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IIE Global Performance Excellence Webinar Series:
Operational Analytics 501:
Detailed Design & Development

Creating Op Analytics Competencies and Capabilities
Tools, Methods, App’s

Our Speaker today and our Sponsor:
Jared Frederici, MBB
The Poirier Group

Jared Frederici Linkedin Page

THE POIRIER GROUP
Focused Performance Improvement

03 Aug 2023
Agenda

11:00-11:10 Scott to ‘tee-up’ the session, go back to go forward just a bit

11:10-11:45 How to develop your OA knowledge and skills—tools, methods, apps, training, etc. (Jared)

11:45-11:55 Scott and Jared Dialogue

11:55 Scott close out and overview our upcoming AI mini-series
Housekeeping

1. Thank you for joining us!

2. We’ll share how to get access to the recording, presentation, YouTube versions and blogs at the end of the webinar. The presentation is available now, use this link to get. (we'll post as a chat)

3. We will field questions as appropriate and time permits. Please use the ‘chat’ function to share your comments and questions.

4. Follow up questions are welcomed and contact information is provided at the end of the presentation.

5. For those who value certificates of participation, IISE will be mailing those out the week after the webinar. Be patient and check your clutter and spam folders if you don’t receive one.

Thanks to our Sponsor and Partner for investing time, money, energy programming and directing this overall Program for IISE!
Our 2023 Mini-Series’:

*Strategies for Riding the Waves of Disruption*

*Supply Chain Management 4.0/5.0*

*Operational Analytics*

*AI*
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https://www.youtube.com/channel/UCixxhLPZrwdKDdKytqYZm1A
How does one develop their Op Analytics Knowledge and Skill and competencies and capabilities

• The focus of today's OA 501 Webinar is on developing your ‘Analyst’ Role knowledge and skills:

  - RECAP: What does an OA Specialist have to be able to ‘do’, create? (Scott)

  - What are the ‘tools’ of the OA trade, what ‘apps’ does one need to be conversant and skilled with? (Jared)

  - The relationship between BPM/I 4.0&5.0 and Op Analytics (we’ll point them to your BPM webinars) (Jared)

  - Jared’s suggested professional development plan to kick your OA game up a couple of notches. (Jared)

  - What does an OA ‘Certification’ look like relative to an ILSS belt certification? (Scott)
Do Organizational/Value Stream baseline analysis.
- How does it work
- How does it need to perform
- How does it perform
- What/where are the gaps
- What’s causing the gaps
- What do we do about the gaps

Build data models, perform the Data Management Role
- Define the Data element requirements
- Source the data
- Assemble and organize the data for analytics
- Transfer from ‘excel’ to your analytics app (e.g. Minitab, PowerBI)

Conceive of, Concept Design for the Information to Decisions to Actions to Benefits Realization causal chain and work backwards as you design and develop (Perform the Analyst Role)

Ultimately be a Change Master, create systems that provoke timely decisions and actions that lead to faster better solutions that lead to faster benefits realization.
OMIX-H Components

Managing the flow of data and information required to develop analytics solutions

Serve in organizing efforts to manage, protect and enable value from enterprise data assets

Coordinate the implementation of advanced analytics solutions to ensure human and AI systems can work, interact and communicate with each other

Enable explorations insight generation and problem solving using data

Advance the organizations capabilities in understanding data, its collection, management and application

Stimulate, surface and shape the organization’s needs across all domains of the organization

They stressed the interactions between components in the system relative to desired business outcomes

OMIX-H Interactions

PRIORITIZATION & INVESTMENT
Prioritization of advanced analytics or AI projects

PEOPLE/CULTURE & DATA LITERACY
Ensure that organizational culture and people capabilities advance with the introduction of new ways of doing work

RISK TOLERANCE & STRATEGY
Ensure a balance between risk appetite and strategic pursuits

TECHNOLOGY & BUSINESS OPPORTUNITIES
Understand current and future needs to data technology and help align investment

Decision Support Analyst

Role:
• Performance data quality, reporting and analytics for clinical and management teams

Skills:
• Epic Cogito reporting, business intelligence, communication, and statistical analysis
• Medical terminology and informatics proficiency
• Database tools/programs (e.g. Crystal Reports, Power BI, SAS and Python)
• Large healthcare data sets

Value proposition:
• Provide accurate information and thoughtful insights on hospital performance to support operational and strategic evidence-based decision-making
• Recommend innovative ways to improve reporting process efficiency and data quality

Example Contributions:
• Stroke Accreditation
• Blood Group Confirmation to ensure patient safety and optimal delivery of blood resources
Analytics Consultant

