SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program Name (no acronyms): Health Data Science	Department: Health and Clinical Outcomes Research
Degree or Certificate Level: MS	College/School: School of Medicine
Date (Month/Year): 11/2023	Assessment Contact: Dr. Divya Subramaniam and Dr. Paula Buchanan

In what year was the data upon which this report is based collected? Fall 2022-Summer 2023

In what year was the program's assessment plan most recently reviewed/updated? Fall 2021-Summer 2022

Is this program accredited by an external program/disciplinary/specialized accrediting organization or subject to state/licensure requirements? NO

If yes, please share how this affects the program's assessment process (e.g., number of learning outcomes assessed, mandated exams or other assessment methods, schedule or timing of assessment, etc.):

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please provide the complete list of the program's learning outcome statements and **bold** the SLOs assessed in this cycle.)

Outcome 1: Identify and define an analytic/operational question.

Outcome 2: Apply appropriate statistical methods.

Outcome 3: Apply appropriate data management strategies.

Outcome 4: Critically evaluate methodological designs.

Outcome 5: Understand organization and financing of healthcare and resulting data sets.

Outcome 6: Effectively communicate results of analyses.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe the artifacts in detail, identify the course(s) in which they were collected, and if they are from program majors/graduates and/or other students. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

Outcome 1: Identify and define an analytic/operational question.

1. We will utilize the final paper from ORES 5300 Foundations of Outcomes Research 1. This paper requires the student to write a study proposal including methods on how they plan to operationalize their research question.

2. We will utilize the final brief report from HDS 5960 Capstone. The capstone project entails the amalgamation of the skills and knowledge gained from the program. The capstone is a project that students complete from start to finish with the guidance from the organization preceptor and faculty from the department. The report is a detailed report of the introduction, methods, results and discussion of their project.

Outcome 5: Understand organization and financing of healthcare and resulting data sets.

1. We will utilize the final report and education video from HDS 5130 Healthcare Organization, Management and

Policy. The students are required to pick a policy critique (organization structure, financing, etc.) to write a sustainable recommendation and support that with scholarly references and data.

2. We will utilize the final brief report from HDS 5960 Capstone. The capstone project entails the amalgamation of the skills and knowledge gained from the program. The capstone is a project that students complete from start to finish with the guidance from the organization preceptor and faculty from the department. The report is a detailed report of the introduction, methods, results and discussion of their project.

Outcome 6: Effectively communicate results of analyses.

1. We will utilize the final project HDS 5330 Predictive Modeling and Machine Learning. The final project for HDS 5330 was a group project where they had to analyze and report the results of a health research question. The students submitted a power point presentation of their project.

2. We will utilize the final brief report from HDS 5960 Capstone. The capstone project entails the amalgamation of the skills and knowledge gained from the program. The capstone is a project that students complete from start to finish with the guidance from the organization preceptor and faculty from the department. The report is a detailed report of the introduction, methods, results and discussion of their project.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (please do not just refer to the assessment plan).

The selected artifacts from a maximum of: 10% of the students (for classes over 50 students), 5 students (for classes under 50), or all the students in each course (if less than 5) will be assessed by 2 faculty members of the department. If there is a disagreement a 3rd faculty member will be brought in to assess the artifact. If a class had more than 5 students, the artifacts were randomly selected. If the artifact was a group project the group counted as 1 student to ensure we were assessing 5 different projects. We will use the attached rubric to assess the artifacts.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

Each outcome was assessed by one artifact from course where learning of the outcome was reinforced and the Capstone experience course where the student is expected to have mastery of the outcome. The coursework selected for each outcome just happened to be taught online from the STL campus. Since our class sizes were less than 50 for the courses included, each class contributed 5 randomly selected assignments or projects to be included as artifacts for evaluation. A score of 0 (Low mastery), 1 (average mastery), or 2 (high mastery) was assigned to

Overall, the students received close to a high mastery score on the objects assessed this year with an average score of 1.83 out of 2.

