How to Assess the Business Value of Data Quality

ABSTRACT

Awareness of any data quality issue immediately leads to questions such as "What impact does information quality have on the business?" and "Why does data quality matter?" Historically it has been difficult to answer these and demonstrate the value of information quality. This presentation discusses various business impact techniques which are qualitative and quantitative methods for determining the effects of information quality on any organization. These approaches from The Ten Steps methodology can be used in many situations and are applied based on need, time, and resources available. The second presentation of this session shows how a variety of the techniques were used to develop and present the "Business Value from Data Quality" at Sallie Mae, a Fortune 500 company and the United State's leading provider of saving, planning, and paying for education programs.

BIOGRAPHY

Danette McGilvray
President and Principal
Granite Falls Consulting, Inc.

Danette McGilvray is president and principal of Granite Falls Consulting, Inc., a firm that helps organizations increase their success by addressing the information quality and data governance aspects of their business efforts. Focusing on bottom-line results, Danette helps organizations enhance the value of their information assets by naturally integrating information quality management into the business. She also emphasizes communication and the human aspect of information quality and governance.

Danette is the author of *Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information*™ (Morgan Kaufmann, 2008). An internationally respected expert, her Ten Steps™ approach to information quality has been embraced as a proven method for both understanding and creating information and data quality in the enterprise. The Chinese language edition will be available by 2011 and her book is used as a textbook in university graduate programs. She has contributed articles to various industry journals and newsletters and has been profiled in PC Week and HP Measure Magazine. She was an invited delegate to the People's Republic of China to discuss roles and opportunities for women in the computer field.

Danette McGilvray
Granite Falls Consulting, Inc.
President and Principal
Phone: 510-501-8234
Email: danette@gfalls.com
Web: www.gfalls.com

Michele Koch
Sallie Mae
Director, Enterprise Data Mgmt
Phone: 703-984-5381
Email:
Michele.V.Koch@slma.com

The Business Value of Data Quality – Part 2
Making it Real – The Business Value
of Data Quality at Sallie Mae

MIT Information Quality Industry
Symposium (IQIS)

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Boston, MA

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Presentation Abstract

Sallie Mae is the largest provider of student loans in the United States. As part of their data quality program they are monitoring and reporting metrics in three areas: State of Data Quality, the Business Value of Data Quality and Data Quality Program Performance.

This presentation focuses on the Business Value of Data Quality. Sallie Mae used various Business Impact techniques from the Ten Steps™ methodology that were discussed in the first presentation of this session. We will show how these metrics were developed, who was involved, and how they are being used to further data quality within Sallie Mae.

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The information contained in this presentation is not comprehensive, is subject to constant change, and therefore should serve only as general, background information for further investigation and study related to the subject matter and the specific factual circumstances being considered or evaluated. Nothing in this presentation constitutes or is designed to constitute legal advice.

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Your Presenters

Michele Koch
Sallie Mae, Inc.
Director of Enterprise
Data Management

Danette McGilvray
Granite Falls Consulting, Inc.
President and Principal

Michele Koch is the Director of Enterprise Data Management and the Data Governance Office at Sallie Mae. Michele and her team were responsible for the successful design and implementation of the enterprise Data Governance and Data Quality Programs at Sallie Mae.

Michele's 27 years of experience in various data fields complements her dual masters' degrees in MIS and Computer Systems Applications from The American University and a bachelor's degree from Cornell University.

Danette McGilvray is President and Principal of Granite Falls Consulting, Inc., a firm that helps organizations increase their success by addressing the information quality and data governance aspects of their business efforts. See www.gfalls.com for more information.

She is the author of *Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information™* (Morgan Kaufmann, 2008). The Chinese language edition will be available sometime in 2011.

Sallie Mae partnered with Granite Falls to define and implement an enterprise Data Quality Program. This included on-going monitoring of data quality rules and quantifying their business value – the focus of this session.

