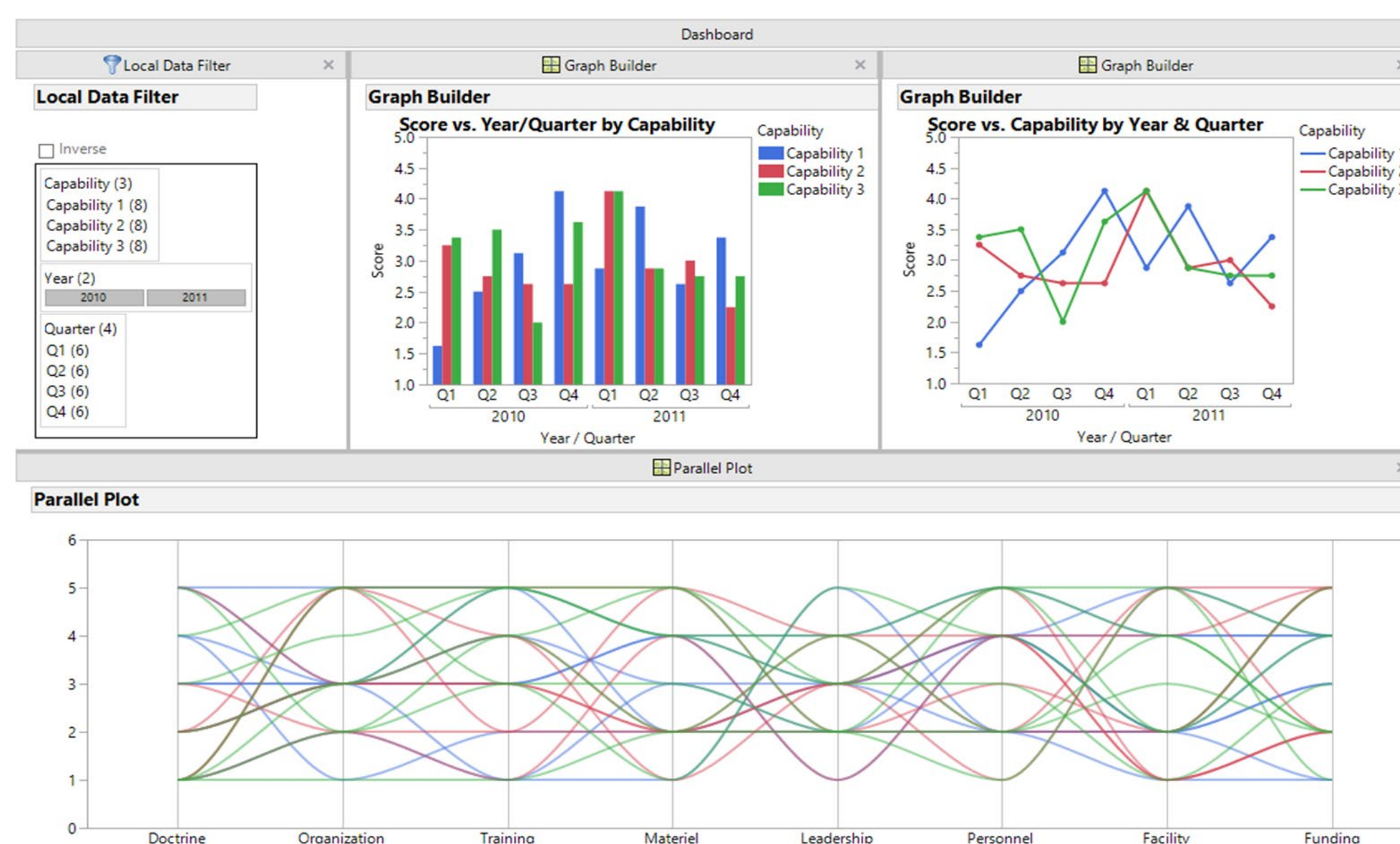
IPCL visualization dashboard

Expected Outcomes and Benefits

- Support prioritization of capabilities based on hard data

- Provide a clear and concise picture of progress being made, or not made, to close identified gaps and/or provide a capability

- Support the creation of a central repository for organizations to distribute pertinent information

Researchers: Prof. Magdi Kamel and Dr. Shelley Gallup
Graduate School of Operational and Information Sciences
Topic Sponsor: Navy Warfare Development Command (NWDC)