Handout #4a

Dr. Ahmad Alhammouri

Jacksonville State University

Key Assessment #2: Content Knowledge

Alternative Class A Mathematics

Key Assessment Cover Sheet

College or University: Jacksonville State University

Key Assessment 2 and Name: Capstone Content

Project

Submitted For:

Class Alt. A Mathematics

EPPs and programs should consult the Rubric for Key Assessments, Scoring Guides, and Data Reports in preparing the submission.

1. Provide a brief explanation of the assessment. *Information may address when it is administered during the course of the program; how it is scored; how reported scores are calculated; by whom it is scored, how the instrument and scoring guide were developed; and recent revisions. Any other pertinent information that would help reviewers understand the assessment should be provided, such as a rationale for a unique or unusual assessment. For Praxis or edTPA, only an explanation of when it is required is needed.*

The purpose of this graduate capstone project is for graduate teacher candidates majoring in Master of Mathematics Education (i.e., Alt. A Math) to create a specific academic content knowledge seminar to showcase their content knowledge. This Graduate capstone project is part of the ESE 520 Teaching Mathematics course (i.e., during their senior practicum) and each graduate student must pass this capstone project to be eligible for graduation. Mathematics graduate teacher candidates will have the opportunity to engage in a full-fledged and open-ended mathematical modeling process, then plan, create, and present, in a seminar format, their presentation. Each student will be given between 30-45 minutes to present their presentation. The expected audience for this seminar presentation will include other graduate students, departmental faculty, content related faculty, and university stakeholders. During their presentation students will evaluated using Quantitative Reasoning Core Competency. The rubric is attached. The rubric was developed by Gregory D. Foley (Morton Professor of Mathematics Education at Ohio University) who is the lead author of the Advanced Quantitative Reasoning textbook. The rubric focusses on the practices and the skills of quantitative reasoning which can involve high cognitive demand of a mathematical based on the activity provided to candidates (activity is attached). Because this capstone project is focused directly on content knowledge, pedagogy and instructional methods should not be included in this seminar. To pass the project, mathematics education candidates should obtain 3 or higher in the quantitative reasoning rubric in every category. The candidates will be evaluated by the Secondary Mathematics Education and content faculty who will attend the seminar.

2. Insert data table(s) here or attach document. *At least three years of data must be provided or an explanation must be provided.* **We do not have data to provide because we will start enacting this project for the first-time next year. Below is the table that we will use to collect the data. Each cell will include the percentages of candidates who score in each category within the four levels.**

4: Exceptional, 3: Proficient, 2: Developing, 1: Unacceptable

Capstone Project

2020-2021

n=

CATEGORIES/ELEMENTS	4 Exceptional	3 Proficient	2 Developing	1 Unacceptable
Quantitative Reasoning Core Competency				
Interpretation *Ability to glean and explain mathematical information presented in various forms (e.g., equations, graphs, diagrams, tables, words) (CIEP: 1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Representation *Ability to convert information from one form (e.g., equations, graphs, diagrams, tables, words) into another (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Analysis *Ability to perform arithmetical and mathematical calculations (1.1.1, 1.1.3)*				
Assumptions *Ability to make and draw conclusions based on quantitative analysis*				
Explanation *Ability to make and evaluate important assumptions in estimation, modeling, and data analysis*				
Interpretation *Ability to explain thoughts and processes in terms of what evidence is used, how it is organized, presented, and contextualized (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				

2021-2022
n=

CATEGORIES/ELEMENTS	4 Exceptional	3 Proficient	2 Developing	1 Unacceptable
Quantitative Reasoning Core Competency				
Interpretation *Ability to glean and explain mathematical information presented in various forms (e.g., equations, graphs, diagrams, tables, words) (CIEP: 1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Representation *Ability to convert information from one form (e.g., equations, graphs, diagrams, tables, words) into another (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Analysis *Ability to perform arithmetical and mathematical calculations (1.1.1, 1.1.3)*				
Assumptions *Ability to make and draw conclusions based on quantitative analysis*				
Explanation *Ability to make and evaluate important assumptions in estimation, modeling, and data analysis*				
Interpretation *Ability to explain thoughts and processes in terms of what evidence is used, how it is organized, presented, and contextualized (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				

2022-2023
n=

CATEGORIES/ELEMENTS	4 Exceptional	3 Proficient	2 Developing	1 Unacceptable
Quantitative Reasoning Core Competency				
Interpretation *Ability to glean and explain mathematical information presented in various forms (e.g., equations, graphs, diagrams, tables, words) (CIEP: 1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Representation *Ability to convert information from one form (e.g., equations, graphs, diagrams, tables, words) into another (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				
Analysis *Ability to perform arithmetical and mathematical calculations (1.1.1, 1.1.3)*				
Assumptions *Ability to make and draw conclusions based on quantitative analysis*				
Explanation *Ability to make and evaluate important assumptions in estimation, modeling, and data analysis*				
Interpretation *Ability to explain thoughts and processes in terms of what evidence is used, how it is organized, presented, and contextualized (1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9)*				

3. Data Analysis

Describe how data were analyzed and how data from this assessment provide evidence standards are met and indicators are addressed. Reference specific standards and indicators. The analysis should note trends, relative strengths and weaknesses, effect of continuous improvement efforts, relationships to other variables (ex., placements or demographics) as appropriate. Other factors may also be discussed.