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Session Topic: The Business Value of Data Quality
- Part 1: How to Assess the Business Value of Data Quality
    - Foundational Concepts
    - Ten Steps™ Process Used in the Case Study
- Part 2: Making it Real – The Business Value of Data Quality at Sallie Mae
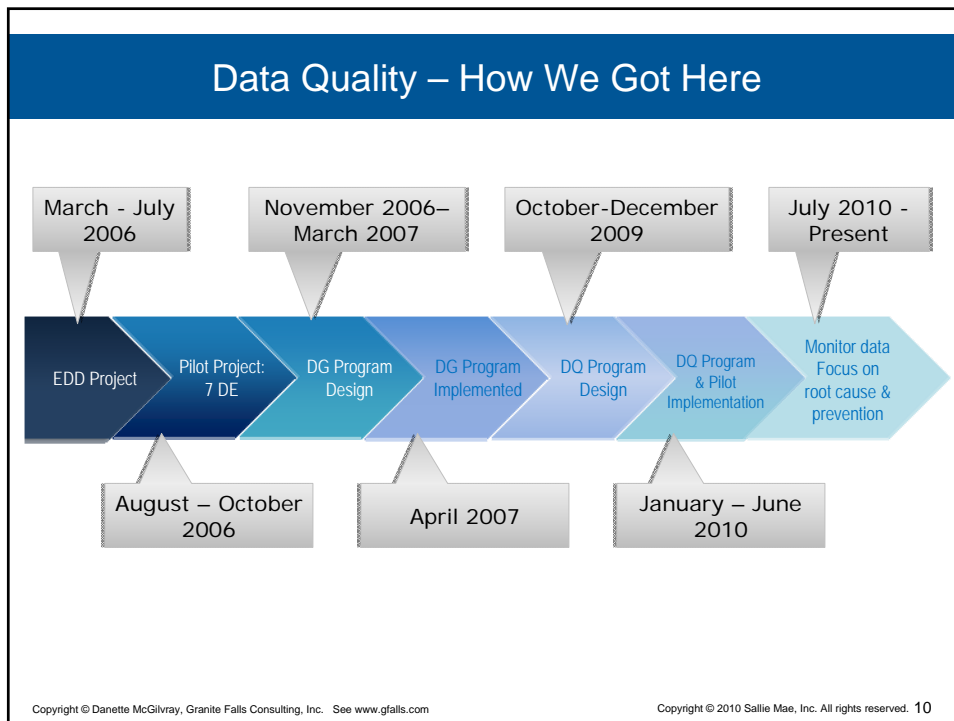   - Practical Application at Sallie Mae
    - Summary and Next Steps

TODAY'S AGENDA (CONTINUED FROM PART 1)

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The Ten Steps™ Used Today

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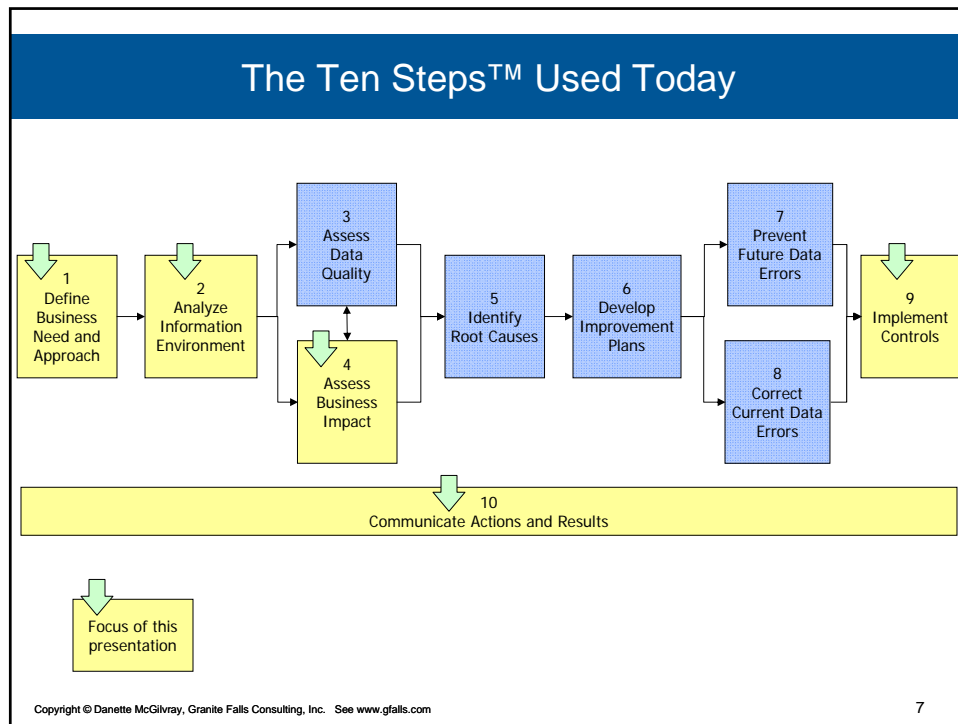
Sallie Mae Background