Using data to solve problems and generate insight

Role:
- Utilize analytics and data to understand and address healthcare challenges

Skills:
- Simulation, predictive analytics, operations research, project management, and change management

Value proposition:
- Leverage UHN data assets to develop innovative analytics solutions that improve the delivery of care and operations

Example Contributions:
- Toronto General Hospital Simulation Model [inform medium and long-term capacity planning]
- Primary Care Provider Data Visualization [understand patient/provider care in the community]
- Emergency Department Predictive Model [forecast patient arrivals to inform staffing decisions]
- Eating Disorders Program Model [understand available capacity and reduce patient wait times]
Data Storyteller

Helping UHN connect to its data, understand it, and take action

Role:
- Convert business problems into decision intelligence solutions using data-driven visual stories to drive decision-making

Skills:
- Data visualization, development methodologies, information architecture, data analysis, user interface design, agile product ownership, and change management

Value proposition:
- Communicating complex data through storytelling to support patients and staff in making critical decisions

Example Contributions:
- UHN Corporate Scorecard [inform Executive Leadership and Board on performance against North Star Indicators]
- Patient facing Emergency Department (ED) wait times tool [inform patients and staff of expected wait to see a provider]
- Patient Experience dashboard [understand and improve how patients’ experience care at UHN]
- COVID-19 vaccine registry dashboard and portal [identify and prioritize eligible groups for vaccination]
This is a neat graphic that helps understand the Analytics Triangle. Many nuances, cultural, cognitive style, complexities to making this all work effectively in organizations.

The Data Management Role

The Bus Intelligence, Analyst, Decision Support Role

DATA
SORTED
ARRANGED
PRESENTED VISUALLY
EXPLAINED WITH A STORY

DATA SCIENTIST MUST-HAVE SKILLS

MATH & STATISTICS
- Machine Learning
- Statistical Modeling
- Exploratory Analysis
- Clustering
- Regression Analysis

PROGRAMMING & DATABASE
- Computer Science Fundamentals
- Database Management System
- Data Visualization
- Python
- Big Data

DOMAIN KNOWLEDGE & SOFT SKILLS
- Inclination towards business operations
- Keen on working with data
- Problem solver
- Strategic, proactive, and cooperative
- Interested in hacking

COMMUNICATION & VISUALIZATION
- Storytelling skills
- Convert data-based insights into decisions
- Collaborative with Sr. Management
- Knowledge of tools like Tableau
- Visual art design

resonate
NANCY DUARTE

Data Story
Organizational Systems, Extended Enterprises down to the smallest process is this happening..

Leadership & management team
(wisdom application, data/facts to information conversion process)

Upstream Systems and Inputs: Suppliers & customer orders

Data management and Operational Analytics

Downstream Systems and Outputs: Orders Fulfilled

The Business Processes/Value Streams/Processes

Data entry

Data capture

Information portrayal

Information perception/understanding / insights

Decisions

Actions
How to Build Better ‘Dials’ on your ‘Dashboards’ and ‘Scorecards’

Key Points to Consider:

– Good analytics come from good context understanding, use case clarity, *good problem/opportunity statements*, clear understanding of DONE, they specify ‘the questions’

– Investment in the data foundation has a positive ROI, as analysts and users move faster when they trust the data – results in faster results

– Good data visualizations can tell the right story quickly, because people are predisposed to believe what they see in a chart …

– Good Operational Analytics *provokes more timely decisions and actions* – indeed, in most organizational systems, simple and persuasive/influential beats complex/ambiguous every time

– Good Operational Analytics *provokes more timely decisions and actions* – indeed, in most organizational systems, simple and persuasive/influential beats complex/ambiguous every time

TPG can help your organization speed things up and achieve Better Benefits Faster. Contact us.
Converting Data to Information to Insights to Decisions-Actions:

The Study-Adjust Process

The Foundational Data Management Role:

- Begins with the formulation of the problem statement, hypotheses, use cases, user requirements, management system modeling and analysis
- It ends with getting the data integrated and organized in a fashion that makes analytics easy

Common Issues/Failure Modes:

- Don’t start with the questions
- Don’t define DONE
- Don’t understand how it works
- Don’t understand ‘customer’ requirements
- Don’t design/build in right sequence, action junky tendencies prevail
Converting Data to Information to Insights to Decisions-Actions:

The Study-Adjust Process

**Feature Extraction:**

- ...is the selection of data elements of interest, key performance indicators, measures of interest and is based on ‘The Questions’, The Use Cases and User Requirements relevant to the improvement work and the ‘system’ focus.

