Business Intelligence Guidebook

Templates

BUSINESS INTELLIGENCE GUIDEBOOK
From Data Integration to Analytics
RICK SHERMAN
MK
FOREWORD BY CLAUDIA IMHOFF
PRESIDENT OF INTELLIGENT SOLUTIONS, INC
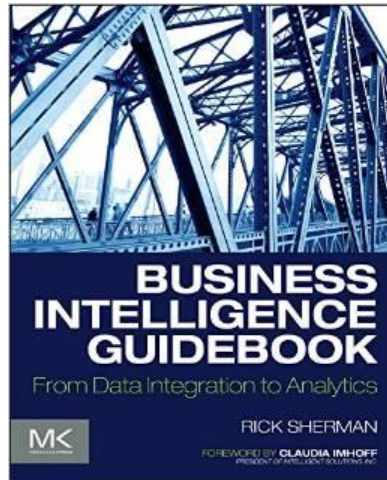
Chapter 3:

Business Requirements Template

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LOGO

[King Khalid University]

BI Requirements

[Academic Success Guidance Project]

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EXECUTIVE SUMMARY

the project aims to improve academic consulting services through the implementation of business intelligence solutions in an academy setting. By converting Excel files into data visualizations, the project will provide a user-friendly interface for academic advisors and the Counseling Unit to analyze student data, track academic progress, and make informed decisions. The key deliverables include data visualization conversion, academic advisor and counseling unit dashboards, and report generation. The critical success factors are seamless integration, security and privacy compliance, and user adoption. Risks and concerns include technical implementation, data accuracy and timeliness, privacy and security risks, and user acceptance and training. By addressing these factors and delivering the project goals, the project will enhance academic advising, improve student outcomes, and support effective decision-making within the academy.

Project description

The project aims to enhance academic consulting services through the implementation of business intelligence (BI) solutions in an academy setting. The goal is to improve the academic advising process, facilitate effective decision-making, and ultimately improve student outcomes. By converting Excel files into data visualizations, the project aims to provide a comprehensive and user-friendly interface for analyzing and understanding students' academic status and performance.

The objectives of the project include:

1. Allocating academic advisors to students at the beginning of each trimester: The BI solution should facilitate the assignment of academic advisors to students based on their academic program and provide a streamlined process for communication and interaction between students and advisors.

2. Following up with students with low GPA or who have exceeded the minimum period of graduation: The BI solution should track students' academic performance and identify those who require additional support, such as students with a GPA below 2.5 or those who have extended their minimum period of graduation.

3. Gathering data and generating reports automatically: The BI solution should automate the collection of relevant data regarding academic advising and generate reports that provide insights into the number of students receiving advisory services, student satisfaction levels, and the number of students with a GPA below 2.5.

Key Deliverables

Week	Duration/Group	Day	Interview Purpose	S# NO.
5	15 Min (Start at 9:05 AM)	Tuesday	Class Business requirements	1
6	15 Min (Start at 9:05 AM)	Tuesday	Class Data requirements	2
7	15 Min (Start at 9:05 AM)	Tuesday	Class BI functional requirements	3
8	15 Min (Start at 9:05 AM)	Tuesday	Class Technical requirements	4
9	15 Min (Start at 9:05 AM)	Tuesday	Class Regulatory and compliance requirements	5
10	15 Min (Start at 9:05 AM)	Tuesday	Class Prioritizing Requirements + Any Other Questions	6

Critical Success Factors

1. BI Requirements Plan: A well-documented plan outlining the specific requirements for developing the Business Intelligence (BI) solution for improving the Academic Advisory and Consultation Services. This plan will include detailed information on the data gathering, report generation, and automation processes needed to achieve the project goals.

2. Academic Advisor Allocation System: A system that facilitates the allocation of academic advisors to students at the beginning of each trimester. This system will streamline the process, ensuring that each student is assigned an appropriate advisor based on their academic program.

3. Student Follow-up System: A system that tracks students' academic performance and identifies those with a GPA below 2.5 or who have exceeded the minimum period of graduation. This system will enable timely interventions and support for at-risk students.

4. Automated Data Gathering and Reporting: A solution that automates the collection of necessary data for academic advisory processes and generates reports automatically. The reports will provide insights into the number of students receiving advisory services, student satisfaction levels, and the number of students with a GPA below 2.5.

