

NCTM Assessment #5: Impact on Student Learning

a. A brief description of the assessment and its use in the program

Education Portfolio Part 2: Assessment Cycle

In the Saint Mary's College teacher preparation program, the Education Portfolio is used to give substance to the teacher candidate's understanding of the scholarship of teaching. The Education Portfolio is one tool that teacher candidates can utilize to demonstrate acquisition of knowledge and appropriate application. Assessment of the portfolio is conducted during the last month of student teaching.

There are several required and optional artifacts in the Portfolio. The artifact chosen to demonstrate teacher candidate's impact on student learning is the assessment cycle artifact found in Part 2 of the Education Portfolio. The inclusion of an assessment cycle was a response to teacher candidates receiving, on average, the lowest ratings in the area of assessment on field evaluations. The department believed that we needed to emphasize the importance of using formative and summative assessments to inform their instruction and determine instructional impact on student learning. To this goal, the requirements for the assessment cycle were created and are now included as part of the overall Education Portfolio.

All teacher candidates are expected to be proficient on all standards by the point in time the Education Portfolio is to be assessed. The rubric used to assess the Education Portfolio Part 2: Assessment Cycle is directly linked to the NCTM standards and elements 3f, 3g, 5a, 5b, and 5c as well as our department learning outcome associated with assessment. (See attached SMC NCTM Assessment 5 Assessment Cycle Rubric).

At the beginning of the student teaching semester, a student teaching seminar is held at which college supervisors, education department faculty, and teacher candidates are made aware of the expectations of the assessment cycle. The seminar participants are given the directions and expectations of the assessment cycle and have an opportunity to ask questions or clarify expectations after reviewing the rubric. The assessment rubric is based on a four point scale (1=Beginning, 2=Developing, 3=Proficient, 4=Outstanding) with proficiency (3) being expected.

b. A description of how this assessment specifically aligns with the standards

This assessment focuses primarily on NCTM standard 5: Impact on Student Learning, however aspects of NCTM standard 3 are integrated since teacher candidates are planning for effective instruction. The assessment cycle requires teacher candidates to verify student learning and dispositions prior to and after the delivery of instruction (5a and 5c) by using both formative and summative assessments to inform instruction and gauge student advancement in mathematical understanding and ability (3f and 3g). Teacher candidates are expected to use the data from the assessments to design

developmentally appropriate math activities and investigations that require active engagement (5b).

To be proficient on this assessment, teacher candidates must be competent in the ability to use fundamental assessment concepts when choosing, designing, and employing both formative and summative assessments. A proficient teacher candidate uses this assessment information to inform future lesson plans.

c. A brief analysis of the data findings.

In 2013 and 2014, 100% of the teacher candidates obtained scores at the proficient or above on **NCTM standard 3**. Areas of strength pertaining to standard 3 can be seen in the *NCTM standard 3 elements 3f.1 and 3f.2* (2013 Mean: 3.43, 2014 Mean: 3.50). This suggests that our teacher candidates are able to plan, select, and implement formative and summative assessments as well as interpret and use results of formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. In 2013 and 2014, 100% of the teacher candidates obtained scores at the proficient or above level on **NCTM standard 5**. This assessment covered *NCTM standard elements 5a, 5b, and 5c*. The scores for NCTM standard 5 elements ranged from 3.29 (*standard elements 5a.1 and 5a.2*) to 3.71 (*standard element 5a.5*) in 2013 and 3.00 (*standard element 5a.1*) to 4.00 (*standard elements 5a.4, 5a.5, and 5b.1*). This suggests our program demonstrates a strength in preparing our teacher candidates to apply the mathematics they learn in a variety of contexts within major mathematical domains (NCTM standard element 5a.5). An area for us to monitor is in preparing our teacher candidates to verify that secondary students demonstrate conceptual understanding and procedural fluency (NCTM standard element 5a.1).

d. An interpretation of how that data provides evidence for meeting standards, indicating the specific SPA standards by number, title, and/or standard wording.

This assessment is hyper focused on assessment. The language of NCTM standards is directly linked to the criteria in the rubric. The language of the criteria is specific and descriptive which makes the expectations very clear for the teacher candidate and the college supervisor. To that end, teacher candidates were required to use the assessment information they gathered to create a lesson plan. Since all of our teacher candidates were rated proficient or higher, we believe they have met NCTM standards 3 and 5 as measured by this assessment relative to assessment and applying knowledge of students to implement instruction that promotes learning for all students. (*NCTM standard elements met at proficiency level: 3f.1, 3f.2, 3g.1, 3g.2, 5a.1, 5a.2, 5a.3, 5a.4, 5a.5, 5b.1, 5b.2, 5c.1, and 5c.2*).

e. The assessment tool itself or a rich description of the assessment (often the directions given to candidates):

Part 2 - Actual Teaching and Evaluating Student Learning

Artifact #3) This artifact includes the documentation of an assessment cycle, lesson plans, and a narrative summary. The assessment cycle consists of collaborating with other professionals to create a pre-test, deliver a lesson, and use a post-test to measure your ability to plan lessons and deliver instruction that has an impact on student learning. Based on the results of the pre-test, a goal or goals should be established for the class as a whole. The lesson plan's objective(s) should be built from these goals. In addition to the class goals, individual goals for three students of varying abilities are to be developed.