- Outcome 1 received an average score of 1.7 - Students received a 1.7 in the reinforced coursework, but only a 1.6 average score on the Capstone, where they were expected to have achieved the outcome.
- Outcome 5 received an average score of 2 (High mastery) in both the reinforced coursework and the Capstone, showing they achieved this outcome.
- Outcome 6 received an average score of 1.8 - In the introductory and reinforcement course the student received high mastery of the outcome. However, by the time they were expected to achieve the outcome in the capstone they only demonstrated above average mastery (1.6 average score).

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you? Address both a) learning gaps and possible curricular or pedagogical remedies, and b) strengths of curriculum and pedagogy.

Our assessment indicates our program does an excellent job at introducing and reinforcing the objectives of the program assessed. However, when students are asked to pull everything together in their Captone experience and project, they tended to not be as detailed orientated which in turn loss them points in mastery. They still show an above average mastery of the material but know they can do better based on the scores of the introductory and reinforcement coursework.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss the results and findings from this cycle of assessment?

During our fall faculty meeting, we discussed the changes to be made to the curriculum. In our ongoing efforts to enhance the Capstone experience in our program, we will implement several key strategies. First, we'll refine and clearly communicate expectations through comprehensive rubrics, ensuring students understand the criteria for success. To address the need for attention to detail, we'll introduce focused workshops and practical exercises. Regular check-ins and a peer review process will be established to provide structured feedback, fostering collaboration and multiple perspectives. Mentorship opportunities will be introduced, allowing students to seek guidance on improving detailed-oriented aspects of their projects. We'll also create a culture of revision and iteration, encouraging students to refine their work continuously. Exemplary projects from previous years will be showcased, providing tangible examples of the expected level of detail. Through these initiatives, we aim to cultivate a more robust and detail-oriented Capstone experience, aligning with the excellence demonstrated in introductory coursework.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies	• Course content • Teaching techniques • Improvements in technology • Prerequisites	• Course sequence • New courses • Deletion of courses • Changes in frequency or scheduling of course offerings
Changes to the Assessment Plan	• Student learning outcomes • Artifacts of student learning • Evaluation process	• Evaluation tools (e.g., rubrics) • Data collection methods • Frequency of data collection

Please describe the actions you are taking as a result of these findings.

In our commitment to continuous improvement, we are undertaking a comprehensive refinement of the courses and sequence in the MS Health Data Science program. Our objective is to create a more cohesive and progressive learning journey for students. We plan to introduce a structured curriculum review process, incorporating feedback from students, industry professionals, and faculty expertise. This process will inform the optimization of course content, ensuring it remains aligned with the latest advancements in health data science. Additionally, we will enhance the sequencing of courses to build a logical progression of skills, facilitating a smoother transition from foundational to advanced concepts. Emphasis will be placed on integrating practical applications, case studies, and real-world projects to provide students with hands-on experience and a deeper understanding of the subject matter. By implementing these refinements, we aim to elevate the overall educational experience in our MS Health Data Science program, preparing students for success in this rapidly evolving field.

If no changes are being made, please explain why.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years **as a result of previous assessment data**?

Building on the valuable insights gained from our previous assessment feedback, we have conducted a thorough review of our data reporting methodologies and results presentation. This scrutiny has prompted us to initiate substantial changes in both our program structure and curriculum sequencing. Recognizing the importance of continuous improvement, we are dedicated to refining the way we convey data and outcomes. This involves not only enhancing the clarity and transparency of our reporting but also making strategic adjustments to the program framework. The upcoming modifications in curriculum sequencing aim to provide a more seamless and logically progressive learning experience for our students. We are committed to incorporating best practices, leveraging innovative teaching methodologies, and ensuring that our program remains at the forefront of educational excellence. Through these endeavors, we aspire to fortify the overall quality and effectiveness of our educational offerings.

