Stevens Institute of Technology

School of Business

**AACSB  
ASSURANCE OF LEARNING**

**Master of Science in**

**Business Intelligence   
and Analytics**

**(BI&A)**

**LEARNING GOAL # 4**

**Students are able to discover, access and assess internal and external data sources and frame questions thatare appropriate for solving business problems. [Morabito & Stohr]**

**Responsibility: Joseph Morabito & Ted Stohr**

May 2024

**Table of Contents**

1. INTRODUCTION: LEARNING GOAL BI&A #4 ……………………. 3

2. LEARNING OBJECTIVES AND TRAITS …………………………….4

3. RUBRICS ……………………………………………………………… 5

4. ASSESSMENT PROCESS …………………………………………….. 7

5. RESULTS OF LEARNING GOAL ASSESSMENT – INTRO ……….. 8

6. RESULTS OF ASSESSMENT: Fall 2021–Spring 2024…………...….. 9

7. OUTCOMES: BIA LEARNING GOAL # 4 AFTER ROUNDS OF ASSESSMENT …………………………………………………………… 22

8. CLOSE LOOP PROCESS – CONTINUOUS IMPROVEMENT RECORD ……………………………………………………………………………... 28

APPENDIX A …………………………………………………………….. 32

# 1. INTRODUCTION: LEARNING GOAL BI&A #4

*Students are able to discover, access and assess internal and external data sources and frame questions that are appropriate for solving business problems.*

This goal is assessed in MIS 633 Data Integration and Business Intelligence – a required course in the BI&A curriculum.

This goal is assessed in the final project for MIS 633. This learning goal requires students to think analytically and complete a BI design project, end-to-end. A key part of this project is the discovery of data necessary to develop a data warehouse and corresponding data visualizations. A lead-up project is to develop a dimensional model using advanced techniques.

# 2. LEARNING OBJECTIVES AND TRAITS

|  |  |
| --- | --- |
|  | **BI&A Learning Goal - 4: Objectives and Traits** |
| BIA 4 | Students are able to discover, access and assess internal and external data sources that are appropriate for solving business problems. |
| **Learning Objectives** |  |
| **Objective 1:** | *Students exploit technical systems to identify, locate, access and assess data* |
| **Traits** |  |
| Trait 1: | Students navigate government, organizational, and public web sites to search and access data. |
| Trait 2: | Students conduct a data audit, including the analysis of existing queries, reports, and systems. |
| Trait 3: | Students design enterprise repositories with enterprise meta-data. |
| **Objective 2:** | *Students exploit organizational/social systems to identify, locate, access and assess data* |
| **Traits** |  |
| Trait 1: | Students extract data requirements from structured interviews with IT and business analysts. |
| Trait 2: | Students build dimensional data models of business intelligence requirements. |
| Trait 3: | Students design data transform rules to get data into a usable state. |

# 3. RUBRICS

**Objective 1:** Students use analytical methods to find solutions for business problems that involve large and heterogeneous data sets.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **BI&A LEARNING GOAL - 4: RUBRIC 1** | | | | |
| **BIA 4** | Students are able to discover, access and assess internal and external data sources that are appropriate for solving business problems. | | | | |
| **Objective 1** | *Students exploit technical systems to identify, locate, access and assess data* | | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** | **Score** |
|  | **Value** | **0** | **5** | **10** |  |
| Trait 1: | Students navigate government, organizational, and public web sites to search and access data. | Cannot understand or navigate. | Understands and navigates | Easily navigates and associates data. |  |
| Trait 2: | Students conduct a data audit, including the analysis of existing queries, reports, and systems. | Cannot conduct data audit. | Conduct data audit | Conducts data audit and is able to associate data |  |
| Trait 3: | Students design enterprise repositories with enterprise meta-data. | Cannot design meta-data | Designs enterprise meta-data repository. | Designs enterprise meta-data repository and integrates with BI systems. |  |
| **Criterion:** |  |  |  |  |  |

**Criterion: Does not meet expectations: 0; Meets: 5; Exceeds: 10**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **BI&A LEARNING GOAL - 4: RUBRIC 2** | | | | |
| **BIA 4** | Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems. | | | | |
| **Objective 2** | *Students exploit organizational/social systems to identify, locate, access and assess data* | | | | |
|  | **Trait** | **Poor** | **Good** | **Excellent** | **Score** |
|  | **Value** | **0** | **5** | **10** |  |
| Trait 1: | Students extract data requirements from structured interviews with IT and business analysts. | Cannot identify data requirements from interviews | Identifies data requirements from interviews | Identifies and integrates data requirements from interviews |  |
| Trait 2: | Students build dimensional data models of business intelligence requirements. | Cannot build data model. | Builds data model. | Builds data models with advanced techniques for complex requirements. |  |
| Trait 3: | Students design data transform rules to get data into a usable state. | Cannot design transform rules. | Designs transform rules. | Designs complex transform rules. |  |