- Sallie Mae is the nation's leading provider of saving, planning and paying for education programs. Since its founding more than 35 years ago, the company has invested in more than 31 million people to help them realize their dreams of higher education

- Sallie Mae manages $236 billion in education loans and serves 11 million student and parent customers. Through its Upromise affiliates, the company also manages more than $27 billion in 529 college-savings plans, and is a major, private source of college funding contributions in America with more than $575 million in member rewards

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How DQ Fits into the Enterprise Data Management Strategy

Data Governance

Data Ownership | Data Stewardship | Data Quality

✓Provides the creation of management structure for policies and rules governing enterprise data
✓Implement necessary tools to automate process

Metadata Management

Repository | Standards | Processes

✓Provides documentation of all aspects of the business and technology components of enterprise data
✓Includes repository building, defining standards, architecture, maintenance process, tool selection & implementation

Data Architecture & Design

Business Context Model | Conceptual Data Model | Logical Data Model | Physical Data Model

✓Design, development and maintenance of data models at the business context, conceptual, logical and physical level
✓Represents the data entities, their relationships, attributes, structure and usage

Data Management Services Definition

Mapping & Conversion	Synchronization	Exception Handling	Performance Mgmt
Replatforming	Integration	Movement	Matching
Consolidation	Quality	Analysis	Transformation
Backup & Recovery	Security	Testing Support	Access

✓Provides capabilities to support comprehensive EDM services

Data Quality – How We Got Here

March - July 2006

November 2006– March 2007

October-December 2009

July 2010 - Present

EDD Project | Pilot Project: 7 DE | DG Program Design | DG Program Implemented | DQ Program Design | DQ Program & Pilot Implementation | Monitor data Focus on root cause & prevention

August – October 2006

April 2007

January – June 2010

Working Together and Communications

Business Impact Techniques Used in Case Study

1	Anecdotes	Collect examples or stories of the impact of poor data quality.
2	Usage	Inventory the current and/or future uses of the data.
3	Five "Whys"	Ask "Why" five times to get to real business impact.
4	Benefit vs. Cost Matrix	Analyze and rate the relationship between benefits and costs of issues, recommendations, or improvements.
5	Ranking and Prioritization	Rank impact of missing and incorrect data to specific business processes.
6	Process Impact	Illustrate the effects of poor quality data to business processes.
7	Cost of Low Quality Data	Quantify the costs and revenue impact of poor quality data.
8	Cost-Benefit Analysis	Compare potential benefits of investing in data quality with anticipated costs through an in-depth evaluation. Includes Return on Investment (ROI) – profit from an investment as a percentage of the amount invested.

Techniques used by Sallie Mae

Anecdotes Prior to Using the Ten Steps™

- Business value was difficult to obtain from the business
- Used outside sources to augment business value scenarios
- Repeatedly worked with the DG Council to document anecdotes over time
- You already know the stories – it is easy to collect, document, and use them, even without a formal process
- The following slides provide examples that supports three corporate drivers
  - Increase revenue
  - Manage cost and complexity
  - Support compliance

Increase Revenue

- **Supports borrower retention**
  - According to the Harvard Business Review, reducing customer attrition results in hard dollars. For example, if attrition is reduced by just 5%, profits may increase by as much as 25%. Retaining borrowers also saves money, since industry research says it can cost 5-7 times more to acquire a new customer than to keep an existing one

- **Supports marketing initiatives to enhance revenue** from current customers and new customers through
    - Better customer segmentation
    - Targeting its best customers
    - Marketing in a timely fashion
  - Industry research shows that an increased response rate to marketing campaigns can have a direct effect on revenue. For a campaign involving 1 million mailings, assuming an average loan of $10,000, an improved response rate of only 0.5% can be expected to result in an additional $50 million in loan volume

