Dynamic Reporting Tools

Monday, February 13, 2017
Jeff Sellers & Kathy Gosa, SST Facilitators
WELCOME AND SESSION GOALS

• **Introductions**
  - Your name, state, role, and one thing you’d like to get out of this session

• **This session is driven by you!**
  - Pre-session survey results
  - Discussion questions
  - State demonstrations
What is a dynamic reporting tool?

From Microsoft:

- **Dynamic reports.** Are created at runtime. Each time a dynamic report is run, it gathers the most recent data in the Data Warehouse. Only the report definition, which remains the same over time, is stored.
- **Static reports.** Are run immediately upon request, and then stored with the data in the Completed Reports module.
DISCUSSION QUESTION

• Why invest time and effort in a dynamic reporting tool?

• For states that are using them (or planning to), what motivated the acquisition?
SURVEY RESULTS

• Survey was sent to 29 session registrants on 2/1/2017, and re-sent to 40 registrants on 2/8/2017
• 5 questions
• 20 responses
Q1: Select the response that most accurately describes your interest in this session

- We have a dynamic reporting tool that meets our needs: 40%
- We have a reporting tool, but are planning/consistency: 45%
- We do not have a dynamic reporting tool and are: 10%
- Other (please specify): 5%

“"We use Tableau for ad hoc reporting and want to add a dynamic reporting feature to the LDS"
Q2: WHICH DYNAMIC REPORTING TOOL/ENVIRONMENT DO YOU CURRENTLY HAVE OR ARE CONSIDERING? (SELECT ALL THAT APPLY)

- Microsoft Reporting...: 50%
- Business Objects: 0%
- Tableau: 70%
- MicroStrategy Report Services: 10%
- IBM Cognos: 5%
- EdFi: 15%
- SAS: 25%
- Oracle BI Publisher: 0%
- WebFOCUS: 0%

Others (1 each):
- Pentaho
- Weave
- Unknown
- Logi
- PerformancePlus
Q3: PLEASE INDICATE THE LEVEL OF IMPORTANCE FOR EACH TOOL FEATURE:

<table>
<thead>
<tr>
<th>Feature</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Cost</td>
<td>13</td>
<td>6</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Ease of development / maintenance</td>
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<td>0</td>
<td>19</td>
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<tr>
<td>Ease of use (for end users)</td>
<td>18</td>
<td>1</td>
<td>0</td>
<td>19</td>
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<tr>
<td>Compatibility with your current technical environment</td>
<td>8</td>
<td>11</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Ability to implement on a mobile platform</td>
<td>2</td>
<td>11</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Ability to standardize user interface</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Other (please specify):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Ability to accommodate large data sets and ability to present data in multiple graphical formats</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>* Skillset needed for ongoing maintenance</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
DISCUSSION QUESTION

• Other considerations when choosing a dynamic reporting tool?

• Any specific considerations in the set up and roll out?
Q5: IS THERE ANYTHING YOU’D LIKE TO ADD IN ORDER TO SHAPE THIS SESSION?

1. An overview of functionality and especially costs across the different platforms listed above would be helpful.
2. The next part of our SLDS project will be focused on secure reporting for districts and schools. We are interested in the ability to create dashboards that highlight student data peculiar to a district or school, e.g., an early warning dashboard.
3. Would like to see how others are using the tool to present data.
4. I believe in only exposing aggregate data to a reporting tool—so no issues with data breach. Also struggle with masking—would love to discuss how others are doing that.
5. Look forward to seeing what other states are doing. Demos of other states would be very valuable.
6. We're interested in data branding across our SEA, integration with current custom applications. We're publishing reports designed in Tableau this year and are considering making this our standard and are hoping to move the department in this direction. Any pointers about this would be great!
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9. Can you define in the session what a "dynamic reporting tool/environment" mean? What are some qualities that makes for a good reporting tool/environment? If we could rubric characteristics of a good reporting tool/environment and score ourselves, that may help us identify people who are doing well and those who could do better. Maybe then we can talk to those who score high on different areas or have them showcase. They can then highlight that characteristics within their reporting software.
BREAK
Dynamic Reporting Tools
State Demonstrations
State Example—Dynamic Reporting Tools