**Criterion: Does not meet expectations: 0; Meets: 5; Exceeds: 10**

# 4. ASSESSMENT PROCESS

|  |  |  |
| --- | --- | --- |
| **Where and when measured?** | **How measured?** | **Criterion** |
| Course-embedded assignment and project in required course *MIS 633. A*ssessed in the fall and spring semester each year. | Description: assignments and project are graded by course owners and aggregated to obtain a total score.  Sampling: All students in the BI&A program are assessed. | 85% of students get a grade of GOOD or better as measured by the rubric for this learning goal |

# 5. RESULTS OF LEARNING GOAL ASSESSMENT - INTRODUCTION

The results of the initial learning goal assessments carried out to date are included below.

**Explanation**

Each learning goal has a number of learning objectives and performance on each objective is measured using a rubric that in turn contains a number of desired “traits”. Students are scored individually on each trait.

The grading sheets for each student are used to develop a Summary Results Sheet for each learning goal objective. A selection of these Summaries is included below.

The first table in the Summary Results Sheet for a learning objective and trait gives the counts of students falling in each of the three categories:

- Does not meet expectations  
- Meets expectations  
- Exceeds expectations

The right-hand column in the table is used to record the average score of the students on each trait. This table provides an indication of the relative performance of students on each trait.

The second table on each sheet provides the counts of students who fall in each of the above three categories for the overall learning objective.

The person doing the assessment provides explanatory comments and recommendations on the bottom of the Results Summary Sheet. The recommendations improve content or pedagogy changes for the next time the course is given.

# 6. RESULTS of ASSESSMENT: Fall 2021

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Fall 2021 semester consisted of 43 students in one on-campus section.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data**

**ASSESSMENT DATE: Fall 2021 ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 43 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 7 | 0 | 36 | 8.37 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 0 | 7 | 36 | 9.18 |
| Students design enterprise repositories with enterprise meta-data. | 0 | 7 | 36 | 9.18 |
| **Average Grade (Maximum 10)** | | | | **8.91** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **7** | **36** |

**COMMENTS:** Most students were able to search and exploit data to support their project; in particular, data visualizations. One group had difficulty discovering necessary data, though they met expectations for the project as a whole.

**REMEDIAL ACTIONS:**

* The instructor will intercede early during the data discovery phase of the project and assist the students.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 43 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 2 | 2 | 39 | 9.30 |
| Students build dimensional data models of business intelligence requirements. | 2 | 2 | 39 | 9.30 |
| Students design data transform rules to get data into a usable state.. | 0 | 0 | 43 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **9.53** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **2** | **2** | **39** |

**COMMENTS:** Most students were able to successfully develop a multi-dimensional model using advanced techniques. A small number of students had difficulty exploiting advanced techniques.

**REMEDIAL ACTIONS:**

* The instructor will further review examples on the use of advanced techniques in multi-dimensional modeling.

# 6b. RESULTS OF ASSESSMENT: Spring 2022

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Spring 2022 semester consisted of 141 students in three on-campus sections.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 141 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 0 | 7 | 134 | 9.75 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 0 | 7 | 134 | 9.75 |
| Students design enterprise repositories with enterprise meta-data. | 0 | 7 | 134 | 9.75 |
| **Average Grade (Maximum 10)** | | | | **9.75** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **7** | **134** |

**COMMENTS:** Most students were able to search and exploit data to support their project; in particular, data visualizations. Two groups had moderate difficulty (7 students), though they met expectations for the project as a whole.

**REMEDIAL ACTIONS:**

* The instructor will intercede early during the data discovery phase of the project and assist the students.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 141 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 0 | 0 | 141 | 10.00 |
| Students build dimensional data models of business intelligence requirements. | 0 | 7 | 134 | 9.75 |
| Students design data transform rules to get data into a usable state. | 0 | 3 | 138 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **9.91** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  |  | **7** | **134** |

**COMMENTS:** Most students were able to successfully develop a multi-dimensional model using advanced techniques. A small number of students had difficulty exploiting advanced techniques.