5. Integration with Academia Portal: Integration of the BI solution with the existing Academia portal, allowing students to view and communicate with their assigned academic advisors. Academic advisors will also be able to monitor their students' academic performance through the portal.

6. Monitoring and Support Tools: Implementation of clear and well-defined monitoring tools to track academic advising processes, ensuring that all activities are carried out effectively. The solution will also provide support for students with special needs and those facing academic difficulties.

7. Orientation Program Enhancement: Improvement of the existing one-day orientation program for newly enrolled students, introducing them to the academic advising services and providing necessary guidance.

Risks and Concerns

1. Resistance to Change: One of the risks associated with implementing a new system for academic advisory and consultation services is resistance to change from both academic advisors and students. Some faculty members may be reluctant to adopt new technologies or processes, which can hinder the successful implementation of the BI solution. Similarly, students may be accustomed to the existing manual processes and may be hesitant to embrace the new automated system.

2. Data Privacy and Security: When implementing a BI solution that involves gathering student data and generating reports automatically, data privacy and security become crucial concerns. It is important to ensure that the system adheres to relevant privacy regulations and that appropriate security measures are in place to protect sensitive student information.

3. Technical Challenges: Developing a well-functioning BI solution requires technical expertise and resources. There may be challenges in terms of system integration, data synchronization, and scalability. It is important to address these technical challenges to ensure the system operates efficiently and effectively.

4. User Adoption and Training: The successful implementation of the BI solution relies on user adoption and proper training. Academic advisors and students need to be trained on how to use the new system effectively. Insufficient training or lack of user acceptance can hinder the system's adoption and undermine its potential benefits.

5. Data Accuracy and Quality: The accuracy and quality of the data used in the BI solution are crucial for generating meaningful insights and reports. There may be concerns about data integrity, completeness, and consistency. It is important to establish data governance practices and implement data validation processes to ensure the reliability of the information used in the system.

6. Resource Constraints: Implementing a comprehensive BI solution requires adequate resources, including financial, human, and technological resources. Limited resources can pose a challenge to the successful implementation and maintenance of the system. It is important to allocate sufficient resources and establish a realistic timeline for the project.

7. Stakeholder Engagement: Engaging all relevant stakeholders, including academic advisors, students, and the Academic Advising and Student Affairs Committee, is crucial for the success of the project. Lack of stakeholder involvement and communication can lead to misalignment of expectations and requirements, which can impact the effectiveness of the BI solution.

BUSINESS REQUIREMENTS

Table 1: List of Business Requirements

Identifier	Name	Description	Priority
REQ-001	Academic Plan Provide easy access to the number High of courses and remaining hours for each student's academic plan.	1. Log in to the system. 2. Navigate to the Academic Plan page. 3. View the number of courses completed and remaining hours in their academic plan. 4. Filter and sort the results as needed. 5. Identify any courses that they need to complete to graduate on time. 6. Create a plan for completing the remaining courses. 7. Track their progress against their plan. 8. Meet with their academic advisor to discuss their progress and get help as needed.	1
REQ-002	Student Data Provide access to relevant student High data such as GPA, academic level, enrollment status, and academic activities.	1. Log in to the system. 2. Navigate to the Senior Data page. 3. View their GPA, academic level, enrollment status, academic activities, and job placement status. 4. Review their academic progress and identify any areas where they need to improve. 5. Develop a plan for completing any remaining requirements and improving their academic performance. 6. Research job opportunities and develop a job search strategy. 7. Update their resume and cover letter. 8. Apply for jobs and attend interviews. 9. Accept a job offer and prepare for their transition to the workforce.	1
REQ-003	Academic Advisor Dashboard Develop a dashboard for High academic advisors to view summarized information such as student count, counselor count, number of visits, and academic status of students.	1. Log in to the system and navigate to the Academic Advisor Dashboard. 2. Review the summary information on the dashboard, including student count, counselor count, number of visits, and academic status of students. 3. Identify any students who are at risk of falling behind or who need additional support. 4. View the student's profile to learn more about their academic progress, academic goals, and any challenges they may be facing. 5. Reach out to the student to schedule a meeting. 6. During the meeting, discuss the student's academic progress, goals, and challenges. 7. Develop a plan to help the student achieve their academic goals. 8. Document the plan in the system and follow up with the student regularly to track their progress.	1
REQ-004	Counseling Unit Dashboard Develop a dashboard for High the Counseling Unit to view summarized information such as student count, counselor	1. Log in to the system and navigate to the Counseling Unit Dashboard. 2. Review the summary information on the dashboard, including student count, counselor count, number of visits, and academic status of students. 3. Identify any students who are at risk of falling behind or who need additional support. 4. View the student's profile to learn more about their academic progress, academic goals, and any challenges they may be facing. 5. Reach out to the student to schedule a counseling appointment. 6. During the appointment, discuss the student's academic progress, goals, and challenges.	1