Kentucky Example
Linda Borkosky

https://kcews.ky.gov/
<table>
<thead>
<tr>
<th>Requirement/Functionality</th>
<th>Tableau (OnSite)</th>
<th>Power BI (Cloud)</th>
<th>Lumira (Cloud)</th>
</tr>
</thead>
</table>
| **1. The ability for the tool to allow narrative to be imbedded into the reports that are created**  
  • To accommodate text along with numbers and metrics                                     | ✓                |                  |                |
| **2. The ability to make large data sets available to users to easily create comparisons, visualizations and customized reports**  
  • To accommodate text along with numbers and metrics                                     | ✓                | Only within an organization & all data stored in the cloud | Need Business Objects Account |
| **3. The ability for users to access the tool through the KCEWS website**                 | ✓                | Limited          | NO             |
  • Without login credentials  
  • Without a cost to or for the user  
  • Without requiring proprietary software to be acquired                                 |
| **4. The ability to have the tool reside on KCEWS’ server**                                | ✓                | NO               | NO             |
  • To access data from KCEWS’ environment                                                |
| **5. The ability to share queries and reports with other users**                           | ✓                | Diff. Report needed for each audience | ✓              |
  • Internal (State employees) and external stakeholders (Universities, researchers, public, etc.) |
| **6. The ability to run what-if scenarios/forecasting with the data**                    | ✓                | ✓                | ✓              |
| **7. The ability to display data graphically**                                            | ✓                | ✓                | ✓              |
  • Bar charts  
  • Pie Charts  
  • Heat Maps                                                                 |
| **8. The ability for users to create customized dashboards**                               | ✓                | Somewhat-can only share with folks with same email | Somewhat       |
  • Using the data that is important to them                                               |
| **9. The ability for the user to create ad-hoc analysis and apply typical research techniques**  
  • i.e., Predictive modeling                                                            | ✓                | ✓                | ✓              |
| **10. The ability for the tool to be accessed via desktop/laptop computers and mobile devices** | ✓                | Can schedule Refresh | ✓              |
| **11. The ability to schedule reports**                                                  | ✓                | Can schedule Refresh | NO             |
| **12. The ability to provide ADA compliance**                                            | ✓                | Not sure         | Not sure       |

**Quick Overview:**

- **Tableau** – Connects directly to over 45 connections and does not require an account/license to view published reports.
- **Power BI** – Doesn’t connect well to large databases—focuses on Microsoft stack with cloud-based data storage, hard to share outside the organization. Microsoft tools needed to fully use the tool.
- **SAP Business Objects Lumira** – Lumira server sits on SAP HANA Database—all data has to be imported into HANA then to the application.
Montana Example
Daniel Bruce

http://gems opi mt gov/Pages/HomePage aspx
STATE EXAMPLE—DYNAMIC REPORTING TOOLS

Hawaii Example
Jana Chang & Shane Hedani
Students with Core Subject F by Teacher

as of January 8, 2017
Source: LDS Admin/Grades
CONFIDENTIAL - ADMINISTRATION USE ONLY
State Example—Dynamic Reporting Tools

Connecticut Example

Richard Cloud, Angela Gambaccini-May, Ajit Gopalakrishnan, Chitralekha Macherla, Charles Martie, Stephanie O’Day, John Watson

http://edsight.ct.gov
Previous State of Reporting

• Majority of Reporting Are Operational
• Numerous Reporting Tools
  – Reporting Services (SSRS)
  – Crystal Reports/Business Object
  – Excel
• Silo-Based Reporting
• Lack of Enterprise Reporting Strategy
  – Internal vs. External
• No Self-Service Reporting Options
• Custom .NET Dashboards Development
Why Tableau?