**REMEDIAL ACTIONS:**

* The instructor will further review examples on the use of advanced techniques in multi-dimensional modeling.

# 6c. RESULTS OF ASSESSMENT: Fall 2022

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Fall 2022 semester consisted of 55 students in one on-campus section.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 55 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 0 | 0 | 55 | 10.00 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 0 | 0 | 55 | 10.00 |
| Students design enterprise repositories with enterprise meta-data. | 0 | 0 | 55 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **10.00** |

Does not meet expectations 0; meets 0; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **0** | **55** |

**COMMENTS:** Virtually all students were able to search and exploit data to support their project; in particular, data visualizations.

**REMEDIAL ACTIONS:**

* None necessary.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 55 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 0 | 0 | 55 | 10.00 |
| Students build dimensional data models of business intelligence requirements. | 0 | 0 | 55 | 10.00 |
| Students design data transform rules to get data into a usable state. | 0 | 0 | 55 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **10.00** |

Does not meet expectations 0; meets 0; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **0** | **55** |

**COMMENTS:** All students were able to successfully develop a multi-dimensional model using advanced techniques.

**REMEDIAL ACTIONS:**

* None required.

# 6d. RESULTS OF ASSESSMENT: Spring 2023

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Spring 2023 semester consisted of 117 students in three sections, two of which were on-campus sections and one a Web Campus section.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data.**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 117 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 1 | 0 | 116 | 9.94 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 1 | 0 | 116 | 9.94 |
| Students design enterprise repositories with enterprise meta-data. | 1 | 0 | 116 | 9.94 |
| **Average Grade (Maximum 10)** | | | | **9.94** |

Does not meet expectations 1; meets 0; exceeds 116

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **1** | **0** | **116** |

**COMMENTS:** Most students were able to search and exploit data to support their project; in particular, data visualizations. One student did not participate in any of the assignments despite several attempts to contact him, though he did not drop the course – I consider this student to be an outlier.

**REMEDIAL ACTIONS:**

* The instructor will intercede early during the data discovery phase of the project to identify and assist students who fall short of participation.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 117 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 1 | 17 | 99 | 9.19 |
| Students build dimensional data models of business intelligence requirements. | 1 | 17 | 99 | 9.19 |
| Students design data transform rules to get data into a usable state. | 1 | 17 | 99 | 9.19 |
| **Average Grade (Maximum 10)** | | | | **9.19** |

Does not meet expectations 1; meets 17; exceeds 99

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **1** | **17** | **99** |

**COMMENTS:** Most students were able to successfully develop a multi-dimensional model using advanced techniques. The same outlier student mentioned above did not participate. A serious issue arose in *one on-campus section* where a large number of students (17 students) cheated on the final project. This included mostly or completely word-by-word coping. Another group had an original introduction and data visualizations but copied the organizational part of the project.

Since the final project includes an integration of most of the topics in the course, it was difficult to proportion the goal traits. It should be noted that the students who cheated on the final project did fine on the individual assignments, including one that addressed dimensional modeling – an important topic for the course and the final project.

Finally, extracting the one outlier and the 17 cheating students, we have 99 students across three sections whose performance was comparable to the Spring 2022 and Fall 2022 sections. The few students who fall short of a good or outstanding grade on a given assignment, including the final project, are given an opportunity to resubmit the assignment, which most do.

**REMEDIAL ACTIONS:**

* During the course introduction, the instructor will give a stern warning on cheating and how it can lead to dismissal from Stevens. This warning will be repeated before every assignment, including the final project.
* The instructor will develop a review process for the final project to check on the progress of project milestones. In the past this was not necessary, almost all students looked forward to the final project (particularly the oral presentation part of the final) – most consider this to be the best part of the course. But we will institute the review process.
* The instructor will coordinate with other data instructors on the timing of the final projects. Several students (in this and another data course I teach) told me that they felt pressure on their final project – there was too much conflict with the finals of other courses. This is no excuse for cheating, but this is the first time students told me explicitly about the pressure and conflict with other finals. I will investigate with the other instructors and ascertain their experience with cheating, particularly on the final project.

# 6e. RESULTS OF ASSESSMENT: Fall 2023

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Fall 2023 semester consisted of 90 students in two on-campus sections.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 90 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 0 | 0 | 90 | 10.00 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 0 | 0 | 90 | 10.00 |
| Students design enterprise repositories with enterprise meta-data. | 0 | 0 | 90 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **10.00** |

Does not meet expectations 0; meets 0; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **0** | **90** |

**COMMENTS:** Virtually all students were able to search and exploit data to support their project; in particular, data visualizations.

