

Annual Report for Assessment of Outcomes

Submitted: June, 2011

SAC: Computer Information Systems

Outcomes Assessed: CIS AAS

1. Describe changes to teaching practices implemented as a result of learning outcome assessments that were carried out in the previous academic year. *(information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

N/A

2. Identify the outcomes assessed this year, and describe the methods used. What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)? *(information provided here may be referenced, inserted into or summarized in Program Review 2.C.i& ii (for Core Outcomes) or 6.B.i & ii (for CTE Degree and Certificate outcomes)*

In the fall of 2010 six classes were selected that contained assignments that could be used to evaluate twelve CIS outcomes (three current CIS outcomes will be dropped, see discussion about these three outcomes in the Improvement to the Assessment section of this document). The classes and their associated CIS outcomes are listed in an attached spreadsheet (see attached spreadsheet named CISPgmOutcomesAssessments10252010.xls).

Our program outcomes were also matched with the college core outcomes (see attached spreadsheet named PCCCoreToProgOutcomes.xls). Thus all PCC core outcomes are indirectly assessed through their relationship with assessed CIS program outcomes.

Of the six classes, three were selected for the 2011 assessment to assess five of the twelve program outcomes. The other three classes will be incorporated into the 2012 assessment and they will add assessments for the other seven outcomes. The three classes for the 2011 assessment are CIS 140M, CIS179 and CIS 275.

The assessment tool that was chosen was a rubric. Three rubrics were developed, one for each class (CIS 275 and CIS 179 rubrics are attached). Each instructor chose assignment(s) that they thought could be used for each rubric criteria and graded them from 1 to 5 points (CIS 275 used a 1 to 4 point scale) with 5 points showing that students had mastered the criteria and 1 point indicating that they had not.

CIS 275 Database Design and Introduction to SQL

The instructor teaching this class in the spring term filled out the following rubric and provided comments. Although the number of students participating is low (6), the sample was random

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and provides a view of strengths and weaknesses. It is hoped that next year a larger random sample can be obtained. The first column indicates the CIS 275 assessment tool that was used to evaluate the criteria in the second column. A scale of 1 to 4 was used in this rubric, which is different from the other two classes used in this assessment.

| Assignment | Criteria | 1 point | 2 points | 3 points | 4 points |
|-------------------|---------------------------|----------------|-----------------|-----------------|-----------------|
| Lab3Q1 | Requirements Analysis | | | 1 | 5 |
| Lab3Q1 | ER Design - Entities | | | 1 | 5 |
| Lab3Q4 | ER Design - Attributes | | | 3 | 3 |
| Lab3Q2 | ER Design - Relationships | | | 3 | 3 |
| Lab3Q3 | ER Design - Cardinality | | | 3 | 3 |
| Lab3Q4 | Normalization | | | 3 | 3 |
| Quiz8Q9 | Analysis of request | | | 2 | 4 |
| Quiz8Q9 | SQL Syntax and Standards | | | 4 | 2 |
| Quiz8Q9 | SQL Functionality | | 1 | 1 | 4 |
| Quiz8Q9 | SQL Efficiency | | 2 | | 4 |

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Instructor comments

For most categories in the rubric, results were good or very good (3-4); only in the SQL categories were scores below 3 present (and none below 2). It should be noted that the SQL query chosen is one of the more advanced queries on the final assignment, and was deliberately selected for this reason. Thus the low scores shown here in **SQL Efficiency** and **Functionality** (for several students) should not be considered symptomatic of a shortcoming in the curriculum.

Further analysis

The following table shows the average results of the 1 through 4 points assigned to each student's results for the CIS 275 assignment/quiz.

| Criteria | Average |
|---------------------------|---------|
| Requirements Analysis | 3.8 |
| ER Design - Entities | 3.8 |
| ER Design - Attributes | 3.5 |
| ER Design - Relationships | 3.5 |
| ER Design - Cardinality | 3.5 |
| Normalization | 3.5 |
| Analysis of request | 3.7 |
| SQL Syntax and Standards | 3.3 |
| SQL Functionality | 3.5 |
| SQL Efficiency | 3.3 |

Summation

Disappointing scores were encountered in two of the criteria. In addition to what has been mentioned by the instructor, SQL syntax and standards also had disappointing results. Also, five other criteria were lower than the top three, normalization, SQL Functionality, and ER-Design attributes, relationships, cardinality.