- A ‘report’ in Power BI is an example of feature extraction.

- It is essentially data base portrayal with the ability to ‘slice and dice’, sort, filter, organize, etc.

**Common Issues/Failure Modes:**

- Report proliferation, Data Rich and Information Poor.
- Get Stuck in/with Feature Extraction.
Converting Data to Information to Insights to Decisions-Actions:

The Study-Adjust Process

Knowledge Extraction:

- ...is the conversion of data portrayal to information portrayal. The basic distinction is that information is directly ‘usable’, one has an answer to a question and/or can act on the basis of what they ‘see’, now know.

- A simple question I always ask is whether the ‘portrayal’ is just a ‘so what’ to users. Nice to know but it doesn’t provoke doing (or not doing) something.
Converting Data to Information to Insights to Decisions-Actions: The Study-Adjust Process

Visualization Science & Art:

- ...is all about ‘how you portray’ the information so that the ‘knowledge’ produces results...

- It’s the art of storytelling, persuasion—it’s all about creating ‘aha’ moments with visualizations.

- It’s where the Questions are put juxtaposition with the Answers and the ‘decision makers’ GET IT, know what to do next (or what not to do).

- It is often about Statistical Thinking, providing longitudinal data, portraying it in a way that makes it easy to see patterns, trends, breakdowns, etc.
Just like DMAIC, OA has a ‘roadmap’

- Most ISE/ILSS Process Improvement Projects require that the ISE/Belt do both roles, certification requires that
- Data is almost never stored in a common place and are not trusted nor available

- the current state process in many large organizations splits data and analytics
- Data are stored in a common place, and are trusted and available

**“Above the line” analyst role**

1. What are the fundamental Questions that have to be answered?
2. What data elements do those questions require?
3. Organize the data and facts and then export to your analytics app.
4. Extract features from data through integration and manipulation of data that move us closer to answers. (torture the data)
5. Apply business acumen to data & analyses – create new knowledge
6. Apply data visualization techniques to aid in telling the right story – as in life, so in business: the best story wins …

**Foundational data role**

1. What do we need to know in order to achieve the performance objectives—what are the questions we have to answer?
2. Architect/Create the Measurement and Analytics Plan (Data Model included)
3. Select and gather data from many sources, preferably through automated extract, transfer, & load (ET&L) process
4. Create (observation, interviews, etc.) any data elements that don’t exist (ISE Measurement)
5. Assure data are cleaned & ready for analysts or you to use – data quality monitors
6. Assure data are integrated & can be joined with other data – think LEGOS
7. Assure data storage is high reliability & user-friendly – SSAS cubes, databases
8. Integration and organization of foundational data elements as well as derivative data and other key metrics of interest
Design for... approach to Management Systems Engineering

Define

OA 101

Concept Design

OA 201

Detailed Design & Development

OA 301 & 501

Optimize

OA 401

Verify

OA 501—The Knowledge and Skills to do this!!
# Design for... approach to Management Systems Engineering

**Define**
- Strategic Context
- Key Stakeholder Analysis
- Management System Model
- Management System Analysis
- Value Stream Mapping and Analytics
- MSM Interface Requirements Definition
- Control Point Metrics and Spec Limit Determination

**Concept Design**
- BPI capability and capacity
- Enterprise level Value Stream Mapping and Modeling (Enterprise Value Map)
- BPI Portfolio Strategy and Development
- Tiered Scorecard and Dashboard and Chartbook Concept Development
- Visible Measurement System
- Tiered Huddle System (as example)

**Detailed Design & Development**
- BPI capability and capacity
- Enterprise level Value Stream Mapping and Modeling (Enterprise Value Map)
- BPI Portfolio Strategy and Development
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- Visible Measurement System
- Tiered Huddle System (as example)

**Optimize**
- Measuring what matters
- Data and Fact Driven Organization
- Enterprise Value growing at best in class rates
- B continually driving out ‘C’ and ‘D’
- Focused innovation and improvement
- Alignment and coordination top to bottom, back to front
- Discipline with ‘A’ and ‘B’
- Accountability, Trust, Culture
- Information (Profound Knowledge) and Insights and Bias for Action and Results

**Verify**
- Creating Visualizations that cause ‘aha’ moments
- Decision-Action Support with data/facts
- Study-Adjust enablement
- Data Modelling
- Data Story Telling—Pyramid Principle
- PML improvement
- Power BI, Power Apps
- ‘Minitab’ or equivalent proficiency
- Information (Profound Knowledge) and Insights and Bias for Action and Results
Rounding the Corner on the Model is a Critical to Success Skillset for the Analyst