**REMEDIAL ACTIONS:**

* None necessary.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access and assess data**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 90 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 0 | 0 | 90 | 10.00 |
| Students build dimensional data models of business intelligence requirements. | 0 | 0 | 90 | 10.00 |
| Students design data transform rules to get data into a usable state. | 0 | 0 | 90 | 10.00 |
| **Average Grade (Maximum 10)** | | | | **10.00** |

Does not meet expectations 0; meets 0; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **0** | **0** | **90** |

**COMMENTS:** All students were able to successfully develop a multi-dimensional model using advanced techniques.

**REMEDIAL ACTIONS:**

* None required.

# 6f. RESULTS OF ASSESSMENT: Spring 2024

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**The Spring 2024 semester consisted of 119 students in three sections, two of which were on-campus sections and one a Web Campus section.**

**LEARNING OBJECTIVE # 1: Students exploit technical systems to identify, locate, access and assess data.**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 119 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students navigate government, organizational, and public web sites to search and access data. | 1 | 0 | 118 | 9.99 |
| Students conduct a data audit, including the analysis of existing queries, reports, and systems. | 1 | 0 | 118 | 9.99 |
| Students design enterprise repositories with enterprise meta-data. | 1 | 0 | 118 | 9.99 |
| **Average Grade (Maximum 10)** | | | | **9.99** |

Does not meet expectations 1; meets 0; exceeds 116

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **1** | **0** | **118** |

**COMMENTS:** Most students were able to search and exploit data to support their project; in particular, data visualizations. One student did not participate in the midterm assignment despite several attempts to contact him, though he did not drop the course – I consider this student to be an outlier.

**REMEDIAL ACTIONS:**

* The instructor will intercede early during the data discovery phase of the project to identify and assist students who fall short of participation.

**LEARNING GOAL # 4: Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.**

**LEARNING OBJECTIVE # 2: Students exploit organizational/social systems to identify, locate, access, and assess data.**

**ASSESSMENT DATE: ASSESSOR: Joseph Morabito**

**NO. OF STUDENTS TESTED: 119 COURSE: MIS 633**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of Students** | | |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| Students extract data requirements from structured interviews with IT and business analysts. | 3 | 1 | 115 | 9.70 |
| Students build dimensional data models of business intelligence requirements. | 3 | 1 | 115 | 9.70 |
| Students design data transform rules to get data into a usable state. | 3 | 1 | 115 | 9.70 |
| **Average Grade (Maximum 10)** | | | | **9.70** |

Does not meet expectations 3; meets 1; exceeds 115

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Students by Category**  (Based on Average score across all traits) | **Not meet expectations** | **Meet Expectations** | **Exceed Expectations** |
|  | **3** | **1** | **115** |

**COMMENTS:** Most students were able to successfully develop a multi-dimensional model using advanced techniques. We consider this to be the most critical assignment for the course and, hence, this semester we implemented an innovation: a *substitute assignment* that tested the same concepts that was offered to those students who wanted to improve their grades. All but 3 took advantage of this exam and both the class grades and involvement with the course improved significantly.

The one student who only met expectations did not participate in the final exam with her team, though doing well in most of the course. She apparently left Stevens before the final presentation (not dropping out of school) and neither me nor her teammates could connect with her.

**REMEDIAL ACTIONS:**

* The introduction of a substitute assignment for the multi-dimensional assignment, popularly known as the *bonus assignment*, made a difference in student performance and will be part of our offering going forward.

# 7. OUTCOMES: BIA LEARNING GOAL # 4 AFTER ROUNDS OF ASSESSMENT

**Outcomes From Previous Assessment (Fall 2021)**

**The Fall 2021 semester consisted of 43 students in one on-campus section.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access and assess data

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by most students. One group had difficulty discovering necessary data, though they met expectations for the project as a whole. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by most students. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by most students. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access and assess data**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood by most students. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood by most students. A small number of students had difficulty exploiting advanced techniques with multidimensional modeling |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood. |

**Outcomes From Previous Assessment (Spring 2022)**

**The Spring 2022 semester consisted of 141 students in three on-campus sections.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access and assess data

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by most students. Two groups had slight difficulty discovering necessary data, though they met expectations for the project as a whole.  The results were much improved from the last assessment. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by most students. Two groups had slight difficulty discovering necessary data, though they met expectations for the project as a whole.  The results were much improved from the last assessment. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by most students. Two groups had slight difficulty discovering necessary data, though they met expectations for the project as a whole.  The results were much improved from the last assessment. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access and assess data**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood. The results were very much improved from the last assessment. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood. The results were much improved from the last assessment. |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood. |

**Outcomes From Previous Assessment (Fall 2022)**

**The Fall 2022 semester consisted of 55 students in one on-campus section.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access and assess data

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access, and assess data.**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |

**Outcomes From Previous Assessment (Spring 2023)**

**The Spring 2023 semester consisted of 117 students in three on-campus sections.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access, and assess data.

