Business plus Intelligence plus Technology equals Business Intelligence

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Decision and System Sciences
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Not new

“Probably at no time in the last decade has the actual knowledge of consumer buying habits been as vital to successful and profitable retailing as it is today.”

New York Times,
“Probably at no time in the last decade has the actual knowledge of consumer buying habits been as vital to successful and profitable retailing as it is today.”

New York Times, May 1, 1931
From Ewen, 1996.
OR/MS HISTORY

• 1950s to early 1970s
  – Tremendous Growth

• Numerous internal OR/MS staffs

HOWEVER
IMPLEMENTATION PROBLEMS

• Individuals felt threatened
• Neither Top nor Middle Management had the educational background
• Lack of understanding of the results
• Black box syndrome
• Selling OR/MS methods
A MAJOR DISCONNECT

“Most managers would rather live with a problem they can't solve than use a solution they don’t understand.”

(F. Bradshaw)
Today—The Confluence

During the past two decades the decision-making process and the manager’s role in it have dramatically changed.

- A major cause of this change has been computer technology. Most organizations today face a significant data explosion problem. Automated data collection tools and mature database technology lead to tremendous amounts of data stored in enterprise resource planning systems, databases, data warehouses and other information repositories.

They are drowning in data, but starving for knowledge!!
During the past two decades the decision-making process and the manager’s role in it have dramatically changed.

• As the information infrastructure continues to mature, organizations now have the opportunity to make themselves dramatically more intelligent through “knowledge intensive” decision support methods, in particular, data mining and management science techniques.
Decision Maker’s Role—
Philosophical Change

**HISTORICALLY:**
disengaged from the decision process. All they wanted was to see/hear what the solution was. They did not care how you got the solution. No longer is the manager interested in the “black box” solution and finding only one optimal solution.
Decision Maker’s Role—Philosophical Change

HISTORICALLY: disengaged from the decision process. All they wanted was to see/hear what the solution was. They did not care how you got the solution. No longer is the manager interested in the “black box” solution and finding only one optimal solution.

Today want to be actively involved in decision-making process and they are also now addressing more complex problems, i.e., problems that are more ill-structured, more fuzzy, including qualitative factors.
Computer Technology and Software

What use to take *years or months* can now be done in *days or hours*!!
Competing on Analytics (Davenport & Harris)

• Analytics are the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions.

• Analytics is a subset of business intelligence; a set of technologies and processes that use data to understand and analyze business performance.
Business Intelligence/Business Analytics

INFORMATION SYSTEMS
- Database
- Enterprise Data
- Systems Analysis, Design, & Theory
- Performance Management
- DataComm
- MIS
- OLAP

STATISTICS
- Basic Statistics
- Multivariate
- Econometrics
- Six Sigma

QUANTITATIVE METHODS
- Data Mining
- Knowledge Management
- Modeling
- VBA
- Supply Chain Management Science
- Operations Research
Why Compete on Analytics?

• Many previous bases for competition are no longer available
  – Unique geographical advantage does not matter in global competition
  – Protective regulation is largely gone
  – Proprietary technologies are rapidly copied
  – Breakthrough innovation in products and services seems increasingly difficult to achieve
Why Compete on Analytics?

- What is left as a basis for competition?
  - Execute business practices with maximum efficiency and effectiveness and make the smartest business decisions as possible

- Analytics themselves don’t constitute a strategy, but using them to optimize a distinctive business capability constitutes a strategy.
4 Pillars of Analytical Competition

- Distinctive Capability
- Enterprise-wide analytics
- Senior Mgmt Commitment
- Large-scale ambition
Five Stages of Analytical Competition

Stage 5
Analytical Competitors

Stage 4
Analytical Companies

Stage 3
Analytical Aspirations

Stage 2
Localized Analytics

Stage 1
Analytically Impaired
WHAT ABOUT OR/MS??
OR/MS RENAISSANCE

• Coming out of the closet--
  Optimization is no longer a bad word
SURVIVAL

The role of OR/MS must also evolve along with the new computer technology and the corresponding changes in decision makers’ expectations.

(Geoffrion 1983, Kitchener 1986)
Math, Engineering, Computer Science and other Science Departments

A MAJOR DISCONNECT

“Most managers would rather live with a problem they can't solve than use a solution they don’t understand.”

(F. Bradshaw)
Premise

Computers, the data they collect, and the results of OR/MS Techniques are **TOOLS for Decision-makers**

i.e.,

- The knowledge gain from these tools will lead to better decision-making
- These tools **DO NOT** make the decision
You have to know the Business
Business Schools

U.S. students’ problem-solving skills are well below the norm of industrialized nations (Dobb 2004a and 2004b).
Business Schools

U.S. students’ problem-solving skills are well below the norm of industrialized nations (Dobb 2004a and 2004b).

A primary reason for our students poor problem-solving skills is that students do not know where and when to use the tools and techniques (Powell 2001, Grossman 2002).
Business Schools--techniques

In the classroom, the mathematics of the tools and techniques are emphasized and not enough time is spent on the skills necessary to analyze a problem situation.

As an analogy, we teach our students how to use the hammer, drill, saw and so on. But, they don’t know anything about how to be a carpenter--given their tools and a stack of lumber and other materials they have no idea where to start to build a house.
Business Schools--Modeling

“The teaching of models is not equivalent to the teaching of modeling”

(Morris 1967).
Business Schools--Modeling

“The teaching of models is not equivalent to the teaching of modeling”

(Morris 1967).