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How the CIS 275 Criteria Relate to CIS Program Outcomes

While it is extremely useful to evaluate a course like CIS 275 on a detailed, criteria level as in the above table, the program assessment involves using this information to evaluate program outcomes. In order to evaluate this “higher” program outcome level the CIS 275 criteria were mapped to the CIS program outcomes in the following table. Thus the following table effectively indicates criteria scores that can be averaged and used to evaluate the two CIS program outcomes that CIS 275 was used to evaluate.

| Program Outcome | CIS 275 criteria that were mapped to the program outcome | Average student scores of criteria |
|---|--|------------------------------------|
| Apply computer technology to address business information system needs. | Analysis of request SQL syntax and standards SQL Functionality SQL efficiency | 3.5 |
| Create effective databases and user interfaces. | Requirements Analysis ER Design – Entities ER Design – Attributes ER Design – Relationships ER Design – Cardinality Normalization | 3.6 |

CIS 179 Data Communication Concepts I

CIS 179 Data Communication Concepts I, a required class for all CIS degrees, is usually taken very early in the student's academic career. Because of this, students don't have as rich of an academic background to draw on.

Two program outcomes were to be evaluated in the class; *Design, implement and deploy systems*, and *Use network concepts and terminology to communicate with vendors and users*.

Assignment 2 asks students to review industry news sources and find applications that are forecasted to be deployed within 5 years. It was selected for the Communications outcome because it focuses on research, interpretation of the results of the research, and written communication of the results of the research.

Assignment 6 involves the evaluation of a provided VLAN system. It was chosen for the Systems outcome because of the complex VLAN systems understanding needed to complete the assignment and the intuitive feedback the student receives as they step through the evaluation process. The student learns how to design a simpler, isolated system as they follow the data through the much more complex system provided as an example.

The CIS instructors responsible for CIS 179 chose to include the rubric evaluations within the rubric tally. This reflects the fact that the CIS department was unsure of what format was supposed to be followed. The scale used here is on a scale of 1 to 5 (the same scale used for CIS 140M).

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| Assignment 2 | 1 points | 2 points | 3 points | 4 points | 5 points |
|--|--|--|---|---|---|
| Outcome: Use network concepts and terminology to communicate with vendors and users | Unable to use network concepts adequately to find relevant sources | Uses some concepts accurately but unable to find relevant news sources | Uses concepts and applies them accurately, but unable to find relevant news sources | Uses concepts, applies them accurately and finds limited value news sources. Limited ability to communicate results | Uses concepts, applies them to find relevant news sources and interprets the results accurately in a clear manner |
| Student Results | 2 | 1 | 3 | 4 | 11 |
| | | | | | |
| Assignment 6 | 1 points | 2 points | 3 points | 4 points | 5 points |
| Outcome: Design, implement and deploy systems | Unable to follow system definition | Limited ability to understand what is happening in the system | Understands the first scenario of the system and can follow the data flow | Understands most system scenarios and follows data flow with few errors | Understands all system scenarios and follows the data flow with no errors |
| Student Results | 3 | 0 | 2 | 3 | 13 |

As the scores indicate there was about as much trouble with both assignments in this rubric. Students had about as much trouble with designing, implementing and deploying a system as they did with communicating effectively with vendors. The averages below reinforce this evenness of difficulty.

| Program Outcome | CIS 179 criteria that were mapped to the program outcome | Average student scores of criteria |
|--|--|------------------------------------|
| Design, implement and deploy systems | Design VLAN system Evaluate the data flow in the design | 4.0 |
| Use network concepts and terminology to communicate with vendors and users | Locate news sources for relevant new applications Identify relevant applications Describe applications Cite sources | 4.1 |

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CIS 140M Operating Systems I: Microsoft

