Tactical Plan for Business Intelligence at WMU
Three-Year Status Report: October 2013

Business Intelligence Mission Statement
Accurately, clearly and efficiently assist the university community, including but not limited to, senior leadership, functional areas, and academic departments, by providing the best possible service and promoting effective operations analysis and long and short-term planning through dynamic, data-driven decision making.

Five-Year Vision Statement: November 2010
Led by the Office of Institutional Research, business intelligence at Western Michigan University will:

- Respond quickly to the majority of information requests, due to:
  - Better data management and the increased availability of historical data
  - Clearly defined reporting processes
  - Clearly defined roles of BI staff
  - Better task management, resulting in less task redundancy
  - Anticipating and meeting the needs of information consumers
- Provide a variety of resources currently unavailable to information consumers, including training sessions; comprehensive documentation for report development, report usage, and data usage; a knowledge base; and a user forum
- Provide comprehensive dashboards for evaluation and planning at both the university and department levels
- Provide a more dynamic environment for information consumers
- Foster an environment that promotes engagement in business intelligence at every level of decision making

Guiding Principles
1. Information is a university asset.
2. Consumers should be able to easily aggregate, manipulate and display data as actionable information.
3. BI should be built from the bottom-up, easily able to satisfy the needs of non-technical users.
4. The BI team should remain objective and unbiased when delivering information.
5. The BI team should make every effort possible to ensure that information consumers understand the information they receive and analyze it within the proper context.
6. The Office of Institutional Research is a service unit to support the university community and the achievement of the university’s teaching, research, and service missions.
Goals and Strategies

I. Data Organization

Current situation:
Data are located in multiple systems in many different formats. Some data are easy to access and integrate while other data are in the form of Excel spreadsheets, text files, and Access databases, which make them difficult to use.

The current practice is to use the reporting views provided by Ellucian within Cognos Framework Manager model. Some of these views are inefficient. There is also data redundancy within models, and there are too many models to maintain well. There is a lack of documentation and a lack of comprehensive knowledge of the underlying tables, their structure, and the flow of data from Banner into the ODS.

Goals: To reorganize data in a way that improves report performance and data usability/flexibility, reduces redundancy, and makes it easier for report authors to write effective reports.

Steps to goal achievement:
1. Import historical data into the ODS

   In order to make census data available for long-term trend reporting, census snapshots should be imported into an Oracle database. This solution will also allow us to maintain data in a central repository and minimize the risk of differences between distributed user databases.

   Progress: First phase nearly completed. We have imported into the ODS at least five years of census snapshots. We are currently in the process of auditing these snapshots and incorporating them into data models.

2. Create freeze tables that match our business practice

   The ODS tables and views were built by Ellucian, and as such, they are general purpose views of the data and reflect Ellucian’s vision of how each school would use the data. While a large majority of WMU’s data needs can be met with the out-of-box data, several reports would benefit from the creation of tables and/or views that more closely align with WMU business practices. Some potential uses for customized freeze tables are comprehensive transfer and advisor reports.

   Additionally, we need to develop and document standards and practices for identifying data, establishing stewardship, and incorporating the data into the data store and/or data warehouse.
**Progress:** First phase completed. All known business needs have been met, but we would like to explore additional ways in which data may be frozen to support decision making.

3. Increase knowledge of the data in the ODS and the EDW amongst the BI team

There are several data models used for reporting, however many of the people who are responsible for writing and maintaining reports are not familiar enough with data location or context. The documentation provided by the vendor can be cryptic, and it does not document WMU business practices. Through the creation of a knowledge base, WMU produced documentation, and an in-house instructor led training program, we should be able to address the current knowledge deficit. These topics will be addressed further with documentation (§IV) and training (§VI).

**Progress:** Ongoing. Documentation is created for specific topics as needed, and information is delivered electronically and through regular face-to-face meetings with report developers. Additional formal documentation is needed.

4. Create and document best practices for table and view use

Ellucian suggests that customers use the provided reporting views for their reporting needs. Whenever possible, we follow this suggested model; however, some views perform poorly. They contain several function calls and fields that are not relevant to our needs. These views need to be examined. When we determine that a view is to slow for our reporting needs, alternative tables or views should be created and used. The number of views joined within models needs to be examined to increase performance. In addition, Oracle best practices should be considered.

