Stevens Institute of Technology

School of Business

**AACSB
ASSURANCE OF LEARNING**

**Master of Science in Information Systems**

**COMPETENCY GOAL # 4**

**Students can analyze a business situation and design an integrated process and data model to satisfy strategic organizational goals.**

**Responsibility: Ted Stohr**

Note:

Competency Goal5 (now Competency Goal 4) was assessed continuously from spring 2008 through spring 2018 in the course *MIS 710 Process Innovation and Management*. The results of these assessments have been archived.

In this version of Competency Goal 4, the goal remains unchanged however, the objectives have been reduced from 4 to 3 by eliminating the “reengineering principles” objective on which students were consistently performing well. Goal 4 is measured with a rubric that is used each semester to grade the major individual homework in the course. This homework, the “Reengineering” homework, requires students to redesign a simplified version of a real industry process (see Appendix.)

February 3, 2023

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# 1. INTRODUCTION: COMPETENCY GOAL MIS #5

*Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals*

This goal is assessed in MIS 710 Process Innovation and Management, which is one of the required “integration courses” in the MIS core curriculum. This krequires students to think analytically and to synthesize material from other courses in the curriculum – notably, MIS 631 Data Management and MIS 632 Data Management Lab. Because this is a design exercise, students are required to think creatively.

The assessment exercise requires individual students to take an initial “as-is” process description and to redesign (or “reengineer”) it. A typical assessment exercise is included in Appendix B.

To complete this exercise successfully, students need to master a number of process representation techniques including: process narratives, relationship diagrams, process maps using Business Process Management Notation (BPMN) and entity relationship data models.

Students are assessed on their ability: to use the above tools effectively; relate the goals of the process to organizational goals; develop the conceptual data model for the process; describe the process logic; employ relevant “reengineering principles” and develop the associated job roles.

# 2. LEARNING OBJECTIVES AND TRAITS

|  |  |
| --- | --- |
| **Objective 1:** | *Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals* |
| **Traits** |   |
| Trait 1: | Given an organizational problem statement, the student recognizes appropriate strategic goal(s) |
| Trait 2: | Develops process goals that are relevant to the strategic goal(s) |
| Trait 3: | Provides sound rationale explaining the linkage between the strategic goal and the process goals |
| **Objective 2:** | *The student is able to design a sound "to be" or "should" process map* |
| **Traits** |   |
| Trait 1: | Uses a formal method |
| Trait 2: | The process map is syntactically correct |
| Trait 3: | Process map is logically sound & complete |
| Trait 4: | Correctly identifies the goals for individual activities |
| **Objective 3:** | *The student can identify and design the data that is consumed and created by the process* |
| **Traits** |   |
| Trait 1: | Uses formal method (e.g., an entity relationship map) |
| Trait 2: | Student can develop a syntactically correct data model  |
| Trait 3: | Given the process requirements, the data model is semantically correct |
| Trait 4: | The data model is appropriately linked to the process |

# 3. RUBRICS

**Objective 1:** *Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Trait** | **Poor** | **Good** | **Excellent** |
|   | **Value** | **0** | **5** | **10** |
| Trait 1: | Given an organizational problem statement, the student recognizes the appropriate strategic organizational goal(s) | Does not mention strategy | Identifies an organizational strategy that is relevant to the process | Identifies one or more appropriate organizational |
| Trait 2: | Develops process goals that are relevant to the strategic goal(s) | Does not mention process goals | Develops at least one process goal  | Develops several process goals that are relevant to organization |
| Trait 3: | Presents a sound rationale explaining the linkage between the strategic goal and the process goals | Does not mention strategy | Identifies strategy relevant to process | Develops a convincing argument linking to strategic goals |

**Criterion: Does not meet expectations: 0 – 15; Meets: 16-25 ; Exceeds: 26-30**

**Objective 2:** *The student is able to design a sound "to be" or "should" process map*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Trait** | **Poor** | **Good** | **Excellent** |
|   | **Value** | **0** | **5** | **10** |
| Trait 1: | Uses a formal method | Does not use a formal method | Uses a formal representation | Uses formal representation correctly |
| Trait 2: | The process map is syntactically correct | No process map | Process map is correctly drawn | Process map uses correct semantics |
| Trait 3: | Process map is logically sound and complete. | Does not identify all required activities | Includes feedback loops | Includes all relevant activities & feedback loops |
| Trait 4: | Correctly identifies the goals for individual activities | Does not identify any activity goals | Provides some activity goals | Correctly specifies system activity goals that will achieve process objectives |