The lesson plan(s) should be based on the assessment results and should reflect a variety of instructional strategies and demonstrate standards-based teaching. Methodologies for diverse learners are to be highlighted in the "Accommodations/Modifications" section of the lesson plan(s).

Lesson plan(s) must include a minimum of three formative assessments that vary by range and type and should be administered to all students. Assessments should be designed to measure various applications of depth of content knowledge. At the secondary level, students should be involved in the assessment process (e.g., determining goals, documenting his/her progress, etc.).

The narrative summary should contain:

- Your collaborative effort in developing the assessments
- Any considerations for technology in assessments or lesson planning
- The goals and objectives written for the class and lesson plan
- The goals for the three identified students with varying ability
- An indication of whether the goals were met and how results were shared with students and relevant stakeholders (e.g., parent, teachers, specialists, etc.)
- A description of the formative assessments used to determine effectiveness of instruction as well as the adjustments to instruction or strategies made based on the results of the formative assessments (as evidenced in lesson plan(s))
- For secondary teacher candidates, a description of how students were involved in the assessment process
- A written analysis of how your teaching impacted student learning and what teaching actions might be tried next with the class, or for the three individual students?

Part 2 - Actual Teaching and Evaluating Student Learning (Cont.)

Checklist of evidence requirements for Part 2

- Collaboratively created pre- and post-test
- Lesson plans employed during the assessment cycle
- Data chart for class and the three individual students showing pre-test and post-test results
- Description of goals for class and three students of varying abilities
- Narrative summary (2 to 3 pages)

SAINT MARY'S COLLEGE
Teacher Education Program
Education Portfolio: Part 2 NCTM SPA Standards for Assessment

Candidate Name		Reviewer	
Date			

Please indicate the "score" (Beginning = 1, Developing = 2, Proficient = 3, or Outstanding = 4) which best describes teacher candidate's overall performance in each row. Each Element row score must be at the Proficient level (3) or higher to receive a Proficient (3) score at the NCTM Standard Level. Proficiency is expected.

Element	LEVEL				SCORE
	BEGINNING (1)	DEVELOPING (2)	PROFICIENT (3)	OUTSTANDING (4)	
NCTM 3f.1 SMC #4 Assessment	Is not competent in his/her ability to: plan, select, and implement formative or summative assessments.	Is competent in his/her ability to: plan, select, and implement summative or formative assessments but not both.	Is competent in his/her ability to: plan, select, and implement formative and summative assessments.	Is competent in his/her ability to: plan, select, and implement formative and summative assessments to inform instruction. Teacher candidate uses results for subsequent instructional planning.	
NCTM 3f.2 SMC #4 Assessment	Is not competent in his/her ability to: interpret and use formative assessments or summative assessments.	Is competent in his/her ability to: interpret and use formative assessments or summative assessments, but not both.	Is competent in his/her ability to: interpret, and use results of formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.	Is competent in his/her ability to: interpret, and use results of formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. Teacher candidate uses assessment results for subsequent instructional planning.	
NCTM 3g.1 SMC #4 Assessment	Is not competent in his/her ability to: use both formative and summative assessment data in making instructional decisions.	Is competent in his/her ability to: use either formative or summative assessment data in making instructional decisions.	Is competent in his/her ability to: use both formative and summative assessment data in making instructional decisions.	Is competent in his/her ability to: use both formative and summative assessment data in making instructional decisions. Assessment processes distinguish developmental levels of students' mathematical knowledge and skills.	
NCTM 3g.2 SMC #4 Assessment	Is not competent in his/her ability to: monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals.	Is competent in his/her ability to: monitor students' progress using a limited number of assessment tools that gauge advancement toward stated learning goals.	Is competent in his/her ability to: monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals.	Is competent in his/her ability to: monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals. Teacher candidate designs assessment processes that distinguish among developmental levels of students' mathematical knowledge and skills.	
NCTM 3g.3 SMC #4 Assessment	Is not competent in his/her ability to: use either formative or summative assessments to measure students' mathematical understanding and ability.	Is competent in his/her ability to: use either formative or summative assessments, but not both to measure students' mathematical understanding and ability but not both.	Is competent in his/her ability to: use both formative and summative assessments to measure students' mathematical understanding and ability.	Is competent in his/her ability to: use both formative and summative assessments to measure students' mathematical understanding and ability. Teacher candidate designs assessment processes that distinguish among developmental levels of students' mathematical knowledge and skills.	
Overall NCTM Standard 3: Effective teacher candidates of secondary mathematics apply knowledge of curriculum standards for mathematics and their relationship to student learning within and across mathematical domains. They plan, select, implement, and use formative and summative assessments for monitoring student learning, measuring student mathematical understanding, and informing practice.					

