Social Service Systems Engineering:
How ISE's can help Engineer Value for Social Services

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Interim Executive Director at Eva's
Greater Toronto Area, Canada

Cherie Ann Pereira
Social Worker | Monitoring, Evaluation, Research and Learning Specialist | Social Impact Measurement
Canada

Meg Small
Director of Social Innovation, Bennett Pierce Prevention Research Center at Penn State University

Moderated by:

D. Scott Sink, Ph.D., P.E.
The Poirier Group
Adjunct Prof, Va Tech
Global Perf Excellence
Webinars IISE

Vittal Prabhu
Charles and Enid Schneider Faculty Chair in Service Enterprise Engineering at Penn State University

INSTITUTE OF INDUSTRIAL & SYSTEMS ENGINEERS

24 August 2021

Purpose and Agenda

PURPOSE: *To share Perspectives and Points of View and Case Examples of how ISE is being applied in Social Service Systems*

12:00 Scott and Vittal to tee-up the session

12:10 MICRO/MACRO: Needs, Challenges Opportunities at the Agency, local level and at the System Level

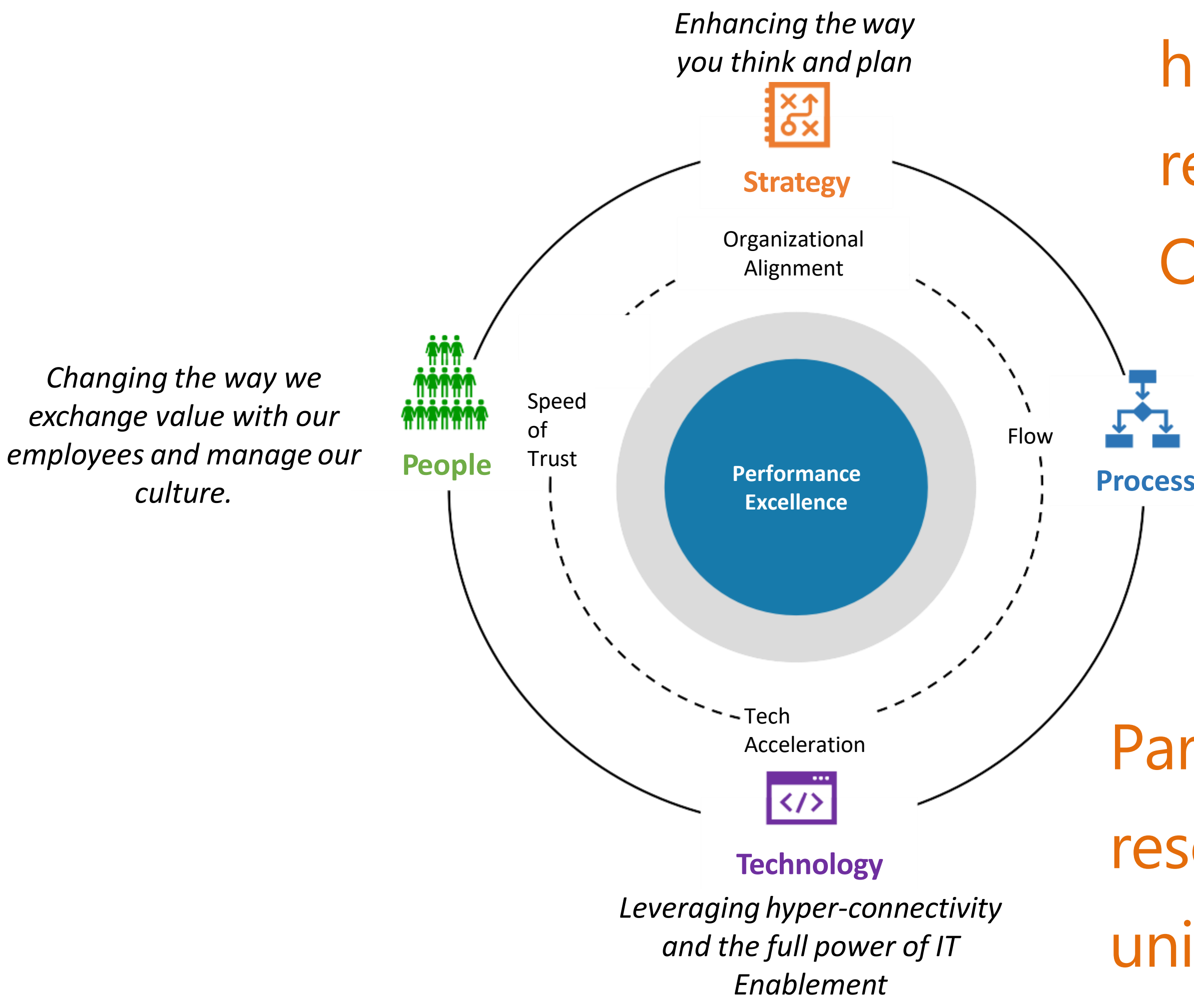
12:20 Louise and Cherie Ann to share Voice of Social Service Provider Perspective, Needs, Challenges, Opportunities, and Case Examples of What's Worked/working

12:35 Meg and Vittal to share system level Solutions

12:50 Wrap up and Close-out

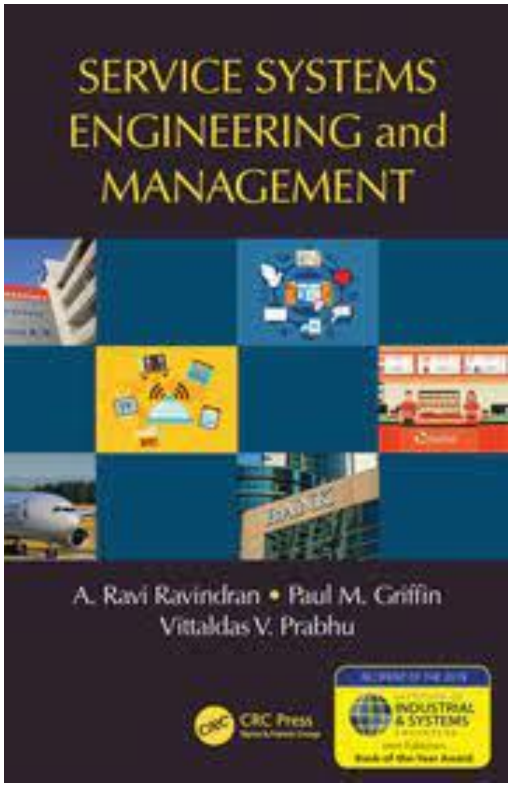
ISE's Create Value by Integrating People, Strategy, Process and Technology

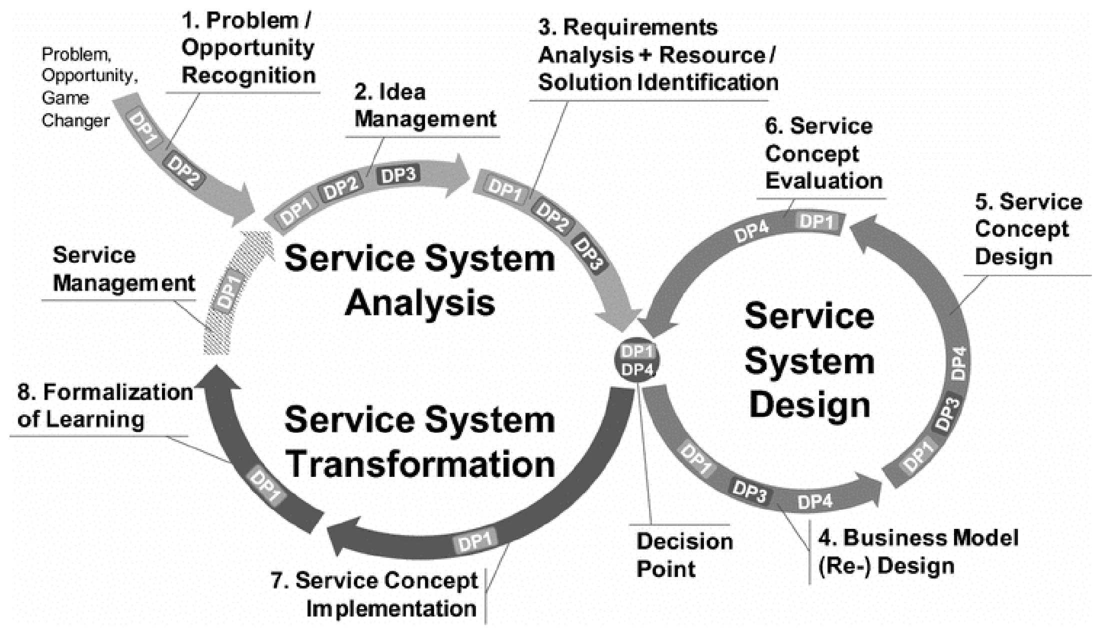
Social Service Systems have unique challenges relative to achieving Operational Excellence.