**Criterion: Does not meet expectations: 0 – 30; Meets: 31-40 ; Exceeds: 41-50**

**Objective 3:** *The student can identify and design the data that is consumed and created by the process*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Trait** | **Poor** | **Good** | **Excellent** |
|   | **Value** | **0** | **5** | **10** |
| Trait 1: | Uses formal method (e.g., an entity relationship diagram.) | No formal method | Attempts formal model but incorrect syntactically | Correct syntax for established model |
| Trait 2: | Student can develop a correct data model (e.g., an entity relationship map) | No data model | Uses a formal representation | Uses formal representation correctly |
| Trait 3: | The data model is syntactically and semantically correct | Data model is developed | Data model is syntactically correct | Data model is syntactically and semantically correct |
| Trait 4: | The data model is appropriately linked to the process | The data model is not linked to the process | Data model is correctly linked to process | Organizational linkages to data are specified |

**Criterion: Does not meet expectations: 0 – 20; Meets: 20-30 ; Exceeds: 30-40**

# 4. ASSESSMENT PROCESS

|  |  |  |
| --- | --- | --- |
| **Where and when measured?** | **How measured?** | **Criterion** |
| Course-embedded design assignment in required course *MIS 710 Process Innovation and Management*  | Sampling: MIS 710 students from the fall and/or spring sections of the course. Description: MIS 710 instructors grade a reengineering exercise using a rubric (see Appendix A.) | 85% of students get a grade of GOOD or better as measured by the rubric for this learning goal. |

# 5. RESULTS OF COMPETENCY GOALASSESSMENT - INTRODUCTION

The results of the initial Competency Goal assessments carried out to date are included below.

**Explanation**

Each Competency 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 Competency Goalobjective. 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

**COMPETENCY GOAL# 5:** Each student can analyze a business situation and design an integrated process and data model to satisfy strategic organizational goals.

**LEARNING OBJECTIVE # 1:** Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals.

**ASSESSMENT DATE: Fall, 2021 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 46 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meets Expectat-ions** | **Exceeds Expectat-ions** | **Avg. Grade on Trait** |
| 1: Given an organizational problem statement, the student recognizes the appropriate strategic organizational goal(s) | **0** | **34** | **13** | 6.4 |
| 2: Develop Process goals that are relevant to the strategic goal(s) | **0** | **22** | **25** | 7.8 |
| 3: Presents a sound rationale explaining the linkage between strategic goals and process goals.  | **2** | **25** | **20** | 6.9 |
| **Average Grade (Maximum 10)** | **7.0** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **1** | **27** | **19** |
| **Students meeting or exceeding expectations:** | **46 (98%)** |

**COMMENTS:**

The students performed well on this goal.

**REMEDIAL ACTIONS:**

Provide a better explanation in class of the relationship between strategic and process goals.

**LEARNING OBJECTIVE # 2:** The student is able to design a sound “to be” or “should” process map

**ASSESSMENT DATE: Fall 2021 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 39 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Competency GoalTraits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| 1: Use of formal method | **0** | **2** | **44** | 9.8 |
| 2: The process map is syntactically correct  | **0** | **28** | **18** | 7.0 |
| 3: Process map is logically sound & complete | **2** | **31** | **13** | 6.2 |
| 4: Correctly identifies the goals for individual activities | **12** | **25** | **9** | 4.7 |
| **Average Grade (Maximum 10)** | **6.9** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **8** | **36** | **3** |
| **Students meeting or exceeding expectations:** | **39 (83%)** |

**COMMENTS:**

Students performed slightly below the target for this objective (83% vs 85% of students met or exceeded expectations.)

**REMEDIAL ACTIONS:**

Improve explanation in class of the relationship between process and activity goals.

**LEARNING OBJECTIVE #3:** The student can identify and design the data that is consumed and created by the process.

**ASSESSMENT DATE: Fall 2021 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 40 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Competency GoalTraits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| 1: Student can develop a correct data model (e.g., an entity relationship map) | **4** | **4** | **42** | 9.4 |
| 2: The data model is syntactically correct  | **4** | **23** | **23** | 7.5 |
| 3: The data model is syntactically correct | **3** | **32** | **12** | 6.5 |
| 4: The data model is appropriately linked to the process | **3** | **22** | **22** | 7.5 |
| **Average Grade (Maximum 10)** | **7.7** |

Does not meet expectations 0 - 10; meets 11-20; exceeds 21 - 30

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **7** | **26** | **14** |
| **Students meeting or exceeding expectations:** | **40 (85%)** |

**COMMENTS:**

The students minimally met the target for this objective (85% of students met or exceeded expectations.)