- Enterprise-class business analytics platform that can scale up to hundreds of thousands of users
- Supports your choice of data architecture
- Create operational and analytical reporting
- Self-service reporting
  - Natural path from report consumer to report developer
- Offers a fast, in-memory Data Engine that is optimized for analytics

Tableau Software was founded on the idea that data analysis and subsequent reports should not be isolated activities but should be integrated into a single visual analysis process—one that lets users quickly see patterns in their data and shift views on the fly to follow their train of thought. Tableau combines data exploration and data visualization in an easy-to-use application.
# Tableau Product Suite

<table>
<thead>
<tr>
<th>Creating/Authoring</th>
<th>Share in the Enterprise</th>
<th>Share outside the Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop</td>
<td>Server</td>
<td>Online</td>
</tr>
<tr>
<td><strong>Creating/Authoring</strong></td>
<td><strong>Share in the Enterprise</strong></td>
<td><strong>Share outside the Enterprise</strong></td>
</tr>
<tr>
<td>Data Visualization software that allow you to create Tableau Dashboards and reports for consumption</td>
<td>Browser based mobile enabled tool to interact with dashboards/reports created with Tableau Desktop. Can refresh data sources and supports live or data extracts</td>
<td>Small Team</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public</th>
<th>Professional</th>
<th>Server</th>
<th>Online</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Connections</strong></td>
<td><strong>Deployment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File based data sources (Excel, Access, CSV) only</td>
<td>On premise or Cloud</td>
<td>Cloud (Tableau Host)</td>
<td></td>
</tr>
<tr>
<td><strong>Sharing</strong></td>
<td><strong>Data Connections</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tableau Public Only</td>
<td>Live data connections</td>
<td>Live data connections (Cloud Only)</td>
<td></td>
</tr>
<tr>
<td>Export Package workbook Publish to Server/Online</td>
<td>Data Extracts</td>
<td>Data Extracts</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Authentication</strong></th>
<th><strong>Data Connections</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authentication Single Sign-on Active Directory</td>
<td>No Live Connections Data Extracts saved to .twbx file extensions</td>
</tr>
<tr>
<td>Local Authentication Single Sign-on Active Directory</td>
<td>No Live Connections Data Extracts</td>
</tr>
</tbody>
</table>
Tableau Pros

• Support Operational and Analytical Reporting
• Stunning Data Visualizations Options
• Interactive Discovery Solution
  – Can drill down from summarized view to detail and underlying data source
• Data Source Integration
  – Can blend data from multiple sources
  – Can connect to your data no matter where it lives
• Supports Mobile Devices
• Drag-and-Drop Report Design Interface
Tableau Cons

• Cost Prohibitive
  – Core licensing model for Tableau Server
• Initial Data Preparation
  – Requires strong technical skills to build initial structure
• Complexity of Advanced Dashboard Design
  – High-level or technical expertise required
  – Will require IT intervention
• Data Management
  – Works best with Tableau Data Extracts vs. live connections
  – IT management of another redundant data repository
• Security for External Users
  – No one-stop authentication mechanism for external and internal users
• Change Management
  – No concept of report version
Tableau Report Samples

Explore the student makeup of each school by clicking on a school in the list below.

Click a School
- Bradshaw Mountain High School
- Casa Grande Union High School
- Casa Verde High School
- Douglas High School
- Holbrook High School
- Kingman High School
- Lee Williams High School
- Mingus Union High School
- Mohave High School
- River Valley High School
- San Luis High School
- Vista Grande High School
- Wickenburg High School

Race/Ethnicity

- American Indian / Alaskan Native: 2.46% (7 students)
- Asian: 3.17% (9 students)
- Black African American: 41.55% (118 students)
- Hispanic Latino: 52.11% (143 students)
- Two or More Races: 4.66% (13 students)

AZ Merit Results

- Performance Level %
- ELA
  - Highly Proficient: 8.09% (6.09%)
  - Minimally Proficient: 17.02% (21.30%)
  - Partially Proficient: 15.32% (25.22%)
  - Proficient: -58.57% (-47.39%)
- Math
  - Highly Proficient: 6.09% (6.09%)
  - Minimally Proficient: 17.02% (21.30%)
  - Partially Proficient: 25.22% (-25.22%)
  - Proficient: -47.39% (-47.39%)

Special Categories

- Disability
  - 2.46% (7 students)
- Free Reduced Lunch
  - 41.55% (118 students)
- ELA Free Reduced Lunch
  - 0.70% (2 students)
- Disability Free Reduced Lunch
  - 7.75% (22 students)
Agency ODS ETL Summary Report

Summarized view of ETL metrics for nightly extract of data from numerous source systems to Agency Operational Data Store for the specified period. Allows business stakeholders and Agency ODS team members to monitor ETL activities and identify potential issues/deficiencies during processing.