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by most students.  The results were comparable to the Fall 2022 and Spring 2023 assessment periods. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by most students.  The results were comparable to the Fall 2022 and Spring 2023 assessment periods. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by most students.  The results were comparable to the Fall 2022 and Spring 2023 assessment periods. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access, and assess data.**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood by most students. The results were skewed by several students who cheated on the final project, but the results for the remaining students were comparable to the Fall 2022 and Spring 2023 assessment periods. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood by most students.  The results were skewed by several students who cheated on the final project, but the results for the remaining students were comparable to the Fall 2022 and Spring 2023 assessment periods. |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood by most students. The results were skewed by several students who cheated on the final project, but the results for the remaining students were comparable to the Fall 2022 and Spring 2023 assessment periods. |

**Outcomes From Current Assessment (Fall 2023)**

**The Fall 2023 semester consisted of 90 students in two on-campus sections.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access, and assess data.

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access, and assess data.**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |

**Outcomes From Current Assessment (Spring 2024)**

**The Spring 2024 semester consisted of 119 students in three sections, two of which were on-campus sections and one a Web Campus section.**

Competencies, (knowledge, skills, abilities) addresses in this course:

# Learning Objective #1: Students exploit technical systems to identify, locate, access, and assess data.

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students navigate government, organizational, and public web sites to search and access data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 2. Students conduct a data audit, including the analysis of existing queries, reports, and systems. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |
| 3. Students design enterprise repositories with enterprise meta-data. | This skill was well understood by virtually all students  The results were much improved from the last assessment. |

**Learning Objective #2: Students exploit organizational/social systems to identify, locate, access, and assess data.**

|  |  |
| --- | --- |
| **Traits** |  |
| 1. Students extract data requirements from structured interviews with IT and business analysts. | This skill was well understood by virtually all students.  The results were much improved from the last assessment. |
| 2. Students build dimensional data models of business intelligence requirements. | This skill was well understood by most students.  The innovation of a bonus assignment greatly improved student performance and participation and will become part of the regular offering for this course. |
| 3. Students design data transform rules to get data into a usable state. | This skill was well understood by virtually all students.  The results were much improved from the last assessment. |

# 8. CLOSE LOOP PROCESS – CONTINUOUS IMPROVEMENT RECORD

**Assurance of Learning**

**Assessment/Outcome Analysis**

**Close Loop Process - Continuous Improvement Record**

**Program:** Master of Science in Business Intelligence & Analytics

**Goal 4:** Students are able to discover, assess and access internal and external data sources that are appropriate for solving business problems.

**Goal Owner:** Joseph Morabito and Ted Stohr

**Where Measured:** Course-embedded assignment and project in required course **MIS 633** *Data Integration and Business Intelligence*. Assessed in the fall and spring semester each year.

**How Measured:** Description: assignments and project are graded by course owners and aggregated to obtain a total score.

Sampling: All students in the course are assessed.

The following table shows the average scores on each goal objective over the past two assessments. Note that the sample size from the current assessment (Spring 2022) was substantially larger than that of the previous assessment (Fall 2021). The Spring 2022 semester consisted of 141 students in three on-campus section, whereas the Fall 2021 semester consisted of 43 students in one on-campus section..

|  |  |
| --- | --- |
|  | Objective 1 |
| Fall 2021 | **36 (83.7%) Exceed Expectations; 100% Meet or Exceed Expectations** |
|  | Objective 2 |
| Fall 2021 | **41 (95%) Meet or Exceed Expectations** |
|  |  |

|  |  |
| --- | --- |
|  | Objective 1 |
| Spring 2022 | **134 (95.0%) Exceed Expectations; 100% Meet or Exceed Expectations** |
|  | Objective 2 |
| Spring 2022 | **141 (100%) Meet or Exceed Expectations** |
|  |  |

|  |  |
| --- | --- |
|  | Objective 1 |
| Fall 2022 | **55 (100%) Exceed Expectations; 100% Exceed Expectations** |
|  | Objective 2 |
| Fall 2022 | **55 (100%) Exceed Expectations; 100% Exceed Expectations** |
|  |  |