**REMEDIAL ACTIONS:**

Two improvements have been introduced in a companion core course, MIS 631/632 Data Management and Data Management Lab:

1. The addition of the MIS 632 labs to the MIS 631 lecture sections will allow students to apply database theory and concepts to practical examples.
2. A database design tool, ERWIN, has been introduced in MIS 631/632, which will improve students’ understanding of relational database design.

# 7. SPECIFIC STEPS TAKEN BASED ON FALL 2021 RESULTS

**LEARNING OBJECTIVE # 1: Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals.**

**REMEDIAL STEPS**

1. An in-class exercise requiring students to link strategy and process goals for a hypothetical organization was added to help students use the Balanced Score Card approach to make this linkage. This exercise was administered in session 4 and is worth 1% of the final course grade.

**LEARNING OBJECTIVE # 2: The student is able to design a sound “to be” or “should” process map**

**REMEDIAL STEPS**

1. An in-class exercise in using the more precise BPMN process mapping notation was administered in lecture 9-Process/Workflow Design.

**LEARNING OBJECTIVE # 3: The student can apply process improvement (reengineering) principles to achieve process**

**REMEDIAL STEPS**

1. This requirement was included in the problem statement and the requirement was discussed in class.

**LEARNING OBJECTIVE #4: The student can identify and design the data that is consumed and created by the process.**

**REMEDIAL STEPS**

1. A revised version of the MIS 630 course was taught for the first time in fall 2008. As a result, the data modeling skills of our students should be improved. It is still the case that some students in some majors will not taken MIS 630 before taking MIS 710.

# 8. RESULTS OF ASSESSMENT: FALL 2023

**COMPETENCY GOAL# 4:** Each student can analyze a business situation and design an integrated process and data model to satisfy strategic organizational goals.

**LEARNING OBJECTIVE # 1:** Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals.

**ASSESSMENT DATE: Fall, 2023 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 37 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Learning Goal Traits** | **Not Meet Expectat-ions** | **Meets Expectat-ions** | **Exceeds Expectat-ions** | **Avg. Grade on Trait** |
| 1: Given an organizational problem statement, the student recognizes the appropriate strategic organizational goal(s) | **2** | **24** | **11** | 6.2 |
| 2: Develop Process goals that are relevant to the strategic goal(s) | **1** | **8** | **28** | 8.6 |
| 3: Presents a sound rationale explaining the linkage between strategic goals and process goals.  | **4** | **20** | **13** | 6.2 |
| **Average Grade (Maximum 10)** | **7.0** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **4** | **8** | **15** |
| **Students meeting or exceeding expectations:** | **333 (89.2%)** |

**COMMENTS:**

Overall student performance was good on this task (>85 % of students exceeded expectations.)\_

**REMEDIAL ACTIONS:**

**LEARNING OBJECTIVE # 2:** The student is able to design a sound “to be” or “should” process map

**ASSESSMENT DATE: Fall 2023 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 37 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Competency GoalTraits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| 1: Use of formal method | **15** | **2** | **20** | 5.9 |
| 2: The process map is syntactically correct  | **13** | **11** | **13** | 5.0 |
| 3: Process map is logically sound & complete | **13** | **12** | **12** | 4.9 |
| 4: Correctly identifies the goals for individual activities | **16** | **7** | **14** | 4.7 |
| **Average Grade (Maximum 10)** | **5.1** |

Does not meet expectations 0; meets 5; exceeds 10

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **18** | **11** | **8** |
| **Students meeting or exceeding expectations:** | **19 (51.3%)** |

**COMMENTS:**

Student performance on this trait was surprisingly poor. Some exogenous reasons include a lower quality, less ambitious, incoming first semester class for COVID-related reasons. (Instructors in other classes have had the same experience. Nevertheless, this is very concerning.

**REMEDIAL ACTIONS:**

Hitherto, students have been expected to learn how to learn the process-mapping tool Signavio by themselves. A required tutorial and a second process-mapping exercise will be introduced in spring 2024.

**LEARNING OBJECTIVE #3:** The student can identify and design the data that is consumed and created by the process.

**ASSESSMENT DATE: Fall 2023 ASSESSOR: Ted Stohr**

**NO. OF STUDENTS TESTED: 37 COURSE: MIS 710 A**

|  |  |  |
| --- | --- | --- |
|  | **Number of Students** |  |
| **Competency GoalTraits** | **Not Meet Expectat-ions** | **Meet Expectat-ions** | **Exceed Expectat-ions** | **Avg. Grade on Trait** |
| 1: Student can develop a correct data model (e.g., an entity relationship map) | **12** | **11** | **17** | 6.2 |
| 2: The data model is syntactically correct  | **13** | **17** | **10** | 5.2 |
| 3: The data model is syntactically correct | **12** | **22** | **6** | 4.8 |
| 4: The data model is appropriately linked to the process | **11** | **17** | **12** | 5.7 |
| **Average Grade (Maximum 10)** | **5.5** |