We need our students, not only business students, but all students, to learn the craft of modeling skills so what they can become master carpenters.
Saint Joseph’s University (SJU)

- Saint Joseph's is home to 4,200 full-time undergraduates and 3,100 graduate, part-time and doctoral candidates.
- Erivan K. Haub School of Business—
  - AACSB Accredited
  - Largest U.S. Jesuit Business School
- Dept. of Decision & System Sciences—
  - 8 years old
  - Undergraduate: Provides Major and Minor in Business Intelligence
- Graduate: on-campus and online MSBI
Dept. of Decision & System Sciences

- Provides Major and Minor in Business Intelligence

- Trains students to:
  - Transform data into actionable knowledge
  - Become an effective problem solver
  - Integrate technology with application

- Research areas:
  - Statistical Analysis & Applications
  - Optimization & Quantitative Modeling
  - Forecasting & Predictive Modeling
  - Supply Chain Management
  - Econometric Modeling & Applications
  - Data Mining & Knowledge Management
**Undergraduate**

**Business Analytics**
- IT
- Intro
- Database
- OLAP
- VBA
- Supply Chain
- MS/OR
- Quant

**Business Intelligence**
- Enterprise Data
- Data Mining
- Multivariate
- Basic Statistics
- Six sigma
- Stat

**MAJOR/MINOR**
1. Database
2. VBA; VB; modeling
3. Enterprise Data

**IT Track**
5. System Theory
6. IT Capstone

**Stat/Quant Track**
5. Supply Chain/6 sigma
6. Stat/Quant Capstone
MSBI Course Flow
(on campus and online)

Management
- Foundations for BI
- Critical Performance Management
- Management Issues in BI

Analysis
- Decision Making Competencies
- Advanced Business Intelligence
- Advanced Business Intelligence 2

Data
- DSS Modeling
- Database Management Systems
- Enterprise Data
- Applied Business Intelligence

Each course takes 8 weeks
Two Courses per Semester
## Management Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Concepts</th>
<th>Tools</th>
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</table>
| DSS-4415 Foundations for Business Intelligence | • Value Chain  
• Supply Chain Management  
• CRM  
• Business Process Analysis and Design | • Six Sigma  
• IT Concepts  
• TPS, MIS and EIS | • JMP |
| DSS-5565 Critical Performance Management    | • Scoreboards  
• Dashboards  
• Key Performance Indicators | • Business Strategy Review | • Xcelcius  
• Prism  
• MicroCharts  
• PerformancePoint |
| DSS-5585 Management Issues in Business Intelligence | • Management/Technical Interface  
• BI and Heuristics  
• Continuous Improvement  
• Ethics and BI | • Fraud and Security  
• Knowledge Management  
• Emerging Technologies |
## Analysis Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Concepts</th>
<th>Tools</th>
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<tbody>
<tr>
<td>DSS-4715</td>
<td>• Management Science</td>
<td>• Excel</td>
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<td>• Operations Research</td>
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<td>• Statistics</td>
<td>• JMP</td>
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<td>• Pivot Tables</td>
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<td>• Forecasting</td>
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<td>• Linear Programming</td>
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<td></td>
<td>• PERT/CPM</td>
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<tr>
<td>DSS-5545</td>
<td>• Business Process Design</td>
<td>• Extend LT</td>
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<tr>
<td>Applied Business</td>
<td>• Process Improvement</td>
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<td>Intelligence</td>
<td>• Simulation</td>
<td>• JMP</td>
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<tr>
<td>DSS-5555</td>
<td>• Multivariate Statistics</td>
<td>• Enterprise Miner</td>
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<tr>
<td>Advanced BI</td>
<td>• Clustering</td>
<td>• Tableau</td>
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<td>• Factor Analysis</td>
<td>• JMP</td>
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<td></td>
<td>• Data Mining</td>
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<td>• Decision Trees</td>
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<td>• OLAP</td>
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<tr>
<td>DSS-5575</td>
<td>• Advanced Data Mining</td>
<td>• Visualization</td>
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<tr>
<td>Advanced BI 2</td>
<td>• Predictive Analytics</td>
<td>• Project</td>
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<td>• Enterprise Miner</td>
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<td>• SAS</td>
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# Data (Development)

<table>
<thead>
<tr>
<th>Course</th>
<th>Concepts</th>
<th>Tools</th>
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</thead>
</table>
| DSS-5515 Decision Support System Modeling | • Excel VBA Programming  
• Model Design          | • Excel VBA |
| DSS-5525 Database Management Systems | • Relational Data Models  
• E-R Modeling  
• SQL        | • Advanced SQL  
• PL/SQL  
• Reverse Engineering | • ORACLE |
| DSS-5535 Enterprise Data        | • ERP Systems  
• Data Warehouse Design | • Extraction, Transformation and Loading (ETL)  
• OLAP | • ORACLE  
• Access (VBA) |
We are currently preparing students for jobs and technologies that don’t yet exist... in order to solve problems we don’t even know are problems yet.
We can’t solve problems by using the same kind of thinking we used when we created them

--Albert Einstein
“operates under what could be called the "95/5" rule: 95 percent of Excel users use a mere 5 percent of the program's features.”

Paul McFedries
Future

In 5-10 years:

• Most Business programs will not be using Excel

• They will be using..
Future

In 5-10 years:
• Most Business programs will not be using Excel
  • They will be using..
    • OLAP tools, like Cognos..
Future

In 5-10 years:

• Most Business programs will not be using Excel

• They will be using..
  • OLAP tools, like Cognos..
  • or Statistical software, like JMP
Future

In 5-10 years:

• Most Business programs will not be using Excel

• They will be using..
  • OLAP tools, like Cognos..
  • or Statistical software, like JMP

Excel will be like a calculator is today