Manage Cost and Complexity

- **Supports more efficient and effective spending around marketing campaigns**
  - Marketing wants to employ more electronic communications, which are more cost-effective than paper-based communications
  - Marketing wants to avoid the cost associated with sending inappropriate offers to current or potential customers
  - Using emails to reach customers is more cost effective than paper mailings. For example, for a campaign targeting 1 million customers, we can achieve a cost savings of $200,000 for postage costs alone, with additional savings for avoided paper production costs
- **Helps Sallie Mae minimize losses from loan defaults**
  - When loan payments are not being made in a timely fashion, Sallie Mae needs to contact the customer. This means that Sallie Mae needs to retain information that may otherwise have been discarded over time
- **Avoids costs of ad hoc efforts to identify, assess, and correct data quality issues**
  - Data Governance and Data Quality efforts enable catching issues before they require a lot of work to correct
  - The Data Quality project detects quality issues and identifies the root cause for correction before downstream errors and additional costs occur

Manage Cost and Complexity (cont'd)

- **Assists in system redesign and data redesign efforts**
  - Sallie Mae anticipates improving its ability to effectively and efficiently derive value from its IT systems and the data they manage. To this end, the organization will be improving its MDM systems and will be implementing Service Oriented Architecture (SOA)
  - Data Governance will reduce these costs by identifying business needs, identifying key business rules, identifying opportunities for more efficient and effective data architectures, and by addressing issues with key data elements
- **Supports better revenue forecasting and debt management forecasting**
  - Key data elements must be clearly defined and used consistently to maintain consistent and auditable forecasting
- **Supports better calculations used in Premium Models**
- **Supports better calculation of required Loan Loss Reserves**
  - Loan Reporting depends upon the completeness and accuracy of Credit Score Number (FICO) data in the calculation of Privately Insured Loan Loss Reserves, which is reported in financial statements
- **Reduce reconciliation efforts caused by redundant data and multiple, disparate sources of data**

Support Compliance Initiatives

- **Helps Sallie Mae maintain compliance with privacy requirements and Marketing constraints**
  - Sallie Mae must ensure that communications from Marketing, Servicing, and other business functions adhere to requirements for customer privacy and communications as well as restrictions on marketing
  - Data Governance and Data Quality efforts enable this by identifying and addressing issues around how Sallie Mae collects, understands, aligns, and uses permissions
  - Enables a better understanding how Sallie Mae systems classify the ownership of the loans Sallie Mae services
- **Improves global understanding of data across lines of business**
  - When different Sallie Mae functions must all act on the same data using different business rules and assumptions, the result can be confusion, loss of confidence in the data, and high resource costs to assess and manage risk

Support Compliance Initiatives (cont'd)

- **Data Governance efforts reduce these costs by**
  - Providing an alignment mechanism between various stakeholder groups
  - Establishing agreed-upon decision rights and accountabilities
  - Bringing clarity to interdependent processes
  - Identifying and aligning business rules
  - Identifying and addressing data quality issues
- **DG further assists Sallie Mae by**
  - Introducing and reinforcing standardized, transparent, and auditable processes for framing issues
  - Identifying solution paths
  - Monitoring the progress of boundary-spanning, data-related efforts

Using Technique 1 - Anecdotes

1. Collected examples using Ten Steps™ Anecdote template

2. Compiled and summarized examples

- **Increase Revenue**
  - Facilitate specific product lines speed to market
  - Improve servicing performance resulting in an increase of our volume percentage awarded under the contract
  - Increase volume available for the PUT process and Trusts
- **Manage Cost and Complexity**
  - Eliminate data reconciliation efforts and manual workarounds
  - Reduce operational servicing costs
  - Set the stage for Service Oriented Architecture (SOA)
  - Implement enterprise architectural improvements (e.g. person matching)
- **Reduce Risk and Support Corporate Compliance Initiatives**
  - Address the enterprise data elements, resulting in improved quality and assurance, risk management, and corporate compliance
  - Improve company-wide communications regarding data (increase consistency)
  - Improve identification and documentation of identity fraud