Partnering with ISE resources represents a unique opportunity to master these challenges.

At the Delivery level this is a nice model for how the innovation can take place





You'll hear about how this is happening with Eva's and BBBST in Toronto

Often in Social Service Systems, it is the Process and Technology components that are most challenging.

Technology is 'buyable' but the integration of process, people, technology is difficult to implement effectively.

Fundamental Questions/ Agenda

1—What are the unique Challenges and Opportunities that Social Service Providers face that can be addressed and capitalized on by partnering with ISE resources? Micro/Macro

2—Vittal to provide overview of Prevention Services.

3—Meg on the challenges of scaling evidenced based services

4—Scott & Louise and Cherie Ann to provide executive overviews of how TPG's Purpose Beyond Profit Program has benefited their organizations and how ISE can help organizations that are providing Evidence Based Services can improve their Capability to be more Effective and Efficient.

5—Scott to wrap up and close out.

What are the needs, special challenges, opportunities in Social Services that ISE can contribute to?

Local Agency View (Louise and Cherie Ann and Scott)

- struggle with 'technology enablement'
- don't understand how to improve process maturity and improve flow and capacity
- Data rich and information poor, not leveraging the data we have

System View (Meg and Vittal)

- How do you balance delivery of social services with the evaluation of the value of those services?

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Engineering Prevention Services

Vittal Prabhu

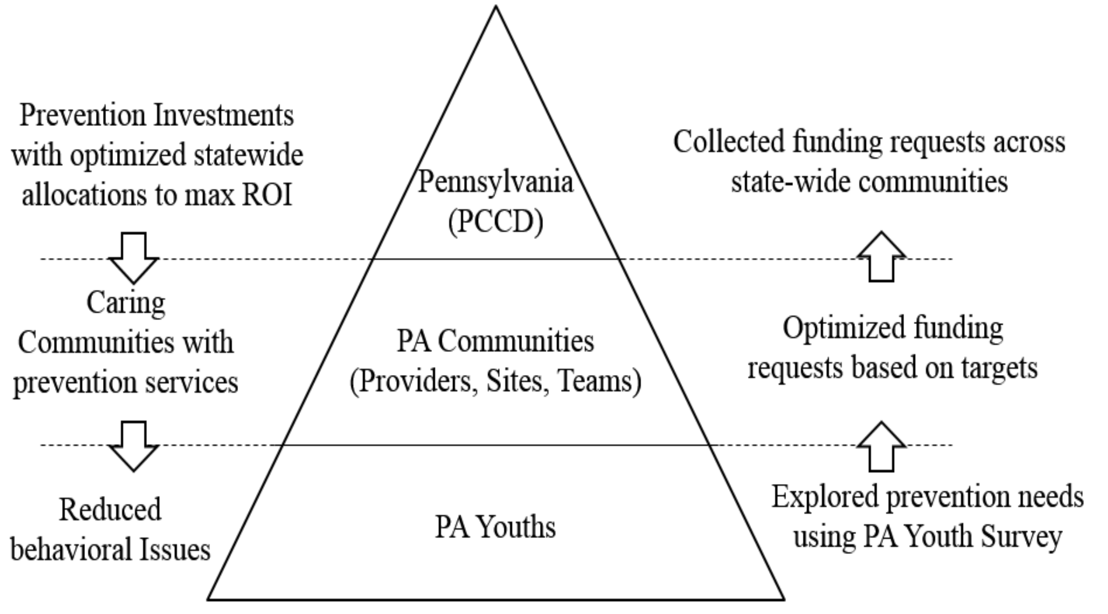
Penn State

Prevention Services

- Objective is preventing mental, emotional, and behavioral (MEB) disorders among young people
- It is estimated that 14 to 20% youth experience MEB disorders
- MEB and other problem behaviors (e.g. early drug, alcohol use, aggressive behavior, and violence) take an enormous toll
- The quantifiable cost of such disorders among young people was estimated to be $247 billion per year in 2007

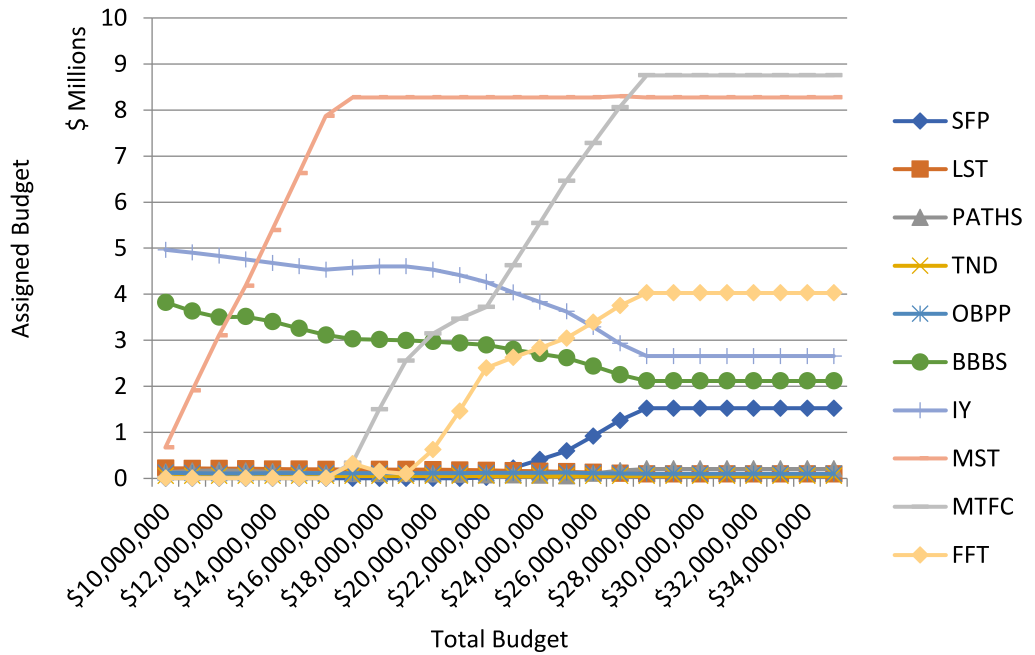
O'Connell, M. E., Boat, T., & Warner, K. E. (2009). Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities. National Academies Press

Decision-Making Models in Planning Prevention Services



Kang, Y., Lee, Y., Ulan, L. M., Small, M. L., & Bumbarger, B. Prabhu, V. Quantitative Multi-Criteria Approach to Modeling Demand and Supply in Prevention Service Chain.