The Business Processes/Value Streams:

Upstream Systems and Inputs: Suppliers & customer orders

Downstream Systems and Outputs: Orders Fulfilled

Leadership & management team

(wisdom application, data/facts to information conversion process)

Data management and Operational Analytics

Data Organization

Data entry

Information perception/understanding / insights

Information portrayal

Decisions

Actions

Data capture

Data capture

Data capture

Data capture

The Business Processes/Value Streams
How does one develop their Op Analytics Knowledge and Skill competencies and capabilities

The focus of today's OA 501 Webinar is on the ‘Analyst’ Role:

- What does an OA Specialist have to be able to ‘do’, create? (Scott)
- What are the ‘tools’ of the OA trade, what ‘apps’ does one need to be conversant and skilled with? (Jared)
- The relationship between BPM/I 4.0&5.0 and Op Analytics (we’ll point them to your BPM webinars) (Jared)
- Jared’s suggested professional development plan to kick your OA game up a couple of notches.. (Jared)
- What does an OA ‘Certification’ look like relative to an ILSS belt certification? (Scott)
• Business Process Management is undergoing a rapid evolution that is part of the Industry 4.0/5.0 transformation.

• We (TPG) have defined the migration strategy and plan that organizations can take to ‘mature’ their BPM capabilities and capacities and get a competitive edge.

• Tools, app’s, power app’s, in general ‘methods/mechanisms’ abound, picking the right ‘tools’ is important and challenging for most.

• Navigating up the Process Maturity levels can be difficult, often external guidance is useful.

• Operational Analytics is a key cog, component in the BPM Process Maturity Improvement activity with correlated maturity levels for OA capabilities and competencies.
Business Process Management 4.0 and 5.0 Framework

Using a variant of the classic BPMM model, we can assess the maturity of an organization’s process maturity of BPM. TPG’s client set has an average maturity index of 2.2 / 6 across its past ~400 projects.

BPM 5.0

6. Algorithmic-based or AI dependent programs analyze dynamic process data that has been mined and both predict and mitigate process breakdowns autonomously.

BPM 4.0

5. Most process is digital, via a “digital twin”. Process mining exists and process data is constantly analyzed.

4. A mature competency exists to both document new processes and fix broken processes dynamically.

3. Future-state has been designed and somewhat implemented.

2. Processes are written down. People thought through current state.

1. Controlled chaos. Process is art.

1. Ad Hoc
Select Tools / BPM Technology Roadmap

High correlation between successful IE’s in moving your organization up the maturity curve and knowing **how and when to deploy corresponding technologies.**
Navigating Common Maturity Level Increases (1-3)

Many IE’s, especially those deployed into small organizations, startups or organizations with lower maturity, may find themselves working on the basics, to setup the foundation for higher levels.

**Frameworks to Employ**

- Enterprise Levels 1-3 Mapping
- Swimlane Level 4 Mapping
- RACI Matrix
- SOP’s
- A few Core Data Cubes

**Tools to Support**

- miro
- Visio
- Excel
- Word
- Access

**Strategies**

- Get an understanding of the enterprise business processes
- Leverage digital whiteboards to obtain process characteristics
- Choose, in priority order, business processes to get mapped (Visio is most common) and map by swim lane
- For the most critical processes, get clear SOPs in place and trained on
- Basic RACI matrix to see the interactions between and within processes
- Basic database management to connect key data tables (Data cubes, OLAP) in prep for efficient queries
Navigating Common Maturity Level Increases (3-5)

This phase begins to stretch the typical IE background and does require access to some more advanced tools and analytics to properly employ. However, this phase can also deliver much higher ROI’s via automation.

### Strategies

- Create the “digital twin” of in-scope business processes, those ripe for automation via technology platforms matched to your organization's tech stack / ERP.
- Begin using tools to leverage RPA to automate some of the digital workflows you have. Some great candidates are typically found in the service back office around invoice management.
- Work with more dynamic process data, mining both manually and semi-automatically and setup business rules for cases where decision support comes automatically without much human intervention.
- Ensure integration of governance structure upon review of automated or semi-automated processes.