|  |  |
| --- | --- |
|  | Objective 1 |
| Spring 2023 | **116 (99%) Exceed Expectations; 99% Meet or Exceed Expectations** |
|  | Objective 2 |
| Spring 2023 | **99 (85%) Exceed Expectations; 99% Exceed or Meet Expectations** |
|  |  |

|  |  |
| --- | --- |
|  | Objective 1 |
| Fall 2023 | **90 (100%) Exceed Expectations** |
|  | Objective 2 |
| Fall 2023 | **90 (100%) Exceed Expectations** |
|  |  |

|  |  |
| --- | --- |
|  | Objective 1 |
| Spring 2024 | **119 (100%) Exceed Expectation or Meet Expectations** |
|  | Objective 2 |
| Spring 2024 | **116 (98%) Exceed Expectations; 3 Did not Meet Expectations** |
|  |  |

**Closing the Loop: Actions taken on specific objectives**

|  |  |
| --- | --- |
| **Objective 1** | *Students exploit technical systems to identify, locate, access and assess data* |
| **When Assessed:** | *Spring 2023:* |
| **Remedial Action** | When adjusted for cheating students, the bulk of the students met or exceeded expectations on both learning objectives. Our strategy of interceding early in all phases of data discovery, analysis, and design assisted the students appears to of been successful. This was apparent in the improvement in this assessment as compared to the Spring 2022 assessment (the last large group).  We will warn students about cheating and the possibility of being dismissed from Stevens. We will also develop a review process for the final project to check on the progress of project milestones. |
| **When Assessed:** | *Fall 2022:* |
| **Remedial Action** | Virtually all students exceeded expectations on both learning objectives. Our strategy of interceding early in all phases of data discovery, analysis, and design assisted the students appears to of been successful. This was apparent in the improvement in this assessment as compared to the prior assessment. |
| **When Assessed:** | *Spring 2022:* |
| **Remedial Action** | The bulk of the students met or exceeded expectations on both learning objectives. Our strategy of interceding early in all phases of data discovery, analysis, and design assisted the students appears to of been successful. This was apparent in the improvement in this assessment as compared to the prior assessment. |
| **Outcome from previous assessment:** | See Objective 2 below. |
| **When Assessed:** | *Fall 2021* |
| **Remedial Action** | Intercede early in all phases of data discovery, analysis, and design. |
| **Outcome from previous assessment:** |  |
| **When Assessed:** | *Fall 2023* |
| **Remedial Action** | Non required |
| **Outcome from previous assessment:** |  |

|  |  |
| --- | --- |
| **Objective 2** | *Students exploit organizational and social systems to identify, locate, access and assess data* |
| **When Assessed:** | *Spring 2022:* |
| **Remedial Action** | The bulk of the students met or exceeded expectations on both learning objectives. Our strategy of interceding early in all phases of data discovery, analysis, and design assisted the students appears to of been successful. Also, instructor reviewed examples on the use of advanced techniques in multi-dimensional modeling which was beneficial. This was apparent in the improvement in this assessment as compared to the prior assessment. |
| **Outcome from previous assessment:** | The students performed better on the second learning objective than the first. This may be accounted for because the second objective involved data modeling, which most (if not all) students were exposed to during the first data course, MIS 631. |
| **When Assessed:** | *Fall 2021:* |
| **Remedial Action** | The instructor reviewed examples on the use of advanced techniques in multi-dimensional modeling. |
| **Outcome from previous assessment:** |  |
| **When Assessed:** | *Spring 2024* |
| **Remedial Action** | The introduction of a bonus assignment on a going-forward basis. |
| **Outcome from previous assessment:** |  |

# APPENDIX A

**Assessment Exercise: Final Project**

The main evaluation of this goal is based on a final group project. There was secondary input based on an individual design assignment. The main objective of the project is to create a framework for large scale development of a BI systems for a company the team selects. Students are expected to use a variety of techniques reviewed in class.

*The current student group (Fall 2022) performed substantially better than previous groups. When adjusted for cheating, the performance of the Spring 2023 group is comparable to the Spring 2022 group (the last large group).*

The final report includes the following sections:

* Class Presentation:
  + Domain, organization, or area of application
  + Problem
* Framework: solution proposed
  + Organizational matrices and design artifacts
* Data visualization using an OLAP tool, such as Tableau
* Conclusions: Lessons learned