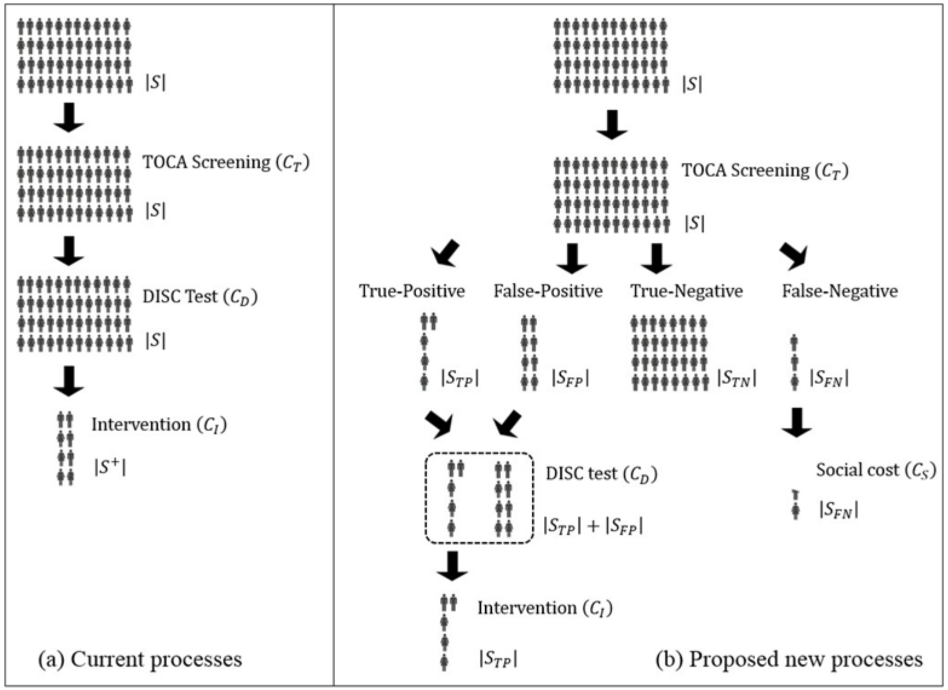
Budget allocation priority to prevention programs based on total budget



Kang, Y., Lee, Y., Ulan, L. M., Small, M. L., & Bumbarger, B. Prabhu, V. Quantitative Multi-Criteria Approach to Modeling Demand and Supply in Prevention Service Chain.

Predictive Analytics for Delivering Prevention Services

Screening, Diagnosis, and Intervention Processes



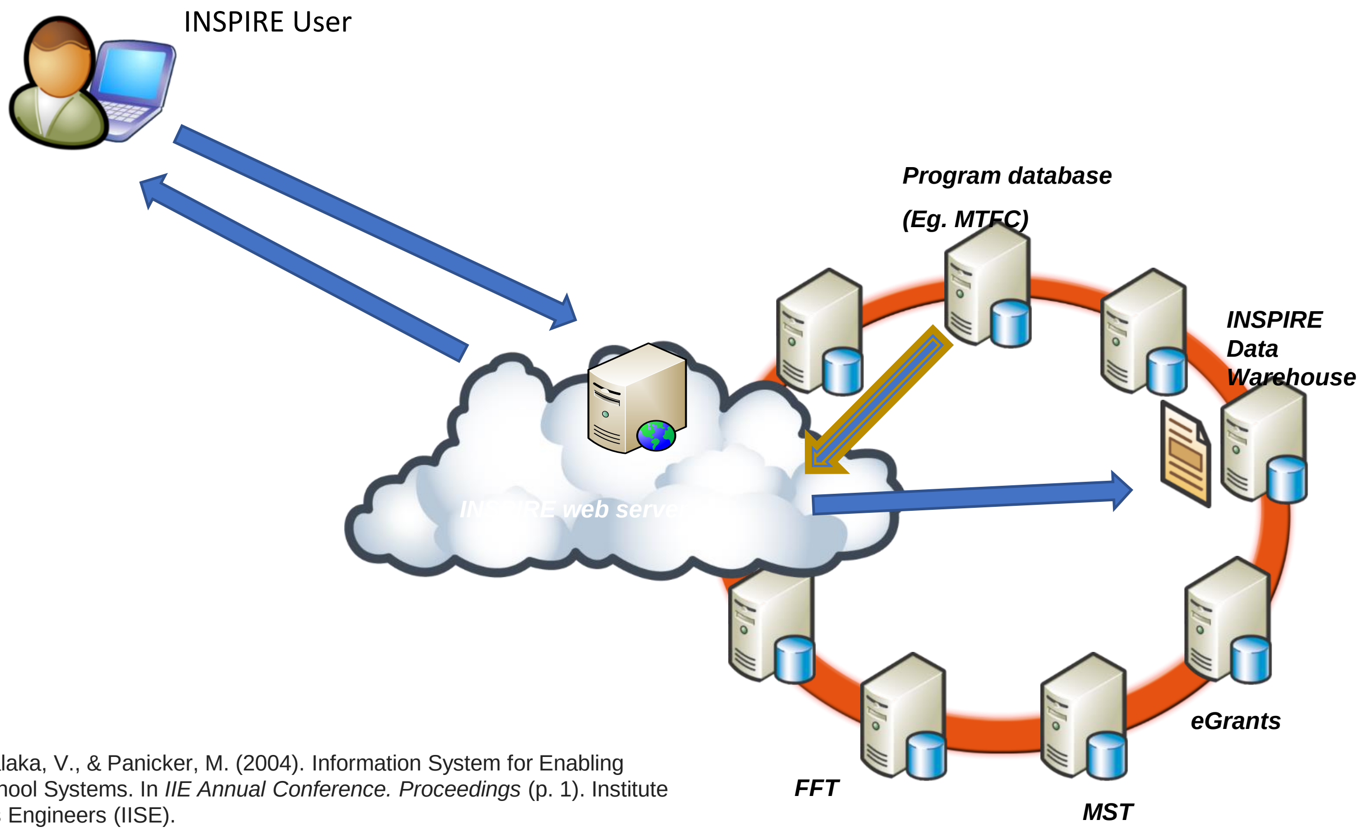
Lee, S., Kang, Y., Ialongo, N. S., & Prabhu, V. V. (2016). Predictive analytics for delivering prevention services. *Expert Systems with Applications*, *55*, 469-479.

Potential Benefit of Predictive Analytics

	Current approach	Proposed approach	Improvement (%)
TOCA cost	9,260	9,260	0.00
DISC cost	18,520	1,560	91.58
Intervention cost	378,885	291,785	23.00
Social cost	-	15,202	-
Total cost	406,665	317,807	21.85

Lee, S., Kang, Y., Ialongo, N. S., & Prabhu, V. V. (2016). Predictive analytics for delivering prevention services. *Expert Systems with Applications*, *55*, 469-479.

INSPIRE – Web Application



Prabhu, V., Small, M., Salaka, V., & Panicker, M. (2004). Information System for Enabling Innovative Process in School Systems. In *IIE Annual Conference. Proceedings* (p. 1). Institute of Industrial and Systems Engineers (IISE).

Lee, Y., & Prabhu, V. (2019). Evaluation and monitoring of community youth prevention programs using a robust productivity index. *Socio-Economic Planning Sciences*, *68*, 100626.

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Challenges in Scaling Evidence-based Preventive Services

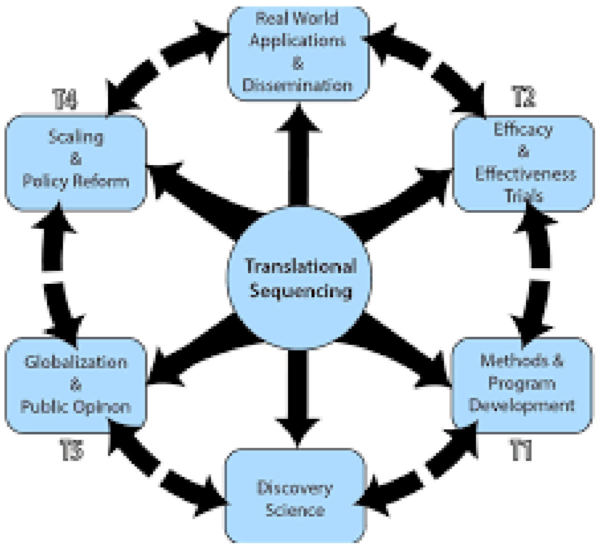
Dr. Meg Small, Director of Social Innovation

PennState
College of Health and
Human Development

EDNA BENNETT PIERCE
PREVENTION RESEARCH CENTER

Translating Knowledge and Evidence into Systems

New Model: Optimizes evidence & uptake
New service design methods
- Data rich environment
- System Readiness