B. How has the change/have these changes identified in 7A been assessed?

N/A

C. What were the findings of the assessment?

N/A

D. How do you plan to (continue to) use this information moving forward?

N/A

IMPORTANT: Please submit any assessment tools (e.g., artifact prompts, rubrics) with this report as separate attachments or copied and pasted/appended into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document. Thank you.

MS in Health Data Science Program Assessment Rubric

#	MS in Health Data Science Program Learning Outcomes	High Mastery (2)	Average Mastery (1)	Low Mastery (0)
1	Identify and define an analytic/operational question.	• Clearly identifies high value question • Question identifies a gap in the current literature/knowledge base • Background and contextual information flow seamlessly into a well stated analytic/operational question that has potential to add to the professional knowledge base • Identifies dataset that can answer the question	• Identifies question correctly but more could have been done with background information and dataset.	• Question lacks clarity and is not answerable • Dataset does not answer the question
2	Apply appropriate statistical methods.	• Utilize appropriate statistical methods to analyze data in the chosen content area • Clearly describes the types of variables used • Clearly describes the outcomes of the data analysis • Display the data analysis visually using a graph, table, etc.	• Most statistical methods were correctly applied but more could have been done with the data.	• Some statistical methods were applied but with significant errors or omissions.

		• Factors that may have contributed to the data obtained • Implications of the data analyzed		
3	Apply appropriate data management strategies.	• Utilizes appropriate data management strategies to analyze data in the chosen content area • Clearly describes steps utilized to extract data • Clearly describes steps utilized to clean data	• Most data management strategies to analyze data in the chosen content area were correctly applied but more could have been done with the data.	• Does no utilize appropriate data management strategies to analyze data in the chosen content area • Does not describe steps utilized to extract data • Does not describe steps utilized to clean data
4	Critically evaluate methodological designs.	• Original, clear, creative, and innovative • Provides thorough and comprehensive description • Flows from question and theory • Uses state-of-the-art tools, techniques, or approaches • Applies or develops new methods, approaches, techniques tools, devices, or instruments • Uses multiple methods • Analysis is sophisticated, robust, and precise • Uses advanced, powerful, cutting-edge techniques	• Appropriate for the problem • Uses existing methods, techniques, or approaches in correct and creative ways • Discusses why method was chosen • Analysis is objective, thorough, appropriate, and correct • Uses standard methods	• Lacks a method • Uses wrong (statistical) method for the problem • Uses (statistical) method incorrectly • Methods do not relate to question or theory • Is fatally flawed or has major confound • Does not describe or describes poorly (insufficient detail) • Is minimally documented Shows basic competence • Analysis is wrong, inappropriate, or incompetent

5	Understand the organization and financing of healthcare, and resulting datasets	• Utilizes datasets correctly • Utilizes codes appropriately • Provides necessary historical and background information on your issue • Includes data that are most important for your audience • Presents different sides of controversial issues, if any • States current state of law or policy • Includes data or information that is necessary to the reader's understanding • Presents necessary data in best format (text, bar graph, line graphs, etc.) • States the policy recommendation that you support • Provides information in favor of the policy option you support • Anticipates and rebuts arguments against likely to be raised against your recommended policy option	• Utilizes datasets minimally • Utilizes codes minimally • Provides minimal background information • Presents one side of the argument • Provides minimum information of policy option	• Does not utilize appropriate dataset • Does not utilize correct codes • Does not provides background information • Does not provide information of policy option
6	Effectively communicate results of analysis.	• Results are aligned with question and theory • Sees complex patterns in the data • Iteratively explores questions raised by analyses	• Links results to question and theory • Substantiates the results • Provides plausible arguments and explanations	• Results are correct but not robust • Includes extraneous information and material • Has difficulty making sense of data

		• Results are usable, meaningful, and unambiguous • Presents data clearly and cleverly • Makes proper inferences • Provides plausible interpretations • Refutes or disproves prior theories or finding		• Interpretation is too simplistic • Data are wrong, insufficient, fudged, fabricated, or falsified • Data or evidence do not support the theory or argument • Interpretation is too simplistic, and not objective, cogent, or inferences • Overstates the results