| count, number of visits, and academic status of students. | 7. Develop a plan to help the student achieve their academic goals. 8. Document the plan in the system and follow up with the student regularly to track their progress. | |

[Requirement Name]

REQ-001 Academic Plan Provide easy access to the number High

of courses and remaining hours

for each student's academic plan.

REQ-002 Student Data Provide access to relevant student High

data such as GPA, academic level, enrollment status, and academic activities.

REQ-003 Academic Advisor Dashboard Develop a dashboard for High academic advisors to view summarized information such as student count, counselor count, number of visits, and academic status of students.

REQ-004 Counseling Unit Dashboard Develop a dashboard for High the Counseling Unit to view summarized information such as student count, counselor count, number of visits, and academic status of students.

- Requirement description

REQ-001 *This requirement aims to provide a user-friendly interface for accessing and displaying the number of courses completed and remaining hours in a student's academic plan.*

REQ-002 *This requirement aims to provide access to important student data, including GPA, academic level, enrollment status, and academic activities.*

REQ-003 *This requirement aims to create a dashboard specifically for academic advisors. The dashboard will display summarized information, including student count, counselor count, number of visits, and academic status of students.*

REQ-004 *This requirement aims to create a dashboard specifically for the Counseling Unit. The dashboard will display summarized information, including student count, counselor count, number of visits, and academic status of students.*

- Data sources

  REQ-001 *Academic plan database, student information system.*

  REQ-002 *Student information system.*

  REQ-003 *Academic advisor database, student information system.*

  REQ-004 *Counseling unit database, student information system.*

- Business and data transformations

  REQ-001 *Convert academic plan data into a user-friendly interface with summarized information.*

  REQ-002 *Present student data in a user-friendly format and link academic activities to student records.*

  REQ-003 *Aggregate and visualize data for the academic advisor dashboard.*

  REQ-004 *Aggregate and visualize data for the Counseling Unit dashboard.*

- Business metrics or Key Performance Indicators (KPIs)

  REQ-001 *Number of courses completed, remaining hours, GPA.*

  REQ-002 *GPA, academic level, enrollment status.*

  REQ-003 *Student count, counselor count, number of visits, GPA trends.*

  REQ-004 *Student count, counselor count, number of visits, struggling student count.*

- Business processes

  REQ-001 *Academic advising, course planning.*

  REQ-002 *Academic advising, student support.*

  REQ-003 *Academic advising, student tracking.*

> **REQ-004** *Academic counseling, student support.*

- List business groups involved and describe type of involvement

> **REQ-001** *Academic advisors, Counseling Unit. They will be both data consumers and creators.*
>
> **REQ-002** *Academic advisors, Counseling Unit. They will be data consumers.*
>
> **REQ-003** *Academic advisors. They will be data consumers.*
>
> **REQ-004** *Counseling Unit. They will be data consumers.*

- List business owner(s)

> **REQ-001** *Head of Academic Advisors, Director of Counseling Unit.*
>
> **REQ-002** *Head of Academic Advisors, Director of Counseling Unit.*
>
> **REQ-003** *Head of Academic Advisors.*
>
> **REQ-004** *Director of Counseling Unit.*

- List subject matter expert(s)

> **REQ-001** *Academic Advisors, Academic Plan Coordinator.*
>
> **REQ-002** *Head of Academic Advisors, Director of Counseling Unit.*
>
> **REQ-003** *Academic Advisors, IT Manager.*
>
> **REQ-004** *Counseling Unit staff, IT Manager.*

