2022 – 23 Departmental Executive Summary

Department: Math and Computer Science	**Date:** 6/13/2023
Members involved with analysis of artifacts: Marcus Gubanyi, Kent Einspahr, Brian Albright, Ed Reinke	

See #1 Undergraduate Program Assessment Plan: Student Outcomes for:
a) Student Outcome; b) Background; c) Question(s); d) Methodology

Analysis of artifacts:

1). **PERFORMANCE CRITERIA*** - *How was data analyzed? (attach rubrics/scoring tools if used).*
Instructors of MATH 475 and CS 391 collected student papers that report on their projects. The department reviewed and assessed the papers together, using the following rubric.

4-point scale:
4 = complete, understandable explanation
3 = explanation is missing minor points and/or is not fully clear
2 = explanation is missing major points and/or includes inaccurate explanation
1 = missing or mostly inaccurate explanation

We expected a successful assessment of >50% of our students scoring 4 and >80% of students scoring 3 or 4.

Summary of **RESULTS***:

1). Restate the assessment question(s) (from the Assessment plan):
A. Can students communicate complex technical content in understandable terms?
B. Can students incorporate data in communicating results of their work?
2). Summarize the assessment results. (A narrative summary is required. Charts, tables or graphs are encouraged but optional.)
We collected artifacts from all students enrolled in MATH 475 and CS 391. The scores are as follows:
CS 391 Scores: 2, 2, 3, 2, 1
MATH 475 Scores: 4, 4, 3, 3, 4

According to our success criteria, CS 391 failed to meet the marks with only 20% of students scoring a 3 and no students scoring a 4. However, MATH 475 scored well with 60% at 4 and the rest at 3.

The artifacts assessed for CS 391 were the final papers that overviewed a semester long project. The bulk of the course is the development of a technical solution (typically software) to solve a problem. The students are expected to spend the last two weeks of the semester writing the final paper reporting on the project results. All of the papers appeared to be written hastily and only loosely following the assignment specification. Since technical writing is an essential part of this course, it was discouraging to see such poor results.

MATH 475 was assessed with smaller projects. Students created excel documents that included data, calculations, and explanations in text-boxes. The students performed well based on our assessment. Note that these artifacts were small-scale writing assignments.

3). **INTERPRETATION*** - *Discuss how the results answer the assessment question(s).*
 The assessment results answered both questions similarly. For complex technical content and the incorporation of data, students are able to successfully write for smaller assignments when provided sufficient guidance. For large papers with less guidance, students struggled. We suspect the poor results are due to a combination of lack of understanding on how to write technically but more-so, a lack of student motivation.

We expect that the large papers in CS 391 would have scored better if students were provided more guidance and more clear expectations. Each of the CS 391 papers covered complex technical content at only a high-level, and thus, were missing major points in their explanations. Students were not required to submit drafts of their papers for intermediate feedback. Other courses in our programs (taken before CS 391) cover technical writing so we expected to see better results. We intend to explore adjustments to our courses that cover technical writing.

4). Observations made that were not directly related to the question(s).
Assignments in our courses (even writing assignments) oftentimes are not written with assessment of writing in mind. For instance, students grades and instructor feedback are usually based on other components of

assignments. In future assessments of students' ability to communicate effectively, we will need to adjust assignments to more clearly outline writing expectations, enabling us to more accurately assess their writing capabilities

Sharing of Results: *When were results shared? Date:* 5/17/2023
How were the results shared? (i.e. met as a department) Met as a department
Who were results shared with? (List names): All department members: Marcus, Kent, Brian, Ed

Discussion of Results –Summarize your conclusions including:
1. **ACTION***- *How will what the department learned from the assessment impact:*
   a. Teaching: More intentional feedback loops should be implemented - with students receiving feedback on their writing and making updates based on the feedback.
   b. *Assignment/course*: Assignments need to be more clear on expectations for writing. In particular, example papers should be provided.
   c. *Program:* The above changes for teaching and assignments should be made when appropriate in writing intensive courses in our programs.
   d. *Assessment:* NA
2. **IMPACT***- *What is the anticipated impact of the* **ACTION*** *on student achievement of the learning outcome in the next academic year?* After implementing the above actions, we anticipate students will be more successful in writing satisfactory papers that cover technical content in math and computer science.

While communication skills are essential to a well-rounded mathematician or computer science, they are not emphasized in all our courses. Problem-solving skills and knowledge of fundamental concepts in math and computer science are the focus of our programs. This assessment did identify deficiencies in our students' communication skills, but we do not intend to significantly change our programs. We will continue to focus most on problem-solving and core knowledge.
3. **BUDGET IMPLICATIONS** – *Indicate budget requirements necessary for the successful implementation of the* **ACTION*** NA

If action is taken – it is recommended that the same learning outcome and assessment plan be used for a second assessment cycle.

What assessment questions related to the learning outcome would the program like to investigate in the future? We intend to assess communication again but will assess different courses that intentionally cover writing. We will use similar questions to this assessment, slightly adjusted based on the assessed course content.

Submitted by: Marcus Gubanyi	**Reviewed by the Assessment Committee (date): 6/15/23**

Department Chair notified approved/additional action needed: Approved
BUDGET IMPLICATIONS – Assessment Committee Chair notified appropriate Dean: na