Education Portfolio: Part 2 NCTM SPA Standards for Assessment

Element	LEVEL				SCORE
	BEGINNING (1)	DEVELOPING (2)	PROFICIENT (3)	OUTSTANDING (4)	
NCTM 5a.1 SMC #4 Assessment	Is not competent in his/her ability to: verify that secondary students demonstrate conceptual understanding or procedural fluency.	Is competent in his/her ability to: verify that secondary students demonstrate conceptual understanding or procedural fluency, but not both.	Is competent in his/her ability to: verify that secondary students demonstrate conceptual understanding and procedural fluency.	Is competent in his/her ability to: verify that secondary students demonstrate conceptual understanding and procedural fluency. Teacher candidate demonstrates sustained and meaningful use of data to inform practice.	
NCTM 5a.2 SMC #4 Assessment	Is not competent in his/her ability to: verify that secondary students demonstrate the ability to solve problems.	Is competent in his/her ability to: verify that secondary students demonstrate the ability to solve problems.	Is competent in his/her ability to: verify that secondary students demonstrate the ability to formulate, represent, and solve problems.	Is competent in his/her ability to: verify that secondary students demonstrate the ability to formulate, represent, and solve problems. Teacher candidate demonstrates sustained and meaningful use of data to inform practice.	
NCTM 5a.3 SMC #4 Assessment	Is not competent in his/her ability to: verify that secondary students reason logically and reflect on their reasoning.	Is competent in his/her ability to: verify that secondary students reason logically, but do not require students to reflect on their reasoning.	Is competent in his/her ability to: verify that secondary students reason logically and reflect on their reasoning.	Is competent in his/her ability to: verify that secondary students reason logically and reflect on their reasoning. Teacher candidate demonstrates sustained and meaningful use of data to inform practice.	
NCTM 5a.4 SMC #4 Assessment	Is not competent in his/her ability to: verify that secondary students demonstrate a productive disposition toward mathematics.	Is competent in his/her ability to: encourage secondary students to demonstrate a productive disposition toward mathematics.	Is competent in his/her ability to: verify that secondary students demonstrate a productive disposition toward mathematics.	Is competent in his/her ability to: verify that secondary students demonstrate a productive disposition toward mathematics. Teacher candidate demonstrates sustained and meaningful use of data to inform practice.	
NCTM 5a.5 SMC #4 Assessment	Is not competent in his/her ability to: verify that secondary students apply the mathematics they learn in a variety of contexts within major mathematical domains.	Is competent in his/her ability to: verify that secondary students apply the mathematics they learn in another context within major mathematical domains.	Is competent in his/her ability to: verify that secondary students apply the mathematics they learn in a variety of contexts within major mathematical domains.	Is competent in his/her ability to: verify that secondary students apply the mathematics they learn in a variety of contexts within major mathematical domains. Teacher candidate demonstrates sustained and meaningful use of data to inform practice.	
<p>Overall NCTM Standard 5: Effective teacher candidates of secondary mathematics provide evidence demonstrating that as a result of their instruction, secondary students' conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and application of major mathematical concepts in varied contexts have increased. Teacher candidates support the continual development of a productive disposition toward mathematics. They show that new student mathematical knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology in building new knowledge. (Each Element row score must be at the Proficient level (3) or higher to score this NCTM Standard at the Proficient (3) level)</p>					Score on next page