DATA AND DATA QUALITY REQUIREMENTS

Data sources

1. Academic plan database

2. Student information system

3. Academic advisor database

4. Counseling unit database

Data cleansing

1. Identify and resolve any inconsistencies between data sources in data formats, codes, and naming conventions.

2. Ensure that all data is complete, accurate, and up-to-date.

3. Develop and implement data cleaning and validation processes.

Master Data Management (MDM)

1. Establish data governance policies and data quality rules to ensure the consistency and accuracy of master data.

2. Identify and manage master data entities, such as students, courses, and academic plans.

3. Implement data stewardship processes to ensure that master data is maintained and updated accurately.

Data acquisition

Descriptive analytics: This type of analysis is used to summarize and describe student data, such as GPA, enrollment status, and academic progress.

Descriptive analytics can be used to identify trends and patterns in student data, which can help academic advisors to better understand the needs of their students and develop targeted interventions.

- *Student GPA data*

- *Enrollment status data*

- *Academic progress data*

- *Course grades*

- *Attendance data*

  Diagnostic analytics*: This type of analysis is used to identify the root causes of student problems. For example,*

  diagnostic analytics can be used to identify students who are at risk of dropping out and to understand the factors that are contributing to their academic struggles.

  Diagnostic analytics can help academic advisors to develop more effective strategies for supporting these students.

- *Student engagement data (e.g., time spent on learning management system, participation in class discussions, completion of assignments)*

- *Financial aid data (e.g., student loan debt, grant eligibility)*

- *Academic survey data (e.g., student satisfaction with academic experience, plans for after graduation)*

  Predictive analytics: *This type of analysis is used to predict future outcomes, such as student dropout risk or academic performance.*

  Predictive analytics can be used to identify students who are most likely to benefit from specific academic interventions or to develop early warning systems to flag students who are at risk of falling behind.

- *Student dropout risk data (e.g., previous academic performance, engagement data, financial aid data)*

- *Academic performance data (e.g., predicted GPA, predicted course grades)*

Prescriptive analytics*: This type of analysis is used to recommend optimal solutions to problems. For example, prescriptive analytics can be used to recommend the best academic advisor for a student or to develop personalized learning plans.*

Prescriptive analytics can help academic advisors to provide more effective and targeted support to their students.

- *Student academic advisor data*

- *Personalized learning plan data*

- *Course recommendation data*

FUNCTIONAL REQUIREMENTS

BI use cases

1. Academic Advisor Dashboard:

   - Summarized student information: The dashboard provides a summary of key student information such as number, name, university ID, completed hours, remaining hours, GPA, and contact information.

   - Detailed student information: Advisors can access more detailed information by clicking on a link, which opens the information in the same or a separate page. This includes GPA breakdown, academic activities, and the number of visits made.

   - Filtering and sorting: Advisors can filter and sort students based on criteria such as GPA, name, and level.

   - Visit requests management: Advisors have a separate form or page to handle visit requests from students. They can accept, reject, or modify the requests based on availability.

2. Academic Counseling Unit Monitoring:

   - Academic counseling effectiveness: The unit can monitor the effectiveness of academic counseling by tracking metrics such as the number of advisors, number of students, advisor-student assignment status, number of visits made, and the status of struggling students.

   - Key Performance Indicators (KPIs): The unit defines KPIs to measure the success of academic counseling, such as the percentage of students receiving visits in a semester and the ratio of struggling students per advisor.

   - Transfer of requests: If an advisor cannot handle requests, they can be transferred to the counseling unit for further action or discussion with the department head.

   - Existing request visibility: The unit needs to see the existing requests from students and track their status.

3. Student Schedule and Guidance:

   - Schedule generation and alternatives: Students can access information on how their schedule is generated and explore alternative courses or options if their desired sections are closed or unavailable.

   - Guidance for course selection: Advisors can provide guidance to students based on their general information, academic record, plan, and current schedule. Recommendations and discussions regarding course drops or withdrawals can be facilitated.

   - Reports and manual assessment: Reports containing student information, academic records, and current schedules are required to support the manual guidance process.