**SUCCESS**

- **ETL Status**: Days Since Last Failure
- **Package Execution Time**: 148.1 Min
- **Number of packages**: 156
- **Records Processed**: 115.1M
- **New Records**: 5.1M
- **New Students**: 345
- **New Enrollments**: 2,830

**ETL Processing Comparison by Domain**

1/20/2017 vs Average Last 7 Days

- **Education Organization**: Green
- **School Calendar**: Green
- **Student Integrity**: Blue
- **Student Demographics**: Blue
- **Student Enrollment**: Red
- **Student Attendance**: Blue
- **Program Participation**: Red
- **Student Teacher Course**: Green
- **Staff**: Red

Legend:
- Red: Over 10% Increase
- Blue: Within Benchmark
- Green: Over 10% Decrease
Questions
Michigan Example
Michael McGroarty

http://www.mischooldata.org
Utah Example
Aaron Brough
South Dakota Example
Sara Kock

http://doe.sd.gov/data/tables/
Public Reporting

• Pull data from the SLDS or source systems into Excel and suppress when appropriate (ex: subgroups of < 10 students)

• Tableau
  – Desktop Professional License
    $1,599/user with $458 annually for maintenance
  – Publish using Tableau Public – Free
  – Use embedded link to post on DOE website

• Pros/Cons
  + Affordable
  + DOE can develop our own reports
  + User friendly
  – Have to manually pull data
Internal STARS Reports

• OtisEd iMart Data Warehouse – SQL 2014
• Blender Portal Solution
  – DOE users – see students in the state
  – District/school users – see students in their district/school
  – Teachers – see students in their courses or caseload
• Utilized SQL Server Report Services
• Pros/Cons
  + It is free
  + It is user friendly
  – It require programmers to develop reports, so DOE and districts cannot write our own reports
Websites

• Tableau - http://doe.sd.gov/data/tables/
• Internal STARS Reports – https://doestars.sd.gov

Is this “dynamic”?
Internal Accountability Reports

• OtisEd iMart Data Warehouse – SQL 2014
• Blender Portal Solution
  – Purchased a product/module of the Blender portal
  – Supports state, district, and school users
  – Provides aggregated results down to student rosters
• OtisEd runs calculations, Blender does the visual
• Pros/Cons
  + It is user friendly
  + We tripled the amount of data districts get
  – It require programmers to develop reports
  – Any changes costs money
  – Requires lots of validation time
Websites

• PDF of 4-Year Cohort Graduation Page and Roster in TRAINING CENTER - https://doestars.sd.gov/

Is this “dynamic”?

• To see Public Report Card PDF http://doe.sd.gov/reportcard/listnew/
Working on...

- **MicroStrategy**
  - OtisEd partnered with them to get a reduced rate on their reporting services. The price is contingent on a OtisEd Data Warehouse.

- **Foreseen Pros/Cons**
  - Allows for trained DOE staff to create and publish reports to users
  - Allows for trained district staff to create and publish reports to district/school users
  - Can write SQL code to pull the data
  - Lots of options
    - We were one of the first, so it has taken a lot of time to implement (Aug 2014-March 2017)
    - Cannot publish on website without purchasing MicroStrategy public license (expensive)
    - Lots of options
    - Training!!!
## Dual Credits Analysis