3. Further summarized for management presentation

Using Technique 3 – Five "Whys" for Business Impact

From asking the questions …

- Issue: We have inconsistent benefit profiles
- Why does that matter?
  - It means there will be inaccurate benefits on the loans
- Why does that matter?
  - This means SLM has to spend time correcting the loans
- What does that affect?
  - It means that loans were delayed from going through the PUT process
- What difference does that make?
  - This decreased our revenue by increasing our funding costs

… to presenting results

Best Practice

- Use the following fundamental techniques together with most of the other business impact techniques. Improve your ability to:
    - Collect and tell stories (Technique 1 – Anecdotes)
    - Ask the next deeper question (Technique 3 – Five "Whys" for Business Impact)

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Business Value and Metrics

- Three categories of metrics are being reported
    - State of Data Quality
    - Business Value (BV) from Data Quality
    - Data Quality Program Performance
- For each category, a dashboard level status is summarized from detailed reports
- Drilldown information is included as appropriate for the specific metric

Dashboard

Drilldown

Detail

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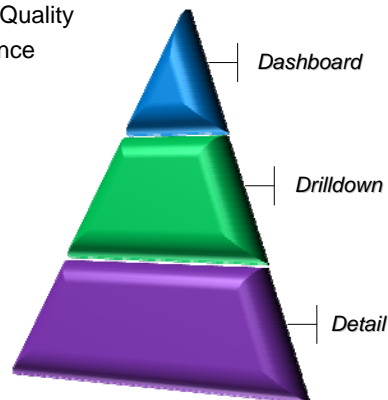
Dashboard - Reporting the Metrics

From concept …

… to reality

Within each section is the ability to drilldown and select information based on business rules or line of business

Process for Adding a New Business Rule for Monitoring

- After a lot of work, we now have metrics in place and a good process for adding a new business rule (BR)
- Ten Steps™ Business Impact Techniques used:
    - 2 – Usage
    - 5 – Ranking and Prioritization
    - 7 – Cost of Low Quality Data
- The following slides will show how we got there

State of Data Quality Metrics — Collect DQ Information for BR
- Who is responsible for taking action on monitoring results
- BR number, title, and definition
- Data quality rules
- Other notes and input source
- Data field standardization

SLM Business/ DG Council — Request business rule for monitoring

Data Quality Services (DQS) and DG Council — Research and determine if BR will be monitored

Business Value from Data Quality Metrics — Collect BV information for BR
- Impact of poor quality data on business, BV categories, and ranking (High, Medium, Low)
- Status criteria ranges (Red-Amber-Green)
- BV calculations
- BV intangibles

DQS — Update and test technology

DQS, DGO, DG Council — BR in production:
- Communication
- Dashboard
- Reports
- Action

Data Quality Program Performance Metric — Track BR
- Add issue to DQ Issue Tracking DB
- Update throughout process

Business Value – Initial Prioritization

- The SLM Data Quality Pilot team worked with the Data Governance (DG) Council to
  - Prioritize the top data elements to be monitored for the State of Data Quality metrics
    - A Word document captured the Council's first set of elements to be considered for monitoring
    - Some could not be monitored because the data was not available
    - Result was a list of 10 data elements/metrics to be monitored
  - Complete an initial survey to understand which Lines of Business (LOB) were impacted by data issues
    - Put a check mark to indicate which Lines of Business are impacted by the data issue represented by the metric
- The initial 10 metrics became 22 business rules (BRs) to be monitored for data quality and to assess BV

Initial Survey - Compiled Results

Metric Number	Metric Definition	LOB 1	LOB 2	LOB 3	LOB 4	LOB 5	LOB 6	LOB 7	LOB 8
	Respondent Name								
1		X			X	X		X	X
2					X	X		X	X
3					X	X		X	
4			X			X	X		X
5			X			X			X
6			X			X			X
7			X			X			X
8			X			X			X
9			X			X			X
10			X	X	X	X	X	X	X

Business Value – Typical Costs

- Started with standard lists of impacts due to poor quality data (see below)
- Developed a final list and descriptions of Sallie Mae "Typical Costs Due to Poor Quality Data"

Process Failure Costs
- Irrecoverable costs
- Liability and exposure costs
- Recovery costs of unhappy customers

