

Problem Solving through Inquiry and Data Analysis

This cover sheet should accompany a single submitted assignment and resulting student work from all students in one course to be assessed with the attached Problem Solving Through Inquiry and Data Analysis rubric. The attached rubric and the data generated from student work are solely for program assessment purposes and are not intended for grading students, evaluating courses, or evaluating faculty.

Problem Solving Objective

Students will think critically and synthesize ideas within and across disciplines. They will fuse experience, training and research into considered judgment, then working individually or with others, form problem-solving strategies and evaluate their effectiveness. Among these strategies, students will analyze and interpret data as a means to evaluate arguments and make informed choices.

Using the Rubric

This rubric is designed for use in a variety of disciplines that engage in quantitative analysis of data to address problems. The rubric language assumes that the inquiry and analysis process carried out by the student is appropriate for the discipline required. For example, if analysis using statistical methods is appropriate for the discipline then a student would be expected to use an appropriate statistical methodology for that analysis. In addition, this rubric addresses the **products** of analysis and inquiry, not the **processes** themselves. The more the student constructs, the more complex the inquiry process.

The rubric focuses on eight criteria: Research Question, Integration of Information from Outside Sources, Using Appropriate Methodology to Collect Data, Creating Figures, Tables or Statistics, Explaining Patterns or Trends, Drawing Appropriate Conclusions, Identifying Pros and Cons of Arguments, and Applying Knowledge, Methods and/or Results to New Situations. In the spaces below, please provide your name or department name, the name of the assignment (attach a copy as well) and other information, including your own evaluation of which of the criteria are specifically taught in the course, addressed in the assignment prompt and which can be effectively assessed from the student work. The purpose of this information is to avoid incorrectly scoring student work as deficient when an element of the rubric is lacking because the students were not aware they needed to address that criterion. In some cases they should be aware because the criterion was taught as part of course instruction and in other cases because the assignment prompt mentions the criteria. Please indicate yes or no for each of these boxes and then make a final yes/no judgment on whether scorers should assess this criterion.

Faculty member or department name _____

Course Number _____ Course Name _____

Assignment name _____ Number of students in course _____

Date _____ % of grade covered by assignment < 3% 3-5% 6-10% 11-20% > 20%

Problem Solving Criteria: See rubric on back for details	This criterion is . . .		
	Taught as part of course instruction	Addressed in the assignment prompt	Appropriate to be assessed
Research Question			
Integration of Information from outside sources			
Using Appropriate Methodology to collect data			
Creating Figures, Tables and/or Statistics			
Data Description			
Judgments/Conclusions			
Identifying Pros and Cons of Arguments			
Applying Knowledge, Methods, and/or Results			

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	Proficient 3	Sufficient 2	Deficient 1	No Attempt 0
Research question	Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.	Identifies a focused and manageable/doable topic that appropriately addresses relevant aspects of the topic.	Identifies a topic that is far too general and wide-ranging as to be manageable and doable.	No attempt to identify a topic
Integrates information from outside sources	Synthesizes in-depth information from relevant sources representing various points of view/approaches.	Presents information from relevant sources representing limited points of view/approaches.	Presents information from irrelevant sources representing limited points of view/approaches.	No resources provided when they were clearly expected in the assignment
Uses appropriate methodology to collect the data	All elements of the methodology or theoretical framework are skillfully developed and described. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant subdisciplines.	Critical elements of the methodology or theoretical framework are appropriately developed and described, however, more subtle elements are ignored or unaccounted for.	Description of inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.	No methods described
Creates figures, tables and/or statistics to summarize data.	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.	No attempt
Data description: Explains patterns from observations or data presented as graphs, tables, equations, etc.	Provides thorough and accurate descriptions of patterns or trends in data. Skillfully uses numerical information in those descriptions. For example, differences in means are quantified, with units. Or the slope of a line is used to describe a pattern in a graph.	Provides simple and mostly accurate descriptions of patterns or trends in data.. A simple description would be qualitative but not quantitative. Or there are occasional, minor errors in computations, units, etc.	Draws fundamentally incorrect conclusions about what the data mean.	No attempt
Judgments/ Conclusions: Draws appropriate conclusions based on the quantitative analysis of data	Uses the quantitative analysis of data as the basis for thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work. No attempts to qualify the conclusions, OR minor errors exist in the conclusions.	Conclusions are not appropriate or are clearly incorrect for the data.	May restate a pattern in data/observations, but no attempt is made to draw any conclusions or judgments from the patterns.
Identifies pros and cons of argument(s), including biases and/or limitations.	Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.	Attempts, but fails to accurately describe assumptions as sources of bias or limitations.	No attempt
Applies content knowledge, methods and/or results to new situations.	Successfully applies content knowledge by insightfully discussing implications of content knowledge, methods and/or results.	Presents basic, relevant implications of content knowledge, methods and/or results.	Any implications are irrelevant and/or unsupported.	No attempt to discuss the implications of this study.