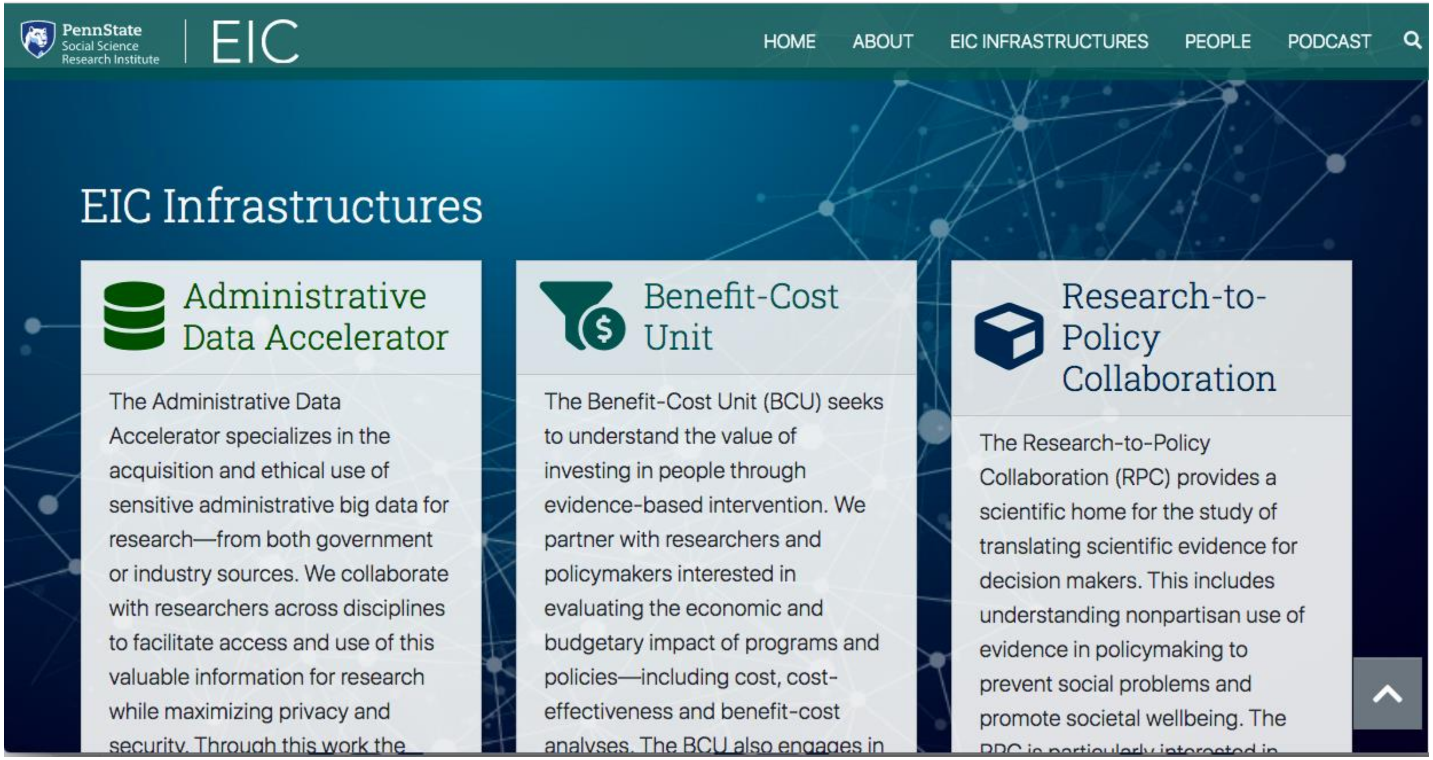


Old Model: Maximizes efficacy
Translated into underprepared systems

Basic Research → Efficacy Trials → Effectiveness Trials → "Service Readiness" → Broad Dissemination

PennState

New Initiative . . . But still missing system processes



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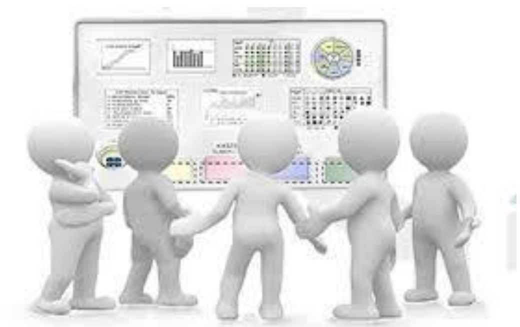
The Poirier Group Purpose Beyond Profit Program

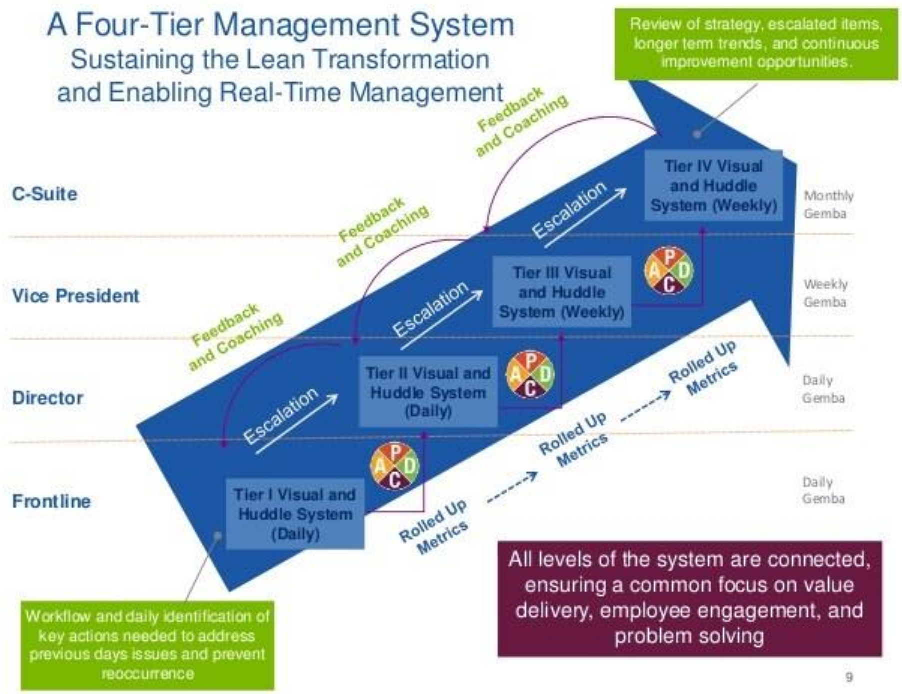
- David Poirier is the Immediate Past President of IISE and the CEO of The Poirier Group.
- TPG commits and deploys 25% of it’s ‘benchtime’ to serving Non-Profits in the Greater Toronto area.
- Eva’s and Big Brothers Big Sisters of Toronto are two great examples of organizations we have served over the past 2 years.
- I’ll let Louise and Cherie Ann briefly explain why they reached out to TPG and at a high level what results we are helping them create.

PPMS and The Tiered Huddle Concept—an example of what 4.0 requires

This is a very effective image of Tiered Huddle System Design.

Our Design calls to integrate PPMS into the tiered PDSA process so that the measurement process is interwoven, naturally, into the process improvement (Study-Adjust) component.





Louise Smith,
COO at Eva's

Kay Dyson
Impact and Innovation Mgr. at Eva's

Rachael Cass
Administrative Assistant at Eva's Innovation, Strategy & Evaluation team

Beth Bebreab,
Exec Asst. to Exec Dir and COO Eva's

Anastasia Gordon,
Corporate Partnerships Mgr. at Eva's Initiatives

PURPOSE STATEMENT: Create Migration Strategy and Plan to take our IT Enablement System and overall Business Process Management System to the next level of Maturity

Strategic Plan as Context → Vision for Integrated Bus Process and IT Enablement → Develop Migration Strategy and Plan → Know what to do, when, why, etc. → Decisions and Actions Cadence with IT Lead in place

CURRENT STATE

(Sept 2020)

- EVA needs/wants an IT Assessment
- EVA needs to improve IT Enablement to support remote work for staff and Youth Programming
- EVA needs improved accessibility and connectivity
- EVA needs to create Virtual Learning Opportunities for Youth Programming
- EVA is interested in improving the 'integrated' performance of their people, strategies, workflows with Technology Enablement

Migration Strategy

DEFINE current state IT System, Bus Processes, R2A2, and Pain Points

REQUIREMENTS Definition: what do you need/want the IT Enablement 'system' to be, do in 2023?