**Progress:** Ongoing. Views have been evaluated as needed, but a more formal evaluation process needs to be completed.

5. Add indexes to tables and modify views where appropriate

When data are frozen in the ODS, Banner automatically creates indexes on the event and the event data. However, it does not create indexes on key fields. Freeze tables should be examined and indexes added where appropriate.

**Progress:** Completed for known issues. We will continue to monitor performance and make changes as needed.

6. Standardize model naming conventions and design

The current data models use the names that were delivered with the ODS. Sometimes these names do not convey the WMU business concepts adequately. This includes the names of the packages (folders) and the names of the tables and fields.
**Progress:** Ongoing. We have begun model redesign and consolidation. This will make renaming and standardization easier to manage. Business names have been determined and used in the newer census-based models.

7. GAP analysis on the EDW

When the EDW was initially installed, we determined that the EDW did not fully meet the needs of WMU. However, with the subsequent upgrades, Ellucian made changes to the EDW that would allow us to include more information and implement WMU business practices. Before we can utilize the new functionality, we need to define data and reporting needs and compare them to EDW functionality.

**Progress:** Ongoing. A gap analysis has been done, and we are still unable to use most of the operational stars that are provided by Ellucian. We have looked at editing the mappings to match our business practices but it will take a lot of effort to make them more usable.

**II. Report Organization**

**Current situation:** Reports are loosely organized within top-level categories based on suspected frequency of use. Folder subcategories are based around Cognos packages (e.g. Academic Outcome, Enrollment) or report functions (e.g. Sport, Institutional Research). The arbitrary top-level categories, the fact that package names may not be intuitive to users, and the sheer volume of reports makes this system hard to navigate.

**Goal:** To improve the user experience by organizing reports in such a way as to make Cognos easier to navigate.

**Steps to goal achievement:**

1. Evaluate current report use

   Determine which reports are being used and by whom. Generally, try to discern how people are using information delivered through Cognos at the University. Based on this evaluation, determine which reports can be disabled or removed and reduce or eliminate report dependency. In addition, address ways in which we can guide users toward optimal information usage.

   **Progress:** Ongoing. We have evaluated all of the major reporting areas and identified candidates for modification or deletion. Evaluation of lesser used and single-purpose reports is ongoing.

2. Eliminate report redundancy
Minimize the number of reports available by eliminating redundancies and combining like reports. This will aid in the overall ease of navigation and simplify the task of improving the directory structure (3).

**Progress:** Ongoing. Based on the report use evaluation, we have rewritten the most commonly accessed reports. In many cases, this resulted in significant report consolidation or deletion. To date, this has resulted in the removal of over 600 legacy reports, making the reporting portal much more navigable and user-friendly.

3. Improve the directory structure by making it more intuitive to the user

Based on the report usage evaluation, devise a directory structure that will allow users the most intuitive navigation of Cognos directories. Attempt to increase Cognos usage in part by minimizing user frustration with navigation.

**Progress:** Completed. We have implemented a new directory structure that more closely aligns with the organization of the university. All informally collected user feedback has been positive with the most frequent comment being that the new structure is much more logical. The new structure will coexist with the old directory structure while we continue to audit and rewrite legacy reports.

4. Standardize report naming conventions

Develop a standard naming convention for Cognos reports. The new convention should allow users to easily determine, at least at a broad level, the purpose of a given report based on the report name and should lend itself to easy report classification and grouping.

**Progress:** Completed. The new directory structure and all new reports are based on a numeric prefix that uniquely identifies the report and the path.

5. Improve report performance

Evaluate reports to address performance concerns. Attempt to minimize report run time and thereby ease user frustration. This task will be closely tied with data organization (§I).

**Progress:** Ongoing. This task closely aligns with the steps 1 and 2. Each time we audit and modify a report, we test performance. As such, all of the most commonly used reports have been optimized.

6. Standardize report design

Develop report design specifications for the report developer community. These specifications should create a common look and feel, making use of WMU colors and branding; include information that will assist in identification of report locations and
report ownership; create reports that are aesthetically pleasing and use established data visualization techniques.

**Progress:** Completed. We have developed report design standards and delivered the new standards to the university report authors. All reports being placed in the publicly accessible areas of the new directory structure must adhere to the new design standards.

7. Establish report ownership/stewardship

Assign each report to a functional office that will manage report maintenance.