How will data be analyzed? Data for the Quantitative Reasoning Core Competency rubric will be analyzed for each reporting period. The percentage of math education candidates scoring in Levels A, B, C, & (D or F) will be calculated per rubric section, included in the above table, and then compare to the percentages of candidate scores in the other periods to define a pattern. **What trends are evident relative to strengths and challenges?** The Quantitative Reasoning Core Competency rubric focuses on quantitative reasoning practices and skills that engages in high cognitive demand of mathematical content. The question is that what does define such a content? It is the mathematical activity provided (i.e., Finding Heights of Inaccessible Buildings, please see the activity's instructions). In this activity, the teacher candidates need to create and use various mathematical representations from various mathematical topics. The subjects that we expect the candidates to address are trigonometry, ratios and proportions, and triangles similarity. Based on these topics and the practices align with them, we believe that the indicators to be addressed by this project are: 1.1.3, 1.2.1, 1.2.3, 1.2.4, 1.3.1, 1.3.2, 1.3.3, 1.3.5, 1.3.6, 1.3.7, 1.3.8, and 1.3.9. The table above shows how the rubric categories address the CIEP standards. **What continuous improvement efforts have been put in place?** We do not have collected data to be discussed and address continuous improvement, but we hope that this capstone project will provide us with an idea about how our candidates can be engaged in open-ended, real-world, and high cognitive demand of tasks. The project addresses key CIEP content indicators. In general, to be competitive and what we have done based on other key assessments findings (i.e., data triangulations), our candidates must have extensive content area knowledge and skills. To continue to support our candidates and ensure that our candidates possess strong mathematical knowledge needed to teach at the high school level. We implement a series of support seminars to assist candidates with content categories such as the MeetUp group. In reviewing teaching field coursework, we have evaluated and aligned specific courses to meet candidates' needs for future success. For example, several meetings have been conducted between the faculties from the Department of Mathematics and the Department of Secondary Education to discuss what kind of adjustments that we can consider helping our candidates. Some changes have been made concerning the courses prerequisites and content.

Key Assessment Cover Sheet

4. Use of Data for Continuous Improvement

Describe how data from this assessment inform program evaluation and possible areas for improvement, if any.

More improvements will be made as move forward with gathering data. Such improvements may include offering seminars, adjusting and revising current courses, and designing and offering new courses. Our School of Education is implementing a series of support seminars to assist candidates with content categories. For example, the Department of Secondary Education formed what is called MeetUp group seminars. The students are invited to meet once a week for 90 minutes in which they can seek support from each other and from the math education instructors. In reviewing teaching field coursework, we have evaluated and aligned specific courses to meet candidates' needs for future success. Also, we started to offer a quantitative reasoning course that engages our candidates in the quantitative reasoning skills and practices to construct a variety of mathematical content topics which advances our candidates mathematical knowledge.

Attachments:

Assessment instrument (not applicable for standardized tests)
Scoring guide or rubric for the assessment (not applicable for standardized tests)
Data tables(s) (if not inserted above)

DEPARTMENT OF SECONDARY EDUCATION GRADUATE CAPSTONE PROJECT/ MATH

The purpose of this graduate capstone project is for graduate teacher candidates majoring in Master of Mathematics Education to create a specific academic content knowledge seminar to showcase their content knowledge. Mathematics graduate teacher candidates will have the opportunity to engage in a full-fledged and open-ended mathematical modeling process, then plan, create, and present, in a seminar format, their presentation. Each student will be given between 30-45 minutes to present their presentation. During their presentation students will evaluated using Quantitative Reasoning Core Competency. The rubric is attached. Because this capstone project is focused directly on content knowledge, pedagogy and instructional methods should not be included in this seminar. Through this project, students will be able to advance their mathematical knowledge through intense academic research and exploration.

Graduate teacher candidates will be given a schedule in advance during their senior practicum regarding the location and time of their seminar presentation. The expected audience for this seminar presentation will include other graduate students, departmental faculty, content related faculty, and university stakeholders. This Graduate capstone project is part of the ED 595 Reflective Practices course and each graduate student must pass this capstone project to be eligible for graduation. To pass the project, mathematics education candidates should obtain B or higher.

Project

Without the help of mathematics, it can be extremely difficult to measure the heights of large structures such as towers, multiple story buildings, or monuments. Using mathematics, specifically trigonometry, can make finding these heights fairly simple. Trigonometry can be one of the approaches to be used, but what if you are asked to use two more other approaches in addition to trigonometry?

For this project, define a building or a structure near you that could be considered as inaccessible height. Then, find the height of this structure using three different strategies including trigonometry. Please do not use simple methods such as counting bricks or stairs. In your method, you must enact the mathematical modeling process. This process must align with the modeling process that you learned about during the mathematics teaching methods course (i.e., ESE 520). Technology and tools must be involved in the modeling process, and you should provide evidence in doing so during your presentation. You may use some online software programs such as GeoGebra and Desmos. Finally, you need to plan, create, and present, in a seminar format between 30-45 minutes presentation discussing your strategies and answers for the activity. During the presentation you will evaluated using Quantitative Reasoning Core Competency.