DESIGN: flesh out, develop a concept design for EVA IT Enablement

DEVELOP: create a migration strategy and plan

IT enablement 'seat on bus' defined and filled?

uy)

Decisioning on Migration Strategy

IT Enablement System ongoing Management

10 Sept

29 Oct

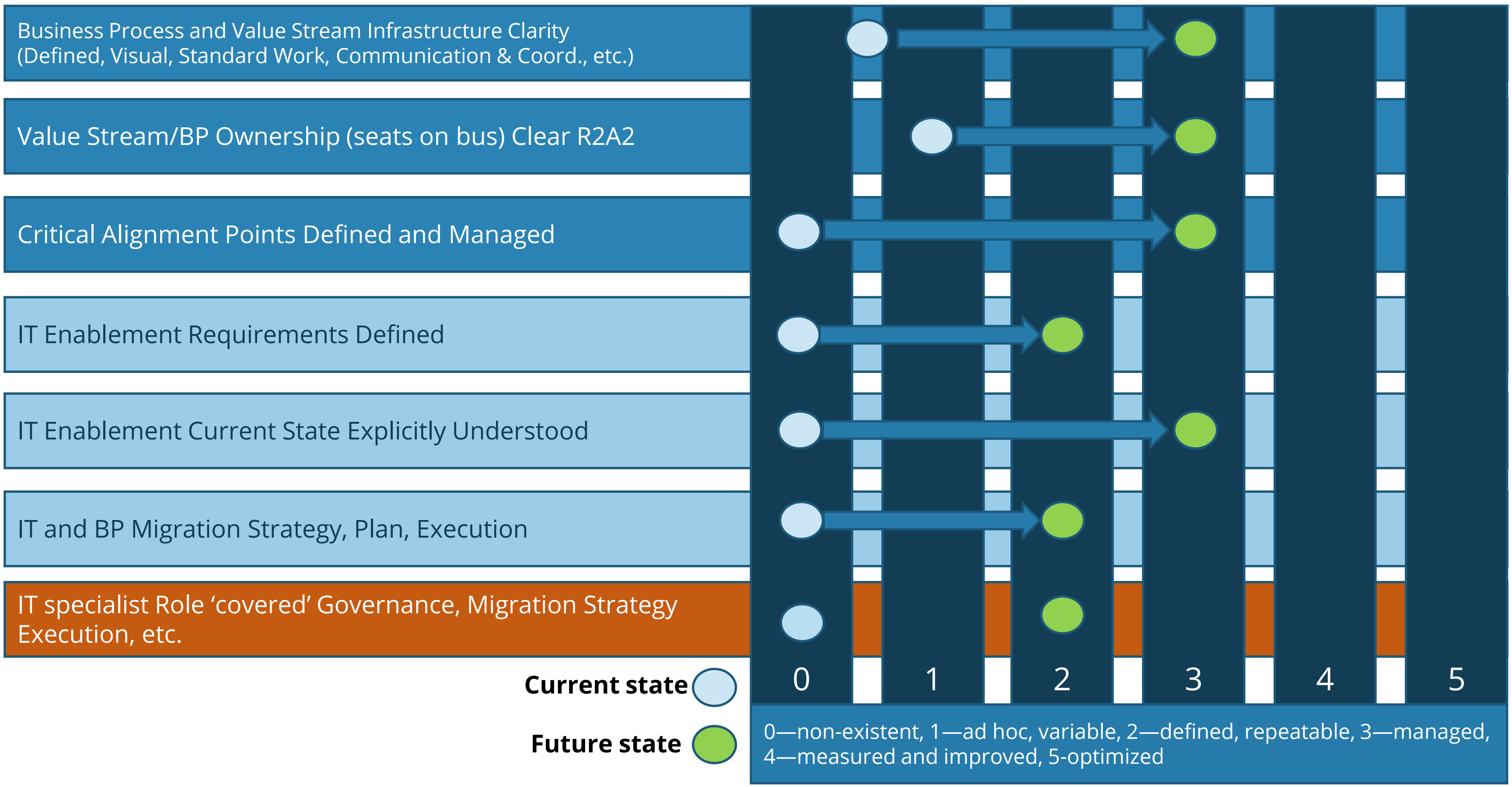
18 Dec

FUTURE STATE

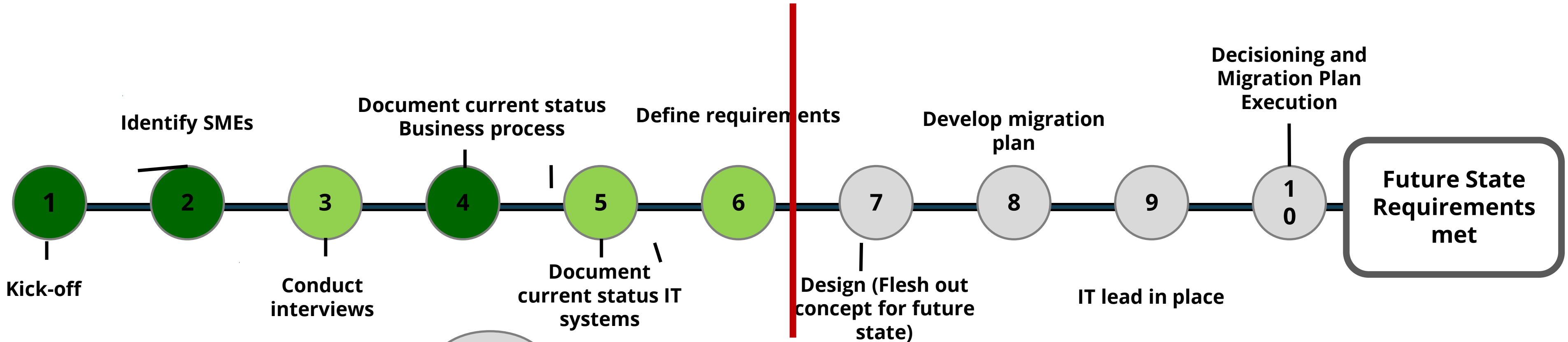
(Dec 2020)

- IT and Business Process Assessment complete and documented
- Migration Strategy and Plan detailed, understood, and underway
- IT 'position' staffed
- IT Enablement specific capability development prioritized
- A clear strategy for ensuring People, Strategy, Process and Technology are better integrated is documented.

TPG Bus Process and IT Enablement Management System Process Maturity Scorecard for EVA's



Roadmap: DEFINE current state IT System, Bus Processes, R2A2, and Pain Points



3

- IT infrastructure fact finding
- Business process interviews and maping

4 &5 & 6

DEFINE current state :

- Bus Processes
- IT Systems
- R2A2
- Pain Points
- Requirements

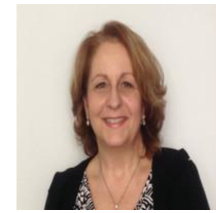
7 & 8

- On-hold pending TPG resourcing availability
- Need to discuss go forward motivation and strategy
- Detailed Migration Plan is next major step

Complete

Work in Progress

Mary Catalfo,
VP Ops



Sue Sheridan
VP Resource Dev

Caroline Kent
Value Stream
Improvement
Program Lead

Cherie Pereira
Evidence, Learning,
Impact Specialist

Sheree Wells
Sr. Mgr
Service Delivery

The Key Objectives (Questions)

How do we reduce Big/Little wait time throughout the process?	How do we increase the # of Bigs/Littles/Matches processed without additional headcount?	Do we need to modify roles and responsibilities to achieve greater efficiency?