The instructor teaching this class in the spring term filled out the following rubric. The number of students participating is healthy at 15. The sample was random and provides a view of strengths and weaknesses. The first row is the outcome being evaluated. Rows 2 and below are the individual criteria used to come to the results in the first row. A scale of 1 to 5 was used instead of 1 to 4.

| | 1 point | 2 points | 3 points | 4 points | 5 points | Average |
|--|---------|----------|----------|----------|----------|---------|
| Evaluate - (Deliverable 1) Gathering system performance data | | | | 1 | 14 | 4.9 |
| Evaluate - (Deliverable 2) Processing & evaluating the gathered data | 2 | | | 2 | 11 | 4.3 |
| Debug - (Deliverable 3) Determining system bottlenecks (troubleshooting) | 2 | 1 | | | 12 | 4.3 |
| Test & Troubleshoot - (Deliverable 4) Making the necessary system adjustments (reducing bottlenecks). | | 2 | 1 | 5 | 7 | 4.1 |

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Students had more trouble with making needed system adjustments than anything else. They did not especially have trouble with gathering information about a problem, evaluating that information or in identifying the problem.

| Program Outcome | CIS 140M criteria that were mapped to the program outcome | Average student scores of criteria |
|---|---|------------------------------------|
| Evaluate, test, debug and troubleshoot systems. | Gathering system performance data Processing & evaluating the gathered data Determining system bottlenecks (troubleshooting) Making the necessary system adjustments (reducing bottlenecks). | 4.5 |

Summary of average results for all five Program Outcomes

| Program Outcome | Class that was assessed for the program outcome | Average student scores class criteria |
|---|---|---------------------------------------|
| Apply computer technology to address business information system needs. | CIS 275 | 3.5 (scale of 1 to 4) |
| Design, implement and deploy systems. | CIS 179 | 4.1 (scale of 1 to 5) |
| Evaluate, test, debug and troubleshoot systems. | CIS 140M | 4.5 (scale of 1 to 5) |
| Create effective databases and user interfaces. | CIS 275 | 3.6 (scale of 1 to 4) |
| Use network concepts and terminology to communicate with vendors and users. | CIS 179 | 4.1 (scale of 1 to 5) |

- Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of degree and certificate outcomes. *(information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

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CIS 275 Database Design and Introduction to SQL

Instructor reaction

There is room for improvement on **SQL Syntax & Standards**; these were not stressed this term, and more examples could be presented for the students to follow. Courier font is required for submissions, but this rule was for aid in grading and was not enforced. Indentation of subqueries and presentation of projected columns and tables in the FROM clause on separate lines could be improved in these assignments. Possibly a short lesson on good standards could be added to the course material.

Summation

As the instructor suggested more examples could be offered to improve understanding where the results were disappointing as with SQL syntax and standards, SQL efficiency and ER diagrams with regards to attributes, relationships cardinality and normalization. Examples could be presented using Camtasia videos, PowerPoint slides, in-classroom presentations and/or separate documents. Additionally, homework assignments could be used for students to work on individually as well as in groups. The homework could then be discussed in class. As the instructor has said, there should be a separate section of the class devoted to SQL standards. Finally, many of these topics can be and should be overlapped. As an example, an assignment that covers normalization should also make use of an ER-diagram.

CIS 179 Data Communication Concepts I

Summation

Additional examples or roll playing might improve scores for both assignments. Perhaps another assignment that involves the design, implementation and deployment of a system and involves communication with a vendor could improve scores in both program outcomes.

CIS 140M Operating Systems I: Microsoft

Summation

More time and attention needs to be spent having students employ fixes to system problems. The process should be hands on as much as possible. More examples of how system problems are implemented could be shown using Camtasia videos. These videos would fit in well with DL classes.

Improvement to the assessment

Three current outcomes will be deleted because they either are not really outcomes or they are impossible to assess. They are not evaluated in this year's assessment. This will still leave the CIS AAS degree with ten outcomes.

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“Program does not consist of training sessions for the tool-of-the-week” is not an outcome. Instead it is a statement about the CIS program. This “outcome” will be deleted.