Education Portfolio: Part 2 NCTM SPA Standards for Assessment

Element	LEVEL				SCORE
	BEGINNING (1)	DEVELOPING (2)	PROFICIENT (3)	OUTSTANDING (4)	
NCTM 5b.1 SMC #4 Assessment	Is not competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that require active engagement in building new knowledge.	Is competent in his/her ability to: engage students in math activities and investigations that require active engagement in building new knowledge. Some activities may not be developmentally appropriate.	Is competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that require active engagement in building new knowledge.	Is competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that require active engagement in building new knowledge. Teacher candidate facilitates students' ability to develop future inquiries based on current analysis.	
NCTM 5b.2 SMC #4 Assessment	Is not competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that include math-specific technology in building new knowledge.	Is competent in his/her ability to: engage students in math activities and investigations that include math-specific technology in building new knowledge. Some activities may not be developmentally appropriate.	Is competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that include math-specific technology in building new knowledge.	Is competent in his/her ability to: engage students in developmentally appropriate math activities and investigations that include math-specific technology in building new knowledge. Teacher candidate facilitates students' ability to develop future inquiries based on current analysis.	
NCTM 5c.1 SMC #4 Assessment	Is not competent in his/her ability to: collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.	Is competent in his/her ability to: collect and organize diagnostic, formative, and summative assessment data but does not analyze and/or reflect on data.	Is competent in his/her ability to: collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data.	Is competent in his/her ability to: collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data. Teacher candidate uses assessment results as a basis for designing and modifying their instruction as a means to meet group and individual needs and increase student performance.	
NCTM 5c.2 SMC #4 Assessment	Is not competent in his/her ability to: determine the extent to which students' math proficiencies have increased as a result of their instruction.	Is competent in his/her ability to: determine the extent to which students' math proficiencies have increased but cannot link the increase to their instruction.	Is competent in his/her ability to: determine the extent to which students' math proficiencies have increased as a result of their instruction and the extent to which they made progress.	Is competent in his/her ability to: determine the extent to which students' math proficiencies have increased as a result of their instruction. Teacher candidate uses assessment results as a basis for designing and modifying his/her instruction as a means to meet group and individual needs and increase student performance.	
Overall NCTM Standard 5: Effective teacher candidates of secondary mathematics provide evidence demonstrating that as a result of their instruction, secondary students' conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and application of major mathematical concepts in varied contexts have increased. Teacher candidates support the continual development of a productive disposition toward mathematics. They show that new student mathematical knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology in building new knowledge. (Each Element row score must be at the Proficient level (3) or higher to score this NCTM Standard at the Proficient (3) level)					

g. Data tables

2013 NCTM Assessment Cycle Results

NCTM Standard	Total N	Beginning		Developing		Proficient		Outstanding		Mean
		n	%	n	%	n	%	n	%	
3f.1	1	0	0%	0	0%	1	57%	1	43%	3.43
3f.2	1	0	0%	0	0%	1	57%	1	43%	3.43
3g.1	1	0	0%	0	0%	1	86%	1	14%	3.14
3g.2	1	0	0%	0	0%	1	86%	1	14%	3.14
3g.3	1	0	0%	0	0%	1	86%	1	14%	3.14
Standard 3	1	0	0%	0	0%	1	86%	1	14%	3.14
5a.1	1	0	0%	0	0%	1	71%	1	29%	3.29
5a.2	1	0	0%	0	0%	1	71%	1	29%	3.29
5a.3	1	0	0%	0	0%	1	43%	1	57%	3.57
5a.4	1	0	0%	0	0%	1	43%	1	57%	3.57
5a.5	1	0	0%	0	0%	1	29%	1	71%	3.71
5b.1	1	0	0%	0	0%	1	43%	1	57%	3.57
5b.2	1	0	0%	0	0%	1	57%	1	43%	3.43
5c.1	1	0	0%	0	0%	1	43%	1	57%	3.57
5c.2	1	0	0%	0	0%	1	43%	1	57%	3.57
Standard 5	1	0	0%	0	0%	1	29%	1	71%	3.71

2014 NCTM Assessment Cycle Results

NCTM Standard	Total N	Beginning		Developing		Proficient		Outstanding		Mean
		n	%	n	%	n	%	n	%	
3f.1	1	0	0%	0	0%	1	50%	1	50%	3.50
3f.2	1	0	0%	0	0%	1	50%	1	50%	3.50
3g.1	1	0	0%	0	0%	1	100%	0	0%	3.00
3g.2	1	0	0%	0	0%	1	100%	0	0%	3.00
3g.3	1	0	0%	0	0%	1	100%	0	0%	3.00
Standard 3	1	0	0%	0	0%	1	100%	0	0%	3.00
5a.1	1	0	0%	0	0%	1	100%	0	0%	3.00
5a.2	1	0	0%	0	0%	1	50%	1	50%	3.50
5a.3	1	0	0%	0	0%	1	50%	1	50%	3.50
5a.4	1	0	0%	0	0%	0	0%	1	100%	4.00
5a.5	1	0	0%	0	0%	0	0%	1	100%	4.00
5b.1	1	0	0%	0	0%	0	0%	1	100%	4.00
5b.2	1	0	0%	0	0%	1	50%	1	50%	3.50
5c.1	1	0	0%	0	0%	1	50%	1	50%	3.50
5c.2	1	0	0%	0	0%	1	50%	1	50%	3.50
Standard 5	1	0	0%	0	0%	1	50%	1	50%	3.50