### Tools to Support

- Power Automate
- UiPath
- airSlate
- blueprism
- Automation Anywhere

### Frameworks to Employ

- Digital Twin
- Automation Workflow
- Process Mining
- Process Layers to Mined Data

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Maturity Level 5 in Action

Visuals / case studies of what this transition looks like:

Of the 67 steps within process X, TPG has identified ~13 **process steps** as candidates for **full** automation and ~18 **process steps** as candidates for **partial** automation; Currently, the cumulation of these steps require **2.9 FTE**

**Workflow Example for Automated File Upload - Power Automate**

**Legend**
- Processes identified as potential candidates for full automation (i.e. manual tasks, manual workflows)
- Processes identified as potential candidates for partial automation

**Rapidly Identify Processes to Automate. Leverage Tools like PowerAutomate to Join, Modify, Delete, Streamline.**
What Does 6 Look Like? Home Grown Version

Automated Process Mapping Using AI

1. Process workshop conducted in Teams, using Miro and recorded (with Transcript)

2. Open AI’s speech-to-text conversion (Whisper) into a summary and direct transcript (GPT 3.5)

3. GPT3+ Excel Add in – Conversion to tabular data process characteristics

4. Conversion to Visio import table requirements for process steps, swimlanes, predecessors, etc.

5. Swimlane process diagram automatically created based on process workshop
What Does 6 Look Like? Enterprise Version

Fully connected AI-based process mining and analysis

VISUALIZATION OF THE ACTUAL PROCESSES

AI-POWERED ROOT CAUSE ANALYSIS & IMPROVEMENT

Tier 1 AI-Based Process Mining Connects to Your Process & Transactional Data and Automatically Maps, Creates, Predicts, Intervenes, Reports Back
Major Developmental Milestones

Key milestones in the BPM 4.0/5.0 journey as IE’s

1. Document Current State
2. Overlay RACI, Structure
3. Overlay Pain, Root Cause, Heat Map
4. Dynamic PDCA
5. Create Mechanism for BPM
6. Architect Future State
7. Database of Process Data
8. Create Digital Twin
9. RPA/ML of Processes
10. Dynamic Process Mining
11. AI Based Predictive Processing
What About Operational Analytics in the Context of BPM?

Just like BPM, Operational Analytics (OA) is a competency within an organization that can be measured. Most IE's we experience are equipped to operate a little over a 4 but rarely deploy 5 and 6 level tools.

OA 4.0
1. Ad Hoc, Reactive
   - Paper files, handwritten analysis, multiple disparate systems, data integrity issues

2. Some Structure, Reactive, EDA
   - Some spreadsheets, a few databases (unlinked), reactive analytics, some basic EDA, little to no RCA

3. Moderate Structure, Reactive, EDA, Some CDA
   - A few relational tables linked, ERP, still reactive, mature EDA, RCA, some CDA but disparate with little follow through

4. Structured, Reactive, Some Predictive EDA and CDA in Parallel
   - Multiple linked databases, ERP or equiv, structure to manage analytics, BI, general triangle managed, CDA strong, some analytics predictive, data scientist role emerging

5. Automated, Predictive, Connected
   - A few relational tables linked, ERP, still reactive, mature EDA, RCA, some CDA but disparate with little follow through

6. Autonomous
   - Mature structured data warehouse, real-time, high integrity, data science practice, RPA/ML occurring, predictive analytics, process mining mechanisms

OA 5.0
6. Large portions of BI and data science practices are autonomous. Predictive and automatic interventions occur based on rules. Humans spend 90% + on decision support and implementation
High correlation between successful IE’s in moving your organization up the maturity curve and knowing how and when to deploy corresponding technologies.
Another Way of Looking at it...

These technologies also **overlay onto the Intel triangle** of the various roles IE play within OA. Lots of overlap but they will equip you to **seamlessly move in and out of these rapidly**.
What Does the 1-2/3 Transition Look Like?

**Bumping up Your Excel Skills**

**Beginner**
- =A1+B2
- Data Entry
- Simple Charts
- Tables
- SUM/AVERAGE

**Intermediate**
- Lookup Functions
- Nested IF statements
- Advanced Charts
- Pivot Tables
- SUMIFS

**Advanced**
- Array Functions
- VBA/Macros
- Scenarios
- Power Pivot
- Doesn’t use the mouse

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**VBA Macro in Excel**

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What Does the 2-4 Transition Look Like?

Getting Good at Access

1. Figure out imports, database management, field settings and data types
2. Understand tables, relationships (inner, outer, cross, union, etc.)
3. Build your first form, link table data, use action buttons
4. Populate new tables (or existing) with form data
5. Run your first query on tabular data connected through joins*
6. Create your first report

5a. Bonus, use SQL to execute query!
What Does the 1-3/4 Transition Look Like?