“Take ownership of IS career by adapting and learning new skills” and “Students should develop enduring skills and knowledge” are outcomes that are impossible to assess and will be deleted from the program outcome list.

Next year the SACC will identify students who are willing to participate in the assessment earlier in the term. This should provide a larger student population from which to choose a larger random sample for the assessment.

A common scale and format for the rubric assessments should be used to avoid weight discrepancies between class assessments. This would make comparisons between rubrics easier to accomplish.

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| Degree Outcome Categories | Degree Outcome Specifics | PCC College Outcomes | | |
|---|---|--|--|--|
| | | | | |
| | | Classes you teach applicable to this PCC and Degree outcome. | | |
| Used to be | | | | |
| Apply computer technology to address business information system needs. | | Critical thinking/Problem solving Professional competence | | |
| Process | Develop and evaluate system requirements. | Critical thinking/Problem solving Professional competence | | |
| | Design, implement and deploy systems. | Critical thinking/Problem solving Professional competence | | |
| | Evaluate, test, debug and troubleshoot systems. | Critical thinking/Problem solving Professional competence | | |
| Technology | Create effective databases and user interfaces. | Communication, Critical thinking/Problem solving, | | |
| | Develop small programs. | Professional competence | | |
| | Use network concepts and terminology to communicate with vendors and users. | Communication/Cultural Awareness/Professional Competence | | |
| | Select appropriate technology tools by recognizing tool capabilities and limitations. | Professional competence | | |
| Information Systems in Business | Apply operational business knowledge in addressing information systems needs. | Critical thinking/Problem solving Professional competence | | |
| Personal and Interpersonal | Communicate effectively in both oral and written form. | Communication/Professional Competence | | |
| | Work effectively in teams. | Communication | | |
| | Manage time, tasks and projects. | Professional competence | | |
| | Take ownership of IS career by adapting and learning new skills. | Professional competence | | |
| Guiding principles for program: | Students should develop enduring skills and knowledge. | Professional competence | | |
| | (Program does not consist of training sessions for the tool-of-the-week.) 12.2007 | Will be deleted as an outcome | | |

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| Degree Outcome Categories | Degree Outcome Specifics | | | |
|---|---|--|--|-----------------|
| | | | | Self-Reflection |
| | | | | |
| Apply computer technology to address business information system needs. | | | | |
| Process | Develop and evaluate system requirements. | | | |
| | Design, implement and deploy systems. | | | |
| | Evaluate, test, debug and troubleshoot systems. | | | |
| Technology | Create effective databases and user interfaces. | | | |
| | Develop small programs. | | | |
| | Use network concepts and terminology to communicate with vendors and users. | | | |
| | Select appropriate technology tools by recognizing tool capabilities and limitations. | | | |
| Information Systems in Business | Apply operational business knowledge in addressing information systems needs. | | | |
| Personal and Interpersonal | Communicate effectively in both oral and written form. | | | |
| | Work effectively in teams. | | | |
| | Manage time, tasks and projects. | | | |
| | Take ownership of IS career by adapting and learning new skills. | | | |
| Guiding principles for program: | Students should develop enduring skills and knowledge. | | | |
| | (Program does not consist of training sessions for the tool-of-the-week.) 12.2007 | | | |

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| Degree Outcome Categories | Degree Outcome Specifics | Class to use | |
|---|---|----------------|---------------------|
| | | for assessment | Type of assessment |
| Apply computer technology to address business information system needs. | | 275 | Lab assignments |
| Process | Develop and evaluate system requirements. | 244 | Lab/Paper |
| | Design, implement and deploy systems. | 179 | Lab assignment |
| | Evaluate, test, debug and troubleshoot systems. | 140M | Lab assignment |
| Technology | Create effective databases and user interfaces. | 275 | Lab assignments |
| | Develop small programs. | 233B, 233J | Lab assignment/Exam |
| | Use network concepts and terminology to communicate with vendors and users. | 179 | Lab assignment |
| | Select appropriate technology tools by recognizing tool capabilities and limitations. | 244 | Lab/Paper |
| Information Systems in Business | Apply operational business knowledge in addressing information systems needs. | 244 | Lab/Paper |
| Personal and Interpersonal | Communicate effectively in both oral and written form. | 244 | Lab/Paper |
| | Work effectively in teams. | 244 | Lab/Paper |
| | Manage time, tasks and projects. | 244 | Lab/Paper |