**Progress:** Ongoing. This task closely aligns with steps 1 and 2. As reports are audited and modified, ownership is also determined.

### III. Business Intelligence Solutions

**Current situation:** We own the Cognos Business Intelligence suite. This suite of tools consists of a reporting tool (Report Studio), a performance management tool (Metrics Manager), an ad-hoc query tool (Query Studio), a personal analytics tool (Cognos Insight), and a data analysis tool (Analysis Studio).

**Goal:** To improve the user experience by implementing tools that will provide more variety and flexibility for information delivery and analysis.

**Steps to goal achievement:**

1. Train super users to use Report Studio

   Train super users or BI ambassadors (more in §VI 3.) in functional areas and departments who will be able to consolidate requests and create and maintain departmental reports.

   **Progress:** No progress.

2. Implement Query Studio models and provide documentation and training

   Roll out Query Studio to allow functional areas and departments to run advanced ad-hoc queries, bypassing involvement of the BI team.

   **Progress:** Ongoing. Preliminary models have been built and tested with the Admissions office, but we were not able to successfully remove the BI team’s involvement in the creation and running of the ad-hoc reports. This item may be supplemented or replaced by the implementation of Cognos Business Insight.

3. Implement Metrics Manager and provide documentation and training

   Roll out Metrics Manager, allowing senior leadership to monitor performance at a glance with university-level scorecards.
**Progress:** Ongoing. Metrics Manager was implemented with usable data. Institutional Effectiveness has used information from Metrics Manager to construct its Measures of Institutional Effectiveness Web site. Further evaluation is needed but will be guided by the needs of senior leadership.

4. Implement Analysis Studio and provide documentation and training

When there is a need for a more robust analysis tool to aid in decision support, we can implement this tool. This is part of a long term plan.

**Progress:** No progress. This item may be supplemented or replaced by the implementation of Cognos Business Insight.

5. Evaluate Transformer for potential implementation

This is a powerful tool; however, we own an older version of the tool and at the time of this printing it is unknown how long IBM will continue to support it. Further evaluation is required.

**Progress:** We have determined that the cost of ownership for this tool is not justified for the small user base. In addition, much of the OLAP functionality can be found in new tools such as Business Insight.

6. Implement Cognos Business Insight

Roll out Cognos Business Insight to allow users to build customized dashboards and reports using predesigned content. We will start by producing content based on the provost’s identified academic operational indicators. Interviews with other administrators, primarily deans and chairs, will be conducted to determine additional needs.

**Progress:** We have begun construction of dimensional models, and some content has been produced. Workspace templates and content are currently being reviewed.

**IV. Documentation**

**Current situation:** Aside from a small number of documents housed within Cognos itself that address specific technical issues, very little documentation for the Cognos system currently exists.

**Goal:** To assist users and the BI team by creating documentation about data organization, report organization, report creation, reporting procedures, policies and governance.

**Steps to goal achievement:**
1. Define BI roles and methods of governance
Establish clearly defined roles for individuals involved in BI administration, development and analysis. Defined roles should encompass data updates, security, information delivery, communication, and the administration of the BI environment.

**Progress:** Partially complete. Roles have been defined within the Office of Institutional Research, but a more comprehensive document delineating roles needs to be created. Further efforts will be led by and coordinated with the university's data governance body and the Director of Data Management.

2. Define a communication plan

   Establish a clearly defined plan for communicating with report developers, Cognos ambassadors, and the broader user community. The plan should include both active (i.e. e-mail correspondence, newsletters) and passive (i.e. knowledge base, Web site) types of communication to maximize audience engagement.

   **Progress:** Partially complete. Methods and standards of communication have been established for communicating actively with the reporting community and users, but we still need to develop a formalized communication plan.

3. Develop policy for the appropriate use of data

   Work in conjunction with other individuals and functional areas (e.g. the university FERPA officer, OIT, Financial Aid, HR) to develop policies that outline restrictions on confidential data use and that identify the roles of data stewards in managing that use. In addition, these policies should address data that may not be strictly confidential but may still be considered sensitive. Ideally, these policies will create a framework for using the minimum effective data in reporting.

   **Progress:** Ongoing. This work will tie closely to the work of the data governance body at the university.

4. Create data dictionaries for the ODS, EDW and report packages

   Data dictionaries and ERDs should be created and shared with report developers and users. Regular review should be completed to ensure dictionaries and diagrams are up to date.