Exploratory Data Analysis (EDA)

1. Consistently see weakness around ability to detect and work with non-normal distributions (or even find out...) and statistical power of sample

2. In v17 and higher, leveraging the assistant function – limiting ourselves to just time-series plots and not getting creative

3. Not realizing “macros” also exist in Minitab via scripts. What if you could populate 30+ charts in a few seconds to explore a data set?
What Does the 2-5/6 Transition Look Like?

Confirmatory Data Analysis (CDA)

1. “Table Stakes” is to be able to rapidly but accurately do CDA based on knowing the statistical distribution(s) of our data set. Minitab’s “Six Pack” and others can combine features.

2. Know how and when to employ hypothesis testing, ANOVA, regression, multiple regression, correlation, etc.

VS.

1. Automated EDA and CDA leveraging a variety of bolt on applications in R, “AutoEDA”, GGAlly, Statsomat / CFA.

2. Copilot demo/beta creating automated analysis / CDA / hypotheses based on multiple input data sources.
What Does the 2-4 Transition Look Like?

Data Cubes

- Once you’ve isolated the sources, and have brought them into a “data warehouse” type of application, create a data model
- Leverage “cubes” and “hypercubes” in your data model for efficient processing

In addition to leveraging a third dimension of data, organizations with relationships into an array of data shown by PowerPivot or PivotTables, there are default cube functions built into Excel 2010 and higher. Examine SQL OLAP cube builder. Note OLAP and NoSQL platforms are growing.
What Does the 2-5 Transition Look Like?

Power of Python

1. Import the libraries.

```python
# Import the necessary libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
plt.style.use('classic')
```

2. Load the dataset using pandas read_csv() function.

```python
# Load the car.csv dataset
car = pd.read_csv('https://raw.githubusercontent.com/automl/automl/master/datasets/car/car.csv')
```

3. Display the head of the dataset using the head() function.

```python
# Display the head of the dataset
(car.head())
```

Create easily data arrays, display them, plot them, visualize and correlate using loops if needed.

Flexible, opensource, tons of analytics libraries now and much better visualization platforms available.
What Does the 2-4 Transition Look Like?

API's and Integration Hubs

A basic understanding of an API (Application Programing Interface) to make data “calls” using requests and responses to obtain web server data is important and the coding/language can be simple for some needs.
What Does the 3-5 Transition Look Like?

Microsoft’s Power Platform

The ability to know a “little bit about a lot” about the Power Platform will go far, especially if your organization is already on various Microsoft platforms.
**Example of Pulling in 2, 3, 4 and 6**

**Automated Benchmarking Analysis**

Corporate ERP Modules, Financial GL & Core Financial Reports, Management Reports, Internal Documents, Transaction Master Files, Sensors/Controllers/Plant Systems, Call Centers, Website Logs, CRM, etc.

**Rapid Organizational Leverage Analysis**

- Pricing: 3.8%
- Volume: 6.2%
- COGS: -10.2%
- SG&A: -8.8%
- Inventory: -14.3%
- Receivables: 4.2%
- Payables: -
- Projects: 24.2%

**Pricing**
- Grow Revenue / Price Recovery

**Volume**
- Reduce Costs

**COGS**
- Reduce Working Capital

**SG&A**
- Improve Fixed Capital

- Chat GPT
- IBIS World
- API
- S&P CAPITAL IQ
- Microsoft 365 Copilot
What Does 6 Look Like?

Automation of Organizational Diagnostic

Summary

The idea of linked systems thinking, which is the concept of how different parts can cause significant effects. The theory of the idea is based on a game from Douglas Hofstadter, which states that a system is not the sum of its parts, but the product of its interactions. The idea uses the game Go, a strategy game to demonstrate how systems thinking works.

The concept of sequencing is also discussed, which is the idea of organizing tasks in a specific order to achieve maximum efficiency. The speaker discusses the importance of sequencing decisions and systems thinking in various aspects of life. By making small sequencing decisions, you can achieve large results.

Next, every element in the ecosystem can be thought of as a system, and by identifying the variables and parameters that affect the system, you can focus on what they can influence and test results over what they cannot control.

Transcript

So let’s get an idea for a video about systems thinking, which is based on my YouTube video, called “Lessons from Great Materials” or “Lessons from Great Materials.” I used that framework to come up with a good video idea and plan. And I’d love to work with the teams on the video to figure out this idea. I’ve had the management consultant Douglas Hofstadter, and I’ve been thinking about what I think that the right kind of understanding is thinking.

A system is not just the sum of its parts. It’s more than the sum of its parts. And it’s not just about understanding the parts. It’s about understanding the interactions.