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| | | | |
|---------------------------------|---|------------------|--|
| | Take ownership of IS career by adapting and learning new skills. | SACC will delete | |
| Guiding principles for program: | Students should develop enduring skills and knowledge. | SACC will delete | |
| | (Program does not consist of training sessions for the tool-of-the-week.) 12.2007 | SACC will delete | |

CIS275 Rubric

| Criteria | 1 point | 2 points | 3 points | 4 points |
|---------------------------|--|--|--|--|
| Requirements Analysis | Data elements and entity classes not identified. | Some entities and attributes are identified. | Entities and attributes determined but business rules incomplete. | Has gathered enough information to begin design phase. |
| ER Design - Entities | Entities were not drawn or do not fulfill any requirements. | A few entities were drawn, but there are major problems with missing entities, non-existent entities, etc. | Most entities are present, but minor errors exist such as one entity being missing. | All entities are present with no unnecessary entities. |
| ER Design - Attributes | Attributes are missing or are not correct. | A few attributes are present, but most are missing, difficult to identify or misplaced. | Most attributes are present, but minor error(s) exist such as an attribute being misplaced. | All attributes are present and placed in the correct entities. |
| ER Design - Relationships | Relationships are not drawn or are not drawn correctly between entities. | A few relationship lines are drawn, but many are missing, or drawn between incorrect entities. | Most relationship lines are drawn, but there are minor error(s) such as one missing line or one line drawn between the wrong entities. | All relationship lines are present and they connect the correct entities in an efficient manner given user requirements. |
| ER Design - Cardinality | Cardinalities are not present or are mostly incorrect. | A few cardinalities are correct, but many are invalid or missing. | Most cardinalities are correct, but minor error(s) exist such as one cardinality being one-to-many that should be one-to-one. | All cardinalities are present and correct. |
| Normalization | None performed | Relations meet the requirements of first normal form. | Relations meet the requirements of second normal form. | Functional dependencies identified. Normalized to 3NF. |
| Analysis of request | Doesn't read or hear question as shown by incorrect or missing list of items to be projected by query. | Knows what needs to be projected but conditions are not met. Little knowledge of database. | Translates request into basic query. | Questions were asked, requirements understood, and resulting query fulfilled users need. |
| SQL Syntax and Standards | SQL is poorly written and does not follow class syntax rules or standards. | SQL is somewhat correctly written, but has major flaws in class syntax rules and/or standards. | SQL mostly follows class syntax rules and standards with only minor error(s). | SQL follows class syntax rules and standards. |
| SQL Functionality | SQL does not execute and has serious errors. | SQL does not execute and has some major errors or executes but does not return requested data. | SQL executes with minor error(s) and returns mostly correct data. | SQL executes without error(s) and returns requested data. |
| SQL Efficiency | SQL is written with major efficiency problems. | SQL is written with a limited number of efficiency problems. | SQL is written with a few minor efficiency problems. | SQL is written in an efficient manner. |

| Assignment 2 | 1 points | 2 points | 3 points | 4 points | 5 points |
|--|--|--|---|---|---|
| Outcome: Use network concepts and terminology to communicate with vendors and users | Unable to use network concepts adequately to find relevant sources | Uses some concepts accurately but unable to find relevant news sources | Uses concepts and applies them accurately, but unable to find relevant news sources | Uses concepts, applies them accurately and finds limited value news sources. Limited ability to communicate results | Uses concepts, applies them to find relevant news sources and interprets the results accurately in a clear manner |
| | | | | | |
| | | | | | |
| Assignment 6 | 0 points | 3 points | 5 points | 7 points | 10 points |
| Outcome: Design, implement and deploy systems | Unable to follow system definition | Limited ability to understand what is happening in the system | Understands the first scenario of the system and can follow the data flow | Understands most system scenarios and follows data flow with few errors | Understands all system scenarios and follows the data flow with no errors |