   **Progress:** No progress.

5. Centralize report scheduling/procedures

   Create and share a master list of scheduled reports to assist in distributing server load. Additionally, formalize procedures to assist report developers in scheduling new reports.
**Progress:** Partially complete. We monitor report scheduling to distribute load and ensure reports are not scheduled during database refresh or maintenance windows.

6. Create documentation for report organization/directory structure/naming conventions

**Progress:** Partially complete. This task aligns closely with task II 6.

7. Customize ODS documentation to match WMU business practices

Adapt out-of-the-box documentation to more accurately reflect WMU business practices and share updated documents with report developers and consumers.

**Progress:** No progress.

**V. Maintenance**

**Current situation:** No formal procedures have been defined for maintaining the ODS, EDW, or Cognos. In the past, we did not apply patches, fixes and updates. Our system crashed several times throughout the day. Although we are monitoring this more consistently, we have still lapsed in applying the latest fixes.

**Goal:** To develop a formalized plan for monitoring updates and report usage, applying fixes and upgrading the system.

**Steps to goal achievement:**

1. Implement auditing software

   Cognos provides a database that will allow the BI team to track report usage and monitor system performance.

   **Progress:** Completed. We have implemented the Cognos auditing capabilities and now have two years of audit history.

2. Auditing data practices and procedures

   As soon as the auditing system is online, reports will be written in order to determine how to best use the available information.

   **Progress:** Completed. We regularly use Cognos auditing capabilities to determine the audience for and frequency of report use.

3. Investigation of a change management system and version control software

   Change management and version control software helps to maintain control over updates to the system. This will make it easier to manage report requests, reports, and data.
Progress: Partially complete. We are using built-in versioning functionality within Cognos at this time and Footprints for change management. Further evaluation of processes and tools may be required.

4. Study current groups, roles, reports, and data to implement a more robust security system

Group-level security is the responsibility of OIT; however, the BI team should be involved in the development of these groups and roles to help minimize the amount of maintenance.

Progress: Ongoing. Preliminary investigation showed the difficulty in implementing security changes. Cognos implemented security changes in the Cognos development area, but we are unable to implement them in production until we get a consensus on which data need to be secured.

5. Minimize manual maintenance for term specific reports and all other reports that contain term/year based prompts (i.e. Cohorts, Attributes)

This will require working with functional areas to determine the best way to use cohorts and attributes and prompts.

Progress: Ongoing. This task closely aligns with II 1 and 2. As reports are audited and revised, we take steps to eliminate or reduce maintenance where possible.

6. Cognos license auditing for compliance

As we implement more BI tools, there will be a greater need to work with OIT and security officers to ensure we stay in compliance with the IBM contract.

Progress: Current audit complete. This will be an ongoing audit done every two to three years when renewing our Cognos License.

7. Create policies, procedure, and communication plans in conjunction with OIT to:
   a. Track ODS/EDW/Cognos modifications in future upgrades
   b. Monitor Patch/RPEs and their affects on WMU
   c. Plan upgrades

Progress: Complete. We worked closely with OIT to develop the procedures and plans for these items, and ongoing maintenance has been improved.

VI. Training

Current situation: No formal training procedures have been defined. In the past, Cognos training sessions were held at the start of the fall semester, and individuals were allowed to schedule one-on-one training with the Data Architect.
**Goal:** To develop formalized training procedures that will maximize the benefit to trainees while most effectively using available resources. To empower users and functional areas to find answers to their reporting questions by using a variety of resources, including in-house documentation, public Web resources, and the campus reporting community.

**Steps to goal achievement:**

1. **Create a knowledge base for IR practices, data changes, notes**

   Create a centralized electronic knowledge base, accessible to report developers and consumers, that houses documentation for BI standards and practices, notes about data changes (e.g. freeze data changes, structural changes to databases, or data usage changes), and other BI policies.

   **Progress:** Ongoing. Currently, information is shared with report developers via access to a network share. Evaluation of additional tools is ongoing.

2. **Create a formal training plan involving instructor-led sessions**

   Develop a training plan that defines the frequency, topics, and audiences for instructor-led sessions. The plan should encompass training for report developers, BI ambassadors, and various levels of report consumers.