If you’re taking a new job, you would not have one or two that would make you. But if you had a new job, you would not have one or two that would make you. But if you had a new job, you would not have one or two that would make you.

Open AI’s speech-to-text conversion (Whisper) into a summary and direct transcript (GPT 3.5)

GPT3+ Excel Add in – Conversion to tabular data, codified to 100 decimal points

Getting to Root Cause 90% Faster...

Process workshop, interviews conducted in Teams, using Miro and recorded (with Transcript)

GPT Add In for Structured Data Sources (File Uploader)

Automated Root Cause Affinity Grouping and Cluster Analysis
Putting it all Together

Mature Structure From Source Data to Visualization with OA

DATA SOURCES
- Operations management system
- Supply chain management system
- Product lifecycle management software
- Financial software
- Manufacturing execution system
- Asset management system
- HR management software
- Fleet management software
- Customer portal
- Ecommerce system
- CRM
- IoT devices
- External datasources (social media, etc.)

DATA INTEGRATION
- ETL/ELT services, streaming services, data quality services, etc.

DATA STORAGE
- Operational data store
- DWH
- Data marts

ANALYTICS
- Ad-hoc query tools
- OLAP tools
- ML tools
- Data mining tools

VISUALIZATION
- Reports, dashboards, scorecards, alerts, recommendations, etc.
Major Developmental Milestones

Key milestones in the OA 4.0/5.0 journey as IE’s

1. Get Great at Advanced Excel
2. Excel Macro’s, R
3. Minitab or Equiv. – EDA, CDA
4. API’s, Integration Hub
5. Data Cubes, OLAP (or NoSQL)
6. Experiment with R, Python + Visualizers
7. SQL, Azure, AWS, Data Warehouse
8. Microsoft Power Platform or Equiv.
9. BI Tools, Automated EDA/CDA
10. AI Based Tools Off the Shelf, Predictive
11. Custom AI Applications
How does one develop their Op Analytics Knowledge and Skill competencies and capabilities

- The focus of today’s OA 501 Webinar is on the ‘Analyst’ Role:
  - What does an OA Specialist have to be able to ‘do’, create? (Scott)
  - What are the ‘tools’ of the OA trade, what ‘apps’ does one need to be conversant and skilled with? (Jared)
  - The relationship between BPM/I 4.0&5.0 and Op Analytics (we’ll point them to your BPM webinars) (Jared)
  - Jared’s suggested professional development plan to kick your OA game up a couple of notches. (Jared)
  - What does an OA ‘Certification’ look like relative to an ILSS belt certification? (Scott)
Op Analytics
Development Options

Opportunistic Analytics Certificate & Certification
120 hours ++ (equiv to 1 semester, 4ch course) 12 CEU’s

$400 students + $250 for certification

$575/725 member/non-member + $550 for the certification


IIESE Training Center

Time/Cost

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

On-Line, Virtual

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
Moresteam University

Delivered Uniquely:
IIESE Training for Op Ex/Analytics ‘Store’
  o 10+ Video Modules for easy, self-paced consumption/learning
  o ‘Chat’ Support with Coaches
  o Periodic Huddles for virtual coaching
  o Certificate requires engagement with the course ‘coach’ on assignments
  o 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: The Evaluation Role
Module 8: Operational Analytics: Putting it All Together: Case Studies
Module 9: The Role of Data and Information (Engineered Management Systems) in Periods of Major Disruption, Reducing the Latencies
Module 10: Creating Cultures that Support Full Potential Performance/Operational Excellence
10 fundamental modules make up the certificate program.

On-demand Learning Management System.

Chat Coaching and periodic ‘huddle’ coaching included.

Approximately 120 hours of studying designed to be completed in 6 months or less.

<table>
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<th>Module</th>
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<td><strong>1. Op Analytics Certificate and Certification Program Overview</strong></td>
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<td><strong>2. Op Analytics: Perspectives and Overview</strong></td>
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<td><strong>3. Op Analytics: Data Management Role</strong></td>
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<td><strong>4. Op Analytics: Analyst Role</strong></td>
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<td><strong>5. Data Scientist Role</strong></td>
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<td><strong>6. Op Analytics: Process Improvement (Moresteam)</strong></td>
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<td><strong>8. Op Analytics: Management Systems Engineering Role</strong></td>
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<td><strong>9. Op Analytics: Case Studies</strong></td>
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<tr>
<td><strong>10. Op Analytics: Data Sets and Skill Development Practice/Exercises</strong></td>
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And, Just Ahead.....

Aug-Oct Offerings for you..