Key Objective 1: Shorten **Lead Time** from Mentee accepted to First Mentee/Mentor/Case Worker Meeting

Key Result: Lead Time from ~ 2 years to 4 months

Key Objective 2: Increase **Steady State Process Capacity**

Key Result 2: from ~320 (in-process at any point in time) to 1000.

Key Objective 3: Start, Stop, Continue with mod's anything and everything.

Key Result 3: found the right levers and pushed them, created the new process capability

Big Brothers Big Sisters OF TORONTO

PURPOSE STATEMENT: ***Execute on the prioritized levers to establish improved flow, fix process before add cost/resources!!***

Strategic Plan as Context → Vision for Integrated Bus Process and IT Enablement → Bus Process Mapping with Value Stream Analysis → Surface, Visualize Pain Points, Burning Issues, Failure Modes (IT related) → Decisions and Actions/Adjustments in partnership with 3rd Party Vendor Support are mapped out in a migration plan for 2021

CURRENT STATE

(April 2021)

- System and Process Defined Modeled, analyzed
- Pain points, opportunities, wastes, chokepoints identifie and solution elements prioritized
- Strategy for People, Strategy, Process and Technology integration developed, agreed to and migration path work underway
- Quick Wins prioritized and being capitalized on
- Tougher Solution Elements prioritized and ownership/accountabilities and plans underway

Phase II Project Plan

Tollgate 1 April

3

4 Tollgate June 15

Launch Solution Element projects

SE 1—Huddle Board, Dashboard, Huddles

SE 2—Value Stream Balancing and Flow for 1000 vs 250 (verify with simulation)

SE 3—Match Process Re-engineering

SE 4—Visible Meas System, Chartbook

SE 5— Targeted Recruiting Strategy

2nd round of SE's will be integrated beginning in June

Board Review

Phase II TG

5 6 7 8

Weekly Huddles—Sprint Concept with Monthly – Qtrly Reviews

Create, deploy, maintain Visible Measurement System (Dashboard)

April | May | June | July | Aug | Sept | Q4

FUTURE STATE

(Dec 2021)

OKR Process

Key Results:

- Lead Time capability = < 6 mos
- System Capacity = 300+ pairs in flight
- Fixed process first—optimized investment/cost (best value solution)

Key Objectives accomplished:

- Dashboard a 'habit'—Study-Adjust
- Sprinting on projects understood
- Push to pull achieved—flow established
- Value Stream Owner exists and functions
- Top 10 improvement projects completed or well underway

THE POIRIER GROUP

Big Brothers Big Sisters OF TORONTO

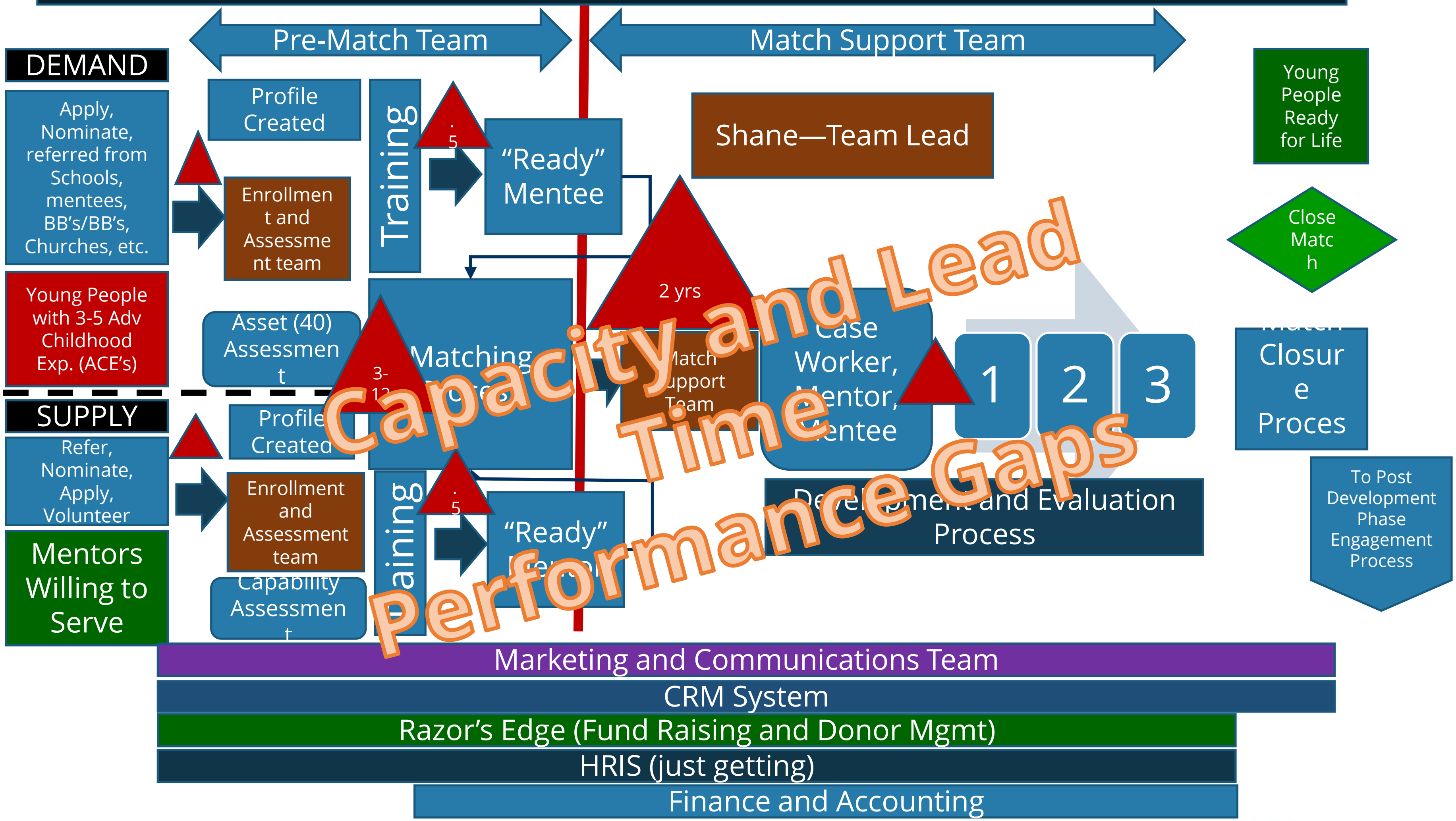
The 3rd step, session 2 for BBBST we utilized Miro to do Silent Generation and then a Delphi Technique method to do the voting an ranking you see here.

QUICK WIN

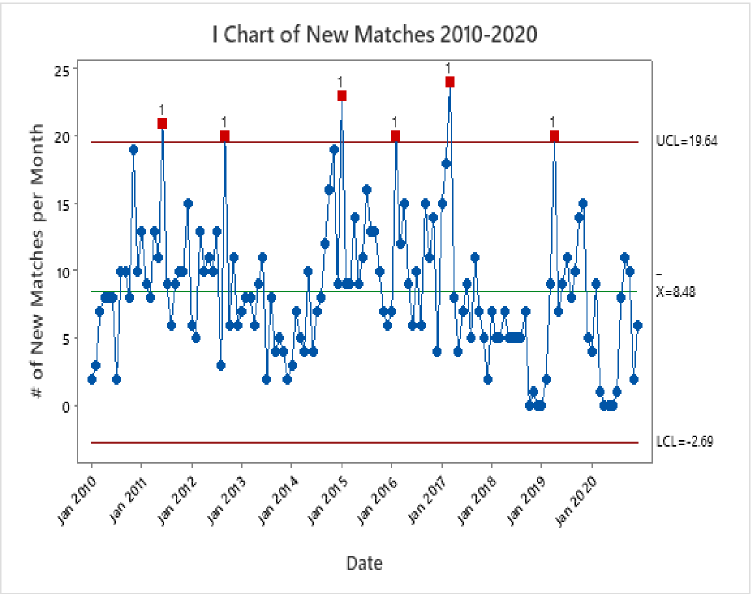
Ideas that align to the Lean Strategy and Principles