Information Scrap and Rework Costs
- Redundant data handling and support costs
- Costs of hunting or chasing missing information
- Business rework costs
- Workaround costs and decreased productivity
- Data verification costs
- Software rewrite costs
- Data cleansing and correction costs
- Data cleansing software costs

Lost and Missed Opportunity Costs
- Lost opportunity costs
- Missed opportunity costs
- Lost shareholder value

Source: Larry P. English, "Improving Data Warehouse and Information Quality"

Hard Impacts – effects can be estimated and/or measured:
- Customer attrition
- Costs attributed to error detection
- Costs attributed to error rework
- Costs attributed to prevention of errors
- Costs associated with customer service
- Costs associated with fixing customer problems
- Time delays in operation
- Costs attributable to delays in processing

Soft Impacts – clearly evident and have an effect on productivity, but are difficult to measure
- Difficulty in decision making
- Costs associated with enterprise-wide data inconsistency
- Organizational mistrust
- Lowered ability to effectively compete
- Data ownership conflicts
- Lowered employee satisfaction

Source: David Loshin, "Enterprise Knowledge Management: The Data Quality Approach"

Business Value – Typical Costs (cont'd)

- Developed three BV categories and definitions which were based on Sallie Mae's operating budget chart of accounts
  - Revenue Generated (e.g. decreased write-offs; funding impact)
  - Costs Avoided (e.g. staff costs)
  - Intangible Benefits (other benefits that cannot be quantified)
- Mapped the Sallie Mae typical costs lists to the BV list
- Used the typical costs list to develop a questionnaire used in interviews

Sample – Sallie Mae Typical Costs and BV Categories

Typical Costs Due to Poor Data Quality	Typical Costs Short Description	Mapping to BV Categories
Lost or Missed Opportunities in the LOB	Lost or missed opportunities within Marketing, Collections, etc.	•Funding Impact •Etc. •Etc.
Workaround Costs and Decreased Productivity	Poor data quality causes manual workarounds to correct the data or deal with the incorrect data.	•Staff Costs •Etc. •Etc.
Etc.		

BV Category for the Dashboard	BV Category Short Description
Revenue Generated	Non-operating expense income statement impacts as a result of improvements in data quality due to the data quality program
Funding Impact	Lower interest expense due to more favorable funding facility
Etc.	
Costs Avoided	Costs avoided (operating expenses) as a result of improvements in data quality due to the data quality program.
Staff Costs	Salaries, overtime, benefits
Etc.	
Intangible Benefits	Other benefits that cannot be quantified (avoiding organizational mistrust, lower employee morale, customer dissatisfaction, regulatory or compliance risk, lower ability to effectively compete. Impact to shareholder value)

Business Value – Initial Interviews

- Initial interviews to:
  - Determine typical costs due to poor quality data using questionnaire
  - Determine BV intangibles
- Phone interviews held over several weeks
  - With the DG Council and others from the LOBs impacted by the business rules to be monitored
  - Notes captured in word docs using the questionnaire template
  - Results for each BR compiled from individual interviews

Business Value - Calculations

- Additional meetings and emails
  - With team members to develop spreadsheet and calculations (based on insights from the interviews)
  - With DG council members to answer questions and finalize BV calculations
- Spreadsheet with
  - One tab for each business rule with all calculations for that BR
  - One summary tab with all intangibles from all BRs
  - One summary tab with calculations based on actual errors from latest DQ monitoring run