Does not meet expectations 0 - 10; meets 11-20; exceeds 21 - 30

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Not meet Expectations** | **Meets Expectations** | **Exceeds Expectations** |
| **Total Students by Category***(Based on Average score across all traits)* | **19** | **13** | **5** |
| **Students meeting or exceeding expectations:** | **18 (48.6%)** |

**COMMENTS:**

Student performance on this trait was surprisingly poor. Some exogenous reasons include a lower quality, less ambitious, incoming first semester class – probably for COVID-related reasons. (Instructors noticed in other classes have had the same experience.) Nevertheless, this is very concerning.

**REMEDIAL ACTIONS:**

Hitherto, students have been expected to learn database modeling in another first-semester class, *MIS 631/632 Data Management*. A required tutorial and a second database demonstration will be introduced in spring, 2024.

# 9. SPECIFIC STEPS TAKEN BASED ON FALL 2023 RESULTS

**LEARNING OBJECTIVE # 1: Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals.**

**REMEDIAL STEPS**

None

**LEARNING OBJECTIVE # 2: The student is able to design a sound “to be” or “should” process map**

**REMEDIAL STEPS**

A required tutorial and a second process-mapping exercise will be introduced in spring 2024.

**LEARNING OBJECTIVE #3: The student can identify and design the data that is consumed and created by the process.**

**REMEDIAL STEPS**

A required tutorial and a second database demonstration will be introduced in spring 2024.

# 10. CLOSE-THE-LOOP PROCESS - CONTINUOUS IMPROVEMENT RECORD

**Program:** Master of Science in Information Systems

**Goal 4:** Students can analyze a business situation and design an integrated process and data model to satisfy strategic organizational goals.

**Goal Owner:** Ted Stohr

**Where Measured:** Course-embedded design assignment in required course MIS 710 Process Innovation and Management

**How Measured:** Sampling: Random samples of 30 MIS 710 students from fall and spring sections of course.

**Description:** One or more MIS 710 instructors grade a reengineering exercise, which requires students to submit a completely new design for a given process.

**Summary Record of Assessments on each Goal 4 Objective**

**Fall 2021 – 47 students assessed**

Overall student performance across all three goal 4 objectives.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goal 4** | **Failed** | **Met**  | **Exceed** | **Meeting or exceeding** |
| **Number of students** | **4** | **38** | **5** | **43** |
| **Percent of students** | **8.5%** | **80.9%** | **10.6%** | **91.5%** |

**Fall 2023 – 37 students assessed**

Overall student performance across all three goal 4 objectives.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Goal 4** | **Failed** | **Met**  | **Exceed** | **Meeting or exceeding** |
| **Number of students** | **13** | **19** | **5** | **37** |
| **Percent of students** | **35.1%** | **51.4%** | **13.5%** | **64.9%** |

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

Assessed: Fall 2021, Fall 2023
Students in class MIS 710-A Process Innovation and Management

Instructor: Ted Stohr

|  |  |
| --- | --- |
| **Performance** | *Students can recognize strategic organizational goals and develop process goals that satisfy one or more strategic goals.*  |
| **2021 Fall** | Provide a better explanation in class of the relationship between strategic and process goals. |
| **2023 Fall** | Satisfactory: No specific remedial action |
| **Objective 2** | *The student is able to design a sound “to be” or “should” process map* |
| **2021 Fall** | Improve explanation in class of the relationship between process and activity goals. |
| **2023 Fall** | A required tutorial on Signavio and a second process-mapping exercise will be introduced in spring 2024. |
| **Objective 3** | *The student can identify and design the data that is consumed and created by the process.*  |
| **2021 Fall** | -The addition of the MIS 632 labs to the MIS 631 lecture sections will allow students to apply database theory and concepts to practical examples. -A database design tool, ERWIN, has been introduced in MIS 631/632, which will improve students’ understanding of relational database design |
| **2023 Fall** | A required tutorial and a second database demonstration will be introduced in spring, 2024. |
|  | **SUMMARY: OUTCOMES FROM ASSESSMENTS** |
| **Outcomes from Assessments** | The major changes resulting from the Goal 4 assessments are at the program and school level. In 2021, labs were introduced into the MIS 631 database course and the software design tool, ERWIN, was also introduced. In 2023, poor results on the assessment indicated the need for more in-class tutorials. At the school-level an effort is being made to introduce a more diversified and higher quality student body.  |

# APPENDIX B

**Assessment Exercise – Reengineering a Business Process**