An AI Mini-Series is launching next week

10 August  AI 101-- [https://link.iise.org/AI-part1](https://link.iise.org/AI-part1)

- An ISE perspective on AI

AI 201, 301, 401 Under Development for Aug-Sept.

10 August  OA 601

- A deeper dive on today’s webinar content

- September--Our Annual Final Four Capstone Senior Design Presentations

  - Dalhousie, Virginia Tech, Toronto Metro University, Georgia Tech

- October 19—Best Practices in Service Systems Engineering

  - GM, Purdue & County Community Corrections, Univ. of Illinois and Deepair Solutions

- October 24—Jim Tompkins is back!! With his perspectives and points of view on the evolution of Globalization vs De-Globalization and how this will impact ISE in practice

  - To Register: [Register for Jim Tompkins on Globalization vs De-Globalization Evolution](https://link.iise.org/AI-part1)
The Purpose of our upcoming AI Miniseries

Sense making in an everchanging World

ISE Perspectives and Points of view on AI
Objective: build out the capability to do the top half of the Ops Analytics Process DO-TRAIN/COACH Approach

Results and Benefits Realization

Decisions-Actions

Insights Understanding

The Questions

The BPI/Analytics Team:

The Implementation Science and Benefits Realization Role doesn’t exist yet (PMO)

The BPI/Analytics Support Team:

The Analyst Role: doesn’t exist yet

User Interface to Power BI output: (Data Management Role)

The Data Management Role: (Exists as Silo)
Data Sources, MMS, SQL tables, Query tools, and what’s called Feature Extraction in the form of Reports/Tables/some charts

We need to get this going from top to bottom instead of bottom to top!!
Getting to Visualizations that create insights (aha moments) that provoke timely decisions and actions and improvements is the key

Must do, Accelerate ability to cycle bottom to top on the OA Triangle

- Improved Alignment of OA work with Strategy—better portfolios due to leveraging better OA
- Integrate data creatively, from multiple sources, rapidly using best tools available
- Visualizations must minimize the latency to get to the “Ah-Ha” moment and then drive the causal chain to Benefits Realization
What are the components of the ‘Management System’ (‘B’)

- **Measurement, Evaluation, Analytics Systems**
- **Communication and Coordination**
- **Motivation—Ideal Behavior Assurance**
- **Scorecards, Dashboards, Chartbooks (PowerBI)**
- **Agile Huddles & Retrospectives (Sharepoint)**
- **Knowledge of Results, Growth Needs, Engagement**
- **Alignment** top to bottom, front to back (e.g. Hoshin Kanri)
- **Tiered PDSA Huddles** (Communication & Coordination)
- **Visible Measurement Systems (Knowledge of Results, Accountability)**
- **Planning System**
- **Deployment Process**
- **Augmented Processes with Tech Enab. (quality & speed)**
- **Job Enrichment** (augment, enable people for them to do higher order tasks and innovate)

- **‘Technology’ Enablement**—includes Process design
- **Visible Measurement Systems** (Knowledge of Results, Accountability)

- **Augmented Processes with Tech Enab.** (quality & speed)
- **Scorecards, Dashboards, Chartbooks (PowerBI)**
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Steps in the “Build” of better PDSA systems

1. Map & Analyze the Value Stream

2. Leadership & Management
   - Information Perception

3. Data Management
   - Data Capture
   - Data Entry
   - Data Portrayal

4. Information Portrayal
   - Actions

5. Huddles & Study-Adjust
   - Decisions
   - Information Portrayal

Peavey Performance Management/Measurement System

Operational Analytics (PBI & Sharepoint & Huddle Boards)

Suppliers

Customers

Collect, Store, ‘Manage’ Data for Op Analytics

Positioning Value Exchange Management Operational Excellence
Moving from Big Data to Operational Analytics

Unknown, Unmeasured, Unthought about Data

Identify and figure out how to get

Big data

Data analytics funnel

Results
• Driving Results that are Sustainable
  - Much work ahead but will come quickly

• Study-Adjust:
  - Strong Alignment on the need for this
  - Need BPI tiger team to point the way

• Data Analytics:
  - Lots of work to do, directionally correct

• Data Management:
  - Solid foundation to build on
Objective 1: build out the capability to do the top half of the Op Analytics Process DO-TRAIN/COACH Approach

The Development Team:

The Analyst Role: doesn’t exist yet

The Implementation Science and Benefits Realization Role doesn’t exist yet (PMO)

The Development Support Team:

User Interface to Power BI output: (Underdeveloped in most org’s)

The Data Management Role: (Underdeveloped and mis aligned to BPI)
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