Business Value – Ranking and Status Criteria

- Additional meetings and emails to:
  - Rank impact to processes:
    - High - complete failure of the process or unacceptable financial, compliance, legal, or other risk is highly likely
    - Medium – Process will be hampered and significant economic consequences will result
    - Low – Minor economic consequences will result
  - Review initial DQ results, if available
  - Set status criteria ranges. What percentage DQ results will equal
    - Green – Results met target
    - Amber – Results failed target or unfavorable trend
    - Red – Unacceptable results
- Add BV information to dashboard and documentation
- We will be able to combine meetings for the next set of data to be monitored because of the experience from the first time
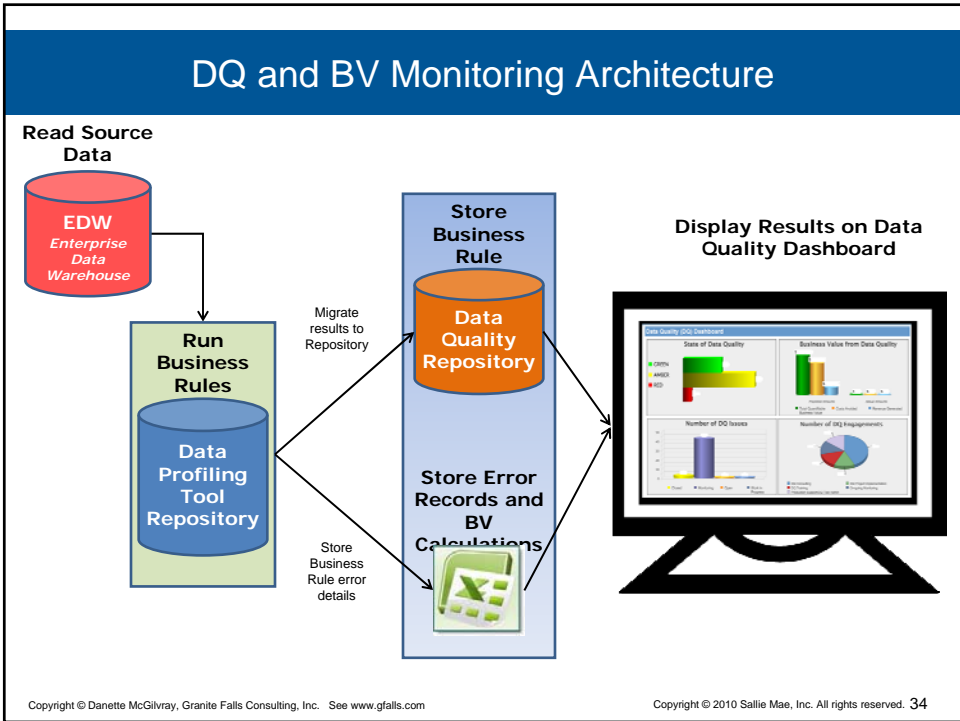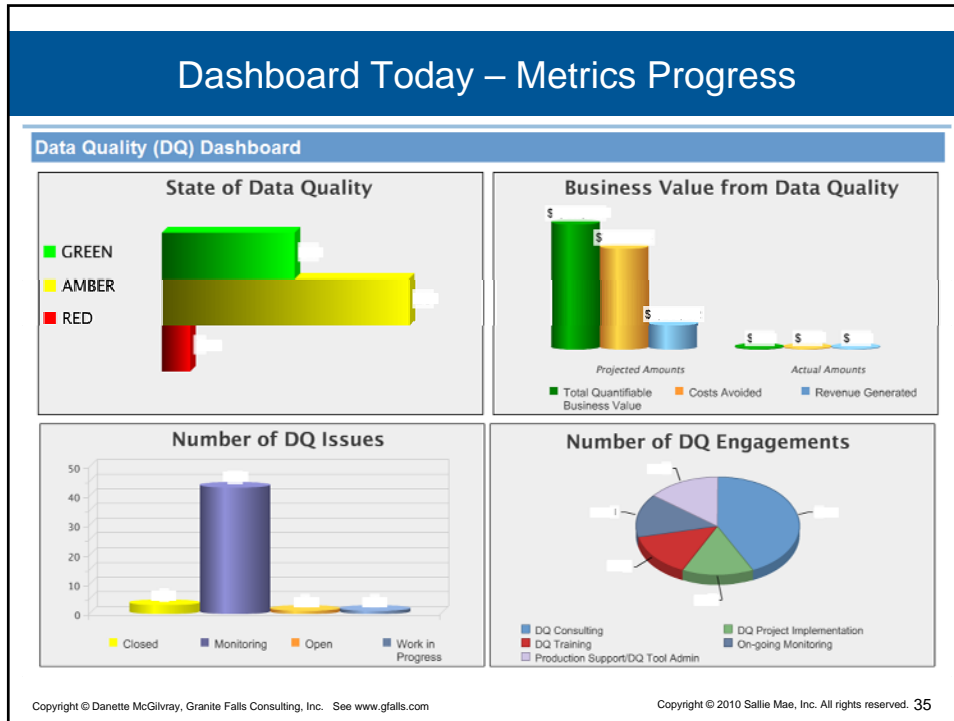
Example: Ranking Results of DQ Monitoring