### Number of course enrollments

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>Fall</td>
<td>Spring</td>
<td>Summer</td>
<td>Total</td>
<td>Fall</td>
<td>Spring</td>
<td>Summer</td>
<td>Total</td>
</tr>
<tr>
<td>Black Hills State University</td>
<td>1,773</td>
<td>2,046</td>
<td>317</td>
<td>4,136</td>
<td>1,391</td>
<td>1,474</td>
<td>352</td>
<td>3,217</td>
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<tr>
<td>Dakota State University</td>
<td>720</td>
<td>855</td>
<td>155</td>
<td>1,730</td>
<td>245</td>
<td>680</td>
<td>105</td>
<td>1,030</td>
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<tr>
<td>Lake Area Technical Institute</td>
<td>815</td>
<td>1,305</td>
<td>135</td>
<td>2,256</td>
<td>375</td>
<td>575</td>
<td>40</td>
<td>990</td>
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<tr>
<td>Mitchell Technical Institute</td>
<td>740</td>
<td>1,170</td>
<td>20</td>
<td>1,930</td>
<td>506</td>
<td>1,103</td>
<td>30</td>
<td>1,639</td>
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<tr>
<td>Northern State University</td>
<td>1,985</td>
<td>1,970</td>
<td>210</td>
<td>4,145</td>
<td>735</td>
<td>865</td>
<td>195</td>
<td>1,795</td>
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<td>South Dakota School of Mines and Technology</td>
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<td>255</td>
<td>15</td>
<td>625</td>
<td>205</td>
<td>180</td>
<td>10</td>
<td>395</td>
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<tr>
<td>South Dakota State University</td>
<td>2,185</td>
<td>2,921</td>
<td>560</td>
<td>5,646</td>
<td>900</td>
<td>1,745</td>
<td>415</td>
<td>3,060</td>
</tr>
<tr>
<td>Southeast Technical Institute</td>
<td>1,180</td>
<td>1,875</td>
<td>350</td>
<td>3,405</td>
<td>832</td>
<td>1,395</td>
<td>336</td>
<td>2,583</td>
</tr>
<tr>
<td>University of South Dakota</td>
<td>2,901</td>
<td>4,047</td>
<td>496</td>
<td>7,524</td>
<td>1,916</td>
<td>2,590</td>
<td>370</td>
<td>5,270</td>
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<tr>
<td>Western Dakota Tech</td>
<td>1,247</td>
<td>1,318</td>
<td>185</td>
<td>2,750</td>
<td>232</td>
<td>505</td>
<td>305</td>
<td>1,132</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13,041</td>
<td>17,762</td>
<td>2,443</td>
<td>34,146</td>
<td>7,337</td>
<td>11,602</td>
<td>2,458</td>
<td>21,097</td>
</tr>
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</table>

### Number of course enrollments by institute (full year)

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<thead>
<tr>
<th>Academic Year</th>
<th>2015-2016</th>
<th>2014-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>1,247</td>
<td>1,916</td>
</tr>
<tr>
<td>Spring</td>
<td>2,981</td>
<td>555</td>
</tr>
<tr>
<td>Summer</td>
<td>1,875</td>
<td>1,395</td>
</tr>
</tbody>
</table>

Institution:
- Western Dakota Tech
- University of South Dakota
- Southeast Technical Institute
- South Dakota State University
- South Dakota School of Mines and Technology
- Northern State University
- Mitchell Technical Institute
- Lake Area Technical Institute
- Dakota State University
- Black Hills State University

### Course Enrollments

- **Fall**: December, January, February
- **Spring**: March, April, May
- **Summer**: June, July, August
Enrollment Analysis
## District Reports

<table>
<thead>
<tr>
<th>Aberdeen 06-1</th>
<th>Andes Central 11-1</th>
<th>Belle Fourche 09-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Enrollment List Document v3</td>
<td>Student Enrollment List Document v3</td>
<td>Post Secondary Course Grades for Dual Credit Students from Cube Report</td>
</tr>
<tr>
<td>ACT Stoplight Document</td>
<td>Student Demographics Dashboard v2</td>
<td>Post Secondary Grades for Dual Credit Students from Object Model Report</td>
</tr>
<tr>
<td>Student Demographics Dashboard v2</td>
<td></td>
<td>ACT Overview Document</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Freeman 33-1</th>
<th>Harrisburg 41-2</th>
<th>Yankton 63-3</th>
</tr>
</thead>
<tbody>
<tr>
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<td>ACT Stoplight Document</td>
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Anything else that we should cover?
NEXT STEPS?

What follow-up to this session would you like to see?
Thank you!