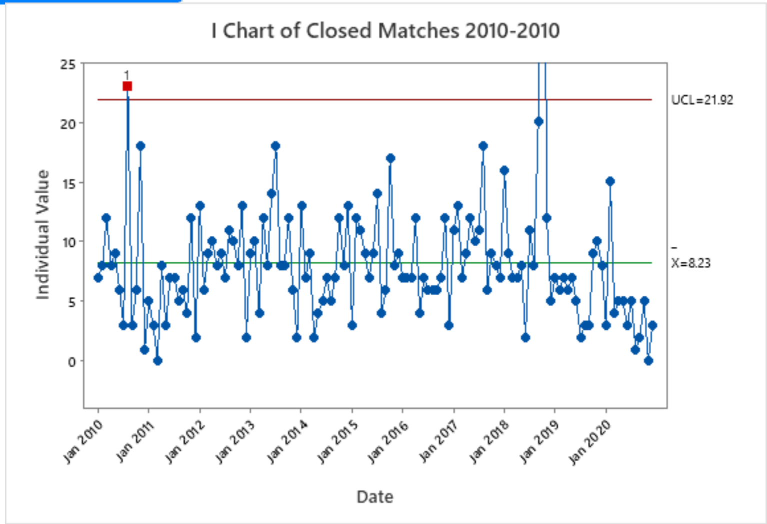
	Process Improvement Ideas													Total Voting F	Sum of Votes	Product	Rating
1	21. Create automated match-making tool (shared, visible system that shows potential matches, make the matching process more visible and automated)	5	1	3	4	7	7			7	7	5	3	10	49	490	29.4118
QUICK WIN 2	8. need to separate the E&A position with two job areas (1—assessments, 2—matching)					2		7	5		6	7	6	6	33	198	11.8848
3	5. a webinar for 'bigs' 101 so staff isn't required to facilitate with a function to ensure successful completion			6		4	3	1		1	5	6		7	26	182	10.9244
QUICK WIN 4	29. streamline, reduce, evaluate level of involvement of Case Workers after year 3 of the mentoring process to free up time to handle more year 1 & 2 workload	4	4		6	6		6			2			6	28	168	10.084
5	13. Automated system for tracking where they are in process		2	5	3	3							7	5	20	100	6.0024
6	2. Need a tracker/countdown system for potential mentors—visibility on status of process to stakeholders		3		2				6	5		2		5	18	90	5.40216
QUICK WIN 7	20. Establish clear spec's on how long matching should take and how many are required each week to sustain required flow and create a Visible Measurement System, do Huddles weekly, use the charts to do Study Adjust and integrate into PMP.				7	5			3			4		4	19	76	4.56182
8	15. Involve, engage volunteers in other activities while they wait to be paired	3				1		2	2	4				5	12	60	3.60144
9	28. system to book match introductions that synch's to MSC calendars (that can book more than 1 person)			1	1			5		6				4	13	52	3.12125
10	7. automated system that shares documents and on-line forms-e-mail sent to assessor upon completion.	1		7							4	1		4	13	52	3.12125

We completed extensive interviews with every team member and ‘mapped’ and analyzed the value stream



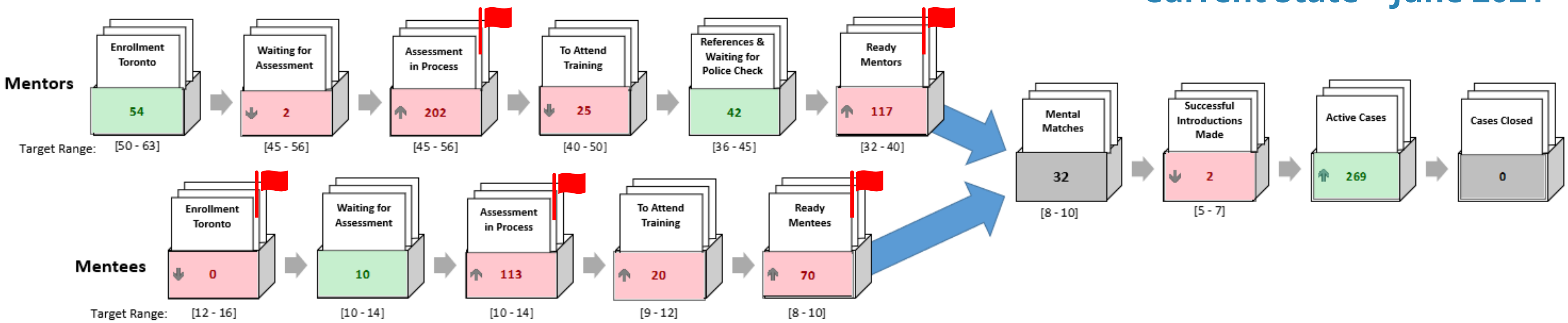
We wanted to use data/facts to help us tell a story and get them connected to what we are creating in relationship to what we said we want to, choose to create



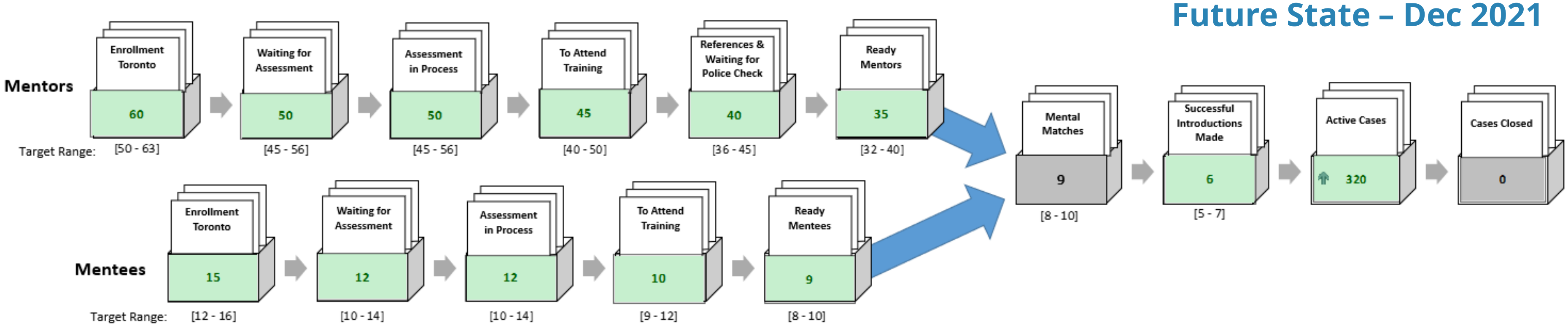


And then we created a Value Stream Map that highlighted the 'buffers' at each control point which clearly depicts gaps in current state (poor flow) which in turn is why we are serving mentees instead of the required 1000.