Impact to the Business Processes of Missing or Incorrect Data as Indicated by Results of Data Quality Business Rules

	Lines of Business (LOB)			
	LOB1	**LOB2**	**LOB3**	**Final Overall Ranking**
Business Rule 1	High	Medium	Low	High
Business Rule 2	Medium	Medium	Medium	Medium
Business Rule 3	Low	Low	High	High
Business Rule 4	Low	Low	Low	Low
Business Rule 5	Medium	Low	Medium	Medium
Business Rule 6	Medium	High	High	High
Etc.				

Team used results to:
• Determine which business rules to monitor
• Set status criteria (red, yellow, green) for each business rule
• Identify responsible LOBs to work errors and identify root causes

DQ and BV Monitoring Architecture

Dashboard Today – Metrics Progress

Actual Business Value

► Correcting data quality errors leads to actual business value

► Identifying and fixing root causes leads to preventing errors in the first place

Session Topic: The Business Value of Data Quality
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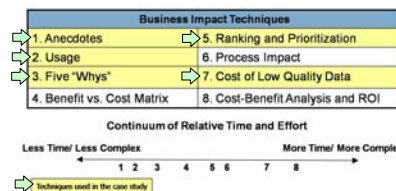
TODAY'S AGENDA

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What We Covered Today

Ten Steps Used for Business Value
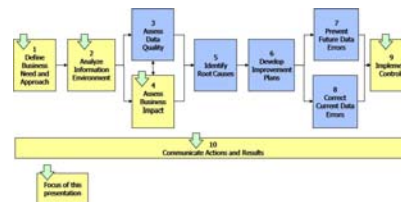
Business Impact Techniques

Case Study - Ten Steps and Techniques Used to Assess and Report Business Value

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Guidelines for Building the Business Case

- **Do something.** There is *something* you can do to show business impact
- **Pick-and-choose.** Select the business impact technique(s) applicable to your situation
- **Relevant.** Ensure your work is associated with the business issue to be resolved
- **WIIFT.** Always look for What's In It For Them
- **Reuse (80/20 rule).** Bring together existing knowledge in such a way that you can understand it better. Supplement existing material with original research only as needed
- **Be prepared for questions.** At any time you may need to defend your data quality and governance work

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Best Practice

What you learned today will apply to any:

Organization:
- For-profit businesses
- Government agencies
- Educational institutions
- Healthcare
- Non-profits and charities

Category of Data:
- Master data
- Transactional data
- Reference data
- Metadata

Data Subject Area:
- Customer
- Order Management
- Sales
- Marketing
- Finance
- Procurement
- Manufacturing
- Human Resources
- Etc.

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Taking Action

- Apply what you have learned
  - Indicate the Ten Steps and business impact techniques most useful for your situation – and why
  - How can you include them in your program, projects or individual activities?

- What are *your* next steps?
  - This week
  - Next Monday
  - Next month

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Your Next Steps

Start where you are
Use what you have
Do what you can

--Arthur Ashe

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Additional Resources

- Contact Danette McGilvray (danette@gfalls.com or see www.gfalls.com) for
  - Help solving issues related to data quality and governance
  - Consulting, presentations, training, and focused workshops

- *Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information™* by Danette McGilvray (Morgan Kaufman Publishers, Copyright 2008 Elsevier Inc.)
  - Available at Amazon.com or your favorite bookseller
  - E-book also available at: https://elsevierdirect.vitalsource.com/elsevierdirect

- See http://tensteps.gfalls.com for:
  - Downloadable pdfs of the Framework for Information Quality, data quality dimensions, business impact techniques, The Ten Steps process and more
  - Templates described in the book

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Feel free to contact us if you have comments or questions

THANK YOU!

Danette McGilvray
President and Principal
Granite Falls Consulting, Inc.
Fremont, California USA

Email: danette@gfalls.com
Phone: 510-501-8234
Fax: 510-505-9898
Web: www.gfalls.com

Michele Koch
Director, Enterprise Data Mgmt
Sallie Mae
Reston, Virginia USA

Email: Michele.V.Koch@slma.com
Phone: 703-984-5381

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