4. Integration and User-Friendly System:

   - Integration with Academia: The new system should be seamlessly integrated into Academia, utilizing the existing database and adding missing components.

   - User-friendly system: The system should be user-friendly for both advisors and the academic counseling unit, automating manual processes, providing visualizations, KPIs, and notifications.

   - Permissions and data source: The dashboard should have specific permissions and designated data sources for each party, ensuring secure access to relevant data and reports.

   - Notifications: Instead of manually checking the system, advisors can receive notifications via email about new requests, prompting them to access the system for details.

Analytical process workflow and user interaction

   1. Academic Advisor Dashboard:

   Business Processes:

   - Gathering student information: The academic advisor collects and maintains student records, plans, and schedules.

   - Filtering and sorting: The advisor applies filters and sorts students based on criteria such as GPA, name, and level.

- Visit request management: The advisor handles visit requests from students, including accepting, rejecting, or modifying them.

Analysis Processes:

- Data summarization: The system summarizes student information such as completed hours, remaining hours, GPA, and contact details for display in the dashboard.

- Visualization: Visual representations, such as charts or graphs, are generated to provide a visual overview of student performance and activities.

- Drill-down analysis: Advisors can click on specific data points or links to access more detailed information about a student, including GPA breakdown, academic activities, and visit history.

2. Academic Counseling Unit Monitoring:

Business Processes:

- Monitoring counseling activities: The counseling unit tracks the number of advisors, students, assigned advisors, and visits made.

- Identifying struggling students: The unit identifies students who are struggling academically and need counseling support.

- Transfer of requests: If advisors cannot handle certain requests, they are transferred to the counseling unit for further action or discussion with the department head.

Analysis Processes:

- Key performance indicators (KPIs): The system calculates KPIs, such as the percentage of students receiving visits in a semester and the ratio of struggling students per advisor.

- Data analysis: The system analyzes the data to identify reasons for low visit rates, such as advisor availability issues or student-related problems.

- Request tracking: The system tracks existing visit requests, their status, and any necessary follow-up actions.

3. Student Schedule and Guidance:

Business Processes:

- Schedule generation: The system generates student schedules based on requirements, availability, and other factors.

- Alternative course recommendations: Students seek guidance from advisors on alternative courses or options when their desired sections are closed or unavailable.

- Manual assessment: Advisors manually assess student situations based on their general information, academic records, and current schedules.

Analysis Processes:

- Schedule optimization: The system optimizes student schedules by considering factors such as course availability, prerequisites, and student preferences.

- Course guidance analysis: Advisors analyze student information, academic plans, and current schedules to provide appropriate guidance on course selection, drops, or withdrawals.

- Reporting: The system generates reports containing student information, academic records, and current schedules for advisors to reference during the guidance process.

Analytical styles needed

1. Reporting and Dashboards:

- Style Description: Reporting and dashboards involve presenting summarized data and key metrics in a visual and easily consumable format. Reports provide structured information, while dashboards offer interactive visualizations.

- Applicable BI Use Cases: This style applies to both the Academic Advisor Dashboard and the Academic Counseling Unit Monitoring use cases.

- BI Roles: Power users, such as academic advisors and members of the counseling unit, create reports and dashboards. Report readers, including other advisors and counseling unit members, examine the presented data.

2. Data Visualization:

- Style Description: Data visualization focuses on presenting data visually through charts, graphs, and other visual representations. It enhances understanding and enables users to identify patterns, trends, and outliers.

*- **Applicable BI Use Cases:** Data visualization is relevant to the Academic Advisor Dashboard and the Academic Counseling Unit Monitoring use cases, where visualizations aid in summarizing student performance, visit statistics, and counseling effectiveness.*

*- **BI Roles:** Power users, including advisors and counseling unit members, create visualizations. Report readers, such as other advisors and counseling unit members, utilize visualizations to gain insights.*

3. Ad Hoc Analysis:

*- **Style Description:** Ad hoc analysis allows users to explore data interactively, perform drill-downs, apply filters, and answer specific questions on the fly. Users can manipulate data to gain deeper insights and perform what-if analyses.*

*- **Applicable BI Use Cases:** Ad hoc analysis is primarily relevant to the Academic Advisor Dashboard use case, where advisors can drill down into student details, explore GPA breakdowns, and analyze academic activities. It also applies to the Academic Counseling Unit Monitoring use case when analyzing visit requests and struggling student data.*

*- **BI Roles:** Power users, such as advisors and counseling unit members, perform ad hoc analysis to delve into specific student or counseling-related details.*

REGULATORY/COMPLIANCE REQUIREMENTS

> ⓘ When you're gathering requirements, be aware that people you're working with either may not know all the relevant and required compliance and regulatory rules, or may assume that you already know them. See page 53 of the *BI Guidebook* for examples of regulatory requirements.