Current State – June 2021



Future State – Dec 2021



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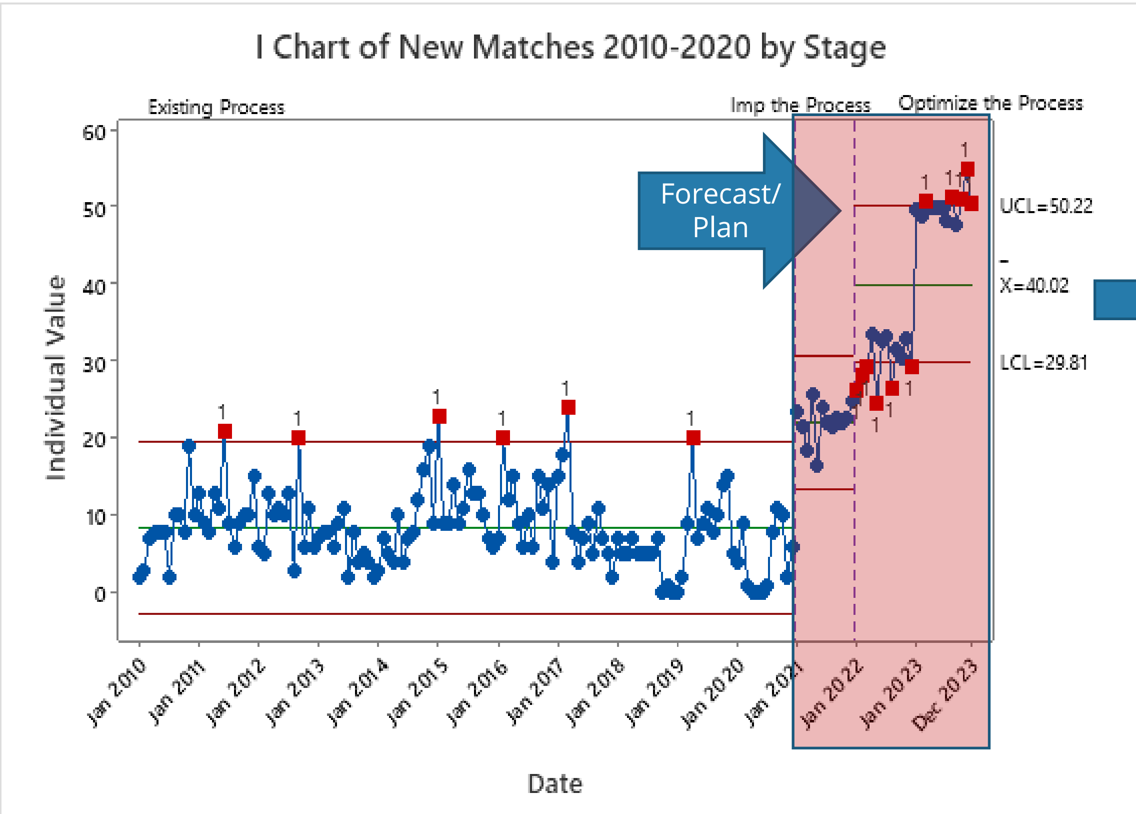
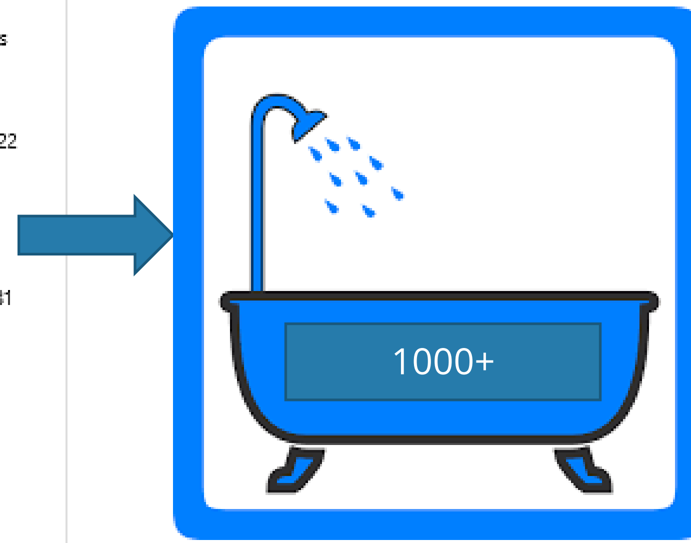
This is what we intend to have happen over the next 2 years (this is a conservative improvement curve with slow addition of personnel to the process) "Get Good, then Get Fast"





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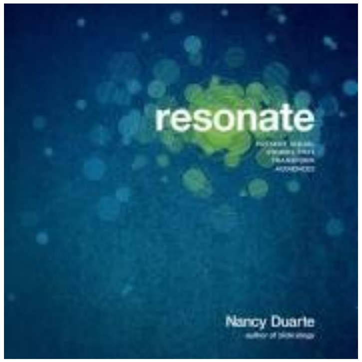
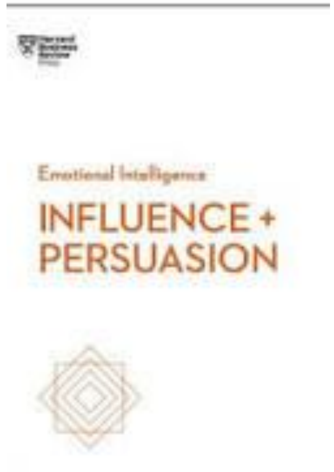
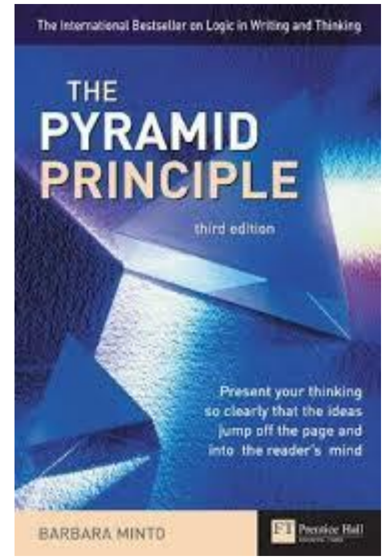
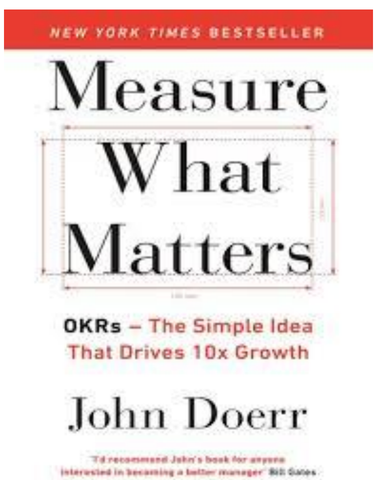
Contextual Fundamental Guiding Principles for Analysts









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INSTITUTE OF INDUSTRIAL & SYSTEMS ENGINEERS

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Performance Excellence topics include ...

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Change Leadership and Management	Industry and Service Systems 4.0	Integrated Lean and Six Sigma
Operational Analytics	Operational and Business Process Excellence	Personal and Professional Mastery

Accelerating Benefits Realization

Dive into agile and other methodologies that speed up operational results and bottom line impact.

- Disruptive Innovation in Distribution: From Weeks to Days to Hours
- Agile Methodology to Enable Rapid Process Innovation and Improvement
- The Agile Scrum Process for Process and Product Improvement
- Rapid (AGILE) Deployment and Execution of Integrated Systems Engineering Principles and Methods in Times of Major Disruption

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Just Ahead!!

Sept 14: IISE ***Operational Analytics Certification Program Launch—Overview for ISE Students and Practitioners***

Register with this link

https://attendee.gotowebinar.com/register/5560236216382159884

Oct 7: ***Business Process Management 4.0—a Glimpse at what's ahead***

Register with this link

https://attendee.gotowebinar.com/register/7929275855425721356

Op Analytics Development Options

4 days to 6 mos. $600-$5,000

On-Line, Virtual

https://careerfoundry.com/en/blog/data-analytics/best-data-analytics-certification-programs/

IISE Training Center

120 hours ++, $450 students + $250 for certification $675/875 member/non-member + $550 for the certification

Hybrid/ Blended Model

1-2 yrs, $50-100k

On campus or Hybrid MS Programs

Op Analytics represents huge opportunity for ISE's

In Partnership with:

The Poirier Group

Delivered Uniquely:

IISE Digital Op Ex 'Mall and Stores'

- **Video Recordings for easy, self-paced consumption/learning in ~:60 chunks**
- **'Chat' Support with Coaches**
- **Periodic Huddles for virtual coaching**
- **Certificate requires an on-line final exam**
- **Certification requires the Certificate plus a reduction to practice, proof of skill project**

Module 1: OA Thought Leader Perspectives
Module 2: Operational Analytics Perspectives, Points of View and Foundational Principles and Methods and Models
Module 3: Operational Analytics: The Foundational Data Management Role
Module 4: Operational Analytics: The Analyst, Decision/Action Support Role
Module 5: Data Sciences and The New Industrial and Systems Engineering
Module 6: Operational Analytics: Value Stream and Process Improvement Analytics
Module 7: Operational Analytics—Visual Measurement/Management Systems
Module 8: Operational Analytics: Putting it All Together: Management Systems Engineering Role
Module 9: Operational Analytics: Case Studies
Module 10: Final Exam and Certification Requirements Definition Document
Module 11: Bonus Module—ISE's Engineering Value in Times of Disruption