   **Progress:** Ongoing. End-user training sessions have been developed and used throughout the year. The sessions are continually refined based on attendee feedback. Report developer training is ongoing and is based on the needs and interests of the Cognos Report Writers Group.

3. **Identify and cultivate BI reporting ambassadors in each of the functional areas/departments**

   Identify report developers or superusers in each functional area or department who serve as “ambassadors” for IR and will be able to assist others in their area in report development or use.

   **Progress:** No progress.

4. **Create and host Train the Trainer sessions for ambassadors**

   Ambassadors should be trained in report development techniques, data identification for different reporting needs, university policies regarding data use, and basic analysis.

   **Progress:** No progress.

5. **Create an electronic forum for the campus reporting community to share knowledge and resources**

   Create a forum, similar to a newsgroup in format, which will allow report developers and consumers to share knowledge with each other. The forum could be hosted.
internally or externally but should be moderated by a member of IR to answer questions, prevent the spread of misinformation, and prevent security risks.

**Progress:** Research is ongoing.

6. Develop a strategy for communicating reporting solution developments (report/package modifications, changes in best practices, etc.) to the user community

Evaluate and select the best format, delivery method (e.g. newsletter, e-mail, Web site, etc.), and schedule to distribute useful information to report developers and consumers.

**Progress:** Completed. We use a combination of organizational knowledge and the Cognos auditing capabilities to target the affected users for direct e-mail communication.

---

**VII. Strategic Planning**

**Current situation:** Currently, WMU does not take advantage of its size and status as a large Ellucian Banner, ODS, and EDW customer. We do not participate in the Large School Consortium and only recently started sending a BI representative to the Ellucian Summit.

**Goal:** To develop the skill sets of the BI team members and to use those skills to set goals, develop and implement plans to meet goals, and evaluate outcomes.

**Steps to goal achievement:**

1. Develop relationships with other large public universities who also use Banner (ODS/EDW) and Cognos

   **Progress:** Ongoing.

2. Develop relationship with Ellucian to drive future development of software. Join the large school consortium

   **Progress:** Ongoing. We have joined the large school consortium.

3. Study Summit presentations and documentation to identify potential improvements to our BI architecture and processes, as well as which of our currently practices should be modified or discontinued.

   **Progress:** Ongoing. This happens bi-annually.

4. Disaster recovery
Develop a comprehensive disaster recovery plan. This will require working with OIT to test backup software and verify its usability.

**Progress:** Completed. OIT has a comprehensive disaster recovery plan and IR has tested and verified the usability of the data.

5. Evaluate how information delivery in the Cognos environment ties back to university mission and goals.

**Progress:** Ongoing.

6. Integrate multiple data sources in a single reporting tool

The IR office will need to work with other university offices to determine the feasibility and best methods of incorporating data from satellite information systems into the operational data store.

**Progress:** We are currently using student data from Banner and HR data from PeopleSoft. We are working with the Office of Admissions to get access to student recruitment data (e.g. EMAS and ACT data). Exploration of the possibility of integrating the DegreeWorks system is also underway.

7. Develop a greater presence with professional societies

**Progress:** Ongoing. We are active within the Higher Education Data Warehousing Forum and keep current with the Association of Institutional Research. In addition, we are regularly represented at the regional IBM Cognos Users Group.

8. Develop leadership and project management skills of the BI Team

**Progress:** Ongoing. Members of the BI team have participated in the Academic Leadership Academy and have taken courses related to project management.

9. Establish more formal interaction with various change management teams

**Progress:** Ongoing. We participate in both the PeopleSoft Change Committee and the Student Systems Integration Team.

**VIII. Evaluation**

**Current situation:** No formal mechanism for evaluation of the BI initiative has yet been established.

**Goal:** To accurately and meaningfully measure the effectiveness of the BI initiative and related achievement of goals.
Steps to goal achievement:

1. Develop performance metrics. As new information becomes available, we will be able to create metrics to evaluate the goals in this strategic plan. This will allow us to more accurately determine which areas need improvement.

Progress: No progress.

\(^{i}\) Quinn, Kevin; “Five Rules for BI Success”; Information Management Newsletters; September 21, 2010
\(^{ii}\) Quinn, Kevin; “Five Rules for BI Success”; Information Management Newsletters; September 21, 2010