> ⓘ *List and briefly describe the regulatory and compliance requirements*

TECHNICAL REQUIREMENTS

1. *Data Integration and ETL (Extract, Transform, Load):*

   Requirement: The BI solution needs to integrate data from various sources, transform it into a consistent format, and load it into a data repository or data warehouse.

   Business Impact: This requirement ensures that relevant data from different systems (e.g., student information systems, learning management systems) can be consolidated and analyzed effectively.

2. *Data Storage and Management:*

   Requirement: The BI solution requires a scalable and efficient data storage mechanism, such as a data warehouse, data lake, or cloud-based storage.

   Business Impact: This requirement ensures that the BI solution can handle large volumes of data and provide fast access to information for analysis and reporting.

3. *Data Modeling and Schema Design:*

   Requirement: The BI solution needs a well-designed data model and schema to support efficient querying and analysis.

   Business Impact: A well-structured data model enables users to easily navigate and understand the data, facilitating meaningful analysis and visualization.

4. *Reporting and Visualization:*

   Requirement: The BI solution should provide flexible reporting capabilities and interactive data visualizations.

   Business Impact: Effective reporting and visualization enable users to explore data, identify trends, and communicate insights more effectively, supporting data-driven decision-making.

5. *Security and Access Control:*

Requirement: The BI solution must have robust security measures in place to protect sensitive data and ensure appropriate access control.

> *Business Impact: This requirement ensures that only authorized users can access and manipulate data, maintaining data privacy and compliance with regulations.*

6. *Scalability and Performance:*

> *Requirement: The BI solution should be scalable to accommodate increasing data volumes and user load, while maintaining acceptable performance.*

> *Business Impact: Scalability and performance ensure that the BI solution can handle growing data demands and provide timely insights to users.*

7. *Integration with Existing Systems:*

> *Requirement: The BI solution needs to integrate with existing systems, such as student information systems, CRM systems, or email platforms.*

> *Business Impact: Integration allows for seamless data flow between systems, enabling comprehensive analysis and providing a holistic view of student data..*

REQUIREMENTS CROSS-MATRIX

> **i** Consolidate and coordinate the varied requirements into a cohesive set of BI project requirements to determine which ones truly drive value. See page 55 of the *BI Guidebook* for the dimensions by which you should categorize the requirements. Chapter 18 provides further discussion.

> **i** *Classify and list the requirements according to agreed-upon categories.*

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PRIORITIZING REQUIREMENTS

ℹ️ Never accept that every requirement is a top priority. The business needs to classify the requirements into categories such as:

- Must-have
- Should-have
- Nice-to-have
- Forget about it

See page 56 of the *BI Guidebook* for more on this.

ℹ️ *List each requirement, its priority and business owner.*

APPROVALS

> **i** It is a best practice to obtain sign-off approval of each project milestone. An organization's policies and culture will dictate who the approvers are, but typically the sponsors and key stakeholders are included.

Title	Name	Approval Date

APPENDIX: INPUTS FOR REQUIREMENTS

Interviewees

> *List all people interviewed with their name, title, organizational group and project role if applicable. List all dates when that person participated in interviews, meetings or discussions. If the person's involvement was extensive then skip listing the dates and describe their involvement.*

Data sources examined

> *List all the data sources – databases, applications, files and external systems – examined to create this deliverable. List all sources examined regardless of whether they will become required data sources for this project.*

Data source systems documentation

> *List and briefly describe the regulatory and compliance requirements*

Reporting systems, reports and data shadow systems examined

> *List and briefly describe the regulatory and compliance requirements*

Authors and contributors

> *List all the people involved in obtaining and analyzing the requirements